arête

Cascade House

Architectural Specification

39 Tailrace Rise, Arthur's Point, Queenstown, New Zealand
Josh & Drew Atkins
Project Ref: 0826
Date: 14 October 2026

PROJECT SPECIFICATION Works, materials and workmanship for construction in accordance with the accompanying drawings.

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1013 DOCUMENT CONTROL

1 DOCUMENT CONTROL

Document Control

1.1 PREPARED BY

Company:	Arête Architects
Postal Address:	50/70 Kingsford Smith Street, Rongotai, Wellington
Street Address:	50/70 Kingsford Smith Street, Rongotai, Wellington
City:	Wellington
Telephone:	04 213 7400
Email:	sam@aretearchitects.c

1.2 DOCUMENT DETAILS

Project Name:	Cascade House
Project Number:	0826
Client:	Josh and Drew Atkins
Client Contact:	Josh Atkins

1.3 REVISION CONTROL

Issue:	Building Consent
Revision:	R1
Amendment Details:	Initial Issue
Issued to:	QLDC
Date of Issue:	23.10.26
Reviewed by:	SB
Approved by:	SB

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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

Construction of new terraced house with attached studio unit.

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.

Site

1.5 SITE

The site consists of: Brownfield Site
As shown on drawing: A2000

1.6 LEGAL DESCRIPTION

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

Site environment - Durability

1.7 EXPOSURE ZONE

The exposure zone is to NZS 3604, Section 4 Durability, 4.2 Exposure zones and NZBC E2/AS1.

The site zone is: B (Low)

Site environment - Wind

1.8 WIND DESIGN PARAMETERS - NON SPECIFIC DESIGN

The design wind pressures are to NZS 3604, Table 5.4 Determination of wind zone, up to and including Extra High Wind Zone.

Building wind zone High (refer to NZS 3604, table 5.4)

Site environment - Seismic

1.9 EARTHQUAKE ZONE - NON SPECIFIC DESIGN

The zone is to NZS 3604, Section 5 Bracing design, 5.3 Earthquake bracing demand.

The earthquake zone is: Zone 3

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Archaeological discovery

1.10 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.

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1234 DOCUMENTATION

1 GENERAL

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

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

Building Consent Authority documentation

1.1 BUILDING CONSENT

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

1.2 BUILDING CONSENT COMPLIANCE

It is an offence under the Building Act 2004

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

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

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

1.3 PROJECT PERSONNEL

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

Licensed Building Practitioner documentation

1.4 LICENSED BUILDING PRACTITIONERS

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

Include the following as applicable

- Site LBP
- Carpenter
- Foundations 1 Concrete foundation walls and concrete slab-on-ground constructor
- Foundations 2 Concrete or timber pile foundations constructor
- Bricklaying and block laying 1 Brick / masonry veneer
- Bricklaying and block laying 2 Structural masonry - Bricklayer / Blocklayer
- Roofing 2 Profiled metal roofer and/or wall cladding installer
- Roofing 4 Membrane roofer
- Roofing 5 Torch on membrane roofer
- External plastering 1 Solid plasterer

Also provide names and contact details of the following

- Registered drainlayer
- Registered plumber
- Registered electrician

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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.

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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:

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- 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

Confidentiality of documents

1.26 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.

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1237 WARRANTIES

1 GENERAL

This general section refers to the requirements for warranties/guarantees, referred to within this specification and referred to within separate specifications/documents relating to this project. It includes:

- Warranties for parts of the work required by the principal in a required form
- Installer/applicator warranties for parts of the work in the installer's/applicator's standard form
- Manufacturer/supplier warranties provided with products, appliances and the like in the manufacturer's/supplier's standard form
- Guarantees provided by contractor in the contractor's standard form

These guarantees/warranties are in addition to any warranties, implied warranties, or guarantees that are required by the Building Act, the Building Regulations, or the building consent.

1.1 SCHEDULE SECTION

Refer to 1237S1 SCHEDULE OF WARRANTIES for work sections contained in this specification that have requirements for warranties.

Warranties

1.2 PROVIDE WARRANTIES

Provide executed warranties in favour of the principal in respect of, but not limited to, materials, components, service, application, installation and finishing called for in that specified section of work. The terms and conditions of the warranty in no case negate the minimum remedies available under common law as if no warranty had been offered. Failure to provide the warranty does not reduce liability under the terms of the warranty called for in that specified section of work.

- Conform to the WARRANTY AGREEMENT form included in the specification/conditions of contract.
- Commence warranties from the date of practical completion of the contract works (unless otherwise stated).
- Maintain their effectiveness for the times stated.
- Provide executed warranties prior to practical completion.

1.3 WARRANTIES - INSTALLER/APPLICATOR

Where installer/applicator warranties are offered covering execution and materials of proprietary products or complete installations, provide such warranties to the contract administrator. These warranties may be provided in lieu of the warranties that are otherwise required provided that these warranties are subject to similar conditions and periods.

Provide warranties in favour of the principal. The terms and conditions of such warranties in no case negate the minimum remedies available under common law as if no warranty had been offered. Failure to provide the warranty does not reduce liability for execution and materials for that part of the work.

1.4 WARRANTIES - MANUFACTURER/SUPPLIER

Where warranties are offered covering materials, equipment, appliances or proprietary products, provide all such warranties to the contract administrator.

Provide warranties in favour of the principal. The terms and conditions of such warranties in no case negate the minimum remedies available under common law as if no warranty had been offered. Failure to provide the warranty does not reduce liability for execution and materials for that part of the work.

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Submission

1.5 REVIEW BY CONTRACTOR

Obtain the warranties from the installers, applicators, manufacturers and suppliers at the earliest possible date and review to ensure that they are correctly filled out and executed. Where warranties are executed as a deed, ensure that a duplicate copy is provided for execution by the owner/principal. Keep safe and secure until required for submission.

1.6 WARRANTIES - REQUIRED BY BUILDING CONSENT AUTHORITY

Obtain copies of warranties required as a condition of the building consent in the form required for submission to the BCA. Keep safe and secure until required at the time of the BCA final inspection and Code Compliance Certificate.

1.7 WARRANTIES - REQUIRED BY CONTRACT

Obtain copies of warranties listed in the contract documents. Provide all warranties at the same time. If the project has an operations and maintenance documentation provision, present the warranties with the operations and maintenance information. If no operations and maintenance documentation provision exists, present the warranties to the contract administrator in a loose-leaf binder with a contents index suitably labelled and including the project name and details. Provide a title on the binder edge "Warranties for (project name)"

2 SELECTIONS

Project warranties / guarantees

Weathertightness and watertightness warranty

2.1 WEATHERTIGHTNESS AND WATERTIGHTNESS WARRANTY

A warranty is required from the contractor for a minimum period of 2 years, covering the weathertightness of the complete building envelope and the watertightness of all liquid supply and disposal systems and fittings. This general warranty is in addition to any specific warranties required.

Provide this warranty in favour of the principal. The terms and conditions of this warranty in no case negate the minimum remedies available under common law as if no warranty had been offered. Failure to provide the warranty does not reduce liability for execution and materials for that part of the work.

- Conform to the standard form WARRANTY AGREEMENT included in the contract documents.
- Commence the warranty from the date of Practical Completion.
- Maintain its effectiveness for the time stated.

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1237S1 SCHEDULE OF WARRANTIES

1 GENERAL

This schedule section identifies work sections in the specification that have requirements for warranties.

1.1 ASSOCIATED SECTIONS

Read in conjunction with:

- 1232S1 EXPLANATION OF SCHEDULE SECTIONS
- 1237 WARRANTIES
- Identified Work Sections

Warranties

1.2 WARRANTIES

Refer to the following sections:

4131EB	Equus Soprema COLPHENE Tanking Membrane
4161PC	Pro Clima Wall and Roof Underlays, Tapes & Accessories
4161PI	Pro Clima Internal Airtightness System
4239	Soffit Cladding
4241RI	Roofing Industries Profiled Metal Cladding
4311RI	Roofing Industries Profiled Metal Roofing
4312RI	Roofing Industries Profiled Natural Lighting
4381EF	Equus Jacks Deck & Tile Support System
4422EF	Equus Soprema Flagon TPO Roof & Deck Membrane
4541SU	Starke Ambiance Inline uPVC Window System
4554AH	Adlux Roof Windows
4610VR	Viridian Glass Residential Glazing
4711EW	Earthwool Glasswool Thermal Insulation
4811	Sealants
6192H	Hardie™ Ceramic Tile Underlay
6211	Wall Tiling Systems
6221	Floor Tiling Systems
6312MF	Marchand Oak Flooring
6511	Carpeting
6700D	Dulux Painting General
6700PP	Porter's Paints General Painting
6745DF	Dulux Protective Coatings - Steelwork
6812W	Warmup Waterproofed Shower System
7123	Hot & Cold Water System
7126RH	Rinnai Hot Water Systems
7352	Type 1 Domestic Smoke Alarm Systems
7382	Fire Stopping Systems
7411RI	Roofing Industries Metal Rainwater Systems
7612	Residential Extract Systems
7673	Split Unit Heat Pump Systems
7702	Electrical Standard

1.3 PROJECT WARRANTIES

Refer to section 1237 WARRANTIES for project warranties.

1.4 WARRANTIES - ADDITIONAL ITEMS

Refer to separate documentation for warranties not contained within this specification.

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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

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1238S1 SCHEDULE OF AS BUILT DOCUMENTATION

1 GENERAL

This schedule section identifies work sections in the specification that have requirements for the submission of as built documentation.

1.1 ASSOCIATED SECTIONS

Read in conjunction with:

- 1232S1 EXPLANATION OF SCHEDULE SECTIONS
- 1238 AS BUILT DOCUMENTATION
- Identified Work Sections

As built documents

1.2 AS BUILT DOCUMENTS

Refer to the following sections:

2242	Backfilling
7431	Drainage Common Requirements

1.3 AS BUILT DOCUMENTS - ADDITIONAL ITEMS

Refer to separate documentation for as built documentation requirements not contained within this specification.

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1270 CONSTRUCTION

1 GENERAL

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

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

Quality control and assurance

1.1 QUALITY ASSURANCE

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

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

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

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

1.2 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.

1.3 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

1.4 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.

1.5 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.

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1.6 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.

1.7 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.

1.8 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.

1.9 TRAFFIC SAFETY

The management of traffic safety on-site and related traffic off-site, to WorkSafe Managing Work Site Traffic - Good Practice Guidelines. Movement on- and off-site also to territorial authority and/or NZTA requirements.

1.10 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.

1.11 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.

1.12 SMOKE FREE REQUIREMENTS

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

1.13 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

1.14 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.

1.15 DATUM

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

1.16 SET-OUT

Set out the work to conform with the drawings.

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1.17 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.

1.18 USE OF SET-OUT INSTRUMENTS

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

1.19 CHECK DIMENSIONS

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

1.20 TOLERANCES

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

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

Refer to work sections for tolerance requirements for finishes.

Execution

1.21 EXAMINE PREVIOUS WORK

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

1.22 REPORT DEFECTIVE PREVIOUS WORK

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

1.23 EXECUTION GENERALLY

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

1.24 EXECUTION - NO DETAIL IS PROVIDED

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

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

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

1.25 EXECUTION - ACCEPTABLE SOLUTION IS REFERRED TO

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

1.26 MINIMISE DELAYS DUE TO WEATHER

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

Defective or damaged work

1.27 DEFECTIVE OR DAMAGED WORK

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

Hot work - fire safety

1.28 HOT WORK

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

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

1.29 COMBUSTIBLE MATERIAL

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

1.30 HOT WORK PERMIT

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

1.31 FIRE SYSTEMS

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

1.32 DURING SUSPENDED WORK

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

For hot works in confined spaces, prevent potential ignition of flammable gases, to NZS 4781 clause 6.5.

Qualifications

1.33 QUALIFICATIONS GENERALLY

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

1.34 QUALIFICATIONS WORKERS – RESTRICTED BUILDING WORK

Where restricted building work (RBW) forms part of the contract works, workers, or supervisors of that work must be licensed building practitioners (LBP) holding current licenses for the particular restricted building work.

For rare instances where non-RBW also requires an LBP refer to individual work sections for details.

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1.35 QUALIFICATIONS WORKERS – MANUFACTURER / SUPPLIER REQUIREMENTS

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

1.36 QUALIFICATIONS WORKERS – LICENSED UNDER STATUTE

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

1.37 QUALIFICATIONS WORKERS – INDUSTRY QUALIFICATION REQUIREMENTS

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

1.38 QUALIFICATIONS – PRODUCER STATEMENTS

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

1.39 REPLACEMENT OF PERSON

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

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

Products

1.40 NEW PRODUCTS

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

1.41 COMPATIBILITY OF PRODUCTS

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

1.42 DELIVERY, STORAGE & HANDLING OF PRODUCTS

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

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

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

Refer to individual work sections for any special requirements.

1.43 SUBSTRATE CONDITIONS

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

1.44 INSTALLING PRODUCTS

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

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1.45 COMPLY WITH STANDARDS

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

1.46 CONDITION OF PRODUCTS

To be in perfect condition when incorporated into the work.

1.47 INCOMPATIBLE PRODUCTS

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

Samples

1.48 SAMPLES FOR REVIEW

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

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

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

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

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

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

Refer to SAMPLES clauses in work sections for further detail.

1.49 CONTROL SAMPLES

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

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

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

1.50 OTHER SAMPLE REQUIREMENTS

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

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Prototypes

1.51 PROTOTYPES - TESTING

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

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

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

1.52 PROTOTYPES - REVIEW

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

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

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

1.53 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

1.54 SPARES & MAINTENANCE PRODUCTS

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

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

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

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

Cleaning during the works

1.55 PERIODIC SITE CLEANING

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

1.56 TRADE CLEANING

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

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Remove protection

1.57 REMOVE PROTECTION

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

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

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

Refer to individual work sections for any special removal requirements.

Completion

1.58 SPECIAL REQUIREMENTS

Refer to individual work sections for any special completion requirements.

1.59 LEAVE WORK

Leave work to the standard required for the following procedures.

1.60 COMPLETION - TESTS & CERTIFICATION

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

1.61 REMOVE CONSTRUCTION WASTE

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

1.62 COMPLETE ALL SERVICES

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

1.63 CLEANING BY CONTRACTOR

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

- Wipe all surfaces to remove construction dust.
- Clean out service ducts and accessible concealed spaces.
- Clean out all gutters and rainwater heads.
- Wipe dust from both sides of glass. Take particular care when removing paint or cementitious materials to not damage the glass. Do not use metal 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

1.64 SPECIAL REQUIREMENTS

Refer to individual work sections for any special commissioning requirements.

1.65 MOVING PARTS

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

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1.66 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.

1.67 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.

1.68 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

Defects period submissions

1.69 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

1.70 FINAL COMPLETION - SUBMISSIONS

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

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

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1278SR SCHEDULE OF SLIP RESISTANCE TESTING

1 GENERAL

This section relates to the testing of surfaces for slip resistance. It includes:

- test methods and minimum test values required for slip resistance testing.
- general reporting requirements.

This section includes schedules identifying work sections with:

- slip resistant surfaces exempt from testing and slip resistant surfaces that have been tested and comply with NZBC D1/AS1 requirements for testing.
- surfaces that require slip resistance testing.

1.1 ASSOCIATED SECTIONS

Read in conjunction with:

- 1232S1 EXPLANATION OF SCHEDULE SECTIONS
- Work sections identified in the schedule(s)

1.2 ABBREVIATIONS AND DEFINITIONS

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

The following abbreviations apply specifically to this section:

BPN	British Pendulum Number
COF	Coefficient of friction
SDV	Slope design value
SRV	Slip resistance value

Documents

1.3 DOCUMENTS

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

NZBC D1/AS1	Access routes
AS 4586	Slip resistance classification of new pedestrian surface materials

Slip resistance - surfaces not requiring testing

1.4 SLIP RESISTANCE - SURFACES EXEMPT FROM TESTING

Walking surfaces on access routes that do not require testing for slip resistance include surfaces identified in NZBC D1/AS1, Table 2 as acceptable. These surfaces are covered in the following Work sections:

4383	Timber Decking
6221	Floor Tiling Systems

1.5 SLIP RESISTANCE - PREVIOUSLY TESTED SURFACE

Walking surfaces on access routes that have previously been tested for slip resistance and found to comply with NZBC D1/AS1 requirements are covered in the following Work sections:

6312MF	Marchand Oak Flooring

Slip resistance - surfaces requiring testing

1.6 SLIP RESISTANCE - SURFACES REQUIRING TESTING

There are no work section requirements.

1.7 TEST METHODS & MINIMUM TEST VALUES

Refer to tables below for test methods and minimum test values required for the stated test condition.

Test condition:	Minimum test value required:	Test method:

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Level access wet	39 SRV	Wet pendulum test method of AS 4586, Appendix A using the Slider 96 rubber.
Sloping access wet	Refer to sloping access wet table below, select BPN value for stated slope.	Wet pendulum test method of AS 4586, Appendix A
Stairs wet - with slip resistant nosings	39 SRV	Wet pendulum test method of AS 4586, Appendix A using the Slider 96 rubber.
Stairs wet - without slip resistant nosings	50 BPN	Wet pendulum test method of AS 4586, Appendix A
Wet areas primarily used barefoot	“B” Classification	Obtain classification from the ramp method of AS 4586, Appendix C
Level access dry	0.4 COF	Obtain slip resistance value from the dry floor friction test method of AS 4586, Appendix B
Sloping access dry	Refer to sloping access dry table below, select COF value for stated slope.	Obtain slip resistance value from the dry floor friction test method of AS 4586, Appendix B
Stairs dry - with slip resistant nosings	0.4 COF	Obtain slip resistance value from the dry floor friction test method of AS 4586, Appendix B
Stairs dry - without slip resistant nosings	0.525 COF	Obtain slip resistance value from the dry floor friction test method of AS 4586, Appendix B

Sloping access wet - minimum test values required for a given slope

Minimum test value required (SDV)	Maximum gradient	Maximum slope in degrees
42 BPN	1 in 39	1.5°
43 BPN	1 in 29	2.0°
44 BPN	1 in 23	2.5°
45 BPN	1 in 20	3.0°
45 BPN	1 in 17	3.5°
46 BPN	1 in 15	4.0°
47 BPN	1 in 13	4.5°
48 BPN	1 in 12	5.0°
49 BPN	1 in 11	5.5°
50 BPN	1 in 10	6.0°

Sloping access dry - minimum test values required for a given slope

Minimum test value required (COF)	Maximum gradient	Maximum slope in degrees
0.433	1 in 39	1.5°
0.444	1 in 29	2.0°
0.455	1 in 23	2.5°
0.466	1 in 20	3.0°
0.477	1 in 17	3.5°
0.488	1 in 15	4.0°
0.499	1 in 13	4.5°
0.504	1 in 12	4.76°
0.521	1 in 11	5.5°
0.525	1 in 10	5.7°
0.543	1 in 9	6.5°

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0.557	1 in 8	7.125°

1.8 GENERAL REPORTING REQUIREMENTS

Provide slip resistance test results to the contract administrator, including a statement that the tested surface meets or exceeds the nominated minimum test value. Refer to individual work sections for additional requirements. If no time is nominated for the submission of test results in the work section, then provide test results prior to practical completion.

If testing identifies a failure to meet performance requirements, notify the contract administrator and manufacturer/supplier. Consult with the manufacturer/supplier to identify the cause, then correct the failure and repeat the test.

Slip resistance - additional items

1.9 SLIP RESISTANCE - ADDITIONAL ITEMS

Refer to separate documentation for slip resistance requirements not contained within this specification.

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2241 EXCAVATION

1 GENERAL

This section relates to the excavating required for the building works, removing surface soils and the disposal of excavated material.

Documents

1.1 DOCUMENTS REFERRED TO

Documents referred to in this section are:

NZS 4402	Methods of testing soils for civil engineering purposes
WorkSafe	Good Practice Guidelines - Excavation Safety

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

Requirements

1.2 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.

Performance

1.3 GROUND CONDITIONS

Foundation investigations and drilling have been carried out. Place your own interpretation on this information as no warranty is implied that the information is truly representative or complete. Make such extra investigations as considered necessary.

Copies of bore logs are within the geotechnical report.

1.4 PROOF DRILLING

Site bores already carried out indicate underlying layers of unsuitable material in certain areas. For the foundations designated on the plan, hand augered proof holes may be required to determine the extent of such material. Include for this work in programming and adjust against provisional quantities scheduled.

1.5 ACCESS FOR MACHINES

Determine working conditions and access for machines. Take into account the time of year, the nature of the ground and subsoil to be excavated, the ground water table and all matters influencing the carrying out of the work.

1.6 SAFE WORKING CONDITIONS

Provide safe working conditions and adequate support to excavations at all times to WorkSafe, Good Practice Guidelines - Excavation Safety. Cover holes and fence off trenches and banks.

1.7 FOUNDATION BEARING

Request written instructions if a natural bearing is:

- reached at a lesser depth or
- not reached at the depth shown on the drawings.

In made-up ground excavate down to a natural bearing. Remove unsuitable material that is exposed and replace with compacted backfill.

1.8 INSPECTION

Arrange for inspections and before placing any new work. If bearing becomes inadequate due to any cause then stop work and request further instructions.

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1.9 SITE MEASUREMENT, ROCK

Where rock is shown to be part of the site condition by the bore logs, all rock removed to be solid measured and the quantity recorded and agreed to in writing as the excavation proceeds.

1.10 SITE MEASUREMENT, OTHER FORMATIONS

If for any reason the excavations have to vary from the drawings, those affected to be solid measured and the quantity recorded and agreed to in writing as the excavation proceeds.

2 PRODUCTS

Materials

2.1 TOPSOIL

Weathered soil, with organic inclusions capable of supporting the growth of vegetation.

2.2 CUT MATERIAL

Consisting of sands, gravels, sedimentary materials, clays, scoria and similar deposits.

2.3 ROCK

Defined as material encountered in excavations which because of its size or position can be removed only by breaking up by explosives or mechanical plant such as jack hammers or percussion drills.

2.4 UNCONTROLLED FILL

Variable fill material placed with little or no compaction control.

2.5 EXCAVATED FILL

Material from other formations in the excavation which may be selected and approved as suitable for filling and complying with NZS 4402 by having grading and moisture content properties that will allow compaction to 95% of maximum density.

3 EXECUTION

Conditions

3.1 REPORT

Report any survey pegs, bench marks, and the like on any features, leaving them undisturbed until approval is given for removal.

3.2 COMPLY

Comply with the requirements of WorkSafe, Good Practice Guidelines - Excavation Safety.

3.3 WORK BY OTHERS

Before taking over work done on the site by others check all levels and conditions and report any discrepancies affecting further work.

3.4 EXISTING SERVICES AND FOUNDATIONS

Locate underground services and foundations before work is started. Any information provided regarding the location of these services and foundations is given from available records but with no guarantee of accuracy as regards alignment or depth. Furthermore no guarantee is given or implied that the information provided covers all existing services and foundations. Make good at no extra cost damage to existing services to the satisfaction of the appropriate network utility operator. Protect existing roads, footpaths, gutters, crossings etc from damage during work.

3.5 KEEP FREE OF WATER

Keep excavations free from water and keep water from excavations clear of other construction work.

3.6 TERRITORIAL AUTHORITY REQUIREMENTS

Obtain from the territorial authority requirements for the method of discharging water from the site.

3.7 FORM SUMPS

Form sumps outside the line of foundations and deep enough to drain excavations. Pump from sumps without disturbing excavations or any material in place.

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3.8 SILT CONTROL

Undertake silt control measures required by territorial authorities and network utility operators in relation to design, location and discharge into the drainage system.

Application

3.9 STRIP TOPSOIL

Strip topsoil carefully over the whole site and stockpile where directed on the site, on the prepared subgrade, for re-spreading at the completion of the contract.

3.10 STRIP TO SUBGRADE

Strip the soil over the whole site to form a subgrade generally, but at a minimum of 200mm below the original ground level. Leave the subgrade level, clear of all loose material and with no impediment for the excavation work.

3.11 DIVERT WATERWAYS

Temporarily divert as necessary all ditches, field drains and other waterways encountered during the excavations and reinstate to approval on completion.

3.12 DIVERT DRAINS AND SERVICE LINES

Divert services, drains and field drains encountered in the excavations to new routes clear of the building and reconnect to the requirements of the network utility operator.

3.13 BREAK OUT

Break out and remove old foundations, floor slabs, drains, manholes and septic tanks, seal up connections and remove contaminated soil. Grub out roots in excess of 75mm diameter to a minimum of 500mm below the bottom level of footings or paving. Backfill with selected excavated material, well rammed in layers.

Take special care when working close to retained trees and shrubs.

3.14 EXCAVATION GENERALLY

Excavate for pads, strip foundations and tie beams to the profiles and levels shown on the drawings. Allow clearance for working space and formwork as necessary. Trim to required profiles, falls and levels. If pouring against natural ground excavate an extra 25mm that side to provide 75mm minimum cover to reinforcement horizontally. Bench surface of sloping ground to receive filling.

Use plant and equipment suitable for the purpose.

3.15 OVER EXCAVATION

Make good with well compacted backfill.

3.16 EXCAVATED BACKFILL

Stockpile selected excavated backfill on site where directed so that it does not impede continuing works until it is required.

Finishing

3.17 BATTERS, TEMPORARY PROTECTION

Protect batters with a change of level between crest and toe of more than 1.5 metres from weather erosion with a waterproof covering of either hessian and tar, or heavy duty black polythene sheet. Seal at joints and securely fix down at crest and toe. Maintain coverings in good condition until the ground is secured by permanent construction.

Completion

3.18 LEAVE

Leave work to the standard required by following procedures.

3.19 SURPLUS TOPSOIL

Remove unwanted stripped soil from the site continually as the work proceeds. Clean up continually any soil if dropped on footpaths or roads.

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3.20 SURPLUS MATERIAL

Remove surplus excavated material from the site continually as the excavation proceeds. Clean up continually any excavated material dropped on footpaths or roads.

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2242 BACKFILLING

1 GENERAL

This section relates to the supply, placing and compaction of materials for backfill, basecourse or built-up ground, as required for the contract works.

Documents

1.1 DOCUMENTS

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

NZS 3104	Specification for concrete production
NZS 3604	Timber-framed buildings
NZS 4229	Concrete masonry buildings not requiring specific engineering design
NZS 4431	Code of practice for earth fill for residential development
NZS 4402	Methods of testing soils for civil engineering purposes
NZTA F2	Specification for pipe subsoil drain construction
TNZ M/04	Specification for basecourse aggregate
NZCMM	NZ Concrete Masonry Manual section 6.1 Masonry Retaining Walls

Requirements

1.2 AS BUILT DOCUMENTS - NZS 4431

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

Provide the following as built documents and records:

- Provide as built contour plan relating final topography to original topography.
- Record areas of filled ground including areas of low density filling and areas not considered to meet the standard.
- Record location of associated drainage.
- Record location and relative levels of levelling points and benchmarks, including the date of the levelling
- Provide draft as built information prior to practical completion.
- Provide final as built information prior to the end of the defects liability period.
- Provide copies to the owner of the land and to the TA

1.3 CONTROL TESTING FOR FILLS - NZS 4431

During construction of earth fills undertake required quantitative control tests on the fill material.

1.4 INSPECTION NOTIFICATION - NZS 4431

Notify the inspecting engineer of the times required for inspection.

1.5 INSPECTION NOTIFICATION

Notify the inspecting engineer of the times required for inspection.

1.6 STATEMENT OF SUITABILITY - NZS 4431

Provide a statement of suitability of earth fill for residential development in accordance with Appendix A of NZS 4431, including engineers report.

2 PRODUCTS

Earth fill materials

2.1 EARTH FILL – NOT REQUIRED TO SUPPORT BUILDINGS OR SURFACES

Lower density fills (defined in NZS 4431) as specified/ identified by the inspecting engineer.

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Granular fill materials - NZS 3604

2.2 GRANULAR FILL MATERIAL – NZS 3604

Comprised of crushed rock or scoria. No more than 5% shall pass through a 2.2mm sieve, with 100% able to pass through a 19 mm sieve for any fill thickness, or a 37.5 mm sieve for a fill thickness exceeding 100 mm.

2.3 BLINDING LAYER FOR POLYTHENE SHEET DPM – NZS 3604

Sand to a nominal minimum thickness of 5 mm, with a maximum compacted thickness of 25 mm.

Private flexible pavements

2.4 SUBBASE – FLEXIBLE PAVEMENTS

Hard rock material with the largest aggregate size not larger than 60% of the depth of the layer or 65mm.

2.5 BASECOURSE – FLEXIBLE PAVEMENTS

Refer to Selections.

Site concrete

2.6 SITE CONCRETE

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

Service trench backfill material

2.7 GRANULAR BEDDING

Clean granular non-cohesive material with a maximum particle size of 20mm.

2.8 GRANULAR BEDDING AND SURROUND

Clean granular non-cohesive material with a maximum particle size of 20mm.

2.9 ORDINARY FILL

Use material previously excavated from the trench.

2.10 COMPACTED SELECTED FILL

Granular material free from topsoil and rubbish and has a maximum particle size of 20mm.

2.11 BEDDING & SURROUND – WATER PIPES

Sand.

2.12 BACKFILL – WATER PIPES

Backfill free from organic matter, rock and other hard matter, containing no soil lumps larger than 75mm.

Drainage materials

2.13 FREE-DRAINING AGGREGATE

Scoria or crushed gravel graded 50 to 14 clean.

2.14 NO FINES DRAINAGE METAL

GAP metals with the fines washed out.

Protection Sheets

2.15 PROTECTION SHEET

Rot proof sheets used to protect tanking from damage (particularly from backfill),

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3 EXECUTION

Conditions

3.1 UNSUITABLE MATERIALS

Remove from site all unsuitable filling material.

3.2 REMOVE SURPLUS

Remove surplus imported filling materials from the site.

3.3 PLACE FILLING

Place filling using approved methods, to required dimensions, levels, lines and profiles.

3.4 PROTECTION OF FORMATION

Do not allow construction traffic on filling until the level has been raised not less than 150mm above formation level by properly compacted temporary protective filling. Remove temporary protective filling from the site before beginning permanent construction. Do not stockpile materials on newly filled areas without permission.

3.5 DIFFERING MATERIALS

Where materials of widely divergent characteristics are used for filling, spread and compact in clearly defined separate layers.

3.6 EARTHMOVING EQUIPMENT

Do not use earthmoving equipment for compaction.

3.7 COMPACTION NEAR EDGE SUPPORTS

Ensure that edge supports are strong enough to support compaction forces without movement, cracking or other damage. Make good damage caused by compaction.

3.8 MOISTURE CONTENT, GENERAL FILL

Moisture content at time of compaction to be within the range of optimum less 6% up to optimum. Do not use filling with moisture content above optimum value. If necessary:

- adjust moisture content of filling by turning and drying
- provide water sprinkling equipment if fill is too dry.

Application - Earth fill materials

3.9 SITE PREPARATION - NZS 4431

Before fill is placed on stripped natural ground, the ground surface shall be smoothed and compacted in a manner similar to that to be used on the layers of fill.

3.10 FILL PLACING - NZS 4431

Fill shall be placed in a systematic manner, with near-horizontal layers of uniform thickness of material each being deposited progressively across the fill area. The uncompacted thickness of a layer shall be no greater than 230 mm. Fill water content control and uniformity to the requirements of NZS 4431.

3.11 FILL COMPACTION - NZS 4431

Each layer shall be compacted as a specific construction operation, using plant specifically assigned to the compaction task and following systematic patterns of travel tracks which progressively work across the surface of the fill. Recompact any compacted layer that has deteriorated after the interruption of the work.

Application - Granular fill material

3.12 SPREAD AND COMPACT GRANULAR FILL - GENERAL

Spread and level in layers not more than 150mm loose depth from the approved level. Compact filling in layers as specified by at least four passes of a vibratory roller having a static linear loading of 1.8 - 2.3 kg/mm, or twelve passes of a vibratory roller having a static linear loading of 0.8 - 1.2 kg/mm. Achieve a density of not less than 95% of maximum at optimum moisture content to NZS 4402. Compact with a vibrating plate compactor for small areas and in confined shapes.

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Alternative compaction plant may be used provided it can be shown that the density requirement can be achieved.

3.13 SPREAD AND COMPACT GRANULAR FILL - NZS 3604

Place granular fill in layers of 150mm maximum thickness. Compact each layer until the fill is tightly bound together and does not deform under the weight of a pressed adult heel.

Compact with a vibrating plate compactor for small areas and in confined shapes, compact with a vibrating roller for large areas.

3.14 SAND BLIND SURFACE

Blind surface of area being covered with a concrete slab with sand to required thickness. Roll or compact with a vibrating plate tamper ready to take damp-proofing. Finish the surface with a non-vibrating smooth wheeled roller.

Application - Service trench backfill

3.15 BEDDING AND BACKFILL – COLD WATER PIPES

Surround cold water pipes with compacted sand to provide not less than 75mm cover. Backfill trench and ensure no hard edged object is permitted to come in contact with or rest against any pipe or fitting.

3.16 BEDDING AND BACKFILL – COLD WATER PIPES BENEATH CONCRETE SLABS

Surround cold water pipes with compacted sand to provide not less than 75mm cover between the top of the pipe and the underside of the slab or concrete structure. Compact sand in a manner that will not damage the piping

3.17 MARKING TAPE

Install marking tape at required level during backfilling process.

Application - Retaining wall backfill

3.18 PROTECT RETAINING WALL TANKING

Protect tanking membranes with protection sheets fixed/placed in accordance with manufacturer's requirements.

3.19 BACKFILL TO RETAINING WALLS

Backfill the drainage space behind walls with free-draining aggregate in 200mm layers. Do not disturb subsoil drains. Follow the sequence of filling shown on the drawings so that dependent action from suspended floors is available before filling behind the wall is complete. Do not over-compact with heavy plant.

Completion

3.20 LEVELLING POINTS - NZS 4431

Set permanent levelling points in the upper surface of the fill to the requirements of NZS 4431.

3.21 TAKE AWAY

Take away from the site all selected excavated material or brought-in material not used for backfilling, leaving the site clear and tidy.

3.22 LEAVE

Leave work to the standard required by following procedures.

3.23 REMOVE

Remove all debris and unused materials from the site.

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3102 CONCRETE WORK - STANDARD

1 GENERAL

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

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:

DPM	Damp proof membrane
MPa	Megapascal
CCANZ	Concrete NZ (Legacy Documents)

The following definitions apply specifically to this section:

ACRS	Australasian Certification Authority for Reinforcing and Structural Steels - An independent certification scheme for reinforcing steel and structural steel. Certifies compliance with Australia/New Zealand Standards. Web site - www.steelcertification.com
CNZ PAS:	Concrete New Zealand Plant Audit Scheme - an independent audit scheme for the production of concrete which certifies compliance with NZS 3104 Specification of Concrete Production. Web site: http://rmcplantaudit.org.nz

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	Structural provisions for buildings
NZBC E2/AS3	External moisture provisions for concrete and concrete masonry buildings
AS 1366.3	Rigid cellular plastics for thermal insulation - Rigid cellular polystyrene - Moulded (RC/PS - M)
AS 1478	Chemical admixtures for concrete, mortar and grout - Admixtures for concrete.
AS/NZS 2269.0	Plywood - Structural - Specifications
AS/NZS 3000	Electrical installations
NZS 3101.1	Concrete structures standard
NZS 3104	Specification for concrete production
NZS 3109	Concrete construction
NZS 3114	Specification for concrete surface finishes
NZS 3121	Water and aggregate for concrete
NZS 3122	Specification for Portland and blended cements (General and special purpose)
NZS 3125	Specification for Portland-limestone filler cement
NZS 3604	Timber-framed buildings
NZS 3631	New Zealand timber grading rules
NZS 4229	Concrete masonry buildings not requiring specific engineering design
AS/NZS 4671	Steel reinforcing materials
AS/NZS 4672.1	Steel prestressing materials - General requirements
Concrete NZ TR3	Alkali silica reaction

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Requirements

1.3 QUALIFICATIONS

Refer to 1270 CONSTRUCTION for requirements relating to qualifications

1.4 RECORDS

Retain the following records and make available to the contract administrator upon request:

- Mixing records
- Concrete delivery docket
- Reinforcing steel batch certificate
- Time, date, location and weather condition of each pour.

Performance

1.5 CONCRETE PRODUCTION COMPLIANCE

Concrete production and testing to comply with NZS 3104. Concrete to be supplied from a concrete batching plant holding a current quality Certificate of Audit provided by CNZ PAS Concrete NZ Plant Audit Scheme or an Auditing Engineer with credentials nominated in NZS 3104.

1.6 STEEL REINFORCING COMPLIANCE

Steel reinforcing and steel prestressing materials for concrete to AS/NZS 4671 or AS/NZS 4672.1, respectively. Steel reinforcing to be manufactured in New Zealand, or by an overseas manufacturer holding a current valid NZ S Mark or ACRS certificate for that type of steel.

If requested, the supplier to provide certification upon delivery that reinforcing steel complies with the grades specified on the drawings.

Steel that fails to meet these requirements is not to be used (or ordered) without the contract administrators written approval, further proof and/or testing may be required.

Quality control and assurance

1.7 CONCRETE ASSESSMENT - ON SITE

Where the quality of concrete supplied in in doubt, carry out concrete assessment during construction to NZS 3109: section 9 Concrete Assessment.

Make all test records available, if requested.

1.8 INSPECTIONS

Refer to engineers specification for inspection requirements.

1.9 QUALITY ASSURANCE

Carry out the whole of this work to the requirements of NZS 3109.

Quality assurance procedures to include all aspects of concrete construction including;

- Formwork construction
- Reinforcing steel placing
- Cast in items
- Concrete supply
- Concrete placing and compaction
- Concrete finishes
- Construction tolerances

2 PRODUCTS

Materials

2.1 CEMENT

General purpose Portland cement (Type GP) and general purpose blended cement (Type GB) to NZS 3122.

2.2 CEMENT, FILLER

Portland limestone filler cement to NZS 3125.

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2.3 SAND

To NZS 3121 and NZS 3104 clause 2.5.4. The provisions of Concrete NZ TR3 apply when the sand is potentially reactive.

2.4 COARSE AGGREGATE, NORMAL CONCRETE

To NZS 3121, except as modified by NZS 3104: clause 2.5.3, Coarse aggregate. The provisions of Concrete NZ TR3 apply when the aggregate is potentially reactive.

2.5 AGGREGATE, PRESCRIBED MIX CONCRETE

Builder's mix (all-in aggregate) to NZS 3104: clause 3.1.4, Definition and clause 3.3.2, Aggregate or separate aggregate and sand materials to clause 3.3.3 Proportion of sand and aggregate.

2.6 WATER

To NZS 3121.

2.7 ADMIXTURES, SITE OR PLANT

To AS 1478.

For concrete defined as Normal Concrete(N) to NZS 3104, admixtures may be added at the Plant Engineers discretion as required by concrete producers mix design, subject to the following requirements:

- The quantity of admixture used and the method of mixing to be in accordance with manufacturers recommendations.
- Admixtures containing calcium chloride will not be permitted.
- Concrete must comply with the entrained air requirements of NZS 3101 when the surface is subject to freeze-thaw cycles.
- Additional admixtures may be added to concrete at the Contractor's request to control the set, in response to weather or environmental factors, subject to approval by Engineer.
- Admixtures containing calcium chloride will not be permitted where steel reinforcing is present.

Concrete

2.8 NORMAL CONCRETE

Normal concrete 17.5, 20, 25 MPA up to 50 MPa grade, maximum aggregate size 37.5mm, ready-mixed to NZS 3104 section 2 Provisions for Ready-Mixed Concrete. Refer to SELECTIONS.

2.9 SITE CONCRETE

Low strength concrete 10 MPa with minimum water for workability, all materials and batching to NZS 3104, section 3 Provisions for Prescribed Mix Concrete.

Reinforcement

2.10 GRADE 300E STEEL

To AS/NZS 4671. Round bars are shown by symbol "R" and deformed bars by symbol "D", followed by the diameter in millimetres.

2.11 GRADE 500E STEEL

To AS/NZS 4671. Round bars shown by symbol "HR" and deformed bars by symbol "HD" followed by diameter in millimetres.

2.12 WELDED WIRE FABRIC

Hard drawn steel wire spot welded with correct gauge to AS/NZS 4671 Class E, smooth or deformed and to the spacings and dimensions either specified or shown on the drawings.

2.13 MESH FOR SLABS TO NZS 3604 OR NZS 4229

For concrete slab-on-ground designed to NZS 3604 or NZS 4229, mesh to be in accordance to NZBC B1/AS1, welded reinforcing mesh to AS/NZS 4671, Class E, minimum - Grade 500E, 2.27kg/m2 (1.14kg/m2 in each direction).

2.14 TYING WIRE

Mild drawn steel wire not less than 1.2mm diameter.

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2.15 SPACERS AND CHAIRS

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

2.16 STRUCTURAL PLYWOOD

To AS/NZS 2269.0 for shutter face with plywood grade as necessary to obtain the concrete finish specified.

2.17 TIMBER FALSEWORK

No. 2 framing radiata pine or as required to construct the required formwork.

2.18 RELEASE AGENT

A release agent that will not stain or adhere to the concrete, contaminate reinforcing steel or construction joints, or have a detrimental effect on any finished surface or applied finishes.

Damp proof membrane

2.19 DAMP-PROOF MEMBRANE

0.25mm minimum polyethylene to NZS 3604, 7.5.4, **Damp-proof membrane**.

Accessories

2.20 CEMENT GROUTS

Cement mixed with the minimum quantity of water to obtain a suitable consistency. Grout cement to NZS 3122. Use grout within 30 minutes of preparation.

3 EXECUTION

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 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.

Installation/application

3.4 STANDARDS AND TOLERANCES

Refer to the general section 1270 CONSTRUCTION for general requirements.

Unless stated otherwise on the drawings permissible deviations from established lines, grades, dimensions and cambers to remain within the tolerances laid down in NZS 3109: table 5.1, Tolerances for precast components and table 5.2,Tolerances for in situ construction.

3.5 TOLERANCES OF CONCRETE SURFACE FINISHES

Unless stated otherwise on the drawings, permissible abrupt, offset and gradual deviations for the specified surface finish to remain within the tolerances laid down in NZS 3114: table 3, Tolerances for abrupt deviations or offsets and gradual deviations.

Fix formwork

3.6 LOADINGS

Design and construct formwork and falsework in accordance with in accordance with NZS 3109 Section 5 and sound engineering principles to withstand the worst combination of:

- dead loads of formwork, reinforcement, concrete and precast elements such as floor planks
- construction loads including dynamic effects of placing, compacting and construction traffic
- wind and snow loads

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3.7 PROVIDE ALL FORMWORK

Provide formwork and falsework to NZS 3109 Section 5 and to achieve the required off-the-form surface finishes to NZS 3114. Fabricate in a manner permitting its easy removal without damage to the concrete.

Provide a 20mm x 20mm chamfer to all corners unless detailed otherwise. Protect corners from damage during and after stripping.
Keep absorbent formwork wet before concrete is placed. Clean formwork by waterblasting.

3.8 FALSEWORK

Carry strutting down to a construction sufficiently strong and stable to afford the required support without permissible stress or deflections being exceeded. Prop through to other floors if the construction load on a particular suspended floor exceeds the design load.

3.9 EXPOSED CONCRETE

Formwork linings and surface finishes as nominated for both fair face and concealed or exposed surfaces. Unless detailed, obtain written confirmation of the type and pattern of all joints.

3.10 JOINTS IN FORMS

Construct joints to prevent loss of grout between joints in form linings, as well as between forms and completed work. Column forms to have full height linings so that no horizontal joints occur on exposed faces.

3.11 CAMBERS

Cambers shown on the drawings or specified, relate to the concrete immediately before formwork is struck.

3.12 STRIKING FORMWORK

Ensure the safe removal of all or any part of the formwork. Remove without shock, vibration or damage to the concrete and in such a manner as to take the imposed stresses gradually to NZS 3109.5.4. Stripping times to NZS 3109 table 5.3.

Install damp proofing

3.13 INSTALL DAMP-PROOF MEMBRANE

Install to NZS 3604.7.5.6 Polyethylene (polythene) sheet damp proof membranes. Bring granular hardfill to a suitable surface to receive the DPM using maximum 25mm sand blinding.

Lay the DPM on prepared basecourse with 150mm laps between sheets. Seal laps and penetrations with 50mm wide pressure sensitive plastic tape.
Refer to drawings for perimeter details.

Install reinforcing / cast-in items

3.14 INSTALL REINFORCEMENT TO NZS 3101 & NZS 3109

Install reinforcing in accordance to NZS 3101as modified by NZBC B1/VM1 and NZS 3109. Reinforcement spacing as dimensioned on drawings, or if not shown, to the clear distance minimums in NZS 3109, 3.6, Spacing of reinforcement and requirements of NZS 3101.1 8.3 Spacing of reinforcement.

3.15 INSTALL REINFORCEMENT TO NZS 3604 OR NZS 4229

Install reinforcing in accordance to NZS 3604 or NZS 4229 as modified by NZBC B1/AS1 for foundations, foundation walls and slab-on-grade.

3.16 CUT AND BEND

Cut and bend bars using proper bending tools to avoid notching and to the requirements of NZS 3101.1, 8 and NZS 3109: 3.3 Hooks and bends. Minimum radii of reinforcement bends to NZS 3101.1, 8 and NZS 3109: table 3.1, Minimum radii of reinforcement bends. Do not rebend grade 500E bars. Where rebending is necessary for grade 300E bars, use a purpose built tool, proper preparation and preheating.

3.17 ADJUSTMENTS

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

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3.18 TOLERANCES

Tolerances for reinforcement bending, bar spacing & position and concrete cover to NZS 3109, 3.9, Tolerances for reinforcement, unless tighter tolerances specified.

3.19 SECURE REINFORCEMENT

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

3.20 LAPPED SPLICES

Length of laps where not dimensioned on the drawings in accordance with the SELECTIONS. Provide laps only where indicated on the drawings. Tie all lapping bars to each other. Plain bars lapped splices must be hooked

Wire mesh laps to NZS 3101.1, lap one mesh square plus 50mm minimum (do not count bar extension beyond the outermost wire).

3.21 MESH LAPS FOR SLABS TO NZS 3604 OR NZS 4229

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

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

Do not count bar extensions beyond the outermost cross wire

3.22 REINFORCING BAR LAPS TO NZS 3604

For foundation walls horizontal reinforcing bars to be lapped with a lap length of not less than 500mm. Corners and intersection laps shall be determined by NZS 3604 figure 6.15a

3.23 REINFORCING BAR LAPS TO NZS 4229

For footings reinforcing bars to be lapped with a lap length of not less than 40 times the diameter of the bar. Corners and intersection laps shall be determined by NZS 4229 figure 6.8.

3.24 REINFORCEMENT COVER TO NZS 3101.1

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

3.25 REINFORCEMENT COVER TO NZS 3604 OR NZS 4229

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

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

3.26 CASTING IN

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

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

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

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

3.27 EQUIPOTENTIAL BONDING REINFORCING

Co-ordinate with electrician to provide for equipotential bonding of reinforcing as required by AS/NZS 3000, 5.6 Equipotential Bonding, before concrete placement.

Place concrete

3.28 CONSTRUCTION JOINTS

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

3.29 PRE-PLACEMENT INSPECTION

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

3.30 UNFAVOURABLE CONDITIONS

Do not place concrete in high winds or other unfavourable conditions in accordance with NZS 3109: 7.2 Unfavourable conditions

3.31 PROTECT CONCRETE WORK

Protect formwork, reinforcement, "build in" items and fresh concrete from damage, as the pour is placed, making good any damage if it occurs.

3.32 PREPARATORY WORK

Ensure at the time of placing, that surfaces to receive the concrete are clean, free of debris and with no free water present. Ensure reinforcement, cast-in items and hardened concrete against which fresh concrete is laid are free from any release agent or other deleterious surface deposit.

3.33 TRANSPORT CONCRETE

Transport concrete from agitator to final placement as quickly as possible using means that avoid segregation.

3.34 PUMPING CONCRETE

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

3.35 PLACE CONCRETE

Place concrete to NZS 3109: clause 7.4, Handling and placing. Place in layers not more than 500mm deep, compacted and vibrated. Do not place fresh concrete against the preceding layer after more than 45 minutes, or such lesser time as required by the circumstances, to NZS 3109: clause 7.4, Handling and placing.

3.36 COMPACT CONCRETE

To NZS 3109: clause 7.6, Compaction. Compact by vibration of the concrete to expel entrapped air and until settlement of the concrete is visibly evident over all areas of the surface. Maintain vibration until settlement ceases and coarse aggregate at the surface is embedded. Do not continue vibration beyond reaching this condition.

Note: compaction by vibration is not required when using Self Compacting Concrete (SCC).

3.37 VIBRATORS

Use sufficient immersion vibrators, with one spare for emergency, to ensure that vibration is achieved throughout the entire volume of each layer of concrete, and until complete compaction is reached, to NZS 3109: clause 7.6, Compaction.

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Floor slabs to NZS 3604 or NZS 4229

3.38 FLOOR SLABS TO NZS 3604

Generally for slabs on ground to NZS 3604 as modified by NZBC B1/AS1 and NZBC E2/AS3. Construct to NZS 3604, 4.5 Concrete and concrete masonry and NZS 3604, 7.5, Concrete slab-on-ground floors in timber buildings as modified by NZBC B1/AS1, 2.3 Timber. Lay to true and straight surfaces, screeded, floated and steel (manual or power) trowelled finish.

Allow for free joints maximum 24m centres to NZBC B1/AS1, paragraph 2.3.7.6 **NZS 3604** New clause.

Finishing

3.39 SCREED THE SURFACE

Screed the concrete surface by straight edge or vibrating screed immediately after compaction and to tolerances in NZS 3109: table 5.2, Tolerances for in situ construction.

3.40 SURFACE FINISHES

To NZS 3114, Part 1 Off-the-form surface finishes, Part 2 Exposed aggregate surface and Part 3 Floors, exterior pavements, and inverts, for slabs and pavements. Refer SELECTIONS.

3.41 SAW CUTS TO NZS 3604 OR NZS 4229

Provide saw cuts in accordance to NZS 3604 clause 7.5.8.6 Shrinkage Control Joints and NZS 4229 clause 7.8.5 Shrinkage Control Joints. Cut slabs where indicated on the drawings as required to control shrinkage cracking. Form by saw cutting the slab (blade width approximately 5 mm) to a quarter of the depth of the slab (saw cutting shall take place no later than 24 hours after initial set for average ambient temperatures above 20 ºC, and 48 hours for average ambient temperatures below 20 ºC).

3.42 SAW CUTS

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

3.43 CLEAN OUT SAWCUTS

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

Curing

3.44 CURING PERIOD

Cure all concrete for a minimum of 7 days. Keep time between placing of concrete and the start of curing to an absolute minimum. Ensure curing is continuous.

3.45 CURING METHOD

Notify the curing method to be used for this work. Select from the following methods;

- Ponding
- Sprinkling
- Wet coverings - Do not use at times of freezing weather
- Plastic sheet
- Curing compound

3.46 KEEP ABSORBENT FORMWORK MOIST

Keep formwork left in place continuously moist by sprinkling with water over the curing period. Continue sprinkling the exposed surface if the formwork is removed before the end of the curing period.

3.47 SECURE COVERINGS

When covering with sheet materials, ensure that edges are well secured throughout the specified curing period, to prevent draughts passing over the surfaces of the concrete.

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Defects

3.48 DEFECTS

Reject concrete with structural defects. Immediately after stripping formwork, identify all defects and obtain direction. Do not carry out any repair work until directed and then only in accordance with the direction. Repair defects by cutting out, making good and replacing, or otherwise as directed.

3.49 SURFACE DEFECTS

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

Completion

3.50 COMPLETION MATTERS

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

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3320 CONCRETE MASONRY

1 GENERAL

This section relates to the supply and installation of hollow concrete masonry to NZS 4229, as modified by NZBC E2/AS3, including;

- concrete masonry, mortar, reinforcement and grouting

1.1 ABBREVIATIONS AND DEFINITIONS

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

The following definitions apply specifically to this section:

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

1.2 DOCUMENTS

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

NZBC B1/AS1	Structural provisions for buildings
NZBC E2/AS1	External moisture provisions for timber-framed buildings up to 10 m in height
NZBC E2/AS3	External moisture provisions for concrete and concrete masonry buildings
AS/NZS 2699	Built-in components for masonry
AS/NZS 3000	Electrical installations (known as the Australian/New Zealand Wiring Rules)
NZS 3103	Sands for mortars and plasters
NZS 3109	Concrete construction
NZS 3121	Water and aggregate for concrete
NZS 3604	Timber-framed buildings
NZS 4210	Masonry construction: Materials and workmanship
NZS 4229	Concrete masonry buildings not requiring specific engineering design
NZS 4230	Design of reinforced concrete masonry structures
AS/NZS 4455.1	Masonry units, pavers, flags, and segmental retaining wall units - Masonry units
AS/NZS 4671	Steel reinforcing materials
AS/NZS 4858	Wet area membranes
CCANZ CP 01	Code of practice for weathertight concrete and concrete masonry construction
NZCMM	NZ Concrete Masonry Manual section 6.1 Masonry Retaining Walls

Requirements

1.3 QUALIFICATIONS – INDUSTRY QUALIFICATION REQUIREMENTS

Work to be carried out or under supervision of a Licensed Building Practitioner (LBP) with the relevant license class. Refer to 1270 CONSTRUCTION for additional requirements relating to qualifications.

1.4 CONSTRUCTION CONTROL

Supervise masonry construction to NZS 4230: table 3.1, Observation type B, admissible use and nominal strengths. Keep records of materials to NZS 4210: 2.4.2.

1.5 CONSTRUCTION OBSERVATION BY ENGINEER

Inspections shall confirm compliance with the design and the required standards of construction.

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Obtain from the engineer Producer Statements required relating to the masonry construction. Where required as a condition of the building consent, advise the engineer when inspections are required.

1.6 STEEL REINFORCING COMPLIANCE

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

1.7 TESTS

Carry out all required tests in accordance with NZS 4210: appendix 2A, Compressive strength tests for mortar and grout.

1.8 QUALITY RECORDS

Keep accurate records relating to strength and quality of materials used in the construction, and make the information available to the Building Consent Authority inspector on request.

Do not place grout until all blockwork and reinforcing have been inspected and passed by the Building Consent Authority.
The registered mason is to certify in writing that the masonry observation and work has been carried out in accordance with the relevant NZ Standards. Provide a Producer Statement - Construction (PS3).

Performance

1.9 DURABILITY

To NZS 4210, Table 2.E1 - **Masonry durability requirements**. Refer to SELECTIONS.

EXPOSURE	**DURABILITY REQUIREMENT**		
NZS 3604 ZONES figure 4.2	MORTAR (Note 1)	BUILT IN COMPONENTS (Note 2)	MINIMUM COVER REINFORCEMENT (Note 3)
Zone D	M4	R4	30 (60)mm
Zone C	M4	R3	20 (50)mm
Zone B	M3	R3	15 (45)mm
Closed interiors	M2	R1	5 (35)mm
Walls against earth	M4	R4	30 (60)mm
Geothermal hotspots	M4	R5	Specific engineering design
Zone E (NZBC E2/AS1)	M4	R4	30 (60)mm

Notes

- 1. Mortar mixes to NZS 4210, 2.2.2.1.
- 2. Classifications to the three parts of AS/NZS 2699, R1 is light to heavy galvanised, R3 is heavy hot-dip galvanised, R4 is 316 stainless steel, R5 specific performance.
- 3. Cover is measured to NZS 4210 from the inside face of the block cell (or in brackets to the outside face of the block, assuming 30mm shell thickness).

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2 PRODUCTS

2.1 MASONRY UNITS

To AS/NZS 4455.1.

2.2 REINFORCEMENT

Grade 500E to AS/NZS 4671 deformed mild steel except for ties in plain round mild steel and as detailed.
Refer to the Concrete section for reinforcing and mesh for slabs.

2.3 MORTAR

Sand to NZS 3103. Chloride levels to not exceed 0.04% by dry weight of sand. Mortar to NZS 4210: section 2.2, Mortar. Compressive strength minimum 12.5 MPa at 28 days

2.4 GROUT

To NZS 4210: section 2.3, Grout, with minimum compressive strength of 17.5 MPa.

2.5 WATER

To NZS 3121. Water from a territorial authority/NUO water supply is acceptable.

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3 EXECUTION

3.1 MASONRY CONSTRUCTION GENERALLY

To NZS 4210, NZS 4229 as modified by NZBC E2/AS3 (CCANZ CP 01).

3.2 STORAGE

Store masonry units clear of the ground, under cover and well ventilated until placed in the work. Handle and store reinforcing steel and accessories without damage or contamination. Store on timber fillets on hard ground in a secure area clear of any building operation. Lay steel fabric flat. Ensure reinforcement is clean and remains clean so that at the time of placing concrete it is free of all loose mill scale, loose rust and any other contamination that may reduce bonding capacity.

3.3 MOISTURE CONTENT

Ensure masonry units are air dry prior to laying.

3.4 CHECK BASE CONCRETE

Ensure the base concrete is true to line and level, requiring a base mortar bed of 10mm (minimum) to 20mm (maximum). Ensure that all laitance, loose aggregate, or anything preventing bond is removed prior to laying masonry units.

3.5 STARTER POSITIONS

Before commencing laying masonry units, check the location of starter reinforcement by measure or by a dry trial lay up of the first course. Do not correct misplacement by cranking bars. Where misplacement exceeds the location tolerance, obtain written direction before proceeding.

3.6 REINFORCEMENT

Reinforcement to NZS 4229 and NZS 4210: 2.6, **Reinforcing details**.
Cut and bend bars using proper bending tools to avoid notching and to the requirements of NZS 3109. Do not rebend bars. Where rebending is approved, use a purpose built tool, proper preparation and preheating.

3.7 REINFORCEMENT LAPS

Tie all lapping bars to each other.

Minimum wall reinforcing laps schedule

BAR TYPE	LAP LENGTH
Deformed	40 diameters
Plain round (with hooks)	80 diameters

For shrinkage control joint reinforcing refer to clause VERTICAL CONTROL JOINTS.

3.8 COVER

Cover to NZS 4210, Table 2.E1 - **Masonry durability requirements**, refer to DURABILITY clause in SELECTIONS.

3.9 EQUIPOTENTIAL BONDING REINFORCING

Co-ordinate with electrician to provide for equipotential bonding of reinforcing as required by AS/NZS 3000, 5.6 Equipotential Bonding, before concrete placement.

3.10 TOLERANCES

Construct within the tolerances set out in NZS 4210: clause 2.6.5, **Tolerances**, and clause 2.7.1, **General**. Lay masonry units with bedding of consistent thickness throughout.
Reinforcement to NZS 3109: 3.9 **Tolerances for reinforcement**.

3.11 PROTECTION

Protect fair-faced masonry walls, keeping them clear of mortar droppings, grout splashes, or stains of any kind.

3.12 LAY MASONRY UNITS

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Ensure consistent, fully filled and tooled joints. Where walls are reinforced, prevent mortar droppings from entering the cells to be grouted. Provide clean out holes at base of wall, unless "low lift" (NZS 4210) grouting is used. Ensure reinforcement is accurately placed and tied. Lay in regular stretcher bond with all necessary special units and sill units. Cut masonry, if necessary, true and square without chipping.

3.13 MASONRY UNITS JOINTS

Not exceeding 10mm thick, or less than 8mm when the units are bedded in. Joints tooled concave, unless detailed otherwise.

3.14 VERTICAL CONTROL JOINTS

To NZS 4229 12.1 **Shrinkage control joints**.
Locate at major changes of wall height or thickness, at openings, at ground slab control joints, and at not more than 6m centres, or, as shown on the drawings. Where reinforcement passes through a control joint, provide for breaking bond using methods detailed on NZS 4229 fig. 12.2, **Control joint detail...**, unless specifically detailed otherwise.

3.15 BRACING

Provide sufficient temporary lateral bracing to ensure stability until the final supporting construction is in place.

3.16 PRE-GROUTING INSPECTION

Inspect walls prior to grouting. Ensure cells are clean and reinforcement is correctly placed. Where "high lift" (to NZS 4210) grouting is used, seal the clean out holes and brace to prevent blow outs.

3.17 GROUT CELLS

Grout all masonry unit cells.

3.18 GROUTING PROCEDURE

Use procedures set out in NZS 4210. Methods acceptable on this project are:

- high lift grouting with expansive admixture
- high lift grouting without expansive admixtures
- low lift grouting.

3.19 CONSTRUCTION JOINTS

Form and treat construction joints between grout pours and between masonry walls and hardened concrete work to ensure bonding occurs. Comply with NZS 4210: 2.16, **Horizontal construction joints**.

3.20 MORTAR-IN COMPONENTS

Mortar-in components such as sills, copings, lintels, and steps, as work proceeds.

3.21 BUILD-IN

Build-in plugs, bolts, ties, metal flashings, dowels, fastenings and fixings as required by all trades and as shown on the drawings.

3.22 PROGRESSIVE CLEANING

Clean off mortar splashes and grout spills as they occur, making good any damage at the same time.

3.23 FINAL CLEANING

Clean down masonry work and remove waste material from adjoining surfaces and floors at completion.

3.24 REMOVE

Remove from the site materials not used.

4 SELECTIONS

4.1 DURABILITY - PROJECT REQUIREMENTS

Refer to clause DURABILITY and Engineers Documentation

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4.2 MASONRY UNITS - LANDSCAPE WALLS

Brand:	Viblock Fluted 20 Series
Width:	190mm
Bond:	Stack

4.3 GROUT

Design strength:	17.5 MPa at 28 days
Aggregate size:	13.2mm maximum

Note: if expansive agents are used the minimum strength must be 20 MPa or the design strength whichever is greater.

4.4 MORTAR JOINTS

Joint profile:	Recessed to fluted face, keyed to backl face for plaster
Mortar colour:	Tan to match block

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3322 ICF INSULATING BLOCKWORK

1 GENERAL

This section relates to the supply, erection, reinforcement and concrete filling of hollow ICF (expanded polystyrene) blockwork.

1.1 ABBREVIATIONS AND DEFINITIONS

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

The following definitions apply specifically to this section:

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

1.2 DOCUMENTS REFERRED TO

Documents referred to in this section are:

NZS 3104	Specification for concrete production
NZS 3109	Concrete construction
AS/NZS 4671	Steel reinforcing materials

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

Requirements

1.3 QUALIFICATIONS GENERALLY

Refer to 1270 CONSTRUCTION for requirements relating to qualifications.

1.4 CONCRETE TESTS

Retain mix design information for plant mixed concrete for inspection. Keep an accurate record of the in-place location of all batches. Carry out tests in accordance with NZS 3104, section 2.15 Control tests and their evaluation.

1.5 STEEL REINFORCING COMPLIANCE

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

2 PRODUCTS

Materials

2.1 MANUFACTURER

Refer to SELECTIONS/drawings for manufacturer.

2.2 BLOCKS

Blocks injection moulded from fire retardant polystyrene beads. Final density between 23 and 26 kg per cubic metre.

Metal bridges of galvanized steel, bonded into each external skin of polystyrene.

2.3 REINFORCEMENT

Deformed and plain steel bars to AS/NZS 4671.

2.4 CONCRETE INFILL

Normal concrete infill with a minimum compressive strength of 20 MPa at 28 days, to NZS 3104 and a slump of between 100 and 120mm. Maximum aggregate size 14mm. Supply concrete from a ready mix concrete plant with Certificate of Audit.

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Equipment

2.5 PROP SYSTEM

As recommended and supplied by the manufacturer, for use during erection and the subsequent filling of block cores.

3 EXECUTION

Conditions

3.1 ALL WORK

All work by a firm approved by the manufacturers and/or distributors of the ICF blocks.

3.2 EXECUTION

Carry out all work using persons skilled in the methods and recommendations laid down by the ICF block manufacturer and in accordance with the manufacturer's technical information on the use of equipment and construction techniques.

Keep a current copy of the ICF block manufacturer's technical manual on site and bring to the attention of all workers during the construction process.

3.3 STORAGE

ICF blocks are vulnerable to damage. Take care to protect blocks during delivery, storage and installation, with particular attention taken to preventing damage to corners and rebates.

3.4 SOLVENTS

Do not allow solvent products to come into contact with ICF blocks.

3.5 CUTTING

Carefully follow the recommendations and requirements set out in the manufacturer's technical manual. Generally cut blocks using a small panel saw or sharp Stanley knife, with a keyhole saw used for reveals and cut outs.

3.6 ACCURACY

All walls true to line, level and plumb and within the following tolerances:

Deviation from plan location: 20mm
Deviation from vertical within a storey: 10mm per 3 metres
Relative displacement between load bearing walls in adjacent stories intended to be in vertical alignment:: 5mm
Deviation from line to plan

- Any length up to 10 metres: 5mm
- Any length over 10 metres: 10m

Deviation from horizontal

- Any length up to 10 metres: 5mm
- Any length over 10 metres: 10mm

Application

3.7 PROPPING

Install a propping system to hold the blocks in place during filling. Bolt props to the floor prior to laying of blocks, and install at all wall corners, and every 2 metres along each wall. Adjust for straightness and plumb. Install soft iron wire ties every fourth course, through the polystyrene, around the metal bridge and back out around the prop.

3.8 ALL BLOCKS

Accurately bed all blocks into the blocks below and to butt accurately against each other, ensuring true wall dimensions are achieved. Do not place webs of blocks over the vertical flue of the block below.

Horizontal joints may be glued with polystyrene contact adhesive on each face, when required to assist stability against wind or construction loads.

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Stay all walls against wind and construction loads.

3.9 PLACE REINFORCING

Place and tie reinforcing as detailed and in accordance with NZS 3109. Cut, bend and place reinforcement as shown on the drawings, with cover maintained by the use of plastic or concrete spaces.

Bars lapped only where detailed, with lapping kept to a minimum and staggered wherever practicable.

3.10 BUILT IN ITEMS

Build in all bolts, straps and fixings as detailed and as required. Construct chases, holes, cut-outs and recesses only as and where detailed. Any cast in fixings to have the surrounding polystyrene removed to provide a minimum of 30mm concrete cover around the fixing.

3.11 CONSTRUCTION JOINTS

Locate construction joints in accordance with NZS 3109. Immediately before placing concrete, wet the construction joint area and apply a 10mm thick layer of cement slurry to the joint; slurry being either a cement/water paste, or a 1:1 mix of cement and sand. Work the slurry well into the construction joint before placing the concrete.

3.12 INSPECTION

Provide notification that the work is ready for inspection prior to grouting. Do not proceed with grouting until written approval has been received that walls have been constructed and reinforced in accordance with the design documentation.

3.13 CONCRETING

To NZS 3109. Ensure that all cells are clear and clean and all reinforcement is in place. Consolidate infill concrete by rodding with a 16mm square end reinforcing rod, or by using a small poker vibrator. Height and extent of lifts and sectional lifts to be strictly in accordance with the ICF block manufacturer's technical manual.

Finishing

Completion

3.14 WIRE TIES AND PROPS

Once the concrete infill has cured, cut off all wire ties level with the polystyrene surface. Carefully dismantle and remove the prop system.

3.15 CLEANING

Both during laying and on completion, clean down all exposed block surfaces to remove adhesive or concrete splashes.

3.16 MAKE GOOD

Make good any damaged corners or faces using acrylic cement plaster.

3.17 LEAVE

Leave work to the standard required by following procedures.

3.18 REMOVE

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

4 SELECTIONS

4.1 ICF BLOCKS

Manufacturer:	Nudura
Series:	One

4.2 TANKING AND WATERPROOFING

See 4131EB

4.3 PLASTERING AND COATING

See 4282

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3410 STRUCTURAL STEEL

1 GENERAL

This section relates to the fabrication, erection and specialist coating of structural steelwork of a general nature, for Construction Category CC1 or CC2 (to AS/NZS 5131).

Refer to SELECTIONS for project Construction Category.

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:

AESS	Architecturally Exposed Structural Steelwork
CC	Construction Category
NDE	Non-Destructive Examination

1.2 DOCUMENTS

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

NZBC F5/AS1	Construction and demolition hazards
AS 1111.1	ISO metric hexagon bolts and screws - Product grade C - Bolts
AS 1111.2	ISO metric hexagon bolts and screws - Product grade C - Screws
AS 1112.1	ISO metric hexagon nuts - Style 1 - Product grades A and B
AS/NZS 1163	Cold-formed structural steel hollow sections
AS/NZS 1214	Hot-dip galvanized coatings on threaded fasteners (ISO metric coarse thread series)
AS/NZS 1252.1	High-strength steel fastener assemblies for structural engineering - Bolts, nuts and washers - Technical requirements
AS 1397	Continuous hot-dip metallic coated steel sheet and strip - Coatings of zinc and zinc alloyed with aluminium and magnesium
AS/NZS 1554.1	Structural steel welding - Welding of steel structures
AS 1554.2	Structural steel welding - Stud welding (steel studs to steel)
AS/NZS 1554.3	Structural steel welding - Welding of reinforcing steel
AS/NZS 1554.4	Structural steel welding - Welding of high strength quenched and tempered steels
AS/NZS 1554.5	Structural steel welding - Welding of steel structures subject to high levels of fatigue loading
AS/NZS 1594	Hot-rolled steel flat products
AS 1627.4	Metal finishing - Preparation and pretreatment of surfaces - Abrasive blast cleaning
AS 1627.9	Metal finishing - Preparation and pretreatment of surfaces - Pictorial surface preparation standards for painting steel surfaces
AS/NZS 2312.2	Guide to the protection of structural steel against atmospheric corrosion by the use of protective coatings - Part 2: Hot dip galvanizing
AS/NZS 2312.3	Guide to the protection of structural steel against atmospheric corrosion by the use of protective coatings - Part 3: Thermal metal stray coatings
NZS 3404.1	Steel Structures Standard
AS 3597	Structural and pressure vessel steel - Quenched and tempered plate
AS/NZS 3678	Structural steel - Hot-rolled plates, floorplates and slabs
AS/NZS 3679.1	Structural steel - Hot-rolled bars and sections
AS/NZS 3679.2	Structural steel - Welded I sections
AS/NZS 3750.9	Paints for steel structures - Organic zinc-rich primer
AS/NZS 4680	Hot-dip galvanized (zinc) coatings on fabricated ferrous articles

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AS/NZS 5131	Structural steelwork - Fabrication and erection
AS/NZS ISO 13918	Welding - studs and ceramic ferules for arc stud welding
GANZ	Galvanizing Association of New Zealand - After-Fabrication Hot Dip Galvanizing. A practical reference for designers, specifiers, engineers, consultants, manufacturers and users

Requirements

1.3 QUALIFICATIONS

Welding operators (and supervisors) to be experienced, competent workers, qualified to AS/NZS 5131, Table 7.4, to suit relevant Construction Category and weld category.

1.4 TOLERANCES

To AS/NZS 5131 Section 12 and Appendix F, Tolerance Class 1.

1.5 SHOP DRAWINGS

Generally to AS/NZS 5131, 4.4.

Refer to the general section 1235 SHOP DRAWINGS for the requirements for submission and review and the provision of final shop drawings.

Provide shop drawings to show, but not be limited to:

- Design calculations
- Fully dimensioned elevations of all elements (minimum scale 1:20)
- Complete details of construction, connections and all support systems (minimum scale 1:10)
- Jointing details and method of fixing between individual elements and between this installation and adjacent work
- Co-ordination requirements with other work
- A full schedule of materials and finishes.

Submit shop drawings for review to architect and engineer.

- 10 working days (at least) before fabrication is planned to commence, provide shop drawings for review.
- Complete shop drawing review before commencing fabrication.

1.6 VERIFY DETAILS AND DIMENSIONS

Refer to drawings to ensure all required details and fixings are provided for in the structural steelwork. Verify dimensions against site measurements prior to fabrication.

1.7 TESTS

To AS/NZS 5131, Section 13, Inspection, Testing And Correction and AS/NZS 5131 Appendix I, Inspection of Welding and Bolting (New Zealand Only), as follows:

- Welds: Non-destructive examinations (NDE)

1.8 HOT WORK - FIRE SAFETY

Refer to section 1270 CONSTRUCTION

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2 PRODUCTS

2.1 STRUCTURAL STEEL

Comply with New Zealand, Australian, British or Japanese Standards for steel as required by NZS 3404.1, section 2, including, type, category, and suppression of brittle fracture. Also to AS/NZS 5131, Section 5.

Steel members and sections steel grade table

Component	Conforming to	Grade
Hot rolled steel sections	AS/NZS 3679.1	300; 350; 300L0; 300S0; 350L0, 300L15; 350L15
Plates and flats	AS/NZS 3678; AS/NZS 1594;	250; 300; 350; 400; 450; WR350; 250L0, 300L0; 350L0; 300L15; 350L15
Plates and flats	AS/NZS 1594; TS 102	HA250; HA300; HA350; HA400; HW350
Circular hollow sections	AS/NZS 1163; TS 102	C250L0; C350L0; C450L0
Square hollow sections	AS/NZS 1163; TS 102	C350L0; C450L0
Rectangular hollow sections	AS/NZS 1163; TS 102	C350L0; C450L0
Welded beams and columns	AS/NZS 3679.2; TS 102	300; 400
Quench & tempered plate	AS 3597	500; 600; 700; 900; 1000
Purlins and girts	AS 1397	G250; G300; G350; G450; G500; G550, Z350, Z450

2.2 WELDING CONSUMABLES

To comply with and be selected for grade of steel being welded as required by AS/NZS 1554 series of standards.

2.3 FLUX

Welding flux to be dry and from sealed containers.

2.4 BOLTS, NUTS AND WASHERS

Grade 4.6, screws AS 1111.2 and bolts to AS 1111.1. Grade 4.6 nuts to comply with AS 1112.1. Property Class 8.8 bolts and equivalent nuts and washers (high strength structural quality only) to comply with AS/NZS 1252.1. Hot-dip galvanize to AS/NZS 4680 (and AS/NZS 1214), bolts, nuts and washers forming a permanent part of a structure subject to a protective coating.

Bolt Categories and tensioning

Bolting category	Bolt standard	Property Class	Tension method	Tensioned joint type
4.6/S	AS 1111.1	4.6	Snug tight	
8.8/S	AS/NZS 1252.1	8.8	Snug tight	
8.8/TB	AS/NZS 1252.1	8.8	Full tension	Bearing
8.8/TF	AS/NZS 1252.1	8.8	Full tension	Friction

In bearing type connections where the thread position relative to the shear plane is to be controlled.
N - threads included in shear plane
X - threads excluded from shear plane
F - friction type joints - prepare faying surfaces

2.5 GROUT

To AS/NZS 5131, 5.8.

2.6 CORROSION PROTECTION - HOT DIP GALVANIZED

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Hot dip galvanizing to AS/NZS 2312.2.

3 EXECUTION

Preparation, assembly and Fabrication

3.1 GENERALLY

To AS/NZS 5131, Section 6.

3.2 DELIVERY, STORAGE & HANDLING OF PRODUCTS

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

3.3 ROUTINE MATTERS

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

3.4 SURFACE FINISH

Grind off all burrs and sharp arrises.

3.5 CUTTING

To AS/NZS 5131, Section 6.5.

3.6 HOLING

To AS/NZS 5131, Section 6.7

Do not use slotted holes for connections, other than those documented.

3.7 TEMPORARY MEMBERS FOR GALVANIZED ELEMENTS

Provide temporary members, as required, to strengthen prefabricated elements likely to be distorted by the subsequent hot dip galvanizing process. Co-ordinate, with the galvanizer, the details of any temporary members required.

Welding

3.8 WELDING GENERALLY

To AS/NZS 5131, Section 7 and AS/NZS 1554.1. Equipment to comply with AS/NZS 1554.1, clause 1.8.2.

Site weld only when correct alignment and preset or camber have been achieved.
Weld types as documented elsewhere or on drawings
Weld categories not documented elsewhere or on drawings to be Category GP.

3.9 NON-DESTRUCTIVE WELD EXAMINATION

Non-destructive weld examination (NDE) to AS/NZS 5131, clause 13.6.2 and AS/NZS 5131 Appendix I, Inspection of Welding and Bolting (New Zealand Only).

If non-visual NDE is required, use a third party testing authority.
Repair any welds revealed as faulty by NDE and repeat the examination.

3.10 WELDING GALVANIZED STEEL

When welding already Galvanized steel either:

- remove coating locally and carry out a standard weld
- leave coating and adjust welding technique to those recommended in GANZ After-Fabrication Hot Dip Galvanizing document. (Among other things, this will generally mean a slower welding speed.)

Final weld shall meet all the standards and requirements of a standard weld.

Mechanical fastening

3.11 MECHANICAL FASTENING GENERALLY

To AS/NZS 5131.

Connection contact surfaces to AS/NZS5131, 8.4.1.
Category 8.8/TF bolting to be clean, as rolled and free from applied finishes.

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For washers, place one washer under the part rotated during tightening process (nut or bolt head). Permanent bolt only when correct alignment and preset or camber have been achieved.

3.12 TENSIONING BOLTS

For tensioning of bolting categories 8.8/TB and 8.8/TF, use part-turn method or a direct tension indicator device. Ensure clear thread run out beneath the nut after tensioning is to New Zealand requirement of AS/NZS 5131, 8.2.2.

3.13 THREADS EXCLUDED FROM SHEAR PLANE

Select length of bolts such that the threaded portion does not occur within the shear plane between joined parts.

Erection of structural steel

3.14 ERECTION GENERALLY

To AS/NZS 5131, Section 11.

Make sure every part of the structure has sufficient design capacity and is stable under construction loads produced by the construction procedure.
Comply with NZBC F5/AS1: Construction and demolition hazards, and the WorkSafe publication: Guidelines for the provision of facilities and general safety in the construction industry.

3.15 BOLTS AND ANCHORAGES

For each group of anchor bolts, provide a template with set-out lines clearly marked for positioning the bolts when casting in.

Start erection only when the holding down bolts and anchorages have been cast-in-place long enough to achieve sufficient strength.

3.16 TEMPORARY WORK

Provide temporary bracing, propping and restraint as required to make structure safe. Fix any temporary members so as not to weaken or deface permanent steelwork. Leave temporary bracing and restraint in place until the erection is sufficiently advanced to allow safe removal of temporary bracing.

3.17 SITE WORK

Other than work shown on the shop detail documentation as site work, do not fabricate, modify or weld structural steel on-site.

3.18 GROUTING SUPPORTS

Before grouting steelwork supported by concrete or masonry, set steelwork on packing or wedges as follows:

- Permanent packing or wedges - Form with solid steel or grout of similar strength to the permanent grout.
- Temporary packing or wedges - Remove before completion of grouting.

Grout at supports before constructing supported floors, walls and roofing.
Do not grout if the base plate or the footing surface temperature are outside the range 3°C to 35°C or to manufacturer's requirements.
Fill the space beneath the base plate with grout, if necessary hammered in tight to ensure complete filling of space.

3.19 DRIFTING

Use drifting only to bring members into position, without enlarging holes or distorting components.

Finishing - galvanizing

3.20 STEELWORK BEING GALVANIZED

Fabricator to provide any temporary members required by the galvanizer to strengthen prefabricated elements likely to be distorted by the subsequent hot dip galvanizing process.

Abrasive blast clean to AS 1627.4, class 2.5.
To galvanize, clean sections thoroughly and apply zinc coating by the hot-dip process to the requirements of AS/NZS 4680. Zinc coating thickness not less than AS/NZS 4680, Table 1 and Table 2

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3.21 REPAIR WELD DAMAGED GALVANIZING

Remove welding slag, power tool clean, grind off all burrs and sharp arrises, all repairs to AS/NZS 4680, 8.4 **Site repair**:

- Small repairs:- Colour matched zinc rich paint.
- Large repairs:- With approval, colour matched zinc rich paint or other agreed option.

Finishing - preparation

3.22 ENCASED STEELWORK

Clean the steelwork to be encased in concrete to remove all loose mill scale, rust, dirt and other matter affecting bond with concrete. Achieve this by wire brushing and the use of suitable solvents.

3.23 ABRASIVE BLASTING

To AS/NZS 5131, Section 9.

Remove oil and grease by the use of solvents. Abrasive blast clean to a Class 2.5 finish to AS 1627.4. Clean to bright metal, but avoid producing a polished surface. Select grit type and equipment such that the cleaned surface profile between peaks and valleys does not exceed one third of the dry film thickness. Check that no burrs or sharp arrises remain which may prevent the full coating thickness being attained.

Finishing - paint and protective coatings

3.24 PAINTING

Refer to the appropriate separate painting section(s) for painting requirements.

3.25 UNPAINTED SURFACES

Do not paint:

- faying face of high strength friction grip bolted joints
- areas for site welding, keeping 75mm clear all round
- surfaces being embedded in concrete.

Where steel is only partly encased then extend priming 50mm minimum into the concrete encasement area.

3.26 PRIMING GENERALLY

Coat steelwork, unless specifically noted otherwise, with the specified priming paint, including patch priming on site after erection.

3.27 PATCH PRIMING

Clean areas of damaged priming and areas left clear for site jointing to a standard comparable with that specified for shop cleaning. Wash off chemical deposits from welding fumes. Apply priming coats to the same standard as shop primers, ensuring thorough coating of bolts, nuts and connection areas. Reprime if more than 4 weeks elapse before the final coating system is applied.

3.28 COATING SYSTEMS

Apply all coatings in accordance with the coating manufacturer's requirements. Apply coatings to steel within 4 hours of cleaning and before condensation or light rusting can occur. Ensure steel is dry and atmospheric conditions warm and dry, with an air temperature of greater than 12°C and relative humidity less than 85%.

3.29 TOUCH-UP

Touch up primer. Apply protective coatings as specified.

3.30 TEMPORARY CONNECTIONS

Remove temporary elements on completion and restore the surface.

Completion & Commissioning

3.31 COMPLETION MATTERS

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

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3811 PREFABRICATED STRUCTURAL TIMBER FRAMING

1 GENERAL

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

- timber trusses
- timber frames

1.1 RELATED WORK

Refer to 3821 TIMBER FRAMING for general timber framing and installation of prefabricated timber framing.

1.2 ABBREVIATIONS AND DEFINITIONS

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

The following abbreviations apply specifically to this section:

FSC	Forest Stewardship Council
FTMA	Frame and Truss Manufacturers Association of New Zealand Inc.
PEFC	Programme for the Endorsement of Forest Certification
SED	Specific Engineering Design

Documents

1.3 DOCUMENTS

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

NZBC B1/VM1	Structural design of buildings
NZBC B2/AS1	Durability provisions for building elements
AS/NZS 1170	Structural Design Actions
NZS 1170.5	Structural Design Actions - Earthquake actions - New Zealand
NZS 3602	Timber and wood-based products for use in building
NZS 3603	Timber structures standard
NZS 3604	Timber-framed buildings
NZS 3640	Chemical preservation of round and sawn timber
FTMA CoP	Frame and Truss Manufacturers Association Code of Practice

1.4 SPECIFIC DESIGN DOCUMENTS

Specific design documents relating to this part of the work:

Refer to: Architectural details and structural engineer documentation

Requirements

1.5 QUALIFICATIONS

Fabricators to be experienced competent workers, familiar with the materials and the techniques specified.

Fabrication companies to be members of the FTMA and accredited by the connector plate manufacturers.

1.6 DESIGN CRITERIA NON-SPECIFIC DESIGN

Frames and trusses to NZS 3604.

1.7 DESIGN CRITERIA SED

Frames and trusses to, NZBC B1/VM1, AS/NZS 1170, NZS 1170.5 and NZS 3603, unless otherwise specified in engineers documentation

1.8 SHOP DRAWINGS

Refer to the general section 1235 SHOP DRAWINGS for the requirements for submission and review and the provision of final shop drawings.

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Provide shop drawings to show the general arrangement.

Submit shop drawings for review to architect and engineer.

- 10 working days (at least) before fabrication is planned to commence, provide shop drawings for review.
- Complete shop drawing review before commencing fabrication and/or installation.

1.9 MANUFACTURING STATEMENT - PREFABRICATED TRUSSES

Provide a statement to support the manufacture of the roof trusses, issued by a fabricator after manufacture has occurred and identifying:

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

1.10 IDENTIFICATION OF TRUSSES ON SITE

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

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

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

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

2 PRODUCTS

Materials

2.1 TRUSSES NOT EXPOSED

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

2.2 TRUSSES EXPOSED

Timber bandsawn/dry dressed and identified with its unique identifier. Treatment to suit species and location, to NZS 3602, NZBC B2/AS1, refer SELECTIONS.

2.3 FRAMES NOT EXPOSED

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

Accessories

2.4 STEEL CONNECTOR PLATES

0.8mm to 2.0mm thick steel sheet, hot-dip galvanized to NZS 3604, table 4.2, **Galvanizing of steel components other than nails and screws** and punched to form a toothed connector or nail on connector.

2.5 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.

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

3 EXECUTION

Conditions

3.1 COMPLY

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

3.2 DELIVER, HANDLE AND STORE TRUSSES AND FRAMES

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

Fabrication

3.3 DIMENSIONS, NOT EXPOSED ELEMENTS

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

3.4 DIMENSIONS, EXPOSED ELEMENTS

Each member calculated length ±1mm width and thickness to gauging tolerances. Each overall joint within ±3mm of correct outside profile (including camber allowance). Joint thickness and width difference between members 1mm maximum. Plate location within half of the manufacturer's tolerances plus a rotation of no more than 1mm in 100mm off reference line.

3.5 INSPECTION

Request inspection when timber for exposed trusses and frames is ready for cutting prior to fabrication.

3.6 FABRICATION

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

3.7 TRUSS AND FRAME FIXINGS

Factory fit truss and frame fixings to comply with the required loading capacity for that particular joint and in accordance with the fixing type and capacity in NZS 3604, Section 10, **Roof framing**, the manufacturer's requirements or to engineering specific design. Ensure all elements are correctly located, plumb and true to line and face.

Site installation

3.8 TRUSS ERECTION

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

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3.9 FRAME ERECTION

Lift, place and fix frames without overstressing or deformation. Use temporary bracing and supports as needed without causing damage. Fix frames to floor or base plates and other walls or columns to manufacturer's requirements, but no less than NZS 3604, section 8, **Walls** and in particular section 8.7, **Plates**. Fit and fix bracing as detailed and to NZS 3604: section 5, **Bracing design** and section 8.3, **Systems to resist horizontal loads**. When necessary provide framing to suit any required cladding/lining control joints. Ensure all frames are correctly located, plumb and true to line and face.

3.10 FIT CONNECTORS AND FIXINGS - TRUSS

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

3.11 FIT CONNECTORS AND FIXINGS - FRAMES

Fit connectors and fixings to obtain full bearing over all contact surfaces and ensure the required loading capacity for the frame is maintained. Fix each framing member in accordance with NZS 3604, Section 8, **Walls.** Ensure the size, number and location of nails to be used in framing comply with requirements of Table 8.19, **Nailing schedule for hand-driven and power-driven nails**, the manufacturer's requirements or to engineering specific design. Ensure all elements are correctly located, plumb and true to line and face.

3.12 ROOF BRACING

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

3.13 WALL BRACING

Refer to 3821 TIMBER FRAMING for wall bracing.

3.14 DPC TO TIMBER

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

3.15 TIGHTEN BOLTS

Check and tighten all fixing bolts after erection is completed.

Completion

3.16 REPLACE

Replace or repair damaged elements.

3.17 REMOVE

Remove debris, unused materials and elements from the site.

3.18 LEAVE

Leave work to the standard required by following procedures.

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3813 ENGINEERED WOOD PRODUCTS

1 GENERAL

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

- laminated veneer lumber (LVL)

1.1 RELATED WORK

Refer to 3821 TIMBER FRAMING for general timber framing and installation of engineered wood products.

1.2 ABBREVIATIONS AND DEFINITIONS

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

The following abbreviations apply specifically to this section:

FSC	Forest Stewardship Council
PEFC	Programme for the Endorsement of Forest Certification

Documents

1.3 DOCUMENTS

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

NZBC B1/VM1	Structural design of buildings
AS/NZS 1170	Structural Design Actions
NZS 1170.5	Structural Design Actions - Earthquake actions - New Zealand
AS/NZS 1328.1	Glue laminated structural timber - Performance requirements and minimum production requirements
AS/NZS 1491	Finger jointed structural timber
AS/NZS 1604.1	Preservative-treated wood-based products - Part 1: Products and treatment
AS/NZS 2754.1	Adhesives for timber and timber products - Adhesives for manufacture of plywood and laminated veneer lumber (LVL)
NZS 3602	Timber and wood-based products for use in buildings
NZS 3603	Timber structures standard
NZS 3604	Timber-framed buildings
NZS 3640	Chemical preservation of round and sawn timber
AS/NZS 4357.0	Structural laminated veneer lumber - Specification
AS/NZS 4364	Timber - Bond performance of structural adhesive
BPS	Building Product Specifications

1.4 ABBREVIATIONS

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

LVL	Laminated veneer lumber

Requirements

1.5 QUALIFICATIONS

Fabricators to be experienced competent workers, familiar with the materials and the techniques specified.

Laminated timber fabricators to be certified to AS/NZS 1328.1.

1.6 LAYOUT DRAWINGS

Provide a layout drawing with each element identified by a unique identifier. Provide details of specific design bracing requirements

1.7 PRODUCER STATEMENT

Provide a signed producer statement showing the manufacturer details.

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1.8 LVL DESIGN

To NZS 3603 in general and in particular the manufacturer's technical information. Complying with NZBC B1/VM1, AS/NZS 1170 and NZS 1170.5 when installed.

1.9 LVL MEMBERS TEST

Laminated veneer lumber products are to be tested and the properties monitored to the requirements of the Plywood Association of Australasia.

2 PRODUCTS

Materials - LVL

2.1 LVL BEAMS, POSTS, JOISTS, RAFTERS

To AS/NZS 4357.0, to required sizes and lengths and the manufacturer design properties.

Manufacture to AS/NZS 4357.0 and the manufacturer design properties.

Components - LVL

2.2 ADHESIVE, LVL

Veneers to be bonded with Type A marine bond (phenolic) to AS/NZS 2754.1.

2.3 ADHESIVE, LVL I-JOIST

I-Joist flange to web joint to be formed with resorcinol phenol adhesive (Type A bond to AS/NZS 2754.1 and Type 1 to AS/NZS 4364) permanent and durable structural bond.

2.4 TREATMENT, LVL EXTERIOR

Insecticide treatment to H3/H3.1 LOSP or H3/H3.2 CCA (preservative code 01 or 02) to NZS 3640 and AS/NZS 1604.1. Equivalent solvent based preservative for treating cut ends on site.

Refer to SELECTIONS.

2.5 TREATMENT, LVL INTERIOR

Treatment to H1/H1.2 to NZS 3640 and AS/NZS 1604.1. Equivalent solvent based preservative for treating cut ends on site.

Refer to SELECTIONS.

Accessories

2.6 CORROSION RISKS

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

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

3 EXECUTION

Manufacture - LVL

3.1 LAMINATED VENEER LUMBER, MANUFACTURE

To AS/NZS 4357.0 and the manufacturer's design properties.

Delivery

3.2 DELIVER, HANDLE AND STORE

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

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Application - LVL

3.3 ERECTION

Refer to the manufacturer's guidelines for the installation of laminated veneer lumber structural elements. Ensure all elements are correctly located, plumb and true to line and face.

Carry out the erection of LVL and associated support framing for houses and similar structures to the requirements of NZS 3604. Comply with NZBC B1/VM1, 3.3 Timber. Reseal cut ends, holes, notches and the like of treated LVL with a brush on solvent based preservative. Prop long length beams and lintels at the mid span until the moisture content has reached a suitable level for the application of internal linings.

3.4 TIGHTEN BOLTS

Check and tighten all fixing bolts after erection is completed.

3.5 HOLES AND PENETRATIONS

To manufacturers requirements.

Application - connectors

3.6 CONNECTORS

Refer to the manufacturer's guidelines for installation. Ensure all elements are correctly located, plumb and true to line and face. Ensure that the manufacturers recommended type and quantity of fixings are used.

Completion

3.7 REPLACE

Replace or repair damaged elements.

3.8 REMOVE

Remove debris, unused materials and elements from the site.

3.9 LEAVE

Leave work to the standard required by following procedures.

4 SELECTIONS

4.1 LVL FRAMING

Location:	refer to Engineers documentation
Type/application:	refer to engineers plans
Brand/name:	refer to engineers plans
Size:	refer to engineers plans
Treatment:	H1.2
Connector type:	refer to engineers plans
Connector finish:	refer to engineers plans

4.2 LVL BEAMS

Location:	refer to engineers plans
Type:	refer to engineers plans
Brand/name:	refer to engineers plans
Size:	refer to engineers plans
Treatment:	H1.2
Connector type:	refer to engineers plans
Connector finish:	refer to engineers plans

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3821 TIMBER FRAMING

1 GENERAL

This section relates to the supply and erection of timber framing, as a framed structure, or as part of a partitioning system.

1.1 RELATED WORK

Refer to 4161

1.2 ABBREVIATIONS AND DEFINITIONS

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

The following abbreviations apply specifically to this section:

FSC®	Forest Stewardship Council®
COC	Chain of Custody
PEFC	Programme for the Endorsement of Forest Certification

The following definitions apply specifically to this section:

SG Structural grade to NZS 3604, 1.3 Definitions

Documents

1.3 DOCUMENTS

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

NZBC B2/AS1	Durability provisions for building elements
NZBC E2/AS1	External moisture provisions for timber-framed buildings up to 10 m in height
AS/NZS 2904	Damp-proof courses and flashings
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 3631	New Zealand timber grading rules
NZS 3640	Chemical preservation of round and sawn timber
WorkSafe	Guidelines for the provision of facilities and general safety in the construction industry.
BRANZ BU 673	Cavity battens

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

1.4 DIMENSIONS

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

Requirements

1.5 QUALIFICATIONS GENERALLY

Refer to 1270 CONSTRUCTION for requirements relating to qualifications.

2 PRODUCTS

Materials

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.

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2.2 APPEARANCE TIMBERS

Graded to NZS 3631, treated where required by NZBC B2/AS1, NZS 3602, table 1, and treatment to NZS 3640.

2.3 STRAPPING

Treated to NZBC B2/AS1, NZS 3602, table 1 and to NZS 3640, clause 6.3.1.

Species:	Radiata pine
Grade:	SG6
Size:	70mm x 45mm, 45mm x 45mm or 45mm x 19mm

2.4 EXTERIOR CAVITY WALL BATTENS - TIMBER - NON-STRUCTURAL

To NZBC E2/AS1. H3.1 Radiata pine battens, 20mm thick, 45mm minimum width, and height to match timber framing studs. To NZS 3602, table 1, reference 1D.10, Requirements for wood-based building components to achieve a 50-year durability performance.

2.5 EXTERIOR CAVITY WALL BATTENS - TIMBER - STRUCTURAL

To BRANZ BU 673, part 6. H3.2 SG6 Radiata pine kiln dried battens, 20mm thick, 40mm minimum width, and height to match timber framing studs. To NZS 3602, table 1, reference 1D.10, Requirements for wood-based building components to achieve a 50-year durability performance.

2.6 DPC

Refer to 4161 UNDERLAYS, FOIL AND DPC section

Components

2.7 NAILS

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

2.8 SCREWS

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

2.9 BOLTS AND COACH SCREWS

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

2.10 THREADED RODS

Use stainless steel threaded rods of the required length, with washers and nuts at both ends, when stainless steel bolts of the required length are not available.

2.11 TIMBER CONNECTORS AND FIXINGS

Supply for each particular joint the connectors and fixings as noted on the drawings. Comply with the requirements of the manufacturer, NZS 3604, section 4, Durability, and of the number and form required for each particular junction to NZS 3604, sections 6-10.

2.12 BRACING STRAPS

Nail-on type to the requirements of NZS 3604, section 4, Durability, and of the number and form required for each particular application to NZS 3604, sections 6-10.

2.13 POWDER ACTUATED FASTENERS

To type, size and charge required by the powder actuated tool manufacturer for each particular member and the substrate.

2.14 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.

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

3 EXECUTION

Conditions

3.1 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.

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

Moisture content:

At erection	24% EMC maximum
At enclosure	20% EMC maximum
At lining	16% EMC maximum

3.4 PROTECT TIMBER

Protect all timber against damage and from inclement weather. Ensure that any variation in moisture content is kept to a minimum, before and after erection and before enclosure.

Installation/application

3.5 STANDARDS AND TOLERANCES

Refer to the general section 1270 CONSTRUCTION for general requirements.

Timber framing tolerances shall be in accordance with NZS 3604 Table 2.1 Timber framing tolerances.

3.6 SEPARATION

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

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

3.7 EXECUTION

Execution to comply with 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).

3.8 SET-OUT

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

3.9 SET TIMBERS

Set timbers true to required lines and levels with mitres, butt joints, laps and housings cut accurately to provide full and even contact over the whole of the bearing surface.

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3.10 TIMBER CUTTING

Select and cut spanning members to minimise allowable defects and avoiding knots and short grain on edges in the middle third, and shakes, splits and checks at mid-span and close to ends.

3.11 STRAIGHTENING STUDS

Cutting for straightening to comply with NZS 3604, 8.5.3, Straightening studs.

3.12 TIMBER PLATES AND FURRING

Fix to steelwork with bolts and washers or approved proprietary fastenings at 1 metre maximum spacing and not less than 2 fixings to each member, or to engineering specific design.

3.13 HOLES AND NOTCHES

Limit holes and notches, checks and half-housing for the structure to those allowable in NZS 3604. Neatly form holes and notches for services without lessening the structural integrity of the member.

3.14 EXPOSED TIMBER CONNECTORS AND FIXINGS

Do not use steel timber connectors and fixings on any structural framing exposed to view unless detailed on the drawings.

3.15 POWDER-ACTUATED FASTENING TOOLS

Comply with the requirements of WorkSafe and the Health and Safety at Work Act 2015. Powder-actuated fastening tool operators to have the appropriate current Certificate and/or Licence and tools to have the appropriate certificate of fitness if necessary.

3.16 ADDITIONAL FRAMING

Position and fix all necessary members for the fixing of all services, fittings, fixtures, edges of linings or claddings, and to provide lateral support to load carrying framing.

3.17 FORM NAILED JOINTS

Fully drive nails in all structural joints with the number and location for each particular joint, to the requirements of the nailing schedules of NZS 3604. Where splitting could occur, pre-drill to 80% of nail diameter.

3.18 FORM BOLTED JOINTS

Drill for and set bolts to ensure full bearing and development of the joint strength, with tension to just set the washers into timber or to engineering specific design.

3.19 FIT CONNECTORS AND FIXINGS

Fit connectors and fixings to obtain full bearing over all contact surfaces and full development of the required loading capacity for that particular joint and in accordance with the manufacturer's requirements or to engineering specific design.

3.20 FIT CAVITY BATTENS

Fit and fix 20mm cavity battens over wall underlay or rigid air barrier. Temporary fix battens before being permanently fixed into the framing with the cladding fixings, to the requirements of the manufacturer or to NZBC E2/AS1 and BRANZ BU 673. Make allowances for cladding control joints where required. Fit and fix related flashings. Fit and fix cavity closers to base of walls, open horizontal (or raking) junctions and over openings (windows, meters etc). Use cavity spacers set to 5° fall where fixing is required between cavity battens.

3.21 FIT STRUCTURAL CAVITY BATTENS

Fit and fix 20mm cavity battens over wall underlay or rigid air barrier. Permanently fix battens onto the framing using 60mm x 2.8mm jolt head (60mm x 2.87mm power-driven) hot-dip galvanized nails, or 64mm x 2.8mm power driven stainless steel annular grooved nails at 300mm centres maximum up to Very High Wind Zone and 250mm centres maximum for Extra High Wind Zone, and staggered 12mm either side of the batten centreline, to BRANZ BU 673, part 6. Make allowances for cladding control joints where required. Fit and fix related flashings. Fit and fix cavity closers to base of walls, open horizontal (or raking) junctions and over openings (windows, meters etc). Use cavity spacers set to 5° fall where fixing is required between cavity battens.

3.22 FIT BRACING

Fit and fix subfloor, wall and roof bracing elements to the requirements of the manufacturer or to NZS 3604, to develop the full number of bracing units required.

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3.23 DPC TO LOSP TREATED TIMBER
Refer to 4161 UNDERLAYS, FOIL AND DPC section

3.24 DPC TO TIMBER
Refer to 4161 UNDERLAYS, FOIL AND DPC section

Completion

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

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4 SELECTIONS

4.1 SUB-FLOOR FRAMING - RADIATA PINE

Member	Species	Grade	Treatment
Bearers:	Radiata pine	SG8	H1.2
Ground floor joists:	Radiata pine	SG8	H1.2

4.2 FLOOR FRAMING - RADIATA PINE

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

4.3 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

4.4 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
Valley boards:	Radiata pine	Merch	H1.2
Sarking:	Radiata pine	Merch	H1.2
Skillion roof framing:	Radiata pine	SG8	H1.2
Enclosed flat roof framing:	Radiata pine	SG8	H1.2

4.5 INTERIOR WALL 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 CEILING FRAMING - RADIATA PINE

Member	Species	Grade	Treatment
Ceiling joists:	Radiata pine	SG8	H1.2
Timber ceiling battens:	Radiata pine	SG8	H1.2

4.7 CAVITY BATTENS

Cavity battens	Species	Grade	Treatment
Timber - Structural	Radiata pine	Merch	H3.2
Timber - Non Structural	Radiata pine	Merch	H3.1

4.8 DPC

Refer to 4161T UNDERLAYS, FOIL AND DPC section

4.9 NAILS

Ref NZS3604, Table 4.1

4.10 SCREWS

Ref NZS3604, Table 4.1

4.11 BOLTS AND COACH SCREWS

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Ref NZS3604, Table 4.1

4.12 NAIL PLATES
Ref NZS3604, Table 4.1

4.13 CONNECTORS
Ref NZS3604, Table 4.1

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4131EB EQUUS SOPREMA COLPHENE TANKING MEMBRANE

1 GENERAL

This section relates to the application of Equus Industries Ltd COLPHENE BSW tanking membrane system pre-applied or post-applied to below ground concrete structures and screed protected areas in construction.

It includes:

- waterproof tanking membranes
- components and accessories to complete application

1.1 RELATED WORK

Refer to 7431 DRAINAGE or 7441 GROUNDWATER DRAINAGE for subsoil drainage to basement walls.

1.2 ABBREVIATIONS AND DEFINITIONS

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

The following abbreviations apply specifically to this section:

SBS	Styrene-Butadiene-Styrene

The following definitions apply specifically to this section:

SBS modified bitumen	Modified bitumen (SBS) is an elastomeric additive to bitumen that, when cooled, exhibits rubber-like properties

Documents

1.3 DOCUMENTS

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

NZBC E2/AS1	External moisture provisions for timber-framed buildings up to 10 m in height
NZS 3114	Specification for concrete surface finishes
NZS 3604	Timber-framed buildings

1.4 MANUFACTURER/SUPPLIER DOCUMENTS

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

Equus Product Technical Data Sheets and Safety Data Sheets
Equus SOPREMA COLPHENE BSW standard detail drawings
Equus SOPREMA Quality Assurance (QA) Checklist
BRANZ Appraisal 1037 COLPHENE BSW TANKING MEMBRANE SYSTEM
WMAI Code of Practice for Below-Grade Tanking Membranes

Manufacturer/supplier contact details

Company:	Equus Industries Ltd
Web:	www.equus.nz
Email:	victoria@equus.nz
Telephone:	Southern Branch, Christchurch: 03 353 2434 / 0275126352

Warranties

1.5 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

20 years	For Equus SOPREMA COLPHENE BSW and COLPHENE 3000 tanking membranes. It includes an appropriate Maintenance Statement.

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- Provide this warranty on the Equus Industries Ltd standard form (if unavailable, use the standard form in the general section 1237WA WARRANTY AGREEMENT)
- Commence the warranty from the date of Practical Completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

1.6 WARRANTY - INSTALLER/APPLICATOR

Provide an Equus certified applicator warranty:

10 years	For application of Equus SOPREMA COLPHENE BSW and COLPHENE 3000 tanking membranes.

- Provide this warranty on the applicator standard form (if unavailable, use the standard form in the general section 1237WA WARRANTY AGREEMENT)
- Commence the warranty from the date of Practical Completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.7 NO SUBSTITUTIONS

Substitutions are not permitted to any specified Equus SOPREMA COLPHENE BSW and COLPHENE 3000 tanking membranes or associated components and products.

1.8 QUALIFICATIONS

Waterproofing work to be carried out by approved applicators certified by Equus Industries Ltd. Refer to the general section 1270 CONSTRUCTION for additional requirements relating to qualifications. Contact Equus Industries Ltd for list of approved applicators.

1.9 MAINTENANCE CONTRACT PROPOSAL

Provide a proposed contract for the annual inspection of the tanking membrane by the certified installer, to ensure weather tightness and durability of:

- the top edge of the membrane sheet
- the sheet protection at that top edge
- the subsoil drainage is not blocked and is free draining to an approved outlet
- check all associated building elements that could impact on the durability of the membrane

Compliance information

1.10 INFORMATION REQUIRED FOR CODE COMPLIANCE

Provide the following compliance documentation: -

- Applicator's approval certificate from the manufacturer / importer / distributor
- Manufacturer's, importer's or distributors warranty
- Applicator’s warranty
- Producer Statement - Construction from the applicator / installer
- Other information required by the BCA in the Building Consent Approval documents.

Performance

1.11 PRE-INSTALLATION MEETING

Convene a meeting between the applicator, contractor, all associated consultants and Equus to ensure all parties know what is required for effective performance of the system.

1.12 PROJECT SPECIFIC DETAILS

Where a standard Equus SOMPREMA COLPHENE BSW or COLPHENE 3000 detail does not exist, or if a standard detail cannot be applied, an approved alternative must be obtained from Equus before proceeding with the installation.

1.13 PRESSURE RATING

Obtain a written assurance from Equus that the waterproofing system, comprising membrane and jointing methods, is capable of sustaining the designated water pressure head. Refer to SELECTIONS for the designated water pressure head.

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1.14 INSPECTIONS AND QUALITY ASSURANCE

Maintain quality control necessary to ensure that work is performed in accordance with this specification and the qualifying requirements of Equus.

2 PRODUCTS

Materials

2.1 COLPHENE BSW H WATERPROOFING TANKING MEMBRANE

3.5mm thick SBS modified bitumen waterproofing membrane with non-woven polyester reinforcement. Upper surface adheres to in-situ poured concrete and underside is covered with thermofusible plastic film.

2.2 COLPHENE BSW V SELF-ADHERED WATERPROOFING TANKING MEMBRANE

3.0mm thick self-adhesive SBS modified bitumen waterproofing membrane with composite reinforcement. Upper surface adheres to in-situ concrete and underside is covered with silicone release film.

2.3 COLPHENE 3000 SELF-ADHERED WATERPROOFING TANKING MEMBRANE

1.5mm thick self-adhesive SBS modified bitumen waterproofing membrane with tri-laminated woven polyethylene facer. The underside is covered with silicone release film.

Components

2.4 PRIMER - FOR ICF BLOCK

Equus ELASTOCOL STICK H20 water-based primer for self-adhered membranes compatible with polystyrene substrates.

2.5 SELF-ADHERED REINFORCING STRIP - COLPHENE BSW V

3.0mm thick self-adhesive SBS modified bitumen waterproofing membrane reinforcing strip for reinforcement of internal and external corners.

2.6 LIQUID APPLIED WATERPROOFING MEMBRANE - ALSAN FLASHING

One-component polyurethane bitumen resin liquid applied waterproofing membrane for detailing of penetrations and other details.

2.7 LIQUID APPLIED WATERPROOFING MEMBRANE - MATACRYL THIX

Viscous, urethane-modified, pre-reacted 100% solid membrane system based on acrylic monomers for detailing of penetrations and other details.

2.8 EQUUS BITUMEN ANGLE FILLETS

Triangular angle fillet of rubber modified bitumen.

2.9 LIGHTWEIGHT PROTECTION AND DRAINAGE LAYER

Equus protection & drainage layer, high density polypropylene nodular sheet with laminated geotextile layer.

2.10 EQUUS TERMINATION BAR

Extruded aluminium profile, 2mm thick x 110mm high x 2.4m long.

2.11 EQUUS FIXINGS

Galvanized screws and pressure plates for mechanical fastening of the waterproofing membrane where required.

2.12 SEALANT - ALSAN MASTIC 2200

Bitumen and synthetic rubber flexible mastic sealant.

2.13 SEALANT - SOPRASEAL

Elastomeric, solvent-free, low VOC moisture cure polyether sealant.

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3 EXECUTION

Conditions

3.1 DELIVERY, STORAGE & HANDLING OF PRODUCTS

Refer to the general section 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. Store membranes and accessory materials under conditions that ensure no deterioration or damage.

3.2 ROUTINE MATTERS

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

3.3 PRE-INSTALLATION REQUIREMENTS

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

3.4 DE-WATERING

Maintain water level at not less than 300mm below the level of the base concrete during the progress of the tanking work.

3.5 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.

Application - generally

3.6 GENERALLY

All work and materials to comply with Equus Industries Ltd installation instructions.

3.7 WEATHER CONDITIONS

Install Equus SOPREMA COLPHENE BSW membranes only in fair weather with air temperature above 7°C. Install COLPHENE 3000 membranes only in fair weather with air temperature above 10°C.

3.8 STANDARDS AND TOLERANCES

Refer to the general section 1270 CONSTRUCTION for general requirements

Application Requirements - substrate

3.9 CONCRETE SUBSTRATE - GENERALLY

Concrete to be finished to NZS 3114, U3 with a light trowel texture with all ridges removed and protrusions ground flush. Finish pile edges and fill tie holes with a non-shrink mortar. Confirm all surfaces are smooth, clean, dry and free from dust, dirt and oil. Equus do not recommend the use of curing compounds; however, when used ensure all traces of compound are gone or removed.

3.10 ICF BLOCK PREPARATION

Assemble and construct ICF block walls in accordance with the ICF block system manufacturer's Technical Literature to the locations, layout and details indicated on the design drawings. Ensure block work is cleaned down, free of debris and dry with no damage or defects.

3.11 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 an Equus bituminous fillet or modified cement mortar or epoxy mortar.

3.12 TURN DOWNS

Where tanking is turned over an external corner, first grind the corner to produce a smooth 5mm radius or chamfer.

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3.13 COMPACTED HARD-FILL SURFACE

Confirm that the maximum non-specific design of hard-fill is up to 600mm in depth. Ensure granular fill, sand blinding and compaction to comply with the requirements of NZS 3604. Dress off surface of hard-fill with a 15mm layer of fine, clean sand roll-compacted to a smooth surface.

3.14 REMOVE OTHER FORMWORK

Ensure that formwork has been removed or partially removed from the other face(s) to the membrane face, to the extent that it allows moisture to escape from the concrete to ensure no vapour pressure develops beneath the membrane.

Application - loose laid under slab waterproofing membrane

3.15 LOOSE LAY COLPHENE BSW H TO FOOTINGS

Unroll Equus SOPREME COLPHENE BSW H membrane and align the first roll, loose laid over substrate and cut to length. Lay subsequent rolls ensuring membrane is flat and laps are aligned. Lap roll edges 100mm minimum and end laps 150mm minimum, offset in adjacent runs. Press self-adhesive DUO SELVEDGE laps closed and fully heat weld with gas torch. Take care when placing reinforcing steel to avoid puncture or damage to the membrane.

COLPHENE BSW H membrane shall connect to DPM under-slab using a COLPHENE 3000 sandwich bandage.

Application - post-applied self-adhered membrane on concrete, masonry or ICF block walls

3.16 APPLY PRIMER

Apply ELASTOCOL STICK H20 primer to all polystyrene substrates according to manufacturer spread rates.
Apply ELASTOCOL STICK primer may be used to any concrete substrates according to manufacturer spread rates.

3.17 REINFORCE CORNERS - COLPHENE BSW V

Reinforce internal and external corners to vertical areas with a self-adhered strip of COLPHENE BSW V membrane.

3.18 INSTALL SELF-ADHERED COLPHENE BSW V

Remove silicone backing and apply a reinforcing strip of COLPHENE BSW V self-adhesive membrane at the connection between the vertical COLPHENE BSW V membrane and the horizontal COLPHENE BSW H membrane, fully pressing in place. Apply COLPHENE BSW V vertically aligned to wall, pressing evenly and using a soft broom or roller to prevent trapped air bubbles. Lap roll edges 100mm minimum and end laps 150mm minimum, offset in adjacent runs. Press laps closed and fully heat weld with gas torch or hot air gun.

Application - detailing & membrane termination

3.19 DETAILING

All detailing including outlets and pipe penetrations to be in accordance with Equus technical literature and detail drawings using ALSAN FLASHING or MATACRYL THIX. Seal membrane edges and termination bars using ALSAN MASTIC 2200 or SOPRASEAL.

Application - protection and backfilling

3.20 QUALITY ASSURANCE (QA) & QUALITY CONTROL

As sections of the tanking are completed, arrange for inspection of the work before covering with protective sheets, walls, slabs or back fill. Complete Equus QA Checklist and return to Equus Industries Ltd for warranty purposes.

3.21 INSTALL EQUUS PROTECTION & DRAINAGE LAYER TO VERTICAL MEMBRANE

Protect the vertical tanking from damage by abrasive materials, expansive soils and during back filling by installing Equus protection and drainage layer. Secure drainage layer in place using Equus termination bar and ALSAN MASTIC 2200 sealant to spot stick the drainage layer to the membrane and seal top of the termination bar.

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3.22 PROTECT HORIZONTAL MEMBRANE

After laying is complete the membrane can be protected until the floor slab is poured by covering the tanking with a 50mm layer of 15MPa blinding concrete or compressed cement fibre sheets or similar protective boards suitable for the intended purpose or weight of traffic. This situation arises when there is an extended delay between the membrane installation and the placement of the floor slab or where vehicles and other construction machinery are being taken over the membrane. Remove protective boards prior to placement of reinforcement steel and concrete pour.

3.23 BACKFILLING

Provide a drain coil with a minimum diameter of 100mm (incorporating a filter material) to the base of the foundation. The outlet must discharge to an approved outlet. Install to NZBC E2/AS1. Place free draining granular backfill behind the tanked wall and around the drain coil. An impervious top coating is required above the free draining granular backfill to manage the surface water away from the building with a minimum fall of 1:30.

Application - Repairs

3.24 REPAIRS TO DAMAGED AREAS

Heat weld a piece of COLPHENE BSW H of suitable size to cover the damaged area with a minimum overlap of 130mm on all sides on the exterior surface.

NOTE: Contractor to notify the waterproofing applicator if any damage occurs.

Completion

3.25 COMPLETION MATTERS

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

4 SELECTIONS

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

Tanking waterproofing membrane

4.1 COLPHENE BSW H WATERPROOFING MEMBRANE - LOOSE-LAID APPLICATION UNDER FLOOR SLAB

Location:	Garage Footings
Supplier:	Equus
Brand:	SOPREMA COLPHENE BSW H
Thickness:	3.5mm
Insulation:	Not Required

4.2 COLPHENE BSW V WATERPROOFING MEMBRANE - POST-APPLIED TO WALL

Location:	To retaining Polyblock walls to garage
Supplier:	Equus
Brand:	SOPREMA COLPHENE BSW V
Thickness:	3.5mm
Protection Board:	Equus protection & drainage layer
Insulation:	Integral to Polyblock

Detailing

4.3 SEALANT

Location:	Detailing membrane edges and termination bars
Supplier:	Equus
Brand:	ALSAN MASTIC 2200 or SOPRASEAL

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4161PC PRO CLIMA WALL AND ROOF UNDERLAYS, TAPES & ACCESSORIES

1 GENERAL

This section relates to the application of **Pro Clima NZ Limited** external wall and roof underlays, internal floor protection membranes, tapes and accessories.

1.1 RELATED WORK

Refer to 4161PI PRO CLIMA INTERNAL AIRTIGHTNESS SYSTEM for INTELLO® PLUS reinforced high performance air barrier & vapour control layer

1.2 ABBREVIATIONS AND DEFINITIONS

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

The following abbreviations apply specifically to this section:

NZMRM	New Zealand Metal Roofing Manufacturers Association Inc.
MVTR	Moisture vapour transmission resistance
TEEE	Thermoplastic Elastomer-Ether Ester

The following definitions apply specifically to this section:

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

Documents

1.3 DOCUMENTS

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

NZBC B2/AS1	Durability provisions for building elements
NZBC C/AS2	Protection from fire for buildings other than risk group SH
NZBC E2/AS1	External moisture provisions for timber-framed buildings up to 10 m in height
NZBC F2/AS1	Hazardous building materials
AS 1530.2	Methods for fire tests on building materials, components and structures - Test for flammability of materials
NZS 2295	Pliable, permeable building underlays
NZS 3604	Timber-framed buildings
AS/NZS 4200.1	Pliable building membranes and underlays - part 1: materials
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
CodeMark™ CMNZ30032 verH	SOLITEX EXTASANA Wall Underlay

1.4 MANUFACTURER/SUPPLIER DOCUMENTS

Pro Clima documents relating to work in this section are:

SOLITEX EXTASANA ADHERO® Mass Timber Application Guide
SOLITEX® ADHERO FC & SOLITEX EXTASANA ADHERO® Wall Application Guide Version 2.0 dated January 2026
SOLITEX EXTASANA ADHERO® Mass Timber Moisture Protection
SOLITEX MENTO® Application Guide 24.06.2025
BRANZ Appraisal 815 (2024) - TESCON EXTOSEAL Sill Tape
BRANZ Appraisal 838 (2024)- TESCON EXTORA Sealing Tape
BRANZ Appraisal 855 (2025)- SOLITEX MENTO 3000 Roof and Wall Underlay
BRANZ Appraisal 953 (2024) - KAFLEX and ROFLEX Grommets
BRANZ Appraisal 989 (2023) - SOLITEX EXTASANA ADHERO® Self-adhesive Underlay - Amendment 1

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BRANZ Appraisal 1163 (2021) - SOLITEX EXTASANA® Wall Underlay
SOLITEX UM CONNECT Application Instructions
Specification Guidelines 30 January 2026
Early-Close-In with SOLITEX EXTASANA®
SOLITEX EXTASANA® Early Close-In Application Guide for Vertical Cladding

Manufacturer/supplier contact details

Company:	**Pro Clima NZ Limited**
Web:	www.proclima.co.nz
Email:	welcome@proclima.co.nz
Telephone:	0800 pro clima (776 254)

Warranties

1.5 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

10 years	For Pro Clima system

- Provide this warranty on the Pro Clima standard form.
- Commence the warranty from the date of purchase of the product from the manufacturer.

Refer to the Pro Clima warranty agreement and the general section 1237 WARRANTIES for additional requirements.

1.6 WARRANTY - INSTALLER/APPLICATOR

Provide an installer warranty:

2 years:	For installation

- Provide this warranty on the installer/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.

Compliance

1.7 COMPLIANCE - BRANZ APPRAISAL 815

TESCON EXTOSEAL Sill Tape has been appraised as meeting provisions of the NZBC when used within the Conditions and Limitations of its BRANZ Appraisal 815.

1.8 COMPLIANCE - BRANZ APPRAISAL 838

TESCON EXTORA Sealing Tape has been appraised as meeting provisions of the NZBC when used within the Conditions and Limitations of its BRANZ Appraisal 838.

1.9 COMPLIANCE - BRANZ APPRAISAL 855

SOLITEX MENTO 3000 Roof and Wall Underlay has been appraised as meeting provisions of the NZBC when used within the Conditions and Limitations of its BRANZ Appraisal 855.

1.10 COMPLIANCE - BRANZ APPRAISAL 953

KAFLEX and ROFLEX Grommets have been appraised as meeting provisions of the NZBC when used within the Conditions and Limitations of their BRANZ Appraisal 953.

1.11 COMPLIANCE - BRANZ APPRAISAL 989

SOLITEX EXTASANA ADHERO® Self-adhesive Underlay has been appraised as meeting provisions of the NZBC when used within the Conditions and Limitations of its BRANZ Appraisal 989.

Requirements

1.12 NO SUBSTITUTIONS

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

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1.13 QUALIFICATIONS WORKERS – MANUFACTURER / SUPPLIER REQUIREMENTS

Installation to be carried out by or under the supervision of a Licensed Building Practitioner (LBP) with the relevant License Class.

Installers to be experienced in the installation of Pro Clima products and familiar with Pro Clima NZ Limited technical literature and the related documents listed in this design i.e. NZMRM CoP. Refer to 1270 CONSTRUCTION for additional requirements relating to qualifications.

2 PRODUCTS

Wall underlays

2.1 WALL PROTECTION MEMBRANE - PEEL AND STICK

SOLITEX EXTASANA® ADHERO wall underlay to NZS 2295, comprised of a non-porous, UV stable, water resistant TEEE film, laminated between two layers of non-woven spun-bonded polypropylene, coloured blue on the top surface and grey on the bottom. Pressure sensitive solid acrylic adhesive layer on underside. PE release paper. Watertight to >10,000mm water column pressure, with very low MVTR (diffusion open).

Has a Flammability Index of ≤ 5, when tested to AS 1530.2 and meets the requirements of NZBC C/AS2, paragraph 4.12.5.2 (b), for suspended flexible fabrics, NZBC B2 Performance B2, 3.1(a), 3.1(b), 3.2, NZBC E2 Performance E2, 3.2 and NZBC F2 Performance F2. Supplied in rolls 1.5m x 30m long (45m²)²) and 0.5m x 30m long (15m²) for internal and external corners.
SOLITEX EXTASANA® ADHERO must be covered and protected against weather or ultraviolet light within 180 days.

Roofing underlays

2.2 ROOF UNDERLAY - MEDIUM WEIGHT, TYPE R4, VERY HIGH EXPOSURE (90 DAYS), SELF-ADHESION STRIP

SOLITEX MENTO® 3000 CONNECT consists of a waterproof, non-porous diffusion open membrane laminated to two layers of polypropylene fleece. Has a flammability Index of ≤ 5, when tested to AS 1530.2. Complies with NZBC C/AS2, paragraph 4.12.5.2 (b), for suspended flexible fabrics. Refer to BRANZ Appraisal 855 for details. Available in rolls 1.5m and 3m wide x 50m long. Self-supporting to 1200mm.

SOLITEX MENTO® 3000 connect, must be covered and protected against weather or ultraviolet light within 90 days.

Components

2.3 8mm SEPARATION MESH

Polypropylene 3D separation layer. Available in 1.4 x 30m x 8mm thick rolls.

2.4 WINDOW AND DOOR WEATHERTIGHT CONNECTION STRIP

CONTEGA® EXO exterior window and door connection tape for SOLITEX EXTASANA® wall underlay comprised of PP microfibre fleeces, used for weathertight connection to window and door frames to the wall underlay or other weathertightness layer. Supplied in rolls 85mm and 120mm wide x 30m long for different framing widths.

2.5 WINDOW AND DOOR CONNECTION TAPE

CONTEGA SOLIDO EXO-D, a full-surface adhesive plaster/window-sealing tape with an additional adhesive zone on the fleece side, for exterior use. Can be plastered over directly.

2.6 MULTI-PURPOSE ADHESIVE

ORCON® Classic multi-purpose adhesive, for bonding Pro Clima membranes to rough adjoining structural components or mineral surfaces. Supplied in a 310ml cartridge or 600ml sausage.

2.7 PRIMER

TESCON® PRIMER RP is a solvent free acrylic copolymer used to stop water capillarity in the fleece of SOLITEX EXTASANA ADHERO® when used in low pitch roof applications. Used to pre-treat rough or dirty surfaces before applying SOLITEX® ADHERO VISTO floor protection membrane on internal floors, or before applying COMPEGO sealing tape. Supplied in a 1 litre bottle.

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2.8 FAÇADE CONTROL JOINT STRIP

TFLEX façade control joint strip for inter-floor transitions wtihin the WRB layer. Comprises a sealing strip made from strong and highly flexible Thermoplastic Polyurethane for control joints and seismic movement joints in facade inter-floor transitions. Fire retardant with high UV stability, compatible with the SOLITEX EXTASANA ADHERO® or SOLITEX® ADHERO FC façade applications.

Tapes

2.9 WEATHERTIGHT SEALING TAPE

TESCON EXTORA® weathertight sealing tape, a multi-purpose, UV stable, pressure-sensitive, self-adhering tape comprised of a PP fleece protection layer, solid acrylic glue and siliconized release backing paper. Suitable for jambs and heads of framed openings only. Supplied in rolls 60mm, 100mm, 150mm and 200mm wide x 30m long.

Note: TESCON EXTORA® can be exposed to weather or ultraviolet light for a period of up to 180 days.

2.10 SILL TAPE

TESCON EXTOSEAL® Sill Tape, a butyl rubber, pressure-sensitive, self-adhering, one-piece stretchable, self-sealing, non-bitumen sill tape with a siliconized release backing paper. Workable in cold temperatures, down to - 20°C. Does not melt in the heat and can be applied to damp surfaces. Complies with NZBC E2/AS1, paragraph 9.1.4.1(b). Refer to BRANZ Appraisal 815 for details. Supplied in rolls 150mm, 200mm or 300mm wide x 20m long. TESCON EXTOSEAL® can be exposed to weather or ultraviolet light for a period of up to 180 days.

2.11 WEATHERTIGHT JOINERY SEALING TAPE

TESCON EXTORA® PROFIL weathertight joinery sealing tape, UV stable, pressure-sensitive, self-adhering tape comprised of a PP fleece protection layer, solid acrylic glue and a split, siliconized release backing paper. Applied to perimeter of joinery extrusion and joined to wall underlay. Supplied in rolls 60mm wide x 30m long.

2.12 NAIL & SCREW SEALING TAPE

TESCON® NAIDECK double-sided butyl rubber self-sealing tape, water resistant, reinforced, non-bitumen, used on the underside of a purlin / batten on roofs and behind façade clip and mounts on walls, to form a seal around nail or screw penetrations. Supplied in rolls 50mm wide x 20m long.

2.13 DOUBLE-SIDED TAPE

DUPLEX Double-sided tape comprised of siliconized release paper, used for bonding the overlaps of roof underlay SOLITEX MENTO® membranes and fixing of membranes to steel frame structures. Supplied in rolls 25mm wide x 80m long.

Accessories

2.14 SEALING GROMMETS FOR ROUND CABLES - SINGLE, 5-12MM DIAMETER

KAFLEX mono sealing grommets 145mm x 145mm, manufactured from special reinforced paper with EPDM. For single cables of diameter 5 - 12mm.

Suitable for sealing penetrations through roof and wall underlays. KAFLEX grommets can be exposed to weather or ultraviolet light for a period of up to 180 days.

2.15 SEALING PATCH FOR CABLES ALREADY INSTALLED, UP TO 20MM DIAMETER

KAFLEX post, cable sealing grommet, flexible and elastic for airtight seals around cables that are already in place.

2.16 MULTIPLE CABLE GROMMET FOR UP TO 16 CABLES, 5-12MM DIAMETER

KAFLEX multi, cable sealing grommet manufactured from EPDM with an integrated adhesive flange. Suitable for sealing up to 16 cables of 4.8 - 12mm diameter each in facades and roof linings.

2.17 SEALING GROMMET - FOR PIPES, 15-30mm DIAMETER

ROFLEX 20 self-adhesive sealing grommet for pipes manufactured from PP fleece, solid acrylic glue and EPDM rubber, 140mm x 140mm in size. Sealing grommet for pipes of diameter 15mm-30mm.


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Suitable for sealing penetrations through roof and wall underlays, for indoor and outdoor applications. ROLEX 20 grommets can be exposed to weather or ultraviolet light for a period of up to 180 days.

2.18 SEALING GROMMET - FOR PIPES, 30 - 320mm DIAMETER

ROFLEX 30/50/100/150/200/250/300 self-adhesive sealing grommet for pipes manufactured from PP fleece, solid acrylic glue and EPDM rubber, vary in size from 140mm x 140mm to 500mm x 500mm. Sealing grommet for pipes of diameter 30-50mm, 50-90mm, 100-120mm, 120-170mm, 170-220mm, 220-270mm and 270-320mm.

Suitable for sealing penetrations through roof and wall underlays, for indoor and outdoor applications. ROLEX 30/50/100/150/200/250/300 grommets can be exposed to weather or ultraviolet light for a period of up to 180 days.

2.19 SEALING GROMMET FOR UP TO 9 PIPES/CONDUITS, 15-30MM DIAMETER

ROFLEX 20 multi, a multiple cable sealing grommet manufactured from EPDM. Creates an airtight seal for up to 9 cables of 15 - 30mm diameter in façades and roof underlays. ROFLEX 20 multi can be exposed to ultraviolet light for up to 180 days

2.20 SAFETY MESH

Safety mesh**,** 2mm x 150 x 300mm galvanized or PVC coated safety mesh to AS/NZS 4389.

2.21 ROOF SARKING / SUBSTRATE

Refer to sarking section 4337 PLYWOOD ROOFING & DECKING SUBSTRATE

2.22 GUTTER AND UNDER FLASHINGS

SOLITEX MENTO® range roof underlay to NZS 2295, cut to width for use under valley, apron flashing and internal gutters.

2.23 CAVITY CLOSERS, EAVES FLASHINGS, RIDGE VENT FLASHINGS

Fix cavity closers, eaves and ridge vent flashings and finishing accessories to complete the Pro Clima Roof Ventilation system in accordance with SOLITEX MENTO® Roof Application Guide and to Pro Clima Construction details.

Accessories - FORTX MELIOR system for rainscreen facades

2.24 AIR BARRIER/VAPOUR CONTROL LAYER

Refer to 4161PI PRO CLIMA INTERNAL AIRTIGHTNESS SYSTEM for INTELLO® PLUS reinforced high performance air barrier & vapour control layer.

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 1270 CONSTRUCTION for requirements relating to defective or damaged work, removal of protection and cleaning.

3.3 GENERAL REQUIREMENTS

Design application and installation of Pro Clima NZ Limited products to NZBC E2/AS1, BRANZ Appraisals, Pro Clima Technical Literature and Industry Codes of Practice.

3.4 INSPECTION

Before starting work, check that the building construction phase will allow work of the required standard. Carry out remedial work identified before laying underlay.

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Preparation

3.5 PREPARATION

Before starting work, ensure all surfaces are stable, dry, smooth, and free from dust, dirt, silicone and grease. Remove all unwanted material from the surface with a vacuum cleaner or cloth if necessary. Remove flaking and loose materials such as peeling paintwork, building papers and labels. Adhesion to frozen surfaces not possible, if in doubt carry out adhesion tests.

Application - wall underlay - SOLITEX EXTASANA

3.6 SCOPE LIMITATIONS - PEEL AND STICK WALL PROTECTION MEMBRANE OVER RIGID WALL UNDERLAYS

SOLITEX EXTASANA® ADHERO Peel and Stick Wall Protection Membrane is to be used as a flexible wall underlay over rigid wall underlays on timber and steel framed buildings within the following scope limitations:

- The scope limitations of NZBC E2/AS1, 1.1.1 Scope of this document, with regards to building height and floor plan area.
- With absorbent and non-absorbent wall claddings installed over an 18mm minimum drained cavity.
- With masonry veneer to NZBC E2/AS1.
- Situated in NZS 3604 Wind Zones up to and including Extra High.

3.7 FIX SELF-ADHESIVE WALL UNDERLAY

Fix wall underlay in accordance with SOLITEX EXTASANA® ADHERO Instruction Guide and as follows:

- Mark a horizontal line across RIGID WALL UNDERLAY as a guide.
- Apply SOLITEX EXTASANA ADHERO underlay to exterior walls from below bottom plate in horizontal application only.
- Allow a 150mm minimum lap at horizontal joins.
- Press SOLITEX EXTASANA ADHERO onto substrate using a Pressfix XL applicator tool or a hard rubber roller of approximately 150mm width.
- Tape vertical overlaps with Pro Clima TESCON EXTORA® to increase weathertightness. Repair any forced tears using TESCON EXTORA®.
- Note: Fastenings behind brick veneer must have equivalent service life of 50 years. Refer to NZS 3604 Tables 4.1, 4.2 and 4.3.
- When ready to install doors and windows cut at each opening at 45° from each corner. Pull SOLITEX EXTASANA® ADHERO flaps inside and fasten to frame.
- Apply TESCON EXTOSEAL® sill tape.

3.8 METAL CLADDING ON TIMBER CAVITY BATTENS

Fix strip of generic DPC as a separator between timber and metal cladding.

Application - roofing underlay

3.9 SAFETY MESH

Lay safety mesh over exposed roof areas fixed in accordance with AS/NZS 4389 and NZMRM CoP.

3.10 SCOPE LIMITATIONS - OVER RIGID ROOF SARKING

SOLITEX EXTASANA ADHERO® Self-Adhesive Underlay is to be used over plywood and OSB roof sarking on timber and steel framed buildings within the following scope:

- The scope limitations of NZBC E2/AS1, 1.1.1 Scope of this document, regarding building height and floor plan area.
- With roof claddings in accordance with NZBC E2/AS1, 8.1-8.4
- Situated in NZS 3604 Wind Zones up to and including Extra High.

3.11 SCOPE LIMITATIONS - OVER ROOFS OF SIP AND CLT CONSTRUCTION

SOLITEX EXTASANA ADHERO® Self-Adhesive Underlay is to be used over plywood and OSB roof sarking on timber and steel framed buildings within the following scope:

- The scope limitations of NZBC E2/AS1, 1.1.1 Scope of this document, regarding building height and floor plan area.
- used on buildings constructed from Structural Insulated Panels (SIPs) or
- used on buildings constructed from Cross Laminated Timber (CLT) and

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- With roof claddings in accordance with NZBC E2/AS1, 8.1-8.4
- Situated in NZS 3604 Wind Zones up to and including Extra High.

3.12 SCOPE LIMITATIONS - SPECIFIC DESIGN ROOFS

SOLITEX EXTASANA ADHERO® Self-Adhesive Underlay may be used over roof sarking on buildings subject to specific weathertightness design.

3.13 FIX ROOF UNDERLAY - PRO CLIMA METHOD WITH SELF-ADHESION STRIP

Fix roof underlay in accordance with SOLITEX MENTO® 3000 CONNECT Application Guide and as follows. Applicable when the underlay is separated from the roofing to provide additional ventilation to the roof space:

- Fix roof underlay at maximum 150mm centres to all framing with large-head clouts 20mm long, 8mm-12mm stainless steel staples, self-drilling screws or proprietary underlay fixings.
- Fix roof underlay horizontally and fix direct to the top of the rafter or truss top chord and secure with minimum 20mm x 45mm counter batten fixed directly over the rafter or truss member. Increase the length of fixings used to secure purlins and tile battens to the rafter or truss by the depth of the counter batten.
- All laps to be a minimum of 150mm. Seal laps with self-adhesion strips provided on either side of sheet.
- For pitches less than 10° Pro Clima recommend that the underlay is laid on solid sarking.

3.14 GUTTER AND UNDER FLASHINGS

Install SOLITEX MENTO® range roof underlay for use as an underlay to valley, apron flashings, and internal gutters. Lap under flashings with adjoining underlays. Fix SOLITEX MENTO® range soffit liner from top plate down 150mm past ribbon plate.

Application - tape systems

3.15 APPLY TESCON TAPE SYSTEMS

Apply TESCON tape systems in accordance with Pro Clima TESCON Installation Guides.

Note: Tapes can be specified for all joins in SOLITEX membranes to prevent wind-wash of insulation and resulting degradation of insulation performance.

Application - grommet and detail solutions

3.16 INSTALL GROMMETS AND DETAIL SOLUTIONS

Install grommets and detail solutions in accordance with Pro Clima KAFLEX and ROFLEX Installation Guides.

Application - FORTX MELIOR system for rainscreen facades

3.17 FIX AIR BARRIER/VAPOUR CONTROL LAYER

Refer to 4161PI PRO CLIMA INTERNAL AIRTIGHTNESS SYSTEM for INTELLO® PLUS reinforced high performance air barrier & vapour control layer.

Completion

3.18 COMPLETION MATTERS

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

4 SELECTIONS

For further details on selections go to www.proclima.co.nz.
Substitutions are not permitted to the following.

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Materials

4.1 PRO CLIMA SOLITEX EXTASANA® ADHERO MEMBRANE - PEEL AND STICK

Location:	Behind timber rainscreen
Manufacturer:	Pro Clima NZ Limited
Type:	SOLITEX EXTASANA® ADHERO Peel and Stick Floor, Wall and Roof Protection Membrane
Jointing & sealing tape:	TESCON EXTORA® weathertight sealing tape
	TESCON EXTOSEAL® sill tape
Adhesive:	ORCON® Classic multi-purpose adhesive
Accessories:	as required

4.2 PRO CLIMA SOLITEX MENTO 3000 CONNECT ROOF & WALL UNDERLAY, WITH SELF-ADHESION STRIP

Location:	To all roof areas except entrance awnining
Manufacturer:	Pro Clima NZ Limited
Type:	SOLITEX MENTO® 3000 CONNECT three-layer underlay
Jointing & sealing tape:	TESCON EXTORA® weathertight sealing tape
	TESCON EXTOSEAL® sill tape
Adhesive:	ORCON® Classic multi-purpose adhesive
Accessories:	as required.

Accessories

4.3 ROOF SARKING / SUBSTRATE

Location:	To all roof areas except entrance awning
Type:	12mm Plywood

4.4 GUTTER AND UNDER FLASHINGS

Jointing tape:	TESCON EXTORA

4.5 AIR BARRIER/VAPOUR CONTROL LAYER

Refer to 4161PI PRO CLIMA INTERNAL AIRTIGHTNESS SYSTEM for INTELLO® PLUS reinforced high performance air barrier & vapour control layer.

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4161PI PRO CLIMA INTERNAL AIRTIGHTNESS SYSTEM

1 GENERAL

This section relates to the supply and installation of Pro Clima NZ Limited internal intelligent air tightness and vapour control 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:

ACH	Air changes per hour
ATTMA	Air Tightness Testing and Measurement Association
DAP	Design air permeability
EDPM	Ethylene propylene diene monomer
IAB	Intelligent air barrier
IAS	Intelligent airtightness system
MVTR	Moisture vapour transmission rate
PET	Polyethylene terephthalate
PP	Polypropylene
UV	Ultraviolet

Documents

1.2 DOCUMENTS

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

AS/NZS 9972	Thermal performance of buildings - Determination of air permeability of buildings - Fan pressurization method

1.3 MANUFACTURER/SUPPLIER DOCUMENTS

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

INTELLO® System Brochure
INTELLO® Application Guide (July 2023)
INTELLO® Techincal Datasheet
INTELLO® PLUS Techincal Datasheet
INTELLO® BPIR
INTELLO® PLUS BPIR
INTELLO® Installer QA Checklist
INTELLO® ConneX Connection Strip Technical Datasheet
AEROSANA® VISCONN Technical Datasheet
AEROSANA® VISCONN Installation Instructions (March 2026)
AEROSANA® VISCONN BPIR
DASATOP® Technical Datasheet
DASATOP® Installation Instructions (March 2026)
DASATOP® BPIR
Pro Clima Warranty Agreement
BRANZ Appraisal 1149 (2021) - Intello Humidity Variable Intelligent Airtightness System - Amended 22 March 2022

Manufacturer/supplier contact details

Company:	Pro Clima NZ Limited
Web:	www.proclima.co.nz
Email:	support@proclima.co.nz
Telephone:	0800 PRO CLIMA (776 254)

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Warranties

1.4 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

10 years For Pro Clima system

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

Refer to the general section 1237 WARRANTIES for additional requirements.

1.5 WARRANTY - INSTALLER/APPLICATOR

Provide an installer/applicator warranty:

2 years For installation

- 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

1.6 QUALIFICATIONS GENERALLY

Refer to 1270 CONSTRUCTION for requirements relating to qualifications.

1.7 NO SUBSTITUTIONS

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

1.8 QUALITY CONTROL SYSTEM - MANUFACTURER / SUPPLIER REQUIREMENTS

Installer/applicator to maintain quality control system to Pro Clima NZ Ltd requirements, including but not limited to:

- Organise WINCON testing carried out by Pro Clima
- Arrange for and submit Blower Door testing to AS/NZS 9972 carried out by independent ATTMA certified tester
- Complete and submit INTELLO Installer QA Checklist

Make available quality control records if requested by the contract administrator or consenting authority.

Compliance information

1.9 COMPLIANCE - BRANZ APPRAISAL

INTELLO Humidity Variable Intelligent Airtightness System has been appraised as meeting provisions of the NZBC when used within the Conditions and Limitations of its BRANZ Appraisal 1149.

2 PRODUCTS

INTELLO® Intelligent airtightness system (IAS)

2.1 INTELLO MEMBRANE

Air barrier and vapour control layer, comprised of PP microfibre fleeces and polyethylene copolymer membrane. Supplied in rolls 1.5m wide x 20m and 50m long, and 3m wide x 50m long. Refer to SELECTIONS.

2.2 INTELLO PLUS MEMBRANE

Reinforced air barrier and vapour control layer, comprised of PP microfibre fleeces with PP reinforcement and polyethylene copolymer membrane. Supplied in rolls 1.5m wide x 20m and 50m long, and 3m wide x 50m long. Refer to SELECTIONS.

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2.3 INTELLO CONNEX CONNECTION STRIP

UV-stabilised humidity variable strip, comprised of PP microfibre fleeces and polyethylene copolymer membrane. Supplied in rolls 300mm wide and 900mm wide.

Components

2.4 TESCON VANA ADHESIVE TAPE

Airtight multi-purpose adhesive tape comprised of special PP fleece and solid acrylic adhesive with siliconized release paper. Supplied in rolls 60mm wide x 30m long.

2.5 TESCON PROFIL CORNER SEALING TAPE

Corner sealing tape comprised of special PP fleece and solid acrylic adhesive with siliconized release paper in individual strips 12 / 23 / 25mm. Supplied in rolls 60mm wide x 30m long.

2.6 TESCON PRIMER RP

Acrylic copolymer primer.

2.7 ORCON CLASSIC ADHESIVE

Multi-purpose adhesive comprised of non-aging acrylate polymers. Supplied in a 310ml cartridge or 600ml sausage.

2.8 CONTEGA IQ WINDOW AND DOOR SEALING TAPE

Window and door connection strip comprised of PP microfibre fleeces on PP copolymer membrane. Supplied in rolls 90mm wide x 30m long.

2.9 CONTEGA PV RENDER CONNECTION STRIP

Fleece tape for interior airtight plaster connections, comprised of PET fleece with functional membrane and plaster reinforcement. Supplied in rolls 200mm wide x 15m long.

2.10 DUPLEX DOUBLE SIDED TAPE

Double sided tape comprised of siliconized release paper, used for bonding the overlaps of membranes and fixing of membranes to steel frame structures. Supplied in rolls 25mm wide x 20m long.

2.11 STAPLES

Zinc plated staples. 8-10mm crown width. 8mm long legs.

Accessories

2.12 KAFLEX SEALING GROMMETS

Sealing grommets manufactured from EPDM. Available in a range of penetration configurations for cables 6-12mm diameter. Refer to SELECTIONS.

2.13 ROFLEX SEALING GROMMETS

Sealing grommets manufactured from EPDM. Available in a range of sizes for pipe and conduit penetrations 15-320mm diameter. Refer to SELECTIONS.

2.14 INSTAABOX

260mm x 130mm x 55mm deep installation box manufactured from flexible and extensible polyethylene. Suitable for up to three flush boxes. Pre-pressed exit points for cables up to 20mm in diameter.

3 EXECUTION

Conditions

3.1 DELIVERY, STORAGE & HANDLING OF PRODUCTS

Refer to 1270 CONSTRUCTION for requirements relating to delivery, storage and handling of products. Protect INTELLO and INTELLO PLUS membranes from water, moisture and exposure to direct UV radiation.

3.2 ROUTINE MATTERS

Refer to 1270 CONSTRUCTION for requirements relating to defective or damaged work, removal of protection and cleaning.

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3.3 PRE-INSTALLATION REQUIREMENTS

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

Timber substrate: 20% maximum moisture content

Installation/application

3.4 STANDARDS AND TOLERANCES

Refer to the general section 1270 CONSTRUCTION for general requirements.

3.5 INSTALLATION GENERALLY

Install in accordance with Pro Clima NZ Limited installation instructions.

INTELLO® Intelligent airtightness system installation

3.6 CO-ORDINATION

Co-ordinate the installation of INTELLO ConneX connection strips with the erection of framing and flooring.

3.7 FIX INTELLO CONNEX CONNECTION STRIP

Staple fix INTELLO ConneX connection strip to framing at 200mm centres at framing junctions (e.g. junction between external and internal walls, at uppermost ceiling framing, and at midfloor junctions on multilevel buildings). Adhere the connection strip to floor with a continuous 5mm bead of ORCON CLASSIC adhesive. Seal the connection strip to the floor with TESCON VANA tape.

3.8 INSTALL FIRST LAYER OF INTELLO MEMBRANE

Install first layer of INTELLO membrane horizontally with print facing into building interior. Leave 20mm membrane overhang onto floor. Staple fix membrane taut to framing at 100mm centres to all framing members with staples crown oriented perpendicular to direction of tension.

Use DUPLEX double side tape to temporarily fix INTELLO membrane to steel framing before staple fixing.

3.9 INSTALL SUBSEQUENT LAYERS OF INTELLO MEMBRANE

Install subsequent layers of INTELLO membrane horizontally with a minimum 100mm overlap to first layer and end laps minimum 150mm. Staple fix membrane taut to framing at 100mm centres to all framing members with staples crown oriented perpendicular to direction of tension.

Use DUPLEX double side tape to temporarily fix INTELLO membrane to steel framing before staple fixing.

3.10 SEAL INTELLO MEMBRANE LAPS

Seal all membrane laps with a continuous layer of TESCON VANA adhesive tape. At corners and tight junctions, tape membrane laps with TESCON PROFIL.

3.11 SEAL INTELLO MEMBRANE AT WINDOWS & DOORS

Seal membrane to reveal with TESCON PROFIL tape. For windows and doors without reveals, seal membrane to window and door frame with CONTEGA IQ strips.

3.12 SEAL INTELLO MEMBRANE TO FLOOR

Brush TESCON PRIMER RP onto floor substrate. Allow to dry. Adhere the 20mm membrane overhang to floor with a continuous 5mm bead of ORCON CLASSIC adhesive. Seal membrane to floor with TESCON VANA adhesive tape.

3.13 SEAL INTELLO MEMBRANE TO MASONRY SUBSTRATE

Terminate membrane at junction with masonry substrate. Seal membrane at junction with CONTEGA PV render strips adhered over membrane overlapping onto mesh over masonry substrate.

3.14 INSTALL GROMMETS

Pull the grommet over the penetrating pipe or conduit. Tape the grommet in place with TESCON VANA tape.

For self-adhesive grommets, pull grommet over the penetrating cable, pipe or conduit. Remove the release paper. Press the grommet into place to secure the adhesive bond.

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3.15 INSTALL INSTAABOX

Cut membrane and to suit INSTAABOX. Pull penetrating cable through pre-pressed perforated exit points. Fit INSTAABOX into membrane and secure in place with TESCON VANA tape.

Quality control

3.16 VERIFICATION OF INSTALLATION OF INTELLO INTELLIGENT AIRTIGHTNESS SYSTEM

Organise WINCON air leakage testing carried out by Pro Clima. Carry out air leakage test upon completion of the installation. Identify leak points by feel or smoke pen. Remedy leaks with ORCON adhesive or TESCON VANA tape.

3.17 MEASURING BUILDING PERFORMANCE

Carry out Blower Door testing to AS/NZS 9972 carried out by independent ATTMA certified tester to measure infiltration rates. Refer to SELECTIONS for DAP/ACH required.

Completion

3.18 COMPLETION MATTERS

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

4 SELECTIONS

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

4.1 DESIGN AIR PERMEABILITY

Airtightness level: ≤ 1

4.2 INTELLO INTELLIGENT AIRTIGHTNESS SYSTEM

Location:	Walls and Ceilings
Manufacturer:	Pro Clima NZ Limited
System:	INTELLO IAS
Membrane:	INTELLO
Connection strip:	INTELLO ConneX
Jointing tape:	TESCON VANA
Corner tape:	TESCON PROFIL
Adhesive:	ORCON Classic
Joinery tape:	TESCON VANA for windows/doors with reveals

4.3 PRO CLIMA PENETRATION GROMMETS

Manufacturer:	Pro Clima NZ Limited
Grommet type:	to suit application
Size:	to suit application
Jointing tape:	TESCON VANA

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4171E ECOPLY® BARRIER RIGID AIR BARRIER SYSTEM

1 GENERAL

This section relates to the supply and installation of Carter Holt Harvey Plywood Limited Ecoply® Barrier plywood as a rigid wall underlay and air barrier behind cavity wall cladding 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:

CCA	Copper chrome arsenate
PF	Phenol formaldehyde
uPVC	Unplasticized polyvinyl chloride

Documents

1.2 DOCUMENTS

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

NZBC C/AS1	Protection from fire for buildings with sleeping (residential) and outbuildings (risk group SH)
NZBC C/AS2	Protection from fire for buildings other that risk group SH
AS/NZS 1604.3:2012	Preservative-treated wood-based products - Plywood
AS/NZS 2269.0	Plywood - structural - specifications
NZS 3604	Timber-framed buildings

1.3 MANUFACTURER/SUPPLIER DOCUMENTS

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

Ecoply® Structural Rigid Air Barrier - Barrier Specification & Installation Guide (June 2026)
Ecoply® Barrier Plywood Product Technical Statement and Building Product Information Sheet
Ecoply® Barrier Safety Data Sheet
Ecoply® Barrier sITe App
Ecoply® Barrier CAD drawings
BRANZ Appraisal 827 (2025) - Ecoply® Barrier Rigid Air Barrier

Manufacturer/supplier contact details

Company:	Carter Holt Harvey Plywood Limited
Web:	www.chhply.co.nz
Email:	info@ecoply.co.nz
Telephone:	0800 326 759

Requirements

1.4 QUALIFICATIONS GENERALLY

Refer to 1270 CONSTRUCTION for requirements relating to qualifications.

1.5 NO SUBSTITUTIONS

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

Compliance information

1.6 COMPLIANCE - BRANZ APPRAISAL

Ecoply® Barrier Rigid Air Barrier has been appraised as meeting provisions of the NZBC when used within the Conditions and Limitations of its BRANZ Appraisal 827.

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Performance

1.7 EXTERNAL FIRE SPREAD - CLADDING EXEMPT FROM TESTING

To NZBC C/AS1, 5.3 External Cladding Systems or NZBC C/AS2, 5.5 External Cladding Systems, where external walls are located at a distance greater than or equal to 1.0m from a relevant boundary and a building height less than 10m.

2 PRODUCTS

Materials

2.1 ECOPLY BARRIER PLYWOOD

7mm thick, square edge, synthetic phenolic (PF) resin Type A bonded timber veneer plywood sheets, manufactured to AS/NZS 2269. H3.2 CCA treated to AS/NZS 1604.3:2012. Stress grade F8/F8. Appearance grade DD with water-resistant beige polyester powder coated on front face and four edges. Sheets marked Ecoply® Barrier. Sheets 1197mm wide. Available in 2440mm and 2745mm lengths. Refer to SELECTIONS.

2.2 GIB STANDARD PLASTERBOARD

Refer to 5113G GIB PLASTERBOARD LININGS for GIB® standard plasterboard.

Components

2.3 NAILS

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

Fixing method:	Minimum nail type:	Zone:
Hand driven	50 x 2.8mm (flat head or round head) hot-dip galvanized or better	B & C zones
Power driven Paslode Pneumatic Cladding Coil Nailer	Paslode Impulse 50 x 2.8mm hot-dip galvanized ring round head drive B20557 or better	B & C zones
Hand driven	50 x 2.8mm (flat head or round head) annular grooved stainless steel	D Zone

2.4 ECOPLY BARRIER SILL TAPE

Flexible weathertight tape with butyl rubber and polyethylene film carrier paper, siliconized foil release paper. 20m long roll. Available in 150mm and 200mm widths to suit application. Black colour.

2.5 ECOPLY BARRIER SEALING TAPE

Water-resistant tape with polypropylene fleece carrier paper and siliconized release paper. 25m long roll. Available in 60mm, 150mm, and 200mm widths to suit application. Grey colour.

2.6 GIB HANDIBRAC HOLD-DOWN BRACKET

Galvanized steel bracket by MiTek New Zealand Limited, supplied with 5 Tek screws and 2 BOWMAC screw bolts.

2.7 TIMBER PRESERVATIVE TREATMENT

Soudal Metalex Concentrated Timber Preservative treatment, in clear or green colour. Refer to SELECTIONS.

Accessories

2.8 PRO CLIMA KAFLEX CABLE SEALING GROMMET

EPDM backed, siliconized water-resistant self-adhesive grommet.

2.9 PRO CLIMA ROFLEX SEALING GROMMET

EPDM watertight grommet, size to suit penetration.

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3 EXECUTION

Conditions

3.1 DELIVERY, STORAGE & HANDLING OF PRODUCTS

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

3.2 ROUTINE MATTERS

Refer to 1250 TEMPORARY WORKS & SERVICES for protection requirements.

Refer to 1270 CONSTRUCTION for requirements relating to defective or damaged work, removal of protection and cleaning.

3.3 PRE-INSTALLATION REQUIREMENTS - TIMBER FRAMING

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

Timber substrate: 18% maximum moisture content

Installation/application

3.4 STANDARDS AND TOLERANCES

Refer to the general section 1270 CONSTRUCTION for general requirements.

3.5 INSTALLATION GENERALLY

Install in accordance with Ecoply® Structural Rigid Air Barrier - Barrier Specification & Installation Guide.

3.6 BOTTOM PLATE FIXING - BRACING SYSTEM

Fix GIB® HandiBrac® hold-down brackets at each end of bracing element with supplied fasteners. Within the length the bracing element, fix bottom plates to the requirements of NZS 3604.

3.7 TREAT CUTS

Brush timber preservative onto cut edges and penetration cut outs.

3.8 FIT ECOPLY BARRIER SHEETS

Fit Ecoply® Barrier sheets with long edge oriented vertically, beige polyester powder coated face outwards, and cut sheet ends oriented upward. Sheets to overhang the bottom plate, joist or bearer by a minimum of 25mm. Allow 2mm expansion gap between sheets.

3.9 FIX GIB STANDARD PLASTERBOARD - BRACING SYSTEM

Refer to 5113G GIB PLASTERBOARD LININGS for GIB® standard plasterboard.

3.10 FASTENERS - STANDARD NAILING PATTERN

Nail fix to framing to the standard Ecoply nail pattern. Maintain clearances to sheet edges to Ecoply requirements. Finish fastener heads flush with the panel surface.

3.11 FASTENERS - NAILING PATTERN FOR BRACING SYSTEM

Nail fix to framing to the specific Ecoply nail pattern for the brace element. Maintain clearances to sheet edges to Ecoply requirements. Finish fastener heads flush with the panel surface. Refer to Ecoply® Structural Rigid Air Barrier - Barrier Specification & Installation Guide.

3.12 FIXING TO RESIST UPLIFT

Nail fix the top of the sheet directly to the centre of the top plate using the specific Ecoply nail pattern for a 4.7kN fixing of the top plate to the studs. Fix the remainder of the sheet to standard nailing pattern. Horizontal sheet joints are not permitted within 300mm of top plate. Maintain clearances to sheet edges to Ecoply requirements. Finish fastener heads flush with the panel surface.

3.13 LINTEL CONNECTION FOR UPLIFT

Nail framing and Ecoply® Barrier sheets to Ecoply lintel connection detail for uplifts not exceeding 7.5kN.

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3.14 TAPE - GENERAL

Remove dust from sheets before adhering tape. Apply pressure to seal the tapes with minimal wrinkles.

3.15 VERTICAL ECOPLY BARRIER SHEET JOINTS - WALL PLANE

Centre Ecoply® Barrier Sealing Tape over vertical sheet joints.

3.16 VERTICAL ECOPLY BARRIER SHEET JOINTS - CORNERS

Centre Ecoply® Barrier Sealing Tape over sheet joints at external and internal wall corners.

3.17 HORIZONTAL SHEET JOINT - TAPE Z FLASHING

Apply Ecoply® Barrier Sealing Tape over lower sheet with 60mm overlap to sheet and 80mm upstand to form a Z flashing. Fit upper Ecoply® Barrier sheet over tape upstand with a 15mm expansion gap between upper sheet edge and taped-over lower sheet edge.

3.18 HORIZONTAL SHEET JOINT - FACE SEAL

Fit Ecoply® Barrier sheets with 5mm expansion gap between edges. Apply 150mm wide Ecoply® Barrier Sealing Tape to sheet face centred over sheet joint.

3.19 TAPE SPLICES & JOINTS

Where tape splices occur at a junction, create an overlapping splice of at least 50mm. Take special care to remove any wrinkles or voids at splice areas.

3.20 WINDOW & DOOR OPENINGS

Apply Ecoply® Barrier Sill Tape to cover the bottom of the opening and Ecoply® Barrier Frame Sealing Tape to the vertical trimmer stud and lintel, reinforce corners at each end of the lintel with 100m strip of Ecoply® Barrier 150m Frame Sealing Tape. Apply tapes in accordance with the Ecoply Barrier Specification and Installation Guide.

3.21 PENETRATIONS - ECOPLY BARRIER SILL TAPE

Apply Ecoply® Barrier Sill Tape to flash to Ecoply® Barrier sheet, provide 100mm minimum cover to sheet. Bandage around pipes with Ecoply® Barrier Sealing Tape with 25mm minimum width of cover to pipe.

3.22 PENETRATIONS - PRO CLIMA KAFLEX CABLE SEALING GROMMET

Apply self-adhesive Pro Clima Kaflex Cable Sealing Grommet over cable penetration to Pro Clima installation instructions.

3.23 PENETRATIONS - PRO CLIMA ROFLEX SEALING GROMMET

Apply Pro Clima Roflex Grommet over penetration and seal grommet flange to Ecoply® Barrier sheets with Ecoply Barrier Sealing Tape to Pro Clima installation instructions.

3.24 FLASHINGS

Apply Ecoply® Barrier Sealing Tape over horizontal flashings as required.

Completion

3.25 COMPLETION MATTERS

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

4 SELECTIONS

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

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4.1 ECOPLY BARRIER PLYWOOD

Location:	To all external walls
Manufacturer/supplier:	Carter Holt Harvey Plywood Ltd.
Brand:	Ecoply® Barrier plywood
Width:	1197mm
Length:	as required
Thickness:	7mm
Treatment:	H3.2 CCA
Timber certification:	FSC Certification

4.2 ECOPLY BARRIER PLYWOOD BRACING

Refer to Ecoply® Structural Rigid Air Barrier - Barrier Specification & Installation Guide for specific bracing details. For bracing element location refer to drawn documentation from engineer.

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4221 TIMBER BOARD CLADDING

1 GENERAL

This section relates to the supply and fixing of timber cladding:

- shiplap

1.1 RELATED WORK

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

1.2 ABBREVIATIONS AND DEFINITIONS

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

The following abbreviations apply specifically to this section:

FSC	Forest Stewardship Council
PEFC	Programme for the Endorsement of Forest Certification

Documents

1.3 DOCUMENTS

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

NZBC E2/AS1	External moisture provisions for timber-framed buildings up to 10 m in height
NZS 3602	Timber and wood-based products for use in building
NZS 3604	Timber-framed buildings
NZS 3617	Profiles of weatherboards, fascia boards and flooring
NZS 3631	New Zealand timber grading rules

Performance

1.4 FIXINGS, WIND

Design and use the fixings appropriate for the wind zone (R) and topographical classification (T) of this site and building height; as required by NZS 3604.

1.5 PERFORMANCE

Timber board cladding is to be installed as a non-light (UV) permeable rainscreen only.

2 PRODUCTS

Materials

2.1 UNDERLAYS

Refer to 4161PC UNDERLAYS, FOIL AND DPC section

2.2 EXTERIOR CAVITY WALL BATTENS

Radiata pine battens, minimum 20mm thickness, width and height to match timber framing studs. To NZS 3602, table 1, reference 1D.10, Requirements for wood-based building components to achieve a 50-year durability performance.

2.3 EXTERIOR CAVITY CLOSER/VERMIN-PROOFING

Perforated uPVC, aluminium or stainless steel trays with upstands. Upstand one side 10mm and the other 75mm. Length and width to suit cavity.

2.4 COVER BOARDS, BOXED CORNERS AND SCRIBERS

To profiles as detailed, with species and grading to NZS 3602, NZS 3631, but with all knots excluded. To NZS 3602, table 2, reference 2A.3, Requirements for wood-based building components to achieve a 15-year durability performance.

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Components

2.5 NAILS, STAINLESS STEEL

60mm x 2.8mm and 75mm x 3.15mm stainless steel.

2.6 FLASHINGS

Material, grade and colour as detailed and scheduled and to NZBC E2/AS1, Table C.1.1.1B: Compatibility of materials in contact, and Table C.1.1.1C: Compatibility of materials subject to run-off. Ensure that materials used for flashings are compatible with the window frame materials and fixings and cladding materials and fixings.

Finishes

3 EXECUTION

Conditions

3.1 GENERALLY

Execution to NZBC E2/AS1.

3.2 STORAGE

Take delivery of timber, dry, unmarked and undamaged. Store on site, laid flat and true under cover.

3.3 SUBSTRATE

Before starting fixing ensure that the substrate conforms with NZS 3604, section 2, table 2.1, **Timber framing tolerances** and the requirements of NZS 3604, section 6, **Foundation and subfloor framing** and NZBC E2/AS1, governing support for timber board cladding.

3.4 MOISTURE CONTENT

Immediately before starting fixing, test the moisture content of the boards. Use an electrical moisture meter to test 5% of boards, but not less than 10 boards in the centre of the length. Do not start fixing until 90% of the values obtained are within the range in NZS 3602 table 4, Allowable moisture content (%) at time of installation or in the case of framing timber at time of enclosure.

Application - preparation

3.5 FIX UNDERLAYS

Refer to 4161PC UNDERLAYS, FOIL AND DPC section

3.6 INSTALL DRAINED CAVITY

20mm minimum thickness drained cavity 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 over 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 PENETRATIONS

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

- wall underlay/building wrap to openings finished and dressed off ready for the installation of window and door frames and other penetrations
- claddings neatly finished off to all sides of openings
- installation of flashings (those required to be installed prior to installation of penetrating elements).

3.8 SET-OUT

Using laser or mechanical devices set-out the overlap boards to ensure dimension to exposed face in line of weather is constant and that boards remain horizontal/vertical. Use a string line to set out all nailing that will be visible in the finished work. Align all nailing accurately in straight lines.

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Application - fixing

3.9 FIXING, CLEAR FINISH

Coat all cut ends before fixing. Drill all fixings located within 25mm of board ends. Finish fixings flush.

3.10 FIXING VERTICAL SHIPLAP WEATHERBOARDS

Adjust horizontal set-out to ensure there is a minimum 2mm expansion gap at the overlap between successive boards. Boards to be continuous lengths over a storey height. Nail tongue to every fixing point (nogs at maximum 480mm centres). Nail other side of board just clear of lap. Line nails horizontally across the boards.

Provide cover boards to external corners in accordance to NZBC E2/AS1, Figure 9.4.5.5: External corners for vertical weatherboards. Back flash internal corners in accordance to NZBC E2/AS1, Figure 9.4.4.5: Internal corners for horizontal or vertical weatherboards, either scribe and notch internal corner or use 'W' internal corner flashing.

3.11 INSTALL FLASHINGS

Install flashings, covers and soakers as detailed on the drawings and to NZBC E2/AS1

3.12 COMPLETE

Ensure the work is complete with all flashings, finishings and trim properly installed so the cladding system is completely weathertight.

Completion

3.13 REPLACE

Replace all damaged or marked elements.

3.14 LEAVE

Leave work to the standard required for following procedures.

3.15 REMOVE

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

4 SELECTIONS

4.1 BUILDING WRAPS/UNDERLAYS

Refer to 4161PC UNDERLAYS, FOIL AND DPC section

4.2 CAVITY BATTENS

Timber species:	Radiata Pine
Treatment:	H3.1

4.3 CAVITY CLOSER/VERMIN-PROOFING

Material:	uPVC

4.4 WEATHERBOARDS

Location:	Deck and Entrance Landing
Species:	TBC
Grade:	TBC
Treatment:	TBC
Profile:	Vertical Shiplap
Dimensions:	TBC
Surface finish:	Rough Sawn
Moisture content:	16 % at fixing max.

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4239 SOFFIT CLADDING

1 GENERAL

This section relates to the supply and fixing of cladding to the underside of exterior soffits, verges and eaves and includes:

- Plywood
- Jointers
- Trim

1.1 RELATED WORK

Refer to painting section/s for the protective coating required to meet the NZBC durability requirements.

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 provisions for timber-framed buildings up to 10 m in height
AS/NZS 1604.1	Preservative-treated wood-based products - Part 1: Products and treatment
AS/NZS 2269.0	Plywood - structural - Specifications
AS/NZS 2908.2	Cellulose-cement products - Flat sheet
NZS 3602	Timber and wood-based products for use in building
NZS 3604	Timber-framed buildings
NZS 3617	Profiles of weatherboards, fascia boards and flooring
NZS 4251.1	Solid plastering: Cement plasters for walls, ceilings and soffits

Warranties

1.3 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

20 years	For Material

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

Refer to the general section 1237 WARRANTIES for additional requirements

Requirements

1.4 QUALIFICATIONS

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

1.5 HEALTH AND SAFETY

Comply with all manufacturer/supplier and WorkSafe New Zealand requirements for health and safety.

1.6 NO SUBSTITUTIONS

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

2 PRODUCTS

Plywood soffit cladding

2.1 PLYWOOD SOFFIT CLADDING

Rotary cut, radiata pine veneer ply sheet to AS/NZS 2269.0. Treated H3 to AS/NZS 1604.1.

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Plywood soffit cladding fastener

2.2 NAILS - GALVANIZED

Refer to the plywood cladding manufacturer requirements. Use annular grooved or twisted shank nails for soffit cladding.

2.3 NAILS - STAINLESS STEEL

Refer to the plywood cladding manufacturer requirements. Use annular grooved or twisted shank nails for soffit cladding.

2.4 SCREWS - STAINLESS STEEL

Refer to the manufacturer's requirements for size and use; galvanized countersunk or stainless steel to NZS 3604, Table 4.1.

2.5 ADHESIVE

Adhesive for plywood soffit cladding, used in conjunction with mechanical fixings, as required by manufacturer / supplier documents.

Plywood soffit cladding edge treatment

2.6 PLYWOOD CUT EDGE TREATMENT

A solution of 12.5% copper naphthenate in white spirits, or mineral turpentine.

Timber profiles

2.7 TIMBER COVER BATTENS

To profiles detailed/scheduled with 6x6 mm weather grooves. Species and grading to the requirements of NZS 3602 , table 2, Requirements for wood-based building components to achieve a 15-year durability performance, treated H3.1 unless durable heart wood., Select appearance grades to NZS 3631 requirements, but with all knots excluded.

2.8 TIMBER TRIM

Species and grading to the requirements of NZS 3602 , table 2, Requirements for wood-based building components to achieve a 15-year durability performance, treated H3.1 unless durable heartwood. Select appearance grades to NZS 3631 requirements, but with all knots excluded.

3 EXECUTION

Conditions

3.1 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.

3.2 HANDLING

Avoid distortion and contact with potentially damaging surfaces. Do not drag sheets across each other, or across other materials. Protect edges, corner and surface finish from damage. Reject all product with damaged faces or edges

3.3 SUBSTRATE

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

3.4 PLYWOOD CLADDING SUPPORT

Fully support all edges and joints.

3.5 EXPANSION PLYWOOD CLADDING

Provide 2-3mm gap at all edges of cladding for sheet expansion.

3.6 PLYWOOD CUT EDGE TREATMENT

Brush on surface treatment to all edges of plywood cut after treatment.

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3.7 PENETRATIONS

Form small holes to accommodate penetrations through the soffit as per the method detailed in the sheet manufacturer's technical literature.

Install plywood sheets

3.8 EXECUTION

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).

3.9 PLYWOOD EDGE TREATMENT

Treat cut edges of plywood with edge treatment solution before fixing.

3.10 PLYWOOD SEALING

Seal cut edges of plywood before fixing with primer or sealer to suit the surface finish being used.

3.11 FIXING PLYWOOD SOFFIT CLADDINGS

Fit and fix to NZBC E2/AS1, 9.8 Plywood sheet and the plywood manufacturer's requirements with sheets and trim in square, true alignment and plane. Allow a 2-3 mm expansion gap between square edge sheets.

3.12 FIXING NAILS - PLYWOOD PAINT FINISH

Punch nails before finishing and apply a first coat of selected primer or sealer to suit the surface finish being used.

Install timber profiles

3.13 EXECUTION

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

3.14 TIMBER TRIM

Using full lengths, scribe internal joints and mitre external and running joints. Fully support all joints and fix securely and true to line and face, fully nailed. For paint finish prime joint edges before fixing, otherwise seal them without runs onto any exposed face.

3.15 TIMBER COVER BATTENS

Using full lengths, scribe internal joints and mitre external and running joints. Fully support all joints and fix securely and true to line and face, fully nailed. For paint finish prime joint edges before fixing, otherwise seal them without runs onto any exposed face.

3.16 NAILING, PAINT FINISH

Punch nails and patch prime external trim being painted, before stopping as specified under painting preparation.

3.17 NAILING, CLEAR FINISH

Punch nails flush with the face of external trim being stained or clear finished.

Completion

3.18 COMPLETION MATTERS

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

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4 SELECTIONS

Plywood soffit cladding

4.1 PLYWOOD SOFFIT CLADDING

Thickness:	12mm
Grade:	F8
Treatment:	H3.1
Joints	Timber cover battens
Finish:	Ebony or similar dark stain/paint

Accessories

4.2 TIMBER COVER BATTENS

Profile:	50x18 TO SHEET JOINTS, 100X18 TO FLASHING JUNCTIONS
Timber species:	Radiata pine
Treatment:	H3.1

Finishes - materials supplied unfinished

4.3 MATERIALS SUPPLIED UNFINISHED FOR ON SITE FINISHING

Soffit:	Refer to appropriate painting section/s for finishes
Trim:	Refer to appropriate painting section/s for finishes
Cover batten:	Refer to appropriate painting section/s for finishes

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4241RI ROOFING INDUSTRIES PROFILED METAL CLADDING

1 GENERAL

This section relates to the supply and fixing of **Roofing Industries** profiled cladding complete with accessories.

1.1 RELATED WORK

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

1.2 ABBREVIATIONS

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

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

Documents

1.3 DOCUMENTS

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

NZBC C/AS1	Protection from fire for buildings with sleeping (residential) and outbuildings (risk group SH)
NZBC C/AS2	Protection from fire for buildings other than risk group SH
NZBC C/VM2	Framework for fire safety design
NZBC E2/AS1	External moisture provisions for timber-framed buildings up to 10 m in height
AS 1397	Continuous hot-dip metallic coated steel sheet and strip - Coatings of zinc and zinc alloyed with aluminium and magnesium
AS 1530.2	Methods for fire tests on building materials, components and structures - Test for flammability of materials
AS/NZS 2728	Prefinished/prepainted sheet metal products for interior/exterior building applications - Performance requirements
AS 3566	Self-drilling screws for the building and construction industries
AS/NZS 4201.6	Pliable building membranes and underlays - methods of test Method 6: Surface water absorbency
NZMRM CoP	NZ Metal Roof and Wall Cladding Code of Practice

1.4 MANUFACTURER/SUPPLIER DOCUMENTS

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

Roofing Industries Technical Literature

Manufacturer/supplier contact details

Company:	Roofing Industries Ltd
Web:	www.roof.co.nz
Email:	techinfo@roof.co.nz
Telephone:	0800 844 822

Warranties

1.5 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

15 years	For paint will not flake, peel or excessively fade
15 years	For substrate will not perforate through corrosion

- Provide this warranty on the material manufacturer's standard Warranty Form
- Commence the warranty from the date of practical completion of the contract works

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Refer to the general section 1237 WARRANTIES for additional requirements.
For Warranty requirements in excess of this contact Roofing Industries.

1.6 WARRANTY - INSTALLER/APPLICATOR

Provide an installer/applicator warranty:

5 years For workmanship

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

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

Requirements

1.7 QUALIFICATIONS

Refer to 1270 CONSTRUCTION for requirements relating to qualifications.

1.8 NO SUBSTITUTIONS

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

Performance - General

1.9 EXTERNAL FIRE SPREAD - CLADDING MATERIAL, NON-COMBUSTIBLE MATERIAL

Roofing industries profiled metal claddings are a non-combustible substrate to NZBC C/AS1 and NZBC C/AS2, as composed of entirely steel or aluminium with a surface finish no more than 1mm in thickness.

2 PRODUCTS

Materials

2.1 STEEL - TYPE AZ COATING (ALUMINIUM/ZINC ALLOY), PREPAINTED

Formability steel sheet, G550 for roll forming or G300 for flashings, coated to AS 1397. Prefinished /prepainted to AS/NZS 2728.

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.

2.3 FIXING SCREWS

Screws to AS 3566 and Roofing Industries Profile Technical Summary fixing chart or Specific Engineered Design, with a minimum Class 4 or 5 durability and not less than the material being fixed. Refer to SELECTIONS.

2.4 RIVETS

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

Components

2.5 FLASHINGS GENERALLY

To NZBC E2/AS1, 4.0 Flashings.

Formable grade 0.55 BMT for coated and prepainted steel, and 0.90 BMT for aluminium to the same standards as the profiled sheets, notched where across profile or provided with a soft edge.

2.6 EXTERIOR CAVITY WALL BATTENS

Minimum H3.1 Radiata pine cavity battens, minimum 20mm thick and 45mm wide to NZBC E2/AS1 or proprietary cavity battens. Refer to relevant section for details.

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2.7 EXTERIOR CAVITY CLOSER/VERMIN-PROOFING

Proprietary aluminium, stainless steel and uPVC profiles with drainage holes/slots to NZBC E2/AS1.

2.8 CLOSURE STRIPS

Non-bituminous compressible, profiled foam strips to fit the sheet profile.

Accessories

2.9 WALL UNDERLAY

Refer to 4161PC UNDERLAYS, FOIL AND DPC for wall underlays.

2.10 SEALANT

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

2.11 SEPARATION STRIP TIMBER CAVITY BATTENS

PVC tape or similar as a separator between the timber battens and metal cladding. Ensure separator is slightly wider than the batten.

3 EXECUTION

Conditions

3.1 DELIVERY, STORAGE & HANDLING OF PRODUCTS

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

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.

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.

3.2 ROUTINE MATTERS

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.

Inspect the wall framing and supporting structure to ensure that it is complete and fully braced ready for cladding. Ensure that all necessary members are positioned so that flashings can be fastened at both edges through the cladding to the primary structure.

Ensure moisture content is:

Timber framing: 18% maximum
12-16% maximum under traverse flashings

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.

3.4 SEPARATION

Isolate dissimilar materials (metals and non-metals) in close proximity as necessary by painting the surfaces or fitting separator strips of compatible materials. Place isolators between metals and treated timber and cement based materials.

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Application

3.5 STANDARDS AND TOLERANCES

Refer to the general section 1270 CONSTRUCTION for general requirements.

3.6 INSTALLATION GENERALLY

Install Roofing Industries profiled metal cladding materials in accordance with NZMRM CoP and Roofing Industries requirements, to form a weather-tight performance for the completed cladding system, including all flashing/cappings and penetrations through the cladding.

3.7 INSTALL SEPARATION STRIP - METAL CLADDING ON TREATED CCA TIMBER

Fix PVC tape or similar to separate metal sheeting from CCA treated timber batten or framing, prior to fixing metal cladding.

3.8 PENETRATIONS

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

- wall/cladding underlay to openings finished and dressed off ready for the installation of window and door frames and other penetrations.
- claddings neatly finished off to all sides of openings where appropriate.
- installation of flashings (those required to be installed prior to installation of penetrating elements).

3.9 SET-OUT FOR VERTICAL CLADDING

Set cladding to vertical plumb lines and maintain verticality. Set all exposed fixings with horizontal string lines. Carefully set out sheets with side laps away from the main line of sight, and with the widths of end sheets the same. Check during fixing to eliminate creep or spread and to keep fastenings in line.

3.10 MARKING AND CUTTING

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

3.11 FIX SHEETS

Fix sheets in place using the fastening system in accordance with Roofing Industries Profile Technical Summary - fixing chart to suit project wind loadings stated in the general section 1220 PROJECT or in accordance with specific design in accordance with project engineers requirements.

Use only screws as required by Roofing Industries. For timber purlins ensure minimum 30mm embedment and for steel purlins ensure minimum embedment of 3 threads. Paint colour matched fixings and accessories before installation.

3.12 END LAPS

End laps are not permitted, except where specifically detailed.

3.13 THERMAL MOVEMENT

Fix for Thermal Movement to Roofing Industries Profile Technical Summary for Selected Profile.

3.14 INSTALL FLASHINGS

Flash to parapets, roofs and penetrations to detail. Flashings to be installed on timber framing with a moisture content of less than 18%. Where no detail is provided flash to NZMRM CoP recommendations and Roofing Industries and NZBC E2/AS1 requirements. Cut accurately and fix using sealant and rivets to detail and to Roofing Industries requirements to form a weatherproof cover. For visible flashings, plan joints/junction to take account of the aesthetic requirements.

3.15 FLASHING PENETRATIONS

Flash all penetrations through the cladding. 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.

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3.16 USE OF SEALANTS

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

Completion

3.17 COMPLETION MATTERS

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

4 SELECTIONS

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

Cladding

4.1 ROOFING INDUSTRIES RT7® PROFILE METAL CLADDING

Location:	Refer to Construction Legend
Profile:	RT7
BMT/material:	0.55mm Steel
Coating system:	ColorCote® ZinaCore™
Colour:	Weathered Copper
Framing material:	Timber
Pan fixing:	2-11x50 Class 4* Type 17 Woodteks or Roofzips with neos

Accessories

4.2 FLASHINGS - GENERALLY

BMT/material:	0.55 Steel
Coating system:	To match cladding
Paint colour:	To match cladding

4.3 CLOSURE STRIPS

Required

4.4 PVC TAPE TO TIMBER CAVITY BATTEN

Required

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4263 CONCRETE MASONRY VENEER CLADDING

1 GENERAL

This section relates to laying concrete masonry as a veneer cladding.

1.1 RELATED WORK

Refer to Concrete Masonry section for load bearing reinforced concrete masonry.

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 provisions for timber-framed buildings up to 10 m in height
NZS 1170.5	Structural design actions, - Earthquake actions - New Zealand
AS/NZS 2699.1	Built-in components for masonry - Wall ties
AS/NZS 2699.3	Built-in components for masonry - Lintels and shelf angles
NZS 3103	Sands for mortars and plasters
NZS 3109	Concrete construction
NZS 4210	Masonry construction: materials and workmanship
AS/NZS 4455.1	Masonry units, pavers, flags, and segmental retaining wall units - Masonry units

Requirements

1.3 SELECTED MASONRY

Refer to the drawings for areas of masonry, which require select quality blocks to both sides, self-insulating masonry or for weatherproof construction.

1.4 QUALIFICATIONS – INDUSTRY QUALIFICATION REQUIREMENTS

Work to be carried out or under supervision of a Licensed Building Practitioner (LBP) with the relevant license class. Refer to 1270 CONSTRUCTION for additional requirements relating to qualifications.

1.5 NO SUBSTITUTIONS

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

Performance

1.6 DESIGN PARAMETERS - NON SPECIFIC DESIGN

Design the installation to the seismic parameters of NZS 4210 Masonry construction: materials and workmanship.

Refer to SELECTIONS for details.

2 PRODUCTS

Materials

2.1 MASONRY

To AS/NZS 4455.1 with true and unblemished surfaces and arrises and from a single manufacturer.

2.2 LINTELS

To AS/NZS 2699.3.

2.3 METAL TIES

Metal ties of the required grade to suit the weight of the veneer wall, manufactured to AS/NZS 2699.1 and NZS 4210, 2.1.9 Wall ties.

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Accessories

2.4 SAND FOR MORTAR

Sand to comply with NZS 3103. Chloride levels not exceeding 0.04% by dry weight of sand.

2.5 MORTAR

To NZS 4210, 2.2 Mortar. Do not rework if not used within 1.5 hours of adding cement. A plasticiser may be used instead of lime.

2.6 MORTAR COLOUR

Mineral oxide pigment conforming to requirements of NZS 4210, clause 2.2.2.2(f).

2.7 WATER

Clean, fresh and free from excess alkali, salt, silt and organic materials.

3 EXECUTION

Conditions

3.1 VENEER WORK

To NZBC E2/AS1, 9.2 Masonry veneer; NZS 4210, section 2.9, veneer and cavity wall construction.

3.2 DETAILING

Where not otherwise detailed on the drawings or covered in the documents listed, carry out veneer construction to the details required by NZBC E2/AS1, 9.2 Masonry veneer.

3.3 STORAGE

Store masonry units clear of the ground, under cover and well ventilated until placed in the work.

3.4 TOLERANCES

Construct within the tolerances set out in NZS 4210, 2.6.5 Tolerances and 2.7 Laying the units, unless specified otherwise on the drawings or in this specification. Lay masonry with jointing of consistent thickness throughout.

Lay masonry to an even, plane surface with no deviation exceeding 3mm in 3 metres on any surface in view in the finished work.

3.5 CHECK BASE

Check that the base concrete on which masonry is being built is true to line and level, to ensure that work can be taken up true and plumb with 10mm thick bed and perpendicular joints. If more than 20mm thickness of mortar bed is needed to correct inaccuracies obtain written direction on remedial action.

3.6 CONSTRUCTION JOINTS

Ensure the structural integration of all masonry with adjacent concrete work by providing well roughened, retarded construction joints at all junctions.

All construction joints between grout and concrete and between grout and grout similar to Type B as described in NZS 3109, clause 5.6.3, prepared using an approved retarder, except that the roughness at fine grout surfaces may be ±1.5mm above and below the average level. Use a "double strength" retarder if necessary to suit the high cement content of the grout.

Vertical joints between masonry and concrete to achieve full structural integration across the joints. Allow to construct concrete work first with prepared vertical construction joints at block junctions the same as for horizontal construction joints. Lay masonry so that all courses have open ends abutting the existing concrete work.

3.7 MOISTURE CONTENT

Ensure that blocks are air-dry prior to laying. If necessary to reduce excess absorption of water from the mortar, some dampening of the surface is permissible but no surface water may be present at the time of placing mortar.

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3.8 PROTECTION

Keep fair face block walls clean of mortar droppings, grout splashes, or stains of any kind as the work proceeds and before any droppings set.

3.9 WEATHER PRECAUTIONS

When extreme temperatures prevail, either below 4°C or above 27°C, make adjustments to construction as listed in NZS 4210: 2.18 Cold weather construction, and 2.19 Hot weather construction. Do not use expansive grout for filling in temperatures below 5°C.

Application

3.10 SELECTION

For fair face walls select blocks for consistent colour, texture and lack of imperfections.

3.11 BONDING PATTERN

Unless specifically shown or described otherwise, lay masonry in running bond with full masonry bonding at intersections.

3.12 CUTTING

Use a masonry saw to provide clean, accurate cuts.

3.13 FLUSH JOINTS

Finish joints which are not visible in the completed work, or in walls to be plastered, by striking off flush with the trowel.

3.14 TOOLED JOINTS

Finish joints on exposed masonry by tooling to produce a neat joint profile.

3.15 CAVITY WIDTH

To NZS 4210, 2.9 **Veneer and cavity wall construction**.

3.16 WALL TIES GENERALLY

Wall ties at unsupported edges, all openings and at bottom of veneer walls to NZS 4210: 2.9 Veneer and cavity wall construction and NZBC E2/AS1, Table 9.2.7.1A: Specification of maximum tie spacings for type B veneer ties, Table 9.2.7.1B: Placement of wall ties, and Table 9.2.7.1C: Corrosion protection to masonry wall ties.

3.17 BUILD IN WALL TIES - TIMBER

Build in wall ties for timber support walls to NZS 4210, 2.9 Veneer and cavity wall construction and NZBC E2/AS1, Table 9.2.7.1A: Specification of maximum tie spacings for type B veneer ties, Table 9.2.7.1B: Placement of wall ties, and Table 9.2.7.1C: Corrosion protection to masonry wall ties. Fix to timber stud with screws or other non impact fasteners.

3.18 BUILD IN WALL TIES - CONCRETE AND MASONRY

To NZS 4210, table 2.3. Build in wall ties for reinforced concrete or masonry support walls, typically at 600mm horizontal and 400mm vertical maximum, or equivalent area. Set into concrete with dovetail ties slotted in as work proceeds. Fix to concrete or concrete masonry with one double-thread fastener.

3.19 BUILD IN LINTELS

To NZS 4210, 2.9.8 Openings and lintel sizes to NZBC E2/AS1, Table 9.2.9.4B: Minimum masonry veneer lintel sizes for masonry veneer with a maximum thickness of 70 mm, and Table 9.2.9.4C: Minimum masonry veneer lintel sizes for masonry veneer with a maximum thickness of 90 mm. Build in angle lintels as work proceeds, with 200mm bearing each end for spans over 2m, and 100mm bearing for smaller spans.

3.20 CONTROL JOINTS

Provide vertically each side of an opening or window width of more than 1.8 metres and at not more than 6 metre spacing, all to NZS 4210: 2.10 Method of controlling wall movements.

3.21 WEEPHOLES

Provide where exposed to the weather above foundations, bond beams and slabs a 50mm x 10mm weep-hole in every second vertical joint.

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3.22 CAVITY VENTILATION

Ventilate cavity with top and bottom openings to NZBC E2/AS1, 9.2.6 Cavities. Seal cavity off from floor and roof spaces.

3.23 CLEAN OUT

Clean out by removing mortar droppings from ties, any mortar protruding into cavities and all mortar droppings and other loose material in the cavities.

Completion

3.24 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.

3.25 DEFECTIVE OR DAMAGED WORK

Repair damaged or marked elements. Replace damaged or marked elements where repair is not possible or will not be acceptable. Leave work to the standard required for following procedures.

4 SELECTIONS

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

Performance - seismic

4.1 DESIGN PARAMETERS - NON SPECIFIC DESIGN

Building seismic zone: Zone 3 (refer to NZS 4210)

Performance - Corrosion protection

4.2 CORROSION PROTECTION METAL LINTELS & TIES - EXPOSURE ZONES B & C

Minimum corrosion protection to NZBC E2/AS1, Table 9.2.7.1C: Corrosion protection to masonry wall ties, and Table 9.2.9.4A: Corrosion protection to lintels, for exposure Zone B and Zone C to NZS 3604 (& NZS 4210).

Metal ties:	470g/m2 galvanizing on steel
Metal lintels:	600g/m2 galvanizing on steel

Materials

4.3 CONCRETE MASONRY VENEER

Brand:	Viblock - Fluted
Size:	390mm x 190mm x 90mm
Laying pattern:	Stack bond
Pointing:	Racked

4.4 MORTAR

Mix:	1: 0 - 0.25: 3 - cement: hydrated lime: sand
Strength:	12.5 MPa
Bond strength:	200 kPa
Pigment:	Tan

Components

4.5 METAL LINTELS

refer to architectural and engineering details

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4282 EXTERIOR SOLID PLASTER

1 GENERAL

This section relates to coatings of cement plasters, applied by hand or pump to external solid substrates.
Backgrounds include:

- concrete block masonry
- ICF blocks

1.1 ABBREVIATIONS AND DEFINITIONS

The following abbreviations are used in this specification.

AAC	Autoclaved aerated concrete
Background	The solid substrate to which the bond coat is applied
Solid substrate	Concrete, lightweight concrete, concrete masonry, lightweight concrete masonry or brick wall and concrete soffits

Documents

1.2 DOCUMENTS

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

AS 1478.1	Chemical admixtures for concrete, mortar and grout - Admixtures for concrete
AS 1672.1	Limes and limestones - Limes for building
NZS 3103	Sands for mortars and plasters
NZS 3121	Water and aggregate for concrete
NZS 3122	Portland and blended cements (General and special purpose)
NZS 4251.1	Solid plastering: Cement plasters for walls, ceilings and soffits

Health and Safety at Work Act 2015
WorkSafe - Guidelines for the provision of facilities and general safety in the construction industry.

Requirements

1.3 QUALIFICATIONS

Plasterers to be experienced, competent trades people familiar with the materials and techniques specified. If requested provide evidence of qualification / experience prior to commencing.

Qualifications to be:

- Recognised national certificate in solid plastering (National Certificate in Solid Plastering Level 4 or similar)
- LBP solid plastering (when supervising restricted building work)

Health and Safety

1.4 HEALTH AND SAFETY REQUIREMENTS

Refer to the requirements of the Health and Safety at Work Act 2015. Comply with:

- Relevant New Zealand safety legislation
- WorkSafe publications including; Guidelines for the provision of facilities and general safety in the construction industry
- Relevant codes of practice, guides, guidelines and standards

2 PRODUCTS

Materials

2.1 BONDING AGENT

Use to form gauging liquid with water:

Bond coat:	1:1, or to manufacturers requirements

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Flanking and finish coats: 1:2, or to manufacturers requirements
Use in accordance with the bonding agent manufacturer's requirements, maintaining the approved dosage throughout the work.

2.2 ADMIXTURES
To AS 1478.1. Use in accordance with the admixture manufacturer's requirements, maintaining the approved dosage throughout the work.

2.3 PIGMENT
To NZS 3122. Use in accordance with the manufacturers requirements, maintaining the required dosage throughout the work.

2.4 SAND
To NZS 3103, the grading limits of NZS 4251.1 clause 2.2.2.4 Sand, and suitable for the nominated plaster mix. Obtain from a single source, uniform in composition and colour. Chloride levels to not exceed 0.04% by dry weight of sand.

Submit service records of sands proposed in accordance with NZS 3103, clause 8.1 and confirm that they comply. Prevent contamination or segregation of sand in storage. Do not allow it to become more than slightly damp.

2.5 CEMENT
Portland Cement to NZS 4251.1 clause 2.2.2.3 Cement.

2.6 WATER
To NZS 3121, or local town supply.

2.7 LIME PUTTY
To AS 1672.

Accessories

2.8 TRIM GENERALLY
Formed from steel, galvanized to 320 g/m².

2.9 CONTROL JOINTS
0.55mm thick steel galvanized to 320 g/m².

2.10 ARCHITRAVE BEAD
0.55mm thick steel galvanized to 320 g/m².

2.11 CASING BEAD
0.55mm thick steel galvanized to 320 g/m², slit, formed and expanded.

2.12 CORNER SECTION
0.55mm thick steel galvanized to 320 g/m², slit, formed and expanded.

2.13 SCREED SECTION
0.55mm thick steel galvanized to 320 g/m², slit, formed and expanded.

2.14 TIE WIRE
Mild drawn or annealed galvanized wire not less than 1.2mm diameter.

Proprietary plaster finishing system

2.15 POLYMER MODIFIED RENDER SYSTEM
Polymer-modified cement-based plaster render comprised of:

- Basecoat render, a proprietary polymer modified cemintitious render supplied as a complete plastering system
- Finish coats consisting of proprietary trowelled on coloured and textured polymer modified finish coats

Refer to SELECTIONS.

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3 EXECUTION

Conditions

3.1 STORE MATERIALS

Store materials in appropriate conditions ensuring adequate protection from contamination or deterioration.

3.2 PLASTERING CONDITIONS

To NZS 4251.1 clause 2.1.7 Air temperature. Carry out plastering under conditions (not too sunny, windy or freezing) which will not adversely affect the finished work. Complete in sufficient time to enable subsequent finishes to be applied under the proper conditions.

Under cold conditions:

- no plastering shall be carried out in air temperatures below 5°C or if the temperature is likely to drop below 5°C in the 24-hour period following the application of plasterwork

Under hot conditions:

- all necessary precautions shall be taken to protect plaster work against the effects of drying winds, direct sunlight, rain and water run-off for at least 24 hours after application.

3.3 DO NOT BEGIN

Do not begin laying up until:

- Linings have been fitted and fixed
- Required openings, chases or other apertures, have been cut
- Pipes, fixtures, fixing pads, and plugs, have been fixed
- Other preparation is complete
- Work that could damage the plaster is complete.

3.4 SOURCE OF MATERIALS

Supply materials from the same source.

3.5 PROTECT

Protect existing and adjoining work and surrounds, with boards and dust sheets. Clean off immediately droppings and mortar splashes on finished work.

3.6 PROTECT CONCRETE

Protect concrete surfaces from contamination.

3.7 PLANT AND TOOLS

Clean plant and tools to ensure they are free of previous mixes.

3.8 PROPRIETARY PLASTERS

Conform with the various manufacturer's requirements for proprietary and special purpose plasters.

3.9 WORKING TIME

Do not use mixes after initial set has occurred. Do not retemper mixes.

3.10 JOINING UP

If joining up is unavoidable in large areas of work, make junctions so that they are concealed in the finished work.

3.11 SURFACE TOLERANCES

Gradual undulations over the surface and measured between rise and hollow as follows:

Trowelled wall surfaces:	Not exceeding 3mm over a 1200mm straight edge
Textured wall surfaces:	Not exceeding 3mm over a 900mm straight edge

No abrupt deviations permitted.

Take particular care where the surface has light hitting it at an acute angle.

3.12 ALIGNMENT

Finish surfaces evenly to line or level, with angles and corners correct and walls and reveals plumb and square.

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Conditions - background

3.13 CHECK BACKGROUND

Ensure that backgrounds and adjoining surfaces are, after the preparation called for in this section, of the required standard.

3.14 PREPARE SURFACE

Before plastering is commenced, eliminate surface contaminants, remove dust and debris and make good any defects in the background which may adversely affect the quality of the plaster coating.

3.15 IRREGULARITIES

Hack off excessive projections. Fill voids, hollows and honeycomb with a mix not stronger than the background or weaker than the first coat.

3.16 ACCEPTANCE OF BACKGROUNDS

Do not commence work until the background is of the required standard.

Application - preparing the surface

3.17 CLEAN SURFACE

Remove oils, greases, retarders and loose material and leave the surface dust free and clean. Remove paint from already painted surfaces.

3.18 COVER CHASES

Cover chases and conduits in the background with 100mm wide lath bedded in the base coat, pressed down flat and trowelled in.

3.19 EMBEDDED ITEMS

Sheath or wrap water pipes and wastes passing through walls, with strip material, to permit thermal movement.

3.20 CONTROL SUCTION

Control suction by dampening if necessary but without over-wetting. Allow the surface to dry back to a surface-dry condition before plastering.

Application - joints and junctions

3.21 DISSIMILAR BACKGROUND

Fix specified screed sections centred on the junction between dissimilar backgrounds.

3.22 CONTROL JOINTS

To NZS 4251.1, 2.1.9 **Control Joints**, and as shown on drawings.

Provide movement control joints in the plaster to coincide with movement joints in the background and/or junctions between dissimilar backgrounds in the same plane and/or where shown on the drawings. Galvanized mesh or lath shall not be continuous across control joints. Set out of joints to be agreed with owner prior to commencement of plaster application.

3.23 ACCESSORY CONTROL JOINTS

Fix the specified accessory control joints to backgrounds through slots. Fill the joint with sealant before applying finishing coat.

3.24 SECRET CONTROL JOINTS

Form cut joints 3mm wide through the flanking coat plaster to the background. Fill the cut with sealant, following the sealant manufacturer's requirements for primer and masking, before applying the finish coat to provide a secret joint.

3.25 EXPOSED CONTROL JOINTS

Form neat cut joints in plaster. Rule the cut joint straight and true and cut it right through the full thickness of plaster to the background exactly on the line of the junction.

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Application - trim

3.26 FIX CORNER SECTIONS

Fix specified corner sections to external angles, as required by the manufacturer for the appropriate background.

3.27 FIX CASING BEADS

Fix specified casing beads at edge terminations of plaster not covered by other trim, as required by the manufacturer for the appropriate background.

3.28 FORM ARRISES

Where sections or beads are not specified:

- form arrises with 6mm pencil rounds
- soften down severe arrises by rubbing with a wet trowel when finishing

3.29 CHECK FLASHINGS

Ensure that flashings, including flashings to recessed sills are in place before, or are fitted as the coating proceeds so the completed work is completely watertight.

3.30 KEYING

Press plaster through the apertures of metal lath, wings of casing beads and corner sections.

Application - plaster systems

3.31 PROPORTION AND MIXES

Refer to SELECTIONS for plaster thickness and finish.

3.32 WATERPROOF RENDERING

Include waterproofing admixture as specified and as required by the manufacturer. Do not plug or puncture the waterproof render.

Application - curing

3.33 CURING

Confirm the curing and protection systems to be applied to fresh plaster coats. Plastering not to begin until systems are confirmed.

3.34 PROTECT ADJOINING WORK

Protect existing and adjoining work from damage during plastering. Mask adjacent windows and provide temporary covering if necessary. Remove droppings and mortar splashes as the work proceeds.

3.35 MOIST CURING, CEMENT BASED WORK

Cure by preventing rapid or uneven drying out for a suitable period to NZS 4251.1 clause 2.5 Application and curing of plaster coats, and appendix D Plaster on curing.

Bond Coat:	Minimum 48 hours moist curing and 24 hours drying
Flanking Coat:	Minimum 48 hours moist curing and 72 hours drying
Finish Coat:	Minimum 72 hours moist curing depending on ambient temperatures

Do not alter the above curing times.

Completion

3.36 PROTECT FINISHED WORK

Protect finished work from sun, wind, frost, rain and hail and from damage by building operations or other causes. Provide temporary coverings if necessary.

3.37 REINSTATE

Reinstate damaged or marked areas.

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3.38 LEAVE

Leave adjacent materials, fittings and finishes clean and to the standard required by following procedures.

3.39 REMOVE

Remove debris, unused materials and elements from the site.

4 SELECTIONS

Proprietary plaster finishing system

4.1 POLYMER MODIFIED CEMENT-BASED PLASTER RENDER SYSTEM

Background:	ICF Blocks and Concrete Masonry
Base coat:	Applicator to advise
Finish coat:	Applicator to advise
Finish:	Applicator to advise
Colour:	Tan to match Viblock

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4311RI ROOFING INDUSTRIES PROFILED METAL ROOFING

1 GENERAL

This section relates to the supply and fixing of **Roofing Industries** profiled roofing complete with accessories.

1.1 RELATED WORK

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

1.2 ABBREVIATIONS

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

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

Documents

1.3 DOCUMENTS

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

BPS	Building Product Specifications
NZBC C/AS2	Protection from fire for buildings other than risk group SH
NZBC E2/AS1	External moisture provisions for timber-framed buildings up to 10 m in height
NZBC G12/AS1	Water Supplies
AS 1397	Continuous hot-dip metallic coated steel sheet and strip - Coatings of zinc and zinc alloyed with aluminium and magnesium
AS 1530.2	Methods for fire tests on building materials, components and structures - Test for flammability of materials
AS/NZS 1665	Welding of aluminium structures
AS/NZS 1734	Aluminium and aluminium alloys - flat sheet, coiled sheet and plate
AS/NZS 2728	Prefinished/prepainted sheet metal products for interior/exterior building applications - performance requirements
AS 3566	Self-drilling screws for the building and construction industries
AS/NZS 4020	Testing of products for use in contact with drinking water
AS/NZS 4201.6	Pliable building membranes and underlays - methods of test Method 6: Surface water absorbency
NZMRM CoP	NZ Metal Roof and Wall Cladding Code of Practice

1.4 MANUFACTURER/SUPPLIER DOCUMENTS

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

Roofing Industries Profile Technical Summary

Manufacturer/supplier contact details

Company:	Roofing Industries Ltd
Web:	www.roof.co.nz
Email:	techinfo@roof.co.nz
Telephone:	0800 844 822

Warranties

1.5 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

18 years	For paint will not flake, peel or excessively fad
30 years	For substrate will not perforate through corrosion

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- Provide this warranty on the material manufacturer's standard Warranty Form
- Commence the warranty from the date of practical completion of the contract works

Refer to the general section 1237 WARRANTIES for additional requirements.

1.6 WARRANTY - INSTALLER/APPLICATOR

Provide an installer/applicator warranty:

5 years for workmanship

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

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

Requirements

1.7 QUALIFICATIONS

Refer to 1270 CONSTRUCTION for requirements relating to qualifications.

1.8 NO SUBSTITUTIONS

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

Performance - General

1.9 DRINKING WATER

ColorCote® have been tested in accordance with AS/NZS 4020 and have passed the requirements for products in contact with drinking water in accordance with NZBC G12/AS1.

2 PRODUCTS

Materials

2.1 STEEL - TYPE AZ COATING (ALUMINIUM/ZINC ALLOY), PREPAINTED

Formability steel sheet, G550 for roll forming or G300 for flashings, coated to AS 1397. Prefinished /prepainted to AS/NZS 2728.

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.

2.3 FIXING SCREWS

Screws to AS 3566 and Roofing Industries Profile Technical Summary fixing chart or Specific Engineered Design, with a minimum Class 4 or 5 durability and not less than the material being fixed. Refer to SELECTIONS.

2.4 RIVETS

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

Components

2.5 FLASHINGS GENERALLY

To NZBC E2/AS1, 4.0 Flashings.

Formable grade 0.55 BMT for galvanized, coated and pre-painted steel, and 0.90 BMT for folded aluminium to the same standards as the profiled sheets, notched where across profile or provided with a soft edge.

2.6 BOOT FLASHINGS

Generally to NZBC E2/AS1, 8.4.12 Roof penetrations.

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EPDM proprietary pipe flashing laid on 45º bias to roofing, with over-flashing (soaker flashing) if required.
A boot flashing should be positioned so that it dams a roofing pan no more than 50%, if this cannot be avoided use an over-flashing back to the ridge and fix the boot flashing to that.

Accessories

2.7 UNDERLAY

Refer to 4161PC UNDERLAYS, FOIL AND DPC for roof underlays.

2.8 SEALANT

Neutral curing silicone or MS polymer sealant as required by Roofing Industries and used as directed.

2.9 CLOSURE STRIPS

Non-bituminous compressible, profiled foam strips to fit the sheet profile.

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 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.

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.

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.

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.

Ensure moisture content is:
Timber framing: 18% maximum
12-16% maximum under traverse flashings

When continuous metal roofing 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.

3.4 SEPARATION

Isolate dissimilar materials (metals and non-metals) in close proximity as necessary by painting the surfaces or fitting separator strips of compatible materials. Place isolators between metals and treated timber and cement based materials.

Application

3.5 STANDARDS AND TOLERANCES

Refer to the general section 1270 CONSTRUCTION for general requirements.

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3.6 FIXING GENERALLY

Install and fix in accordance with the NZMRM CoP recommendations, and to Roofing Industries requirements, to form a weather-tight performance for the completed roofing system, including all junctions, flashing/cappings and penetrations through the roofing.

3.7 PENETRATIONS AND JUNCTIONS

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

Required work includes the following:

- underlay turned up at wall and parapet lines
- underlay finished and dressed off to all openings, ready for the installation of skylights and other penetrations
- 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).

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 MARKING AND CUTTING

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

3.10 FIX SHEETS

Fix sheets in place using the fastening system in accordance with Roofing Industries Profile Technical Summary - fixing chart to suit project wind loadings stated in the general section 1220 PROJECT or in accordance with specific design in accordance with project engineers requirements.

Use only screws as required by Roofing Industries. For timber purlins ensure minimum 30mm embedment and for steel purlins ensure minimum embedment of 3 threads. Paint colour matched fixings and accessories before installation.

3.11 THERMAL MOVEMENT

Fix for Thermal Movement to Roofing Industries Profile Technical Summary for Selected Profile.

3.12 END LAPS

End laps are not permitted, except where specifically detailed.

3.13 STOP ENDS AND DOWNTURNS

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

3.14 INSTALL FLASHINGS

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

3.15 USE OF SEALANTS

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

3.16 FLASHING PENETRATIONS

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

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Completion

3.17 COMPLETION MATTERS

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

4 SELECTIONS

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

Roofing

4.1 ROOFING INDUSTRIES - RT7® PROFILE ROOFING

Location:	To all roof areas except entrance awning
BMT/material:	0.55 Steel
Coating system:	ColorCote® ZinaCore™
Colour:	Weathered Copper
Purlin material:	Timber
Fixing:	14-10x75 Class 4* Type 17 Woodteks with neos or 14-10x100 Class 4* Type 17 Woodteks with neos
Washers:	RT7 load spreading profile steel and 36mm EPDM

Accessories

4.2 FLASHINGS - GENERALLY

BMT/material:	0.55 Steel
Coating system:	To match roofing
Coating colour:	To match roofing

4.3 CLOSURE STRIPS

Required

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4312RI ROOFING INDUSTRIES PROFILED NATURAL LIGHTING

1 GENERAL

This section relates to the supply and fixing of **Roofing Industries** translucent, moulded, overlapping plastic sheets as roofing and/or cladding, often in conjunction with Roofing Industries overlap rigid sheet metal profiled sheets.
It includes;

- Alsynite product range

1.1 RELATED WORK

Refer to 4311RI ROOFING INDUSTRIES PROFILED METAL ROOFING for roofing.

1.2 ABBREVIATIONS AND DEFINITIONS

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

The following abbreviations apply specifically to this section:

BMT	Base metal thickness
NZMRM	New Zealand Metal Roofing Manufacturers Inc
LBP	Licensed Building Practitioner
SPF	Solar Protection Feature
IR	Infrared

Documents

1.3 DOCUMENTS

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

BPS	Building Product Specifications
NZBC C/AS2	Protection from fire for buildings other than risk group SH
AS/NZS 1170.2:2011	Structural design actions - Wind actions
AS/NZS 1562.3	Design and installation of sheet roof and wall cladding - Plastic
AS 3566	Self-drilling screws for the building and construction industries
NZS 3604	Timber-framed buildings
AS/NZS 4040.4	Methods of testing sheet roof and wall cladding - Resistance to impact (sandbag) for sheet roof materials
AS/NZS 4256.3	Plastic roof and wall cladding materials - Glass fibre reinforced polyester (GRP)
AS/NZS 4389	Roof safety Mesh
NZMRM CoP	NZ Metal Roof and Wall Cladding Code of Practice
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)
ISO 9705:1993	Fire tests - Full-scale room test for surface products

1.4 MANUFACTURER/SUPPLIER DOCUMENTS

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

Roofing Industries product literature.
Refer to Manufacturer of plastic (fibreglass or polycarbonate) sheeting for product literature, brochures and fire test reports.

Manufacturer/supplier contact details

Company:	Roofing Industries
Web:	techinfo@roof.co.nz
Email:	office@roof.co.nz
Telephone:	0800 844 822

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Warranties

1.5 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

20 years	For water penetration
10 years	For light transmission

- 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.

1.6 WARRANTY - INSTALLER/APPLICATOR

Provide an installer/applicator warranty:

5 years	For installation

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

Include a copy of the Manufacturer's maintenance requirements with the warranty.
Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.7 QUALIFICATIONS

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

1.8 NO SUBSTITUTIONS

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

Performance - Wind

1.9 DESIGN PARAMETERS - NON SPECIFIC DESIGN

Building wind zone:

High/1.20kPa: ULS (refer to NZS 3604, table 5.4)
Refer to **Roofing Industries** for "Wind Load Span Design Graphs" for load parameters.
Examples of design parameters include Wind Zone and NZS 3604.

1.10 FIXINGS, WIND

Design and use the fixings/fixing pattern appropriate for the wind design parameters and NZMRM CoP. Refer to **Roofing Industries** Profile Technical Summary for the selected profile.

1.11 RIB FIXING, ROOF

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. Refer to SELECTIONS.

1.12 PAN FIXING, CLADDING

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

1.13 PERFORMANCE

Install roofing materials in accordance with the NZMRM CoP, and **Roofing Industries** Profile Technical Summary for the selected profile, to form a weather-tight performance for the completed roofing system, including all penetrations through the roof and junctions with walls and parapets.

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1.14 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/cladding. Ensure that all necessary members are positioned so that flashings can be fastened at both edges through the roof profile or cladding to the primary structure.

2 PRODUCTS

Alsynite fibreglass sheeting with trafficable properties

2.1 ALSYNITE TOPGLASS® GC ULTRA-SAFE

Translucent acrylic modified polyester resin system with a heavy duty woven roving reinforcing system enclosed within the resin matrix. Manufactured to AS 4256.3 and meets the impact strength tests of AS/NZS 4040.4. Refer to SELECTIONS for options.

Components

2.2 FLASHINGS GENERALLY

Compatible with associated metal roofing. Formable grade 0.55 BMT for galvanized, aluminium/zinc-coated and pre-painted steel, and 0.90 for aluminium to the same standards as the profiled sheets, notched where across profile or provided with a soft edge.

2.3 FLASHINGS TO VERGE, RIDGE AND HIP

Supplied by Roofing Industries to match or to suit the roofing.

2.4 FASTENERS GENERALLY

Durability of all fasteners not less than the roofing material being fixed.

2.5 MID SPAN SUPPORTS

Steel angle supports at mid span.

2.6 FIXING SCREWS

To AS 3566. Screws appropriate to the roofing material and the supporting structure, as required by the Roofing Industries and with durability not less than the material fixed.

2.7 RIVETS

Bulb tite size to suit application. Refer to sheet manufacturer for requirements.

Accessories

2.8 PURLIN PROTECTION STRIP

6mm closed cell foam to full width of the purlin or continuous flat sheet purlin protection strip full width of purlin over mesh or netting.

2.9 SEALANT - FIBREGLASS

Neutral curing silicone or MS polymer sealant to manufacturer's specifications and used as directed.

2.10 LAP SEALING TAPE

Closed cell, 3mm/5mm thick x 15mm wide (minimum) self adhesive nitrile tape.

3 EXECUTION

Conditions

3.1 SAFETY MESH

Install to AS/NZS 4389 and AS/NZS 1562.3.

3.2 INSPECTION

Inspect the roof framing and supporting structure to ensure that it is complete and fully braced ready for roofing. Do not start work until all requirements are complete to the required standard.

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3.3 STORAGE

Take delivery of and accept packs of sheets dry and undamaged on delivery. Reject all damaged material. Store on a level firm base with packs well ventilated and completely protected from weather and damage.

3.4 HANDLING

Use rope or webbing and not chains or wire rope for hoisting. 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.

Application

3.5 GENERALLY

To AS/NZS 1562.3, to the NZMRM CoP and to Roofing Industries recommendations.

Install and fix in accordance with the NZMRM CoP requirements and to Roofing Industries recommendations.

Lay and stick down flat sheet purlin protection strip over mesh. Carefully set out with side laps over the metal roofing edges, with widths of end sheets the same, all sheets 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.

When laying either side of metal roofing sheets, ensure that side laps are neatly seated down and that side stitching fasteners are installed in accordance with Roofing Industries requirements.

3.6 STOP ENDS

Before lifting into place, set in compatible sealant and pop rivet stop-ends to sheets.

3.7 FIXING

Install and fix to plastic roofing manufacturers technical literature, Roofing Industries requirements and to NZMRM CoP, 11 **Natural Light**.

Fix sheets in place using the fastening system required by plastic (fibreglass or polycarbonate) sheeting Manufacturer, making due allowance for dynamic local wind pressures on the building and the thermal movement in the sheet.

Where plastic sheeting is in contact with safety mesh a protective fibreglass strip should be installed over the safety mesh, to avoid fracturing of the underside of the sheet.

3.8 SIDE LAP FIXING

Side laps must be fixed at a maximum of;

- 450mm centres for low rib
- 600mm centres for high rib

Side laps are required to be sealed where the roof pitch is < 10˚ and in high wind design load areas. Refer to NZMRM CoP for requirements.

3.9 END LAPS - FIBREGLASS

End laps are only permitted where specifically detailed and to manufacturer's recommendations. Ensure any end laps are a minimum of 200mm and fully sealed at both ends of the lap using a neutral cure silicone sealant or lap sealing tape. Refer to NZMRM CoP for requirements and 14.11.1, S**ealing End Laps**.

3.10 MID SPAN SUPPORTS - ROOFING

Provide mid span supports over metal sheets at spacings dependent on the profile to manufacturer's specifications.

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3.11 PURLIN PROTECTION - ALSYNITE

When plastic roof lighting is laid over safety mesh or wire netting, protection must be placed over the mesh or netting to avoid damage to the underside of the plastic roof lighting. Protection to be purlin protection strip or other durable and non-absorbent material and be of sufficient thickness and resilience to avoid damage.

3.12 FLASH

Flash roof to verges, walls and penetrations to detail and Roofing Industries requirements.

3.13 PENETRATIONS AND JUNCTIONS

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

- underlay turned up at wall and parapet lines
- underlay finished and dressed off to all openings, ready for the installation of skylights and other penetrations
- 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).

Completion & Commissioning

3.14 COMPLETION MATTERS

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

4 SELECTIONS

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

Materials - Alsynite

For further details on selections go to www.roof.co.nz and www.alsynite.co.nz.

4.1 ROOFING INDUSTRIES ALSYNITE - TRANSLUCENT FIBREGLASS (TRAFFICABLE)

Location:	Entrance Awning
Brand:	Alsynite
Type:	**Topglass® GC Ultra-Safe**
Profile (to match):	RT7
Colour:	TBC - to match adjacent roofing
Sheet thickness:	2.5mm / 3660g/m²
Fixings:	Fixings and washers to manufacturer's specifications

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4337 PLYWOOD ROOFING & DECKING SUBSTRATE

1 GENERAL

This section relates to the use of plywood sheets for:

- decking or decking substrate
- 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
PEFC	Programme for the Endorsement of Forest Certification

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	Structural provisions for buildings
NZBC E2/AS1	External moisture provisions for timber-framed buildings up to 10 m in height
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

2 PRODUCTS

Materials

2.1 PLYWOOD

Radiata pine veneer ply to AS/NZS 2269.0, face sanded, grade as scheduled.

H3 CCA treated to AS/NZS 1604.1 when used as a deck substrate. Confirm compatibility with adhesives being used with the waterproofing membrane.
F11 grade to be used as a substrate for decking membranes. F8 or F11 grades to be used for roofing.

Components

2.2 SCREWS

Stainless steel, counter-sunk. Refer to the plywood manufacturer's 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 NZBC E2/AS1, paragraph 8.5.3.2.)

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2.3 ADHESIVE

Single pack waterproof general purpose construction adhesive, as recommended by the manufacturer.

2.4 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

Handle sheets carefully and reject those with damaged faces or edges.

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:	16% maximum

3.4 PRE-COATING/FINISHING REQUIREMENTS

Check work previously carried out and confirm it is of the required standard for specified finish. Carry out such additional preparatory work as required to bring the substrate to suitable condition.

3.5 SUPPORT FRAMING

Ensure support framing is completed to the plywood manufacturer's stated requirements for laying plywood sheets.

Application/installation

3.6 STANDARDS AND TOLERANCES

Refer to the general section 1270 CONSTRUCTION for general requirements.

3.7 SUPPORT EDGES AND JOINTS

Fully support edges and joints on square edged sheets.

3.8 FIXINGS

Minimum 7mm, maximum 15mm from the edge, 150mm centres along edges and 200mm centres on intermediate supports.

3.9 FIXING PLYWOOD SHEETS

Fix sheets to the plywood manufacturers 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. Allow a 3mm gap between square edge sheets.

3.10 UNDER MEMBRANES

To NZBC E2/AS1, 8.5 Membrane roofs and decks. Screw and adhesive fix sheets for membrane to the plywood 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 Use and limitations, - 1:30 for roofs, 1:40 for decks and 1:100 for gutters

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Completion

3.11 COMPLETION MATTERS

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

4 SELECTIONS

4.1 PLYWOOD - ROOFING SUBSTRATE

Brand/grade:	CD
Stress grade:	F8
Thickness:	12mm
Treatment:	H3 CCA
Fixing:	Screws stainless steel

4.2 PLYWOOD - DECKING SUBSTRATE

Location:	Entrance Deck
Brand/grade:	CD
Stress grade:	F11
Thickness:	21mm
Treatment:	H3 CCA
Fixing:	Screw, stainless steel

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4381EF EQUUS JACKS DECK & TILE SUPPORT SYSTEM

1 GENERAL

This section relates to the supply and installation of EQUUS Jacks proprietary support systems for floating decks and paved patios.

1.1 RELATED WORK

Refer to 4422EF EQUUS SOPREMA FLAGON TPO ROOF & DECK MEMBRANE for roof or deck membrane.

Refer to 6221 TILING SYSTEMS or relevant TILING section for tiles or relevant PAVING section for stone/concrete pavers.
Refer to 4383 TIMBER DECKING for timber decking overlay

1.2 ABBREVIATIONS AND DEFINITIONS

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

The following definitions apply specifically to this section:

Self-supporting:	Self-supporting tiles/stone/pavers are those individually structurally suitable to span between the deck supports. Sometimes referred to as "structural".

Documents

1.3 DOCUMENTS

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

NZBC E2/AS1	External moisture provisions for timber-framed buildings up to 10 m in height
NZS 3604	Timber-framed buildings
AS/NZS 1170.1	Structural design actions - Part 1: Permanent, imposed & other actions

1.4 MANUFACTURER/SUPPLIER DOCUMENTS

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

Equus Jacks Brochure
Equus Jacks Queen and Lord Guide
Equus Jacks product -Technical Data Sheets
Equus Jacks product installation videos

Manufacturer/supplier contact details

Company:	Equus Industries Ltd
Web:	https://equus.nz/
Email:	info@equus.nz
Telephone:	Northern Branch 09 415 4314 Central Branch 04 576 0333 Southern Branch 03 353 2434

Warranties

1.5 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

20 years	For Equus Jacks System components when installed over an Equus membrane system by Approved Equus Applicators

- Provide this warranty on the Equus standard form (if not available then use the standard form in the general section 1237WA WARRANTY AGREEMENT)

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- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

1.6 WARRANTY - INSTALLER/APPLICATOR

Provide an installer/applicator warranty:

5 years For installation of Equus Jacks System

- 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

1.7 QUALIFICATIONS WORKERS - MANUFACTURER / SUPPLIER REQUIREMENTS

Workers to be approved Equus Applicators. Refer to 1270 CONSTRUCTION for requirements relating to qualifications.

1.8 NO SUBSTITUTIONS

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

1.9 INFORMATION REQUIRED FOR CODE COMPLIANCE

Provide the following compliance documentation:

- Other information required by the BCA in the Building Consent Approval documents

2 PRODUCTS

Materials

2.1 QUEEN PEDESTAL - STANDARD

Equus Jacks Queen, an adjustable pedestal manufactured from polypropylene. Consists of a 205mm diameter base, a height adjustable threaded body and a 130mm diameter support head. The support head is fitted with an EPDM rubber pad and a removable tab system for 2mm, 3mm and 4mm joints between pavers/tiles. Available in a range of 5 heights, adjustable from 21mm up to 234mm.

2.2 QUEEN PEDESTAL CROWN

Equus Jacks Queen with Crown head, an adjustable pedestal manufactured from polypropylene. Consists of a 205mm diameter base, a height adjustable threaded body and a 130mm diameter crown head to suit timber or aluminium joints. Available in a range of 5 heights, adjustable from 21mm up to 234mm.

2.3 LORD PEDESTAL & LORD EXTENSION

Equus Jacks Lord, a low profile polypropylene pedestal with black rubber grips and a removable tab system for 2mm, 3mm and 4mm joints between pavers/tiles, 150mm diameter and 8mm thick. Height adjustable using 4mm thick Lord Extension Shims.

2.4 POKER GRID

Equus Jacks Poker Grid is a 600mm x 600mm x 35mm thick modular polypropylene, reinforced with glass fibres, grating system with interconnecting dove tail joints to form a support system for surface finishes. For use over Jacks Queen or Lord Pedestals.

Accessories

2.5 LUCKY RUBBER SKIM

Equus Jacks Lucky, 1.5mm and 2.5mm, rubber skim, for use under Queen or Lord Pedestals.

2.6 KROSS PLATE

Equus Jacks Kross Plate, a polypropylene spacer plate for use with Poker grid to maintain a 4mm joint. 2mm and 3mm Kross plates are also available by special order only.

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2.7 KLIP SYSTEM - KLIP UP / KLIP DOWN / LINE

Equus Jacks Klip Up/Klip Down System including Klip-Up, Klip-Down, and Line. Klip Up Soft Rubber and Klip Up No Profile are also available by special order only. Manufactured from Grade 304 stainless steel.

2.8 KLIP WALL

Equus Jacks Klip Wall, manufactured from Grade 304 stainless steel.

2.9 BASIC ADJUSTMENT TOOL

Equus Jacks Power Key, tool for use with Queen & Queen Plus Pedestals. Can be used manually or inserted into electrical screw driver.

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 - GENERAL

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

Confirm the suitability of tiling or natural stone paving for use over Jacks Pedestal Systems. Ensure they are self-supporting if not using Poker Grid under..

3.4 PEDESTAL LAYOUT

Before commencing work confirm the proposed setting out of pedestals. If not included in project documentation, contact Equus regarding Jacks pedestal calculation and layout service to determine pedestal requirements.

Confirm maximum load of pedestal to determine whether intermediate pedestals are required. Ensure pedestal configurations will not impede critical water flows.

For tiling/paving, consider pattern of tiles, location of cut tiles and other visual considerations of the finished work. Generally the minimum cut size of tile is 20cm but is dependent on the tile type, confirm with tile manufacturer.

Conditions - over waterproof membrane substrate

3.5 PRE-INSTALLATION REQUIREMENT - OVER WATERPROOF MEMBRANES

Before commencing work obtain confirmation from project administrator that the installation of the waterproof membrane complies with NZBC E2/AS1. Ensure that the raised floor / deck support system is not attached to or penetrates the waterproof membrane substrate below, if required secure in place with compatible sealant or adhesive.

Installation - general

3.6 STANDARDS AND TOLERANCES

Refer to the general section 1270 CONSTRUCTION for general requirements.

3.7 INSTALL PEDESTAL SUPPORT SYSTEM

Install raised floor / deck pedestal support system and associated decking/paving/tiling in accordance with Equus Jacks Installation Videos.

3.8 PRIOR TO INSTALLATION

Sweep clean substrate / waterproof membrane and ensure it is clear of any foreign objects before commencing installation.

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Installation - for Equus Jacks Poker Systems

3.9 SET OUT

Set out in accordance with Equus Jacks layout plan using centre lines in both directions. Commence installation from one end, Poker grid tiles are directly and each tiles slots into the previously laid tile. Confirm whether intermediate pedestals are required for irregular edges.

3.10 INSTALL EQUUS JACKS & POKER GRID TILES

Install first four pedestal jacks, and intermediate pedestal if required. For perimeter and corner pedestals, remove section of base plate at the pre-cut lines to suit corner or edge condition. If selected, install Skudo rubber separator between pedestal and waterproof membrane.

Sit the first two Poker grid tile modules in place, Poker grid tiles are directional and each tiles slots into the previously laid tile. Adjust the height of each pedestal so it aligns with datum in both directions. Continue in the same manner for subsequent tiles until edge, cut perimeter Poker Grid tile to suit. At edges, pedestals can be adjusted using Power Key adjustment tool through the slots in the Poker grid tile.

Minor variations between 1.5mm and 2.5mm can be rectified using Lucky Rubber Shims under the pedestal base.

Once installation is complete, confirm the levelling is correct and adjust any pedestal heights as necessary.

3.11 INSTALL ACCESS PANELS

Provide removable Poker Grid access panels at appropriate locations on the deck for cleaning out of sumps and other similar outlets that require servicing. When installing Poker Grid access panels, remove tabs from dovetail joints of adjacent Poker Grid tiles, using pliers, to allow access panel Poker Grid tile to be removed and replaced.

3.12 INSTALL EQUUS JACK KROSS PLATE

Install Kross Plates over Poker Grid, to suit deck surface layout and modules. If selected, install Klip Wall to separate last row of tiles from edge of wall.

3.13 INSTALL KLIP SYSTEM

Fit Klip system (Klip Up, Klip Down and Line pieces) and tiles as required to form vertical edge to decking.

Installation - for timber/aluminium joists

3.14 SET OUT

Place pedestals on the substrate; the distance apart will depend on the supporting bearer/joist span, maximum load of pedestal and decking loading capacity.

For timber floor/deck joists, confirm the timber span and support spacing is in accordance with NZS 3604, for aluminium floor/deck joists confirm the aluminium span and support spacing is in accordance with structural loading to AS/NZS 1170.1 for permanent and imposed actions.

3.15 INSTALL EQUUS JACKS QUEEN - CROWN & FIX JOISTS

Install Jacks Queen pedestal with Crown head. If selected, install Skudo rubber separator between pedestal and waterproof membrane.

Fix joist to top of pedestals with self-drilling stainless screws in accordance with the manufacturer's requirements. Adjust the heights of the pedestals so that the joists are completely level.

Minor variations between 1.5mm and 2.5mm can be rectified using Lucky Rubber Shims under the pedestal base.

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3.16 INSTALL DECKING

Fix timber / composite decking to the joists using stainless steel screws or clips in accordance with manufacturer's requirements. Leave 12mm gap to edge of cladding in accordance with NZBC E2/AS1, 7.2.2 Thresholds of slatted decks. If selected, install Klip Wall to form gap to edge of cladding.

Once installation is complete, confirm the levelling is correct and adjust any pedestal heights as necessary.

3.17 INSTALL ACCESS PANELS

Provide removable screw-fixed access panels at appropriate locations on the deck for cleaning out of sumps and other similar outlets that require servicing.

Completion

3.18 COMPLETION MATTERS

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

4 SELECTIONS

For further details on selections go to https://equus.nz/
Substitutions are not permitted to the following, unless stated otherwise.

4.1 EQUUS POKER GRID

Location:	l4 Patio
Type/Brand:	Equus Poker Grid
Overlay type:	Tiles
Grid:	Equus Jacks Poker Grid, 600mm x 600mm x 35mm
Joints:	Equus Jacks Kross Plate - 4mm joints
Accessories:	Equus Jacks Lucky Rubber Skim (as required) Equus Jacks Klip Wall - to separate the last row of tiles from vertical wall face

4.2 EQUUS JACKS QUEEN CROWN - FOR TIMBER / ALUMINIUM FLOOR / DECK JOISTS

Location:	Entrance Deck
Type/Brand:	Equus Jacks Queen Crown System
Overlay type:	Timber Decking
Joist type/spacing:	Timber joists @ 400mm centres
Pedestals:	Equus Jacks Queen Q (to suit) pedestals with crown head
Extension:	None
Height:	21mm minimum to 234mm maximum substrate to top of pedestal
Joist fixings:	Self-drilling stainless steel screws
Accessories:	Equus Jack Lucky Rubber Skim (as required) Equus Jacks Klip Wall - to separate decking from vertical edge

Overlay systems

4.3 TILES / PAVERS / STONE

Refer to 6221 TILING SYSTEMS for tiling overlay

4.4 TIMBER DECKING / COMPOSITE TIMBER DECKING

Refer to 4383 TIMBER DECKING for timber decking overlay

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4383 TIMBER DECKING

1 GENERAL

This section relates to the fabrication and installation of exterior timber
- spaced boarding to decks

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
PEFC	Programme for the Endorsement of Forest Certification

Documents

1.2 DOCUMENTS

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

NZBC D1/AS1	Access routes
NZS 3602	Timber and wood-based products for use in building
NZS 3604	Timber-framed buildings
BRANZ BU 497	Stair construction

Performance - Slip resistance

1.3 SLIP RESISTANCE - SURFACES EXEMPT FROM TESTING

Walking surfaces comply with NZBC D1/AS1, Table 2 for slip resistance requirements and are exempt from testing.

2 PRODUCTS

Materials

2.1 SOLID TIMBER COMPONENTS

Selection to NZS 3602.

2.2 HARDWOOD SPACED BOARDING FOR EXTERIOR DECKS

Plantation-grown hardwood. Dressed four sides and with arrises, or specifically profiled decking.

3 EXECUTION

Conditions

3.1 GENERALLY

Execution to include those methods, practices and processes contained in the current syllabus for the National Certificate in Carpentry and the National Certificate in Joinery (cabinetry, exterior joinery, stairs).

Check site dimensions. Carry out machining within the practices recommended for the particular timber, wood product or pre-finished wood product being used. Machine drill and cut holes and recesses and form joints to the componentry manufacturer's recommendations. Work to be accurate, square and true to line and face.

3.2 PREPARATION, PRE-COATING

For decking to be, stained, sealed or oiled, ensure underside face, edges and cuts of the decking are pre-coated prior to installation. Refer to SELECTIONS for finish.

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Application

3.3 LAYING TIMBER SPACED BOARDING - ENCLOSED DECKS

Confirm whether the grooved side of the boards are face up or face down. Avoid excessively short or long lengths, drill for all fixings, stagger end joints. Space boards a Minimum of 5mm apart in general conditions. Leave a 12mm minimum gap between the exterior wall and the adjacent decking board.

3.4 SCREW FIXING

Pre-drill for all fixings, where the screws allow, use a proprietary deck pre-drilling and countersinking tool.

Use decking screws and power drive into the deck surface to just slightly below the board surface (approx. 0.5mm). Take care to not overdrive the screw as this may result in the screw heads or the boards being damaged. Refer to SELECTIONS.

3.5 CORROSION RISKS

For exterior timber, timber in damp areas and timber subject to occasional wetting, use only stainless steel or silicon bronze, fixings and connectors, if decking or framing 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).

Completion

3.6 LEAVE

Leave work to the standard required by following procedures.

3.7 REMOVE

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

4 SELECTIONS

4.1 EXTERIOR DECKING - HARDWOOD SPACED BOARDING

Species:	Kwila
Size:	140mm x 22mm
Grooved face:	Down
Finish:	Deck Stain - colour clear

4.2 SCREW FIXING

Screw type:	Stainless steel decking screw
Screw size:	65 x 12g

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4422EF EQUUS SOPREMA FLAGON TPO ROOF & DECK MEMBRANE

1 GENERAL

This section relates to the supply and application of Equus SOPREMA Flagon TPO waterproofing membrane.

It includes:

- Single layer waterproofing membrane.
- All required components and accessories to complete the installation.

1.1 RELATED WORK

Refer to 4381EF EQUUS JACKS DECK & TILE SUPPORT SYSTEM for support system for floating decks and paved patios..

1.2 ABBREVIATIONS AND DEFINITIONS

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

The following abbreviations apply specifically to this section:

PIR	Polyisocyanurate insulation board
TPO	Thermoplastic Polyolefin

Documents

1.3 DOCUMENTS

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

AS 2122.1	Combustion Propagation Characteristics of Plastics - Part 1: Determination of flame propagation following surface ignition of vertically oriented specimens of cellular plastics.
AS/NZS 1604.1	Preservative-treated wood-based products - Part 1: Products and treatment
AS/NZS 2269.0	Plywood - Structural - Specifications
NZS 3114	Specification for concrete surface finishes

1.4 MANUFACTURER/SUPPLIER DOCUMENTS

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

Equus Technical Data Sheets and Safety Data Sheets
Equus Soprema Flagon TPO Roofing Membranes Roof Maintenance Statement
Flagon TPO Accessory Catalogue
Flagon BBA Certificate 00-3750
BRANZ Appraisal 1157 - SOPREMA Flagon TPO Waterproofing Systems
BRANZ Appraisal 1169 - Equus SOPREMA Warm Roof System

Copies of the above literature are available from Equus Industries Limited

Web:	equus.nz
Email:	victoria@equus.co.nz
Telephone:	Southern Branch, Christchurch: 03 353 2434 / 0275126352

Warranties

1.5 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material supplier warranty:

20 years	For Flagon TPO Waterproofing Membrane by SOPREMA and associated product.

- Provide this warranty on Equus Industries Ltd. standard form (if unavailable, use the standard form in the general section 1237WA WARRANTY AGREEMENT)
- Include the appropriate Maintenance Statement and schedule.

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- Commence the warranty from the date of Practical Completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

1.6 WARRANTY - INSTALLER/APPLICATOR

Provide an Equus certified applicator warranty:

5 years	For Flagon TPO Waterproofing Membrane by SOPREMA when installed by an Equus approved installer.

- Provide this warranty on the installer/applicator standard form (if unavailable, use the standard form in the general section 1237WA WARRANTY AGREEMENT)
- Commence the warranty from the date of installation.

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.7 QUALIFICATIONS WORKERS - MANUFACTURER / SUPPLIER REQUIREMENTS

Installers to be approved by Equus Industries Ltd. Refer to the general section 1270 CONSTRUCTION for additional requirements relating to qualifications.

1.8 NO SUBSTITUTIONS

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

1.9 PRE-INSTALLATION MEETING

Convene a meeting between the applicator, contractor, all associated consultants and Equus Industries Ltd. where appropriate to ensure all parties know what is required for effective performance of the system.

1.10 SPECIAL DETAILS

Where a standard Equus SOPREMA Flagon TPO detail does not exist, or if a standard detail cannot be applied, an approved alternative must be obtained from Equus Industries Ltd before proceeding with the installation.

Performance

1.11 TESTING - FLOOD

Flood test horizontal applications with a minimum 50mm depth of water for 48 hours to Equus Industries Ltd. requirements. Repeat water test process after making any necessary repairs.

Compliance information

1.12 INFORMATION REQUIRED FOR CODE COMPLIANCE

Provide the following compliance documentation:

- Applicator approval certificate from the product supplier
- Product supplier warranty
- Applicator warranty (or combined with supplier's warranty)
- Producer Statement - Construction (PS3) from the approved applicator
- Other information required by the BCA in the Building Consent Approval documents.

Quality control and assurance

1.13 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:

Equus Soprema Flagon TPO Roofing membranes Roof Maintenance Statement.

Provide this information prior to Practical Completion.

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2 PRODUCTS

Materials - Membranes

2.1 FLAGON TPO WATERPROOFING MEMBRANE

Flagon EP/PR 1.5 TPOsynthetic membrane made of TPO modified polyolefin, reinforced with a polyester mesh. The upper sand grey layer offers weathering and UV resistance, the underlying black layer provides puncture resistance. The membrane is adhesive or mechanically fixed to various substrates. Supplied in 20m or 25m rolls 1.5mm thick x 2.1m wide.

Components

2.2 MEMBRANE ADHESIVE - EQUUS TPO ADHESIVE

SOPREMA approved adhesive suitable for membrane and substrate

2.3 CLEANER - TPO MEMBRANE CLEANER

Proprietary cleaner to clean Flagon TPO Waterproofing Membrane prior to adhesive application.

2.4 TERMINATIONS - FLAGMETAL TERMINATION PROFILE

Preformed TPO-coated galvanized steel profile, available in 50mm x 20mm and 70mm x 20mm profiles, in 2m lengths. Refer to SELECTIONS.

2.5 TERMINATIONS - FLAGMETAL TERMINATION STRIP

Flat TPO-coated galvanized steel strip, 70mm wide, in 2m lengths.

Accessories

2.6 OUTLETS - ROOF DRAINS AND OVERFLOWS

Aquaknight roof drains and overflows. Refer to SELECTIONS.

2.7 OUTLETS - DECK DRAINS

Aquaknight deck drains. Refer to SELECTIONS.

2.8 OUTLETS - SCUPPER

Equus Stainless Steel Scupper 200mm aperture width x 75mm aperture height. Face height 150mm, face width 350mm, outlet length 400mm.

2.9 PEDESTALS

Refer to 4381EF EQUUS JACKS DECK & TILE SUPPORT SYSTEM.

3 EXECUTION

Conditions

3.1 DELIVERY, STORAGE & HANDLING OF PRODUCTS

Refer to the general section 1270 CONSTRUCTION for requirements relating to delivery, storage and handling of product.

3.2 ROUTINE MATTERS

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

3.3 PRE-COATING/FINISHING REQUIREMENTS

Check work previously carried out and confirm it is of the required standard for specified finish. Carry out such additional preparatory work as required in bringing the substrate to suitable condition.

3.4 PRE-INSTALLATION REQUIREMENTS - PLYWOOD

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

H3.2 treated structural plywood shall be a minimum of 17mm for roofs, and 21mm for decks. Sheets shall be laid tight butt jointed to maximise the use of whole sheets with sheet joints laid over framing members, in a staggered brick-bond pattern, running across the fall of the roof.

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Fix plywood in accordance with the Manufacturer's instructions using countersunk stainless-steel 10g screws, with all sheets laid in a bead of construction adhesive on framing members. Screws shall be fixed at 150mm centres on sheet perimeter and 200mm through the body of the sheet. Tongue and Groove plywood does not negate any of the above requirements
5mm expansion gap around the perimeter is required, 5mm chamfers to outer edges. Plywood surface to be smooth, clean, dry, and free of sharp edges.

Plywood/ timber: Moisture content of 18% maximum including sheet edges

Falls to comply with NZBC E2/AS1, with roofs laid to a minimum fall of 1:30 (2°). Decks laid to a minimum of 1:40 (1.5°). Gutters laid to a minimum fall of 1:100 (0.57°) with no cross seams in gutters.

3.5 WEATHER

Lay Flagon TPO Waterproofing Membrane in fair weather, with ambient air temperature no less than 5°C and no greater than 40°C

3.6 STANDARDS AND TOLERANCES

Refer to the general section 1270 CONSTRUCTION for general requirements.

Installation/Application

Application – Flagon TPO Waterproofing Membrane (non-fleece backed)

3.7 POSITION

Position Flagon TPO EP/PR 1.5mm TPO membrane over acceptable substrate and fold membrane back to expose half of the underside.

3.8 APPLY ADHESIVE – EQUUS TPO ADHESIVE

Apply selected SOPREMA approved adhesive as per product installation requirements.

3.9 INSTALL MEMBRANE SHEETS – FLAGON TPO EP/PR MEMBRANE

Apply Flagon TPO EP/PR 1.5mm TPO fleece backed membrane sheet to substrate and press uniformly with a 20kg + roller to Equus Industries Ltd. requirements. Ballast edges of membrane while adhesive cures.

3.10 LAP JOINTS

Install adjoining Flagon TPO EP/PR 1.5 TPO membrane sheets by overlapping edges a minimum of 50mm to provide for a minimum 30mm hot air weld in a fully adhered system.

Application – General

3.11 LAP PREPARATION - TPO CLEANER

Wipe lap surfaces clean and dry using TPO cleaner and clean/dry cotton cloth.

3.12 HAND WELDING

Basic setting temperature for hand welding Flagon TPO Waterproofing Membrane is 300°C for 20mm nozzle and 350°C for 40mm nozzle.

3.13 AUTOMATIC WELDING

Basic setting temperature and speed for automatic welding Flagon TPO Waterproofing Membrane is 380° - 470°C at 2m per minute.

3.14 PENETRATIONS AND JUNCTIONS

Form and finish upstands, downturns, penetrations, sumps and vents in accordance with Equus Industries Ltd. requirements.

Finishing

3.15 INSTALL PEDESTALS

For installation of Equus Jacks pedestals refer to 4381EF EQUUS JACKS DECK & TILE SUPPORT SYSTEM.

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3.16 FOOT TRAFFIC

Keep foot traffic to a minimum after laying the Flagon TPO Waterproofing Membrane. Lay protection at all traffic concentration areas, such as roof hatches, access doors, rooftop ladders, and walkways.

Completion & Commissioning

3.17 COMPLETION MATTERS

Refer to the general section 1270 CONSTRUCTION for completion requirements and if required, commissioning requirements.

3.18 COMPLETION - TESTS & CERTIFICATION

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

4 SELECTIONS

For further details on selections go to https://equus.nz/

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

4.1 FLAGON TPO MEMBRANE BY SOPREMA - SINGLE LAYER ON PLYWOOD

Location:	Roof deck to garage/Entrance
Manufacturer:	SOPREMA
Distributor:	Equus
Substrate:	Plywood
Membrane:	Flagon EP/PR 1.5 TPO (non-fleece backed)
Colour:	Basalt Grey
Finish:	Smooth
Roll size:	2.1m wide x 20m
Membrane adhesive:	Equus TPO Adhesive (for non fleece-backed)

Accessories

4.2 UPVC ROOF DRAIN / OVERFLOW

Location:	As per architectural drawings
Supplier:	Equus Industries Ltd.
Brand:	Aquaknight
Type:	As per architectural drawings

4.3 UPVC DECK DRAIN

Location:	As per architectural drawings
Supplier:	Equus Industries Ltd.
Brand:	Aquaknight

4.4 OUTLETS - STAINLESS STEEL SCUPPERS

Location:	As per architectural drawings
Type/Brand:	Equus Stainless Steel Scupper
Size:	200mm wide x 75mm high aperture

4.5 TERMINATIONS

Location;	As per architectural drawings
Manufacturer;	SOPREMA
Distributor:	Equus
Type;	Equus Flagmetal Termination

4.6 PAVER PEDESTALS

Location:	As per architectural drawings Refer to 4381EF EQUUS JACKS DECK & TILE SUPPORT SYSTEM

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4541SU STARKE AMBIANCE INLINE uPVC WINDOW SYSTEM

1 GENERAL

This section relates to the fabrication, supply and installation of **Stärke Group Ltd** Stärke Ambiance Inline uPVC Window System window and door systems including hardware, flashings and sealants.

1.1 RELATED WORK

Refer to glazing sections for glass types.

1.2 ABBREVIATIONS AND DEFINITIONS

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

The following abbreviations apply specifically to this section:

SLS	Serviceability limit state
UPVC	Unplasticized polyvinyl chloride
ULS	Ultimate limit state
WGANZ	Window & Glass Association NZ

Documents

1.3 DOCUMENTS

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

NZBC E2/AS1	External moisture provisions for timber-framed buildings up to 10 m in height
NZBC F4/AS1	Safety from falling
NZBC G4/AS1	Ventilation of buildings
NZBC H1/AS1	Energy efficiency for all housing, and buildings up to 300m²
NZBC H1/AS2	Energy efficiency for buildings greater than 300m²
NZBC H1/VM1	Energy efficiency for all housing, and buildings up to 300m²
NZBC H1/VM2	Energy efficiency for buildings greater than 300m²
NZS 3604	Timber-framed buildings
NZS 4211	Specification for performance of windows
NZS 4223.3	Glazing in buildings - Human impact safety requirements
EN 513	Unplasticized polyvinylchloride (PVC-U) profiles for the fabrication of windows and doors. Determination of the resistance to artificial weathering
BS EN 673	Glass in building - Determination of thermal transmittance (U-value) - Calculation method
ISO 10077-1	Thermal performance of windows, doors and shutters - Calculation of thermal transmittance - General
ISO 10077-2	Thermal performance of windows, doors and shutters - Calculation of thermal transmittance - Numerical method for frames
EN 12608	Unplasticized polyvinylchloride (PVC-U) profiles for the fabrication of windows and doors. Classification, requirements and test methods
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 10

US Federal Specification:

TT-S-001543A	Sealing compound, silicone rubber base (for caulking, sealing and glazing in buildings and other structures)

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

1.4 MANUFACTURER/SUPPLIER DOCUMENTS

Manufacturer and supplier documents relating to this part of the work:
IANZ NZS 4211 Various Testing Reports - Aluplast® Ideal 4000 (available from Stärke)

FSA Catalogue Aluplast (Rotoline)
FSA Catalogue Euro Handle (Rotoline)
Stärke Care and Maintenance Guide
Stärke Checklist Sticker
Stärke Ambiance Inline uPVC Window Systems Brochure
Stärke Ambiance Inline uPVC Window Systems - NZS 4211 span charts

Manufacturer/supplier contact details

Company:	Stärke Group Ltd
Web:	www.starke.co.nz
Email:	technical@starke.co.nz
Telephone:	09 279 8617

Warranties

1.5 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

10 years	For Stärke Ambiance Inline uPVC Window System Windows & Doors, materials and fabrication
2 years	For Stärke supplied hardware

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

Refer to the general section 1237 WARRANTIES for additional requirements.

1.6 WARRANTY - INSTALLER/APPLICATOR

Provide an installer/applicator warranty:

5 years	For installation

- 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

1.7 QUALIFICATIONS GENERALLY

Refer to 1270 CONSTRUCTION for requirements relating to qualifications.

1.8 NO SUBSTITUTIONS

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

1.9 CERTIFICATION - WINDOW SASHES & DOORS

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.

1.10 COMPLIANCE - RECESSED INSTALLATION

Stärke standard recessed installation details are an alternative solution to NZBC E2/AS1.

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1.11 SHOP DRAWINGS

Refer to the general section 1235 SHOP DRAWINGS for the requirements for submission and review and the provision of final shop drawings.

Provide shop drawings to show the general arrangement of Stärke Ambiance Inline uPVC Window System window joinery including, but not be limited to:
Construction details (minimum scale 1:5) showing the interface between joinery elements and the building structure including:

- Jointing details and method of fixing between individual elements and between this installation and adjacent work
- Interaction between claddings and linings
- Flashing details
- Sealants and air seals
- Non-standard fixing details including bracketing

And where required the following: -

- Design calculations
- Producer Statement in the form PS1 Producer Statement Design
- Rebate sizes
- Dimensions of all typical elements and of any special sizes and shapes
- Provision for the exclusion and/or drainage of moisture
- Provision for adjustment of fixings to ensure true alignment of windows and doors
- Sealant types and full size sections of all sealants and backing rods
- Provision for thermal movement
- Provision for seismic movement and movement under wind loads
- Sequence of installation
- Glazing specification and details

Where requested provide the following additional information

- Information of Professional Indemnity Insurance held by the person providing the calculations and shop drawings

Submit shop drawings for review to the architect and contractor.

- 10 working days (at least) before fabrication is planned to commence, provide shop drawings for review.
- Complete shop drawing review before commencing fabrication.

Performance - Wind (design by contractor)

1.12 DESIGN PARAMETERS WIND - DESIGN BY CONTRACTOR

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

Performance - General

1.13 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.

1.14 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.

1.15 THERMAL PERFORMANCE - WINDOWS & GLAZED DOORS, HOUSING ONLY

Thermal performance of windows & doors to NZBC H1/AS1. The construction R-Value of windows & doors determined by Appendix D, Table D1.1.1: Construction R-values (R window) of selected generic windows and doors. Refer to SELECTIONS for construction R-values.

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1.16 THERMAL PERFORMANCE - WINDOWS & DOORS

Thermal performance of windows & doors to NZBC H1/AS1 or H1/AS2 & NZBC H1/VM1 or H1/VM2. The construction R-value of windows & doors determined by NZBC H1/VM1 or H1/VM2, Appendix D, D1 Vertical windows and doors:

- Thermal transmittance of window & doors in accordance with ISO 10077-1.
- Thermal transmittance of framing in accordance with ISO 10077-2.
- Thermal transmittance of glazing using BS EN 673.

Refer to SELECTIONS for construction R-values.

Quality control and assurance

1.17 QUALITY CONTROL SYSTEM

Stärke Checklist Sticker System to be completed for each window unit. Complete factory checklist after fabrication and install checklist after installation. Stärke Checklist Stickers to be collated at the completion of project.

2 PRODUCTS

Materials

2.1 WINDOWS - STARKE AMBIANCE INLINE uPVC WINDOW SYSTEM

Stärke Ambiance Inline uPVC Window System Windows available in Tropical White or Jet Black as standard, four other premium colours are available. Refer to SELECTIONS for details.

2.2 DOORS - STARKE AMBIANCE INLINE uPVC WINDOW SYSTEM

Stärke Ambiance Inline uPVC Window System Doors available in Tropical White or Jet Black as standard, four other premium colours are available. Refer to SELECTIONS for details.

Components

2.3 STARKE AMBIANCE INLINE uPVC WINDOW SYSTEM EXTRUSIONS

Stärke Ambiance Inline uPVC Window System extrusions are manufactured by Aluplast® GmbH in Germany, using a tropical formulation of uPVC to EN 12608 and EN 513 for severe climates with high UV such as New Zealand. All profiles incorporate internal steel core profiles for additional rigidity. Stärke Ambiance Inline uPVC Window System extrusions comes in a standard white colour and alternative colour options are achieved by application of a coloured PVDF acrylic foil.

2.4 GLASS

Double or triple glazing unit. Refer to the glazing section for glass types and installation.

2.5 SEALS & GASKETS

Co-extruded soft uPVC seals and gaskets. Do not stretch glazing gaskets during installation. Measure and cut gaskets 5-10% over length before installation.

Components for installation - direct fix systems

2.6 SILL PAN FLASHING

To NZBC E2/AS1, paragraphs 9.1.10.3 - 9.1.10.6, for standard installation to NZBC E2/AS1 or to manufacturer's requirements for recessed installation.. Flashing for direct fix claddings to collect and drain water that may penetrate through the window or door unit. Size to extend from the inner most point of the uPVC frame out over the external face of the cladding.

Components for installation - cavity systems

2.7 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.
Add WGANZ end dam if required.

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Flashings

2.8 FLASHINGS GENERALLY

To NZBC E2/AS1, 9.1.9 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.

Accessories

2.9 FIXINGS

Fastenings to be a minimum 65mm x 8g Grade 304 stainless steel screws or min 75mm x 3.15mm hot dipped galvanized nails for fitting the uPVC windows and doors to framing.
Ensure all fixings and fastening exposed to the weather to be Type 304 stainless steel.

2.10 HARDWARE AND FURNITURE

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

2.11 SAFETY STAYS

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

2.12 FIXING BRACKETS

Designed by manufacturer to specific design.

2.13 WEATHERING / INSTALLATION SEALANT

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

2.14 AIRTIGHTNESS TAPE

Flexible, air tight & vapour permeable tape to provide air tight seal at uPVC window & door junctions.

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 1270 CONSTRUCTION for requirements relating to defective or damaged work, removal of protection and cleaning.

3.3 PRE-INSTALLATION REQUIREMENTS

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

3.4 AVOID CONTACT

Solvent based products must not be kept off the uPVC surface at all times. To prevent staining of uPVC surface, avoid contact with bituminous products.

3.5 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 uPVC joinery from following trades. Remove protection on completion.

3.6 ADDITIONAL PROTECTION

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

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Installation - Generally

3.7 STANDARDS AND TOLERANCES

Refer to the general section 1270 CONSTRUCTION for general requirements.

Assembly

3.8 FABRICATION

Stärke Group Ltd to fabricate frames as detailed on shop drawings. Install glazing, hinges, stays and running gear as required or scheduled. Provide temporary bracing and protection. Temporarily secure all opening elements for transportation.

3.9 HARDWARE GENERALLY

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

3.10 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

3.11 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, 9.1.4 Wall underlays to wall openings**.**
- Full height 20mm jamb battens to NZBC E2/AS1, Figure 9.1.9.4: General window and door opening for direct fixed (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.

3.12 INSTALLATION

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

3.13 INSTALLATION - MANUFACTURER'S RECESSED DETAILS

Install in accordance to window manufacturer's details and drawings for recessed installation including airtightness tape to seal uPVC profiles to the wall underlay where it is dressed into the window/door openings.

3.14 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.

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

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

3.15 FIX HARDWARE

Fix all sash and door hardware and furniture, not already installed, as scheduled.

3.16 TIMBER REVEALS

Refer to 5151 INTERNAL TRIMS for plant-on timber reveals.

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Application - jointing and sealing

3.17 SEAL FRAMES ON SITE

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

3.18 PREPARE JOINTS

Ensure joints are dry. Remove loose material, dust and grease. Prepare joints in accordance with the sealant manufacturer's requirements, using required primers where necessary. Mask adjoining surfaces which would be difficult to clean if smeared with sealant. Note: solvent based products must not be kept off the uPVC surface at all times.

3.19 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.

3.20 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

3.21 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.

3.22 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

3.23 COMPLETION MATTERS

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

3.24 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 uPVC joinery from following trades. Remove protection on completion.

3.25 SAFETY

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

4 SELECTIONS

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

Performance

4.1 NOMINATED FABRICATOR

The nominated fabricators for this section of work are;

Company: Stärke Group Ltd

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4.2 SUPPLY AND INSTALLATION

Supply and installation of the specified Stärke uPVC joinery.

Supply:	Stärke Group Ltd
Installation:	By Contractor

Performance

4.3 THERMAL PERFORMANCE - VERTICAL WINDOWS & DOORS

Refer to ECCHO H1 Modelling

4.4 WIND DESIGN PARAMETERS - DESIGN BY CONTRACTOR

Refer to general section 1220 PROJECT for project wind design parameters.

Starke Ambiance Inline uPVC Window System Window & Door

4.5 STARKE AMBIANCE INLINE uPVC WINDOW SYSTEM - FIXED WINDOW

Location:	Refer to Plans
Brand:	Stärke Ambiance Inline uPVC Window System Suite
Type:	Stärke Ambiance Inline Window System Fixed window sash with up to 41mm glazing pocket
Window No:	Refer to Window Schedule
uPVC colour:	Aludec Umbra Grey to ixterior, Turner Oak Toffee to interior
Glazing system:	Double Glazing - Refer to glazing sections for type and thickness

4.6 STARKE AMBIANCE INLINE uPVC WINDOW SYSTEM - AWNING/CASEMENT WINDOW

Location:	Refer to Plans
Brand:	Stärke Ambiance Inline uPVC Window System Suite
Type:	Stärke Ambiance Inline Window System ~ Window sash with up to 41mm glazing pocket
Window No:	Refer to Window Schedule
uPVC colour:	Aludec Umbra Grey to ixterior, Turner Oak Toffee to interior
Glazing system:	Double Glazing - Refer to glazing sections for type and thickness
Hardware/finish:	Roto Rotoline awning handle

4.7 STARKE AMBIANCE INLINE uPVC WINDOW SYSTEM - TILT/TURN WINDOW

Location:	Refer to Plans
Brand:	Stärke Ambiance Inline uPVC Window System Suite
Type:	Stärke Ambiance Inline Window System Tilt/Turn Window sash with up to 41mm glazing pocket
Window No:	Refer to Window Schedule
uPVC colour:	Aludec Umbra Grey to ixterior, Turner Oak Toffee to interior
Glazing system:	Double Glazing - Refer to glazing sections for type and thickness
Hardware/finish:	Roto Rotoline tilt/turn handle

4.8 STARKE AMBIANCE INLINE uPVC WINDOW SYSTEM - HINGED DOOR

Location:	Refer to Plans
Brand:	Stärke Ambiance Inline uPVC Window System Suite
Type:	Stärke Ambiance Inline Window System ~ hinged door with up to 41mm glazing pocket
Window No:	Refer to Window Schedule
uPVC colour:	Aludec Umbra Grey to ixterior, Turner Oak Toffee to interior
Glazing system:	Double Glazing - Refer to glazing sections for type and thickness
Hardware/finish:	Roto RotoStark Double Door handle lockable

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4.9 STARKE AMBIANCE INLINE uPVC WINDOW SYSTEM - SLIDING/STACKING DOOR

Location:	Refer to Plans
Brand:	Stärke Ambiance Inline uPVC Window System Suite
Type:	Stärke Ambiance Inline Window System Sliding/stacking door with up to 24mm glazing pocket
Door No.:	Refer to Door Schedule
uPVC colour:	Aludec Umbra Grey to ixterior, Turner Oak Toffee to interior
Glazing system:	Double Glazing - Refer to glazing sections for type and thickness
Hardware/finish:	Roto Rotoline RAD2000 Roto D Handle, RAD2000 finger pull

Reveals

4.10 WINDOW AND DOOR REVEALS - PLASTERBOARD

Type:	GIB/Plasterboard reveal
Finish:	Painted

Glazing

4.11 GLASS

Refer to relevant glazing section(s) for type and thickness.

Accessories

4.12 FLASHINGS

Location:	Refer to details
Material/type:	Starke Proprietary Flashings
Finish /colour:	To match cladding
Type to Timber Cladding:	70mm kit to timber rainscreen
Type to Metal Cladding	85mm kit to metal RT7 cladding

4.13 WEATHERING SEALANT

Type:	1-part polyurethane moisture curing, elastic joint sealant
Backing rod:	None

4.14 AIRTIGHTNESS TAPE

Type/brand:	Proclima Tescon Profil

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4554AH ADLUX ROOF WINDOWS

1 GENERAL

This section relates to the supply and installation of Adlux Industries Ltd Harmony range of thermally broken fixed and opening roof windows (skylights).

It includes:

- Roof windows
- Components and accessories for completing installation

1.1 RELATED WORK

Refer to relevant electrical section(s) for power connections to opening roof windows

1.2 ABBREVIATIONS AND DEFINITIONS

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

The following abbreviations apply specifically to this section:

IGU	Insulating glass unit

Documents

1.3 DOCUMENTS

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

NZBC E2/AS1	External moisture provisions for timber-framed buildings up to 10 m in height
NZBC H1/AS1	Energy efficiency for all housing, and buildings up to 300m²
NZBC H1/AS2	Energy efficiency for buildings greater than 300m²
NZBC H1/VM1	Energy efficiency for all housing, and buildings up to 300m²
NZBC H1/VM2	Energy efficiency for buildings greater than 300m²
AS/NZS 2208	Safety glazing materials in buildings
NZS 3604	Timber-framed buildings
NZS 4223.2	Glazing in buildings - Insulating glass units
NZS 4223.4	Glazing in buildings - Wind, dead, snow and live action
BS EN 673	Glass in building - Determination of thermal transmittance (U-value) - Calculation method
EN 755-9	Aluminium and aluminium alloys - Extruded rod/bar, tube and profiles - Profiles, tolerances on dimensions and form
ISO 10077-1	Thermal performance of windows, doors and shutters - Calculation of thermal transmittance - General
ISO 10077-2	Thermal performance of windows, doors and shutters - Calculation of thermal transmittance - Numerical method for frames

1.4 MANUFACTURER/SUPPLIER DOCUMENTS

Manufacturer and supplier documents relating to this part of the work:
Adlux Harmony Roof Window brochure
Adlux Harmony Roof Window Fixed & Electric Opening Installation Guide 2024
Adlux Harmony Roof Window detail drawings
Adlux Harmony Roof Windows BPIR documentation

Manufacturer/supplier contact details

Company name:	Adlux Industries Ltd.
Trading as:	Adlux
Web:	www.adlux.co.nz
Email:	sales@adlux.co.nz
Telephone:	0800 500 557

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Warranties

1.5 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

10 years	For Adlux Harmony Roof Window frames
2 years	For electric components
1 year	For glass unknown breakages

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

Refer to the general section 1237 WARRANTIES for additional requirements.

1.6 WARRANTY - INSTALLER/APPLICATOR

Provide an installer/applicator warranty:

2 years	For installation workmanship

- 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

1.7 QUALIFICATIONS GENERALLY

Refer to 1270 CONSTRUCTION for requirements relating to qualifications.

1.8 NO SUBSTITUTIONS

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

1.9 INFORMATION FOR OPERATION AND MAINTENANCE

Refer to the general section 1239 OPERATION & MAINTENANCE for provision of the general operation and maintenance information contained in the Adlux Harmony Roof Windows BPIR documentation as electronic PDF format documents.

Provide this information prior to practical completion.

Performance

1.10 THERMAL PERFORMANCE - SKYLIGHTS

Thermal performance of skylights to NZBC H1/AS1 or H1/AS2 & NZBC H1/VM1 or H1/VM2. The construction R-value of skylight determined by NZBC H1/VM1 or H1/VM2, Appendix D, D2 Skylights:

- Thermal transmittance of skylights in accordance with ISO 10077-1.
- Thermal transmittance of framing in accordance with ISO 10077-2.
- Thermal transmittance of glazing using BS EN 673, considering the effects of horizontal or angled glazing on the heat transfer.

Refer to SELECTIONS for Construction R-values.

1.11 PERFORMANCE, WIND, DEAD, SNOW, AND LIVE ACTIONS

The design wind pressures, and snow loads to NZS 3604 and NZS 4223.4. Live loads and glazing design, for glass to NZS 4223.4.

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2 PRODUCTS

Materials

2.1 FIXED ROOF WINDOWS - HARMONY FIXED

Adlux Harmony Fixed roof windows, comprised of powder coated 6063 T5 extruded aluminium profiles to EN 755-9 with polyamide thermal breaks and argon filled double and triple glazed IGUs to NZS 4223.2 and AS/NZS 2208. Available in a range of sizes, colours and glass options. Refer to SELECTIONS.

2.2 OPENING ROOF WINDOWS - HARMONY OPENING MAX

Adlux Harmony Opening Max roof windows, comprised of powder coated 6063 T5 extruded aluminium profiles to EN 755-9 with foam-filled base frame, polyamide thermal breaks, concealed electric drive and argon filled double and triple glazed IGUs to NZS 4223.2 and AS/NZS 2208. Available in a range of sizes, colours, glass options and with rain sensor. Refer to SELECTIONS.

Components

2.3 FIXINGS

6mm x 80mm 304 stainless steel star washer construction screws.

2.4 FOAM TAPE

6.3mm x 12mm self-adhesive PVC Black Foam Tape.

3 EXECUTION

Conditions

3.1 DELIVERY, STORAGE & HANDLING OF PRODUCTS

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

3.2 ROUTINE MATTERS

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

3.3 PRE-INSTALLATION REQUIREMENTS

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

Installation - generally

3.4 STANDARDS AND TOLERANCES

Refer to the general section 1270 CONSTRUCTION for general requirements.

3.5 INSTALLATION GENERALLY

Install in accordance with NZBC E2/AS1 and Adlux Harmony Roof Window Installation Guide.

Installation

3.6 APPLY FOAM TAPE TO KERB

Apply a continuous strip of foam tape to the inner and outer perimeters of the top face of the kerb.

3.7 POSITION ROOF WINDOW - FIXED ROOF WINDOW

Position roof window centrally onto the kerb with continuous contact to the foam tape on the top face of the kerb and a 10mm gap between the kerb vertical face and roof window perimeter frame.

3.8 POSITION ROOF WINDOW - OPENING ROOF WINDOW

Orient roof window with hinges located on the high side of the kerb. Measure position of drive cable exit from corner of roof window frame. Mark cable position on the top face of the kerb and drill a 12mmØ hole for cable route vertically through the kerb. Position roof window centrally onto the kerb with continuous contact to the foam tape on the top face of the kerb, a 10mm gap between the kerb vertical face and roof window perimeter frame and drive cable free from crushing and folds.

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3.9 FIX ROOF WINDOW

Pre-drill 3mm pilot holes into vertical face of the kerb through the fixing holes located in the lower part of the roof window perimeter frame and screw fix frame without over tightening.

3.10 REMOVE PROTECTIVE FILM

Remove any protective films immediately after installation.

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

Performance

4.1 THERMAL PERFORMANCE - SKYLIGHT

Roof window number:	Construction R-value:
S01	R 0.48

Adlux roof windows

4.2 ADLUX HARMONY ROOF WINDOW - OPENING MAX

Roof window No:	S01 - refer to window schedule
Type/brand:	Adlux Harmony Opening Max
Model:	HE.G38
Size:	750mm wide x 1850mm high
Kerb external dimensions:	700mm x 1800mm
Kerb pitch:	22º
Frame finish:	Powder coated
Frame colour:	Weathered Copper
IGU type:	Viridian EverWarm Ultra TG
Glass structural laminate:	Not required
Glass finish/colour:	Clear
Glass edge band:	Not required
Operation:	Wall Switch
Rain sensor:	Required

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4555 GARAGE DOORS

1 GENERAL

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

Documents

1.1 DOCUMENTS REFERRED TO

Documents referred to in this section are:

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

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

Requirements

1.2 INFORMATION FOR OPERATION AND MAINTENANCE

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

Performance

1.3 DESIGN PARAMETERS WIND

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

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

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

1.5 RESPONSIBILITY FOR PERFORMANCE

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

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2 PRODUCTS

2.1 GARAGE DOOR

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

2.2 MOTORISED DOOR OPENER

Required

3 EXECUTION

3.1 PREPARATION FOR INSTALLATION

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

3.2 MANUFACTURER'S REQUIREMENT FOR INSTALLATION

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

3.3 START UP

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

3.4 ADJUSTMENT

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

3.5 DEMONSTRATION

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

Completion

3.6 ENSURE

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

3.7 REPLACE

Replace damaged, cracked or marked elements.

3.8 LEAVE

Leave work to the standard required by following procedures.

3.9 REMOVE

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

4 SELECTIONS

4.1 GARAGE DOOR - ROLLER SHUTTER DOOR

Location:	Garage
Brand:	TBC
Type:	Roller Door w/ Automatic Control
Finish:	CUSTOM POWDERCOAT FINISH TO MATCH ALUPLAST ALUDEC UMBRA GREY (AP12 / SIMILAR TO RAL 7022), IN A LOW-GLOSS FINE-TEXTURE FINISH. COLOUR AND TEXTURE SAMPLE TO BE APPROVED AGAINST ACTUAL ALUDEC UMBRA GREY WINDOW SAMPLE PRIOR TO MANUFACTURE

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4610VR VIRIDIAN GLASS RESIDENTIAL GLAZING

1 GENERAL

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

- windows and doors
- frameless shower and bath screens
- splashbacks, wall linings

1.1 RELATED WORK

Refer to 4541SU for Windows and Doors

Documents

1.2 DOCUMENTS

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

NZBC F4/AS1	Safety from falling
NZBC F9/AS1	Means of restricting access to residential pools
NZBC H1/AS1	Energy efficiency for all housing, and buildings up to 300m²
NZBC H1/AS2	Energy efficiency for buildings greater than 300m²
NZBC H1/VM1	Energy efficiency for all housing, and buildings up to 300m²
NZBC H1/VM2	Energy efficiency for buildings greater than 300m²
AS/NZS 1170.2: 2011	Structural design actions - Wind actions
AS/NZS 2208	Safety glazing materials in buildings
NZS 3604	Timber-framed buildings
NZS 4211	Specification for performance of windows
NZS 4223.1	Glazing in buildings - Glass selection and glazing
NZS 4223.Supp1	Glazing in buildings - Supplement 1 to NZS 4223.1:2008 and NZS 4223.4:2008
NZS 4223.2	Glazing in buildings - Insulating glass units
NZS 4223.3	Glazing in buildings - Human impact safety requirements
NZS 4223.4	Glazing in buildings - Wind, dead, snow and live action
AS/NZS 4666	Insulating glass units
BRANZ BU 636	Protecting glass from damage
BPS	Building Product Specifications

1.3 MANUFACTURER/SUPPLIER DOCUMENTS

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

Viridian Architectural Glass, Architectural Glass Guide

Manufacturer/supplier contact details

Company:	**Viridian**
Web:	www.viridianglass.co.nz
Email:	info@viridianglass.net.nz
Telephone:	0800 847 434

Warranties

1.4 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

10 years:	For insulating glass units
10 years:	For toughened glass
5 years:	For laminated glass

- Provide the warranty in the standard form in the general section 1237WA WARRANTY

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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 NO SUBSTITUTIONS

Substitutions are not permitted to any specified **Viridian Glass**, products or systems.

Performance

1.6 THERMAL STRESS ANALYSIS

Obtain the glass manufacturer's thermal stress analysis for spandrel panels and for tinted, reflective and other solar control vision glasses for review before placing final order.

1.7 THERMAL PERFORMANCE - EXTERNAL GLAZING

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

Refer to RELATED WORK sections for Construction R-values for complete windows / glazed doors / curtain walls and/or skylights including glazing.

2 PRODUCTS

Materials

2.1 TOUGHENED GLASS

Grade A safety glazing material to AS/NZS 2208. Refer to SELECTIONS.

2.2 SEALED INSULATING GLASS UNITS (IGU'S)

To the performance requirements of AS/NZS 4666, NZS 4223.2 and the IGU Manufacturers Association (IGUMA) requirements.

Marking to NZS 4223.2 as modified by NZBC B2/AS1, 3.4.3 Insulating glass units.
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 the 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

2.3 MIRROR GLASS

Clear silvering quality annealed mirror glass, including silver, activation, passivation and two protective coats.

2.4 SAFETY MIRROR GLASS

4 mm and 6 mm Float plate mirror with silver plating and vinyl coating, safety glazing material to AS/NZS 2208.

Materials, shower and bath screens

2.5 GLASS SHOWER AND BATH SCREENS

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

Components, general

2.6 JOINTING, PUTTY AND SEALING MATERIALS

Ensure jointing, putty and sealing materials compatible with glass substrates. Confirm compatibility with laminated glass, IGU's and coatings.

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Components, aluminium and uPVC glazing

2.7 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.

2.8 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)

2.9 GLASS ADHESIVE

Adhesive mirror-mastic and double-sided adhesive tape.

2.10 MIRROR DE-MISTER

Refer to appropriate electrical section(s) for type.

3 EXECUTION

Conditions

3.1 GENERAL REQUIREMENTS

To NZS 4223.1, NZS 4223.2, NZS 4223.3 as modified by BPS paragraph 4.4.1.4 and 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 of accurate size with clean, 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**.

Conditions - human impact safety requirements

3.6 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 as modified by BPS paragraph 4.4.1.4 for thickness and maximum areas of safety glass.

3.7 SAFETY GLAZING MATERIAL

Use only safety glazing materials defined in NZS 4223.3, as modified by BPS paragraph 4.4.1.4, 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.

3.8 CONTAINMENT

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

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Assembly

3.9 WORKING OF GLASS

All working of glass as required in NZS 4223.1.

3.10 EDGE WORK AND BEVELLING

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

3.11 SURFACE TREATMENT

Refer to SELECTIONS/drawings for finish.

3.12 SURFACE CUTTING

Refer to SELECTIONS/drawings for finish.

Application uPVC

3.13 INSTALL GLASS TO UPVC FRAMES

Install glass to NZS 4223.1.

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

Application - wall mounted glass (mirrors and splashbacks)

3.14 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

3.15 INSTALL GLASS BALUSTRADES

Confirm/design and carry out installation to;

- Viridian Glass SSPS1.
- NZS 4223.3, 22 Barriers (Balustrades, fences, and screens) as modified by BPS paragraph 4.4.1.4.
- NZBC F4/AS1: Safety from falling, 1.0 **Barriers in buildings**.

3.16 INSTALL GLASS POOL FENCES

Confirm/design and carry out installation to;

- Viridian Glass SSPS1.
- NZBC F9/AS1 Means of restricting access to residential pools
- NZS 4223.3, 22 Barriers (Balustrades, fences, and screens) as modified by BPS paragraph 4.4.1.4.
- NZBC F4/AS1: Safety from falling, 1.0 **Barriers in buildings**.

3.17 INSTALL GLASS SCREENS

Install shower and bath screens and doors to manufacturer's requirements. Fix wall channel with silicone sealant.

Finishing

3.18 SAFETY

Indicate the presence of transparent glass for the remainder of the construction period, with whiting, tape or signs compatible with the glass type. Indicators other than whiting must not be applied to the glass surface.

Completion

3.19 TRADE CLEAN

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

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3.20 REPLACE
Replace damaged, cracked or marked elements.

3.21 LEAVE
Leave work to the standard required by following procedures.

3.22 REMOVE
Remove debris, unused materials and elements from the site.

4 SELECTIONS

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

Performance - wind

4.1 WIND ZONE - NON-SPECIFIC DESIGN
Building wind zone: High (as determined from NZS 3604, NZS 4223.4)

Glass by type

4.2 VIRIDIAN VTOUGH™ SAFETY GLASS - TOUGHENED GLASS

Location:	Where glazing is under 760 from FFL
Brand/pattern:	VTough™ safety glass
Thickness:	4 mm

4.3 VIRIDIAN LIGHTBRIDGE1.1™ - HI PERFORMANCE LOW E INSULATING GLASS UNITS (IGU'S)

Location:	All glazed windows and doors
Brand/type:	Viridian LightBridge1.1™
Outer glass type:	Clear
Thickness:	4mm
Spacer width:	14mm (recommended)
Space gas:	Argon
Inner glass type:	LightBridge1.1™ Low E
Coated surface:	Low E on surface #3

Glass shower and bath screens

4.4 VIRIDIAN TOUGHENED - FRAMELESS SHOWER SCREENS AND DOORS

Location:	Bathrooms
Brand/type:	Viridian VTough™
Thickness:	10mm
Hardware:	Hinged and sliding

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4711EW EARTHWOOL® GLASSWOOL THERMAL INSULATION

1 GENERAL

This section relates to the supply and installation of Earthwool® glasswool thermal insulation. It includes:

- ceiling insulation
- wall insulation
- underfloor insulation

1.1 RELATED WORK

Refer to 4161PC UNDERLAYS, FOIL AND DPC for wall underlay and roofing underlay.

1.2 ABBREVIATIONS AND DEFINITIONS

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

Documents

1.3 DOCUMENTS

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

NZBC H1/AS1	Energy efficiency for all housing, and buildings up to 300m²
NZBC H1/AS2	Energy efficiency for buildings greater than 300m²
AS/NZS 3000	Electrical installations (Australian/New Zealand Wiring Rules)
AS/NZS 4859.1	Thermal insulation materials for buildings - General criteria and technical provisions
AS/NZS 60695.11.5	Fire hazard testing - Test flames - Needle-flame test method - Apparatus, conformity test arrangement and guidance
NZS 4246	Energy efficiency - Installing bulk thermal insulation in residential buildings
CodeMark™ CMNZ30095 verC	Knauf Insulation

1.4 MANUFACTURER/SUPPLIER DOCUMENTS

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

Earthwool® glasswool Insulation Technical Data Sheets
Earthwool® glasswool Insulation Material Safety Data Sheets
Earthwool® glasswool Insulation Installation Instructions
BRANZ Appraisal 648 (2022) - Knauf glasswool Insulation
Eurofins Gold Certificate for Indoor Air Comfort: IACG-323-01-25-2022
Certifire Certificate: AC100.2
ISO 9001 Certificate Registration No. 44 100 190742

Manufacturer/supplier contact details

Company:	Knauf Insulation Limited
Web:	www.knauf.com/en-NZ/knauf-insulation
Email (Technical):	tech.nz@knaufinsulation.com
Email (Sales):	sales.nz@knaufinsulation.com
Telephone:	0800 KNAUFi (562 834)

Warranties

1.5 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)

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- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

1.6 WARRANTY - INSTALLER/APPLICATOR

Provide an installer/applicator warranty:

1 years For installation workmanship

- 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

1.7 QUALIFICATIONS GENERALLY

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

1.8 NO SUBSTITUTIONS

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

Performance - fire properties

1.9 FIRE PROPERTIES

Earthwool® glasswool insulation is deemed non-combustible in accordance with AS 1530.1 and non-combustible to test criteria under the 30's Needle Flame Test to AS/NZS 60695.11.5.

Compliance

1.10 CODEMARK CERTIFICATE

Earthwool® glasswool insulation meets the requirements of the NZBC when used in accordance with the conditions and limitations of its Certificate of Conformity CMNZ30095.

2 PRODUCTS

2.1 UNDERFLOOR INSULATION SEGMENTS

Earthwool® glasswool insulation: Underfloor, non-combustible and certified Red List Free glasswool insulation segments to AS/NZS 4859.1, manufactured using up to 80% recycled glass with DriTherm® silicone treatment, ECOSE® Technology plant-based binder, and faced with a wind-wash barrier. Available in segments 420mm wide x 1160mm long in a range of thicknesses and R-values.

2.2 WALL INSULATION SEGMENTS

Earthwool® glasswool insulation: Wall, non-combustible and certified Red List Free glasswool insulation segments to AS/NZS 4859.1, manufactured using up to 80% recycled glass with DriTherm® silicone treatment, ECOSE® Technology plant-based binder and TwinTech® smooth finish on both faces. Available in a range of segment sizes, thicknesses and R-values. Refer to SELECTIONS.

2.3 CEILING & SKILLION ROOF INSULATION SEGMENTS

Earthwool® glasswool insulation: Ceiling, non-combustible and certified Red List Free glasswool insulation segments to AS/NZS 4859.1, manufactured using up to 80% recycled glass with DriTherm® silicone treatment, ECOSE® Technology plant-based binder and TwinTech® smooth finish on both faces. Available in ceiling and skillion roof variations in a range of segment sizes, thicknesses and R-values. Refer to SELECTIONS.

Accessories

2.4 PLASTIC STRAPPING TAPE

Proprietary plastic strapping tape.

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3 EXECUTION

Conditions

3.1 DELIVERY, STORAGE & HANDLING OF PRODUCTS

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

Do not use damaged or wet insulation material.

3.2 ROUTINE MATTERS

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.

Installation - generally

3.4 STANDARDS AND TOLERANCES

Refer to the general section 1270 CONSTRUCTION for general requirements.

3.5 INSTALLATION GENERALLY

Lay, install, fit and fix insulation without gaps, tucks, folds and over compaction to NZBC H1/AS1 or AS2 and Earthwool glasswool Installation Instructions. For all housing and buildings up to 300m², install in accordance to NZS 4246 sections 5 Walls, 6 Ceilings & Roofs, 7 Underfloor - Suspended Framed Floors and 10 Concrete Slab-on-Ground Insulation, for residential light timber or steel framed buildings. Allow insulation to re-loft/relax prior to installation. Do not cover vents. Lift up electrical wires, lighting transformers/controllers and lay the insulation underneath.

3.6 INSULATION CLEARANCES

Provide insulation clearances to NZS 4246 and for recessed luminaires AS/NZS 3000, 4.5.3.2. Where allowed by these standards provide insulation clearances to product manufacturer's stated clearances. Secure insulation in place so clearances are maintained and use guards/barriers , if required, where insulation is not secured.

3.7 LAY WIRE NETTING - UNDER JOISTS / PURLINS

Lay at right angles across the rafters/roof joists (under purlins). Pull tight and fix.

3.8 LAY PLASTIC STRAPPING TAPE

Lay at right angles across the framing at a minimum of 300mm centres, staple tape to each framing member with stainless steel staples.

3.9 CUTTING INSULATION

Cut insulation using a sharp craft knife.

Installation - Underfloor

3.10 FIT INSULATION BETWEEN FLOOR JOISTS - UNDERFLOOR SEGMENTS

Measure distance between floor joists and cut Earthwool® glasswool insulation underfloor segments minimum 10mm wider and friction fit between floor joists with wind-wash barrier facing downwards, leaving no gaps between segments, 100mm clearance around waste water pipes and maintaining full thickness of insulation over whole installation. Support insulation using plastic strapping tape stapled to joists.

Installation - Wall Framing

3.11 FIT WALL INSULATION - TIMBER WALL FRAMING

Measure distance between studs and cut Earthwool® glasswool insulation segments/rolls minimum 10mm wider and friction fit between framing members with front face of insulation flush with framing. Leave no gaps and maintain full thickness of insulation over whole installation. If cavity depth is greater than the insulation nominal thickness, fix or strap the insulation to secure. Cut insulation pieces as required to fill small spaces, behind outlet boxes, gaps around penetrations and other obstructions. Without compressing, tuck insulation behind wiring, plumbing or ductwork.

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Installation - Ceiling

3.12 FIT INSULATION BETWEEN CEILING FRAMING

Friction fit Earthwool® glasswool insulation segments/rolls between ceiling framing members, leaving no gaps and maintaining full thickness of insulation over whole installation. R7.0 & R8.0 Ceiling batts are designed to expand over truss chords / ceiling joists without the need for notching of batts. Cut insulation pieces as required to fill small spaces, gaps around penetrations and other obstructions. Without compressing, tuck insulation behind wiring, plumbing or ductwork.

Installation - Roof

3.13 FIT INSULATION BETWEEN SKILLION ROOF RAFTERS

Friction fit Earthwool® glasswool insulation segments between rafters, flush with the face of the rafter, leaving no gaps and maintaining a continuous clearance of 25mm minimum between the insulation and the roofing membrane (underlay). Cut insulation pieces as required to fill small spaces, gaps around penetrations and other obstructions. Without compressing, tuck insulation behind wiring, plumbing or ductwork.

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.knauf.com/en-NZ/knauf-insulation
Substitutions are not permitted to the following, unless stated otherwise.

Materials

4.1 EARTHWOOL® GLASSWOOL UNDERFLOOR INSULATION

Location:	Within floor cassettes
Brand:	Earthwool® glasswool insulation
Product:	Underfloor segment
R-value:	R3.0
Thickness:	105mm
Size:	420mm x 1160mm
Density:	19.5kg/m³

4.2 EARTHWOOL® GLASSWOOL THERMAL WALL INSULATION

Location:	All Exterior timber framed walls
Brand:	Earthwool® glasswool insulation
Product:	R4.1 Soundshield Plus
R-value:	R4.1
Thickness:	140mm
Size:	580mm x 1160mm
Density:	22.6kg/m³

4.3 EARTHWOOL® GLASSWOOL THERMAL WALL INSULATION - SERVICE CAVITY

Location:	All Exterior timber framed walls
Brand:	Earthwool® glasswool insulation
Product:	Wall segments
R-value:	R1.3
Thickness:	45mm
Size:	580mm x 1160mm
Density:	20.5kg/m³

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4.4 EARTHWOOL® GLASSWOOL THERMAL CEILING INSULATION - SINGLE LAYER

Location:	Service cavity to ceiling
Brand:	Earthwool® glasswool insulation
Product:	Ceiling segments
R-value:	R3.4
Thickness:	110mm
Size:	580mm x 1160mm
Density:	30.7kg/m³

4.5 EARTHWOOL® GLASSWOOL THERMAL SKILLION ROOF INSULATION

Location:	To Skillion roof cavity
Brand:	Earthwool® glasswool insulation
Product:	Ceiling, skillion roof segments
R-value:	6.0
Thickness:	215mm
Size:	430mm x 1160mm

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4811 SEALANTS

1 GENERAL

This is a reference section dealing with the selection of and application methods for sealants nominated in other work sections.

Documents

1.1 DOCUMENTS

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

US Federal Specifications:

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

Warranties

1.2 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

10 years	For materials

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

Refer to the general section 1237 WARRANTIES for additional requirements.

1.3 WARRANTY - INSTALLER/APPLICATOR

Provide an installer/applicator warranty:

5 years	For installation

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

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.4 SUBMIT

Before commencing work submit the manufacturer's specifications for the specified sealant system, including the following:

- trade name
- generic type: one/multi part, non slump/self levelling, low/medium/high modulus
- chemical composition
- maximum joint movement
- tensile strength
- elastic recovery
- service temperature range
- shrinkage
- staining properties
- toxicity
- tack free time
- through cure time
- colour range
- life expectancy

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- clean up solvents required
- primers required
- method of preparing surface
- method of application.

1.5 TEST SUBSTRATES

Before commencing the sealant installation, obtain and submit a certificate from the sealant manufacturer confirming that adjoining substrates and materials have been examined and are deemed suitable for sealant application, and are compatible with the sealant material specified.

1.6 QUALIFICATIONS

Sealant work, including preparation, to be carried out by competent and experienced sealant applicators, approved by the sealant manufacturer. Provide evidence of technical competence and experience for review before commencing work.

1.7 MANUFACTURER'S TECHNICAL SERVICES

Use the research and development, and the technical information provided by the various sealant manufacturers throughout the design, development and installation stages of sealant work.

1.8 VISIT THE SITE

Arrange for the sealant manufacturer to visit the site to examine the site conditions, to inspect the surfaces and joints, and to discuss the installation procedures, before any sealing work proceeds

2 PRODUCTS

Materials

2.1 AIR SEAL AND JOINT FILLER

Bitumen impregnated sponge plastic, bitumen adhesive-fixed.

2.2 SEALANT, SANITARY FIXTURES

For between sanitary fixtures and accessories and adjacent floor or wall surfaces.

1-part, silicone, containing mildew resistant agents.
Colour: White

Accessories

2.3 JOINT CLEANING MATERIALS

Xylol, methyl-ethyl-ketone, toluol, as acceptable for the substrate material and/or finish and as required by the sealant manufacturer for the particular application. Test solvents to confirm suitability before using on finished work.

2.4 MASKING TAPE

Pressure sensitive, self adhesive crimped paper tape. Do not use masking-grease materials.

2.5 SURFACE PRIMER

As required by the sealant manufacturer for each surface substrate and particular applications. Primers to suit the various project conditions.

2.6 JOINT BACKING ROD

Extruded closed cell polyethylene foam rod, open cell foam polyurethane, or rod stock of butyl or Neoprene, chemically compatible with the sealant. Use backing rod diameter 25% greater than the joint width before installation. Use in long lengths.

2.7 BOND BREAKER TAPE

Pressure sensitive self adhesive polyethylene breaker tape. Masking tape or PVC insulation tape is not permitted.

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3 EXECUTION

Conditions

3.1 COMPATIBILITY

Ensure sealants, joint fillers, primers, backing rods, bond breaker tape and cleaning solutions are compatible with each other.

3.2 NON-BLEEDING SEALANTS

Use only non bleeding sealants capable of supporting their own weight (non slump), except for self-levelling sealant.

3.3 COLOURS

Refer to material selection. Where colour not specified, choose sealant colours from the manufacturer's standard/special colour ranges.

Preparatory work

3.4 ENSURE

Ensure that joints to receive sealants are suitable for the proposed application. Ensure that surfaces are sound, dry, free from dust, dirt, scale, laitance, corrosion or other loose material, oil, grease, paint, release agents or other contaminants which may affect the bond, or the performance of the sealing material.

Ensure that joints and spaces receiving sealant are not less than 12mm deep, with width to suit the sealant being used.

3.5 TEST SUBSTRATES

Test substrates for indications of staining or poor adhesion. If poor adhesion is evident from initial tests, consult the sealant manufacturer about the application of a suitable primer. Only use combinations of sealants and substrates for which favourable adhesion and compatibility have been confirmed sufficiently for satisfactory adhesion of the selected sealant.

Do not apply sealant to concrete or concrete block until concrete and/or mortar has cured.

3.6 CLEAN JOINTS

Clean joints as required by the manufacturer to achieve acceptable joint surfaces for the application of sealant. Protect adjacent surfaces from abrasion or other damage.

3.7 CLEAN METAL SURFACES

Clean metal surfaces with solvent to remove any grease deposits.

3.8 MASK

Mask adjacent surfaces alongside joints to prevent contamination. Mask off any surfaces which would be difficult to clean if smeared with sealant, or where excess sealant could not be neatly trimmed off or removed.

3.9 VENTILATION

Ensure adequate ventilation for sealant applicators during the preparation and application of sealant work.

Application

3.10 FINAL PREPARATION

Prepare joints in accordance with the sealant manufacturer's requirements, using only recommended solvents and cleaning methods.

3.11 BACKING

Insert backing material in joints. Use only blunt instruments to install backing rods to avoid puncturing or damage. Do not twist rods when installing. When using backup material do not leave gaps and do not reduce the depth of the sealant joint to less than the minimum required by the sealant manufacturer.

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3.12 PRIMING

Use manufacturer supplied/recommended primers. Allow to cure for the manufacturer recommended time (minimum and maximum). Refer to manufacturer for instructions if maximum cure time is exceeded before sealant is applied. Do not contaminate bond breakers with primer.

Allow primer to dry as recommended by the manufacturer. Do not prime more than can be completed in one day. Prevent contamination of the primed surfaces prior to applying sealant.

3.13 JOINT FILLING

Fill joint cavity with sealant in accordance with the sealant manufacturer's requirements and quality control programmes. Use a pressure gun with a nozzle cut to suit the required joint width. Ensure sealant is deposited in a uniform, continuous bead, without gaps or air pockets and with clean, neat edges.

3.14 TOOLING

Tool sealant to form a smooth, flat bead, or a smooth convex fillet, with a profile as required by the sealant manufacturer. Complete tooling before the sealant surface starts to form a skin.

3.15 FINISHING

Remove masking immediately after tooling and before sealant surface starts to skin. Remove excess sealant from adjoining surfaces before the sealant has set, using the cleaning materials and methods required by the sealant manufacturer, leaving surfaces clean and the sealant runs undamaged.

3.16 SURROUNDING WORK

Leave surrounding surfaces in a neat, clean condition with no evidence of spill overs.

Completion

3.17 CLEAN UP

Clean up as the work proceeds.

3.18 LEAVE

Leave work to the standard required by following procedures.

3.19 REMOVE

Remove masking tape, used packaging and waste products from the site.

4 SELECTIONS

4.1 AIR SEAL AND JOINT FILLER

Required

4.2 SANITARY FIXTURES SEALANT

Required

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4821 FLASHINGS

1 GENERAL

This section relates to the fabrication and installation of flashing systems not forming part of a proprietary system.

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 provisions for building elements
NZBC E2/AS1	External moisture provisions for timber-framed buildings up to 10 m in height
AS/NZS 2728	Prefinished/prepainted sheet metal products for interior/exterior building applications - Performance requirements
AS 3566	Self-drilling screws for the building and construction industries - General requirements and mechanical properties
NZS 3604	Timber-framed buildings
NZMRM CoP	NZ Metal Roof and Wall Cladding Code of Practice

Requirements

1.2 QUALIFICATIONS

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

1.3 VERIFY DIMENSIONS

Verify dimensions against site measurements prior to fabrication.

Standards of performance

1.4 DURABILITY REQUIREMENTS

Design and install the flashings appropriate for the durability applications in accordance with NZBC B2/AS1. The Building Code B2, 3.2 requires that all hidden elements have at least the same durability as that of the element that covers it. Refer to NZBC B2/AS1, Table C.1.1.1 and NZBC E2/AS1, Table C.1.1.1A: Material selection.

1.5 COMPATIBILITY REQUIREMENTS

Each flashing material shall be selected in accordance with NZBC E2/AS1, Table C.1.1.1A: Material selection, to minimise corrosion. Refer to either NZS 3604 Clause 4.2 or AS/NZS 2728 for the relevant exposure conditions. For compatibility of materials in contact and subject to run-off, refer to NZBC E2/AS1, Table C.1.1.1B: Compatibility of materials in contact, and Table C.1.1.1C: Compatibility of materials subject to run-off.

1.6 PROTOTYPES - REVIEW

Refer to the general section 1270 CONSTRUCTION for details of how prototypes will be reviewed and how instructions to proceed will be given. For flashings where there are no specific details or drawings, provide full size prototypes of the flashings to integrate components into the weathertight system. Co-ordinate with the trades affected by the installation. Provide the prototype flashings to the contract administrator for review.

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2 PRODUCTS

2.1 FLASHING MATERIALS

Acceptable materials for flashings are described in NZBC E2/AS1, 4.0 Flashings. Material, grade and colour as detailed and scheduled. Ensure that materials used for flashings are compatible with the building and cladding materials and their fixings.

2.2 FLASHING FABRICATION

Fabricate flashings generally to NZBC E2/AS1, 4.0 Flashings, from a ductile grade of metal designed for lateral strength by folding, stiffening or ribbing on external edges, having a maximum un-stiffened width of 300mm. Provide all hooks, hems, kick outs, bird's beaks, stop ends, soft edges and turn downs etc. to NZBC E2/AS1, 4.0 Flashings, or as shown on the drawings.

2.3 FIXINGS

Rivets, screws, nails and cleats to be compatible with the materials being fastened. Fasteners complying with the corrosion requirements of AS 3566 are suitable for use with ZINCALUME® steel products. Use only low carbon non-conductive sealing washers.

2.4 JOINTS - SEALANTS

Neutral Curing silicone or MS polymer sealant as required, with low resistance to compression and be-able to withstand large temperature variations. MS polymer sealant to be used where the sealant is exposed and the surrounding surfaces are to be subsequently painted or coated.

3 EXECUTION

Conditions

3.1 DELIVERY

Keep flashings dry in transit. Take delivery of flashings in an undamaged condition. Reject all damaged materials.

3.2 STORAGE

Store materials and accessories on a level, firm base, in dry conditions, well ventilated, out of direct sunlight and completely protected from weather and damage. Ensure storage areas are away from current work areas. Cover to keep dry until fixed.

3.3 HANDLING

Avoid distortion and contact with potentially damaging surfaces/substances. Do not drag flashings across each other, or across other surfaces. Protect edges, corners and surfaces from damage.

3.4 SUBSTRATE

Do not commence work until the substrate is of the standard required by the installer for the specified flashings, level and in true alignment.

3.5 PROTECT

Protect surfaces, window and door joinery, and finishes already in place, from the possibility of damage during the installation process.

3.6 CONFIRM LAYOUT

Before commencing work confirm the proposed installation of the flashings and expansion joints and other visual considerations of the finished work.

3.7 CO-ORDINATE INSTALLATION

Co-ordinate installation of flashings with associated trades.

Application

3.8 INSTALLATION

Install flashings in accordance with NZMRM CoP and in compliance with NZBC E2/AS1, 4.0 Flashings. For very high wind zones and where the pitch of the roof is below 15° the flashing joint laps shall be sealed with sealant at each end of the lap to prevent the ingress of water.

Refer to NZBC E2/AS1, Table 4.5.1.1: General dimensions of metal flashings and other flashings as listed, for general dimensions of flashings.

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3.9 FIXINGS

Fix flashings with fasteners appropriate to the situation. For fixing flashings with proprietary brackets or clips ensure they are aligned to allow for movement and are compatible with the flashing material.

Fix screws with the shank perpendicular to the surface of the flashing with the washer fitted firmly against the flashing. Screws to be compatible with the flashing material.

Rivets 'blind' or 'pop' are to be sealed when used. Aluminium rivets are compatible with zinc or AZ coated steel. Monel and stainless steel rivets can be used to fix galvanized steel flashings. Minimum diameter of rivet to be used is 4.0mm. Drill hole 1mm larger than the rivet size. Seal head of rivet with neutral cured silicone.

3.10 JOINTING - SEALANTS

Clean surfaces to be lapped using a solvent ensuring all traces of the solvent are removed with a clean rag. Apply sealant by gun in a continuous bead of approximately 5mm diameter. Width of sealant when compressed should not exceed 25mm. Sealant joints shall be mechanically fixed for strength. Refer to NZMRM CoP for details.

3.11 FINAL INSPECTION

A final inspection by the installer to take place after completion of the flashing work. Any defects or subsequent damage to be made good.

Completion

3.12 PROTECT

Protect new work from damage.

3.13 REPLACE

Replace all damaged or marked elements.

3.14 LEAVE

Leave work to the standard required for following procedures.

3.15 REMOVE

Remove debris, unused materials and elements from the site.

4 SELECTIONS

4.1 FLASHINGS

Type	Material and finish/colour
General flashings:	0.55 Steel - powdercoated weathered copper
Window/doors:	
- Head:	0.55 Steel - powdercoated weathered copper
- Sill:	0.55 Steel - powdercoated weathered copper
Cladding:	
- External corner:	0.55 Steel - powdercoated weathered copper
- Internal corner:	0.55 Steel - powdercoated weathered copper
Soffit:	0.55 Steel - powdercoated weathered copper
Wall/roof junctions:	0.55 Steel - powdercoated weathered copper
Barge:	0.55 Steel - powdercoated weathered copper
Apron:	0.55 Steel - powdercoated weathered copper
Saddle:	0.55 Steel - powdercoated weathered copper
Gutter apron:	0.55 Steel - powdercoated weathered copper
Roof penetrations:	0.55 Steel - powdercoated weathered copper

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4911 STEEL METALWORK

1 GENERAL

This section relates to the fabrication and installation of steel items, including:

- stairs
- balustrades
- shrouds

Documents

1.1 DOCUMENTS REFERRED TO

Documents referred to in this section are:

AS/NZS 1163	Cold-formed structural steel hollow sections
AS 1397	Continuous hot-dip metallic coated steel sheet and strip - Coatings of zinc and zinc alloyed with aluminium and magnesium
AS/NZS 1554.1	Structural steel welding - Welding of steel structures
AS/NZS 1594	Hot-rolled steel flat products
AS 1627.4	Metal finishing - Preparation and pretreatment of surfaces - Method selection guide - Abrasive blast cleaning
AS 1627.9	Metal finishing - Preparation and pretreatment of surfaces - Method selection guide - Pictorial surface preparation standards for painting steel surfaces
AS/NZ 2312.3	Guide to the protection of structural steel against atmospheric corrosion by the use of protective coatings - Part 3: Thermal metal spray coatings
AS/NZS 3679.1	Structural steel - Hot rolled bars and sections
AS/NZS 4680	Hot-dip galvanized (zinc) coatings on fabricated ferrous articles
AS/NZS 4792	Hot-dip galvanized (zinc) coatings on ferrous hollow sections, applied by a continuous or special process
NZS/BS 1387	Screwed and socketed steel tubes and tubulars and for plain end steel tubes suitable for welding or for screwing to BS 21 pipe threads
BS 2630	Resistance projection welding of uncoated low carbon steel sheet and strip using embossed projections
BS 6497	Powder organic coatings for application and stoving to hot-dip galvanized hot-rolled steel sections and pre-formed steel sheet
BRANZ BU 567	E2/AS1 Flashing Requirements
GANZ	Galvanizing Association of New Zealand - After-Fabrication Hot Dip Galvanizing. A practical reference for designers, specifiers, engineers, consultants, manufacturers and users

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

Requirements

1.2 QUALIFICATIONS

Refer to 1270 CONSTRUCTION for requirements relating to qualifications.

Metalworkers to be qualified as welders and experienced in working with steel and the techniques specified.

1.3 HOT WORK - FIRE SAFETY

Refer to section 1270 CONSTRUCTION

1.4 SHOP DRAWINGS - REQUIRED

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2 PRODUCTS

Materials

2.1 STEEL SECTIONS
Hot-rolled steel bars and sections to AS/NZS 3679.1.

2.2 HOLLOW STEEL SECTIONS
Cold formed to AS/NZS 1163, or hot-rolled as required.

2.3 STEEL FLAT
Hot-rolled sheet and/or strip to AS/NZS 1594.

2.4 PRE-FINISHED HOT-DIP ZINC-COATED STEEL
Hot-dip ZM 275 zinc coated steel coil to AS 1397, pre-treated, primed, top-finished and back-coated.
Zinc coating class: ZM 275

Components

2.5 SCREWS
Self-tapping metal with similar composition and mechanical properties to the parent metal and with the type of head, length, gauge and thread to suit the work and its location.

2.6 SCREWS
Hexagonal head, self-drilling, with similar composition and mechanical properties to the parent metal. Select type of head, length, gauge and thread to suit the work and its location.

2.7 BOLTS
Similar composition and mechanical properties to the parent metal, selecting type and size to suit the work and its location.

2.8 RIVETS
Solid domed with similar composition and mechanical properties to the parent metal. Flat head mild steel to be galvanized.

2.9 TUBULAR RIVETS
Domed/countersunk head steel with composition and mechanical properties to suit the parent metal.

2.10 THREADED STUDS
Mild steel with similar composition and mechanical properties to the parent metal. Select stud and nut threads to suit the base material and the nut being used.

2.11 CLIPS
Form clips to detail of the same metal as the metal sheet to be fixed/secured.

2.12 NAILS
Spiral rolled flat-head/clout type, with similar composition and mechanical properties to the parent metal. Select length and gauge to suit the work and its location.

Finishes

2.13 PRIMER
Alkyd oil zinc chromate priming paint.

2.14 EXTERNAL ORGANIC COATINGS
Polyester exterior grade coatings to BS 6497.

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3 EXECUTION

Conditions

3.1 DELIVERY, STORAGE & HANDLING OF PRODUCTS

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

3.2 ROUTINE MATTERS

Refer to 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 SURFACE DAMAGE

Prevent pre-finished surfaces rubbing together, and any contact with mud, plaster or cement. Keep protective coverings dry.

3.5 PREPARATION

Ensure location and substrate is ready to receive the elements and will allow work of the required standard.

3.6 FLASHINGS

Select and use sheet metals suited to the element, process or finish specified, jointing them as necessary to allow full development of their expected durability with a minimising of corrosion and to BRANZ BU 567.

Assembly

3.7 PROTECTION

During fabrication protect all surfaces which will be visible in completed work.

3.8 COLD FORMING

Cold formed work to be free from warping, buckling and fractures. Form bends with a brake press or by cold rolling.

3.9 CORNERS

Unless specified otherwise, mitre junctions of identical sections.

3.10 HOLES

Form without distortion of surrounding metal.

3.11 MOVING PARTS

When assembled, all moving parts must move freely and without binding.

3.12 CLEANING

Remove all burrs and sharp arrises which would be visible after fixing, or a hazard to the user.

Assembly - Welding

3.13 PREPARATION

Remove grease, dirt, moisture and oxide from edges being welded. Remove scale and residue from arc and power cutting by machining or hand grinding.

3.14 ACCURACY

Ensure accurate fit using clamps and jigs where practical. Use tack welds for temporary attachment where jigging is not practical.

3.15 TACK WELDING

Use only for temporary attachment unless otherwise specified.

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3.16 WELDS

Make joints with parent and weld metal fully fused throughout with no inclusions, holes, porosity or cracks.

3.17 SPATTER

Prevent weld spatter falling on surfaces of materials which will be self finished and/or visible in completed work.

3.18 RESIDUES

Ensure complete removal of flux residues and slag.

3.19 BUTT WELDS

Finish butt welds which will be visible in completed work smooth and flush with adjacent surfaces.

3.20 WELDING OF STEEL

Use one of the following methods for welding steel:

- gas welding
- metal-arc welding to AS/NZS 1554.1 for mild steel
- projection welding to BS 2630
- other methods subject to approval.

Application

3.21 INSTALLATION

Locate plugs accurately and use in accordance with the manufacturer's requirements. Fix plumb, level and true to line. Comply with the specified standards, the reviewed shop drawings and installation details, including brackets, bolts, fixings, grout, bedding compounds and sealants.

3.22 LOADING

Elements must not carry any structural load unless designed to do so. Do not use as strutting or support when in place.

Application - sheet steel

3.23 FABRICATE

Fabricate and assemble in a workshop wherever practicable.

3.24 MARK OUT

Mark out the work accurately, square and true to line allowing for correct radius folds and laps to give the dimensions required for neat, close fits when in place. Use marking methods that do not damage, deface or cause future corrosive attack to the sheet metal being worked. Do not use carbon-based pencils with aluminium/zinc alloy coated metals.

3.25 CUT SHEETS

Cut sheets by mechanical methods leaving edges true to line, square, smooth and free from all burrs. Do not use abrasive cutting blades with aluminium/zinc alloy coated metals.

3.26 FORMING

Use mechanical methods wherever possible and form and fold sheets square and true to line and face free of all deformation and defects. Minimise cold-working and stress build-up and their effects by limiting the amount of working and avoiding sharp radius bends (minimum 1 x sheet thickness).

3.27 PRE-ASSEMBLE

Pre-assemble in the workshop and match mark items for assembly or erection on site. Do not strain, twist, bend or open such items to force them into the correct position while assembling or erecting.

3.28 SEPARATION

Isolate dissimilar materials (metal and non-metal) in close proximity as necessary by painting the surfaces or fitting separator strips. Place isolators between metals and treated timber and cement-based materials. Do not use unpainted lead sheet in contact with or allow water run-off onto zinc-coated and aluminium/zinc alloy coated metals. Refer also to BRANZ BU 567.

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3.29 JOINING PRE-FINISHED HOT-DIP ZINC-COATED STEEL

Neutral cure silicone and rivets as best suits the form and location of the work and the supplier's stated requirements.

3.30 INSTALLATION

Locate fixings accurately and use in accordance with the manufacturer's requirements. Fix plumb, level and true to line. Comply with the installation details and complete with bedding compounds and sealants.

3.31 LOADING

Ensure elements are fully supported unless designed to be self-supporting.

Finishing

3.32 PREPARATION FOR COATINGS

Before applying coatings remove all welding slag, weld spatter, anti-splatter compounds, paints, grease, flux, rust, burrs and sharp arrises. Make good all defects which would show after application of coating. Finish surfaces smooth.

3.33 BRUSHING AND POWER TOOL CLEANING

Remove oil and grease by the use of solvents. Scrape and power wire brush to a minimum Class 2 finish to AS 1627.9. Clean to bright metal, but avoid producing a polished surface. Check that no burrs or sharp arrises remain which may prevent full coating thickness being attained.

3.34 ABRASIVE BLASTING

Remove oil and grease by the use of solvents. Abrasive blast clean to a Class 2.5 finish to AS 1627.4. Clean to bright metal, but avoid producing a polished surface. Select grit type and equipment such that the cleaned surface profile between peaks and valleys does not exceed one third of the dry film thickness. Check that no burrs or sharp arrises remain which may prevent the full coating thickness being attained.

3.35 PRIMING

After fabrication completely remove all surface contaminants and coat with a 2 pot anti-corrosion etch primer.

Reprime if the primer fails or more than 4 weeks elapses before the final coating system is applied.

3.36 APPLY COATINGS

Prepare surfaces and apply the coating system strictly in accordance with the coating manufacturer's technical information.

Completion

3.37 COMPLETION MATTERS

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

4 SELECTIONS

Fabricated steel items

4.1 STEEL METALWORK STAIR FRAMING

refer to architects and engineers documentation for further detail

4.2 STEEL METALWORK BALUSTRADING

refer to architects and engineers documentation for further detail

4.3 STEEL METALWORK HANDRAILS

refer to architects and engineers documentation for further detail

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Coatings

4.4 PRIMER
TBC

4.5 EXTERNAL ORGANIC COATINGS

Brand:	Dulux
Colour:	Scoria
Gloss level:	Semi Gloss
Thickness:	120 microns

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5113G GIB® PLASTERBOARD LININGS

1 GENERAL

This section relates to the supply, fixing and jointing of GIB® plasterboard linings and accessories to timber and steel framed walls and ceilings to form:

- standard systems
- bracing systems
- wet area systems

1.1 ABBREVIATIONS AND DEFINITIONS

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

The following abbreviations apply specifically to this section:

AWCINZ	Association of Wall and Ceiling Industries New Zealand

Documents

1.2 DOCUMENTS

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

NZBC C/AS2	Protection from fire for buildings other than risk group SH
NZBC E2/AS1	External moisture provisions for timber-framed buildings up to 10 m in height
AS/NZS 2588	Gypsum plasterboard
AS/NZS 2589	Gypsum linings - Application and finishing
NZS 3604	Timber-framed buildings
ISO 5660.1	Reaction-to-fire tests - Heat release, smoke production and mass loss rate - Part 1: Heat release rate (cone calorimeter method)
ISO 5660.2	Reaction-to-fire tests - Heat release, smoke production and mass loss rate - Part 2: Smoke production rate (dynamic measurement)
BRANZ Technical Paper P21	BRANZ Technical Paper P21: A wall bracing test and evaluation procedure (2010)

1.3 MANUFACTURER/SUPPLIER DOCUMENTS

Manufacturer's and supplier's documents which refer to work in this section:

GIB® Site Guide (April 2024)
GIB® Noise Control Systems (September 2017)
GIB® Fire Rated Systems (September 2024)
GIB® Wet Area Systems (February 2021)
GIB® Curveline Specification and Installation Manual for Curved Walls and Ceilings
GIB Toughline® Aqua (July 2018)
GIB Ezybrace® Systems (August 2016)
GIB Ezybrace® Bracing Design Software
GIB Ezybrace® Bracing Supplement Document (December 2016)
GIB Ezybrace® for Light Steel Frame Systems (March 2017)
GIBFix® Framing System (August 2016)
GIB Rondo® Metal Batten System (September 2024)
GIB-Cove®
GIB RocTape®
GIB® Goldline™ Platinum Tape-on Trims
GIB® UltraFlex high impact corner mould
GIB® Tough Systems (November 2014)
BRANZ Appraisal 289 (2024) GIB® Fire Rated Systems
BRANZ Appraisal 394 (2025) GIB® Noise Control Systems
BRANZ Appraisal 427 (2021) GIB® Wet Area Systems
BRANZ Appraisal 928 (2021) GIB EzyBrace® Systems

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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 QUALIFICATIONS

Refer to 1270 CONSTRUCTION for requirements relating to qualifications.

1.6 INSPECTIONS AND ACCEPTANCE

Allow for inspection of the finished plasterboard surface:

- before applying sealer and
- before applying finish coatings or decorative papers,

so that after assessment of the type and/or angle of illumination and its effect on the completed decorative treatment, group approval and acceptance of the surface can be given.

Compliance

1.7 COMPLIANCE - BRANZ APPRAISAL 427

GIB® Wet Area Systems has been appraised as meeting provisions of the NZBC when used within the Conditions and Limitations of its BRANZ Appraisal 427.

1.8 COMPLIANCE - BRANZ APPRAISAL 928

GIB EzyBrace® Systems has been appraised as meeting provisions of the NZBC when used within the Conditions and Limitations of its BRANZ Appraisal 928.

Performance

1.9 BRACING REQUIREMENTS

Braced wall systems to NZS 3604 when tested to BRANZ Technical Paper P21, using:

- GIB Ezybrace® Systems and/or GIB Ezybrace® Bracing Design Software
- GIB Ezybrace® Bracing Supplement Document
- GIB Ezybrace® for Steel Frame Housing (NASH) Software (to NASH Residential and Low-Rise Steel Framing Part 1 2010 Design Criteria)

Refer to drawings for location and type.

2 PRODUCTS

Materials

2.1 GIB® PLASTERBOARD

Gypsum plaster core encased in a face and backing paper formed for standard and water resistance use to AS/NZS 2588. Refer to SELECTIONS for location, type, thickness and finish.

GIB® Standard plasterboard
GIB Wideline® plasterboard
GIB Ultraline® high quality surface plasterboard
GIB Fyreline® fire resistant plasterboard
GIB Braceline® & GIB® Noiseline® dual purpose wall bracing & noise control plasterboard
GIB Aqualine® wet area plasterboard
GIB Toughline®
GIB Toughline® Aqua
GIB Curveline® plasterboard for forming tight curves.

Components

2.2 CEILING BATTENS

GIB® Rondo® metal ceiling battens, batten joiners and perimeter channel.

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2.3 SCREWS

GIB® Grabber® drywall type screws as follows:

Grabber® type	Used for fixing:
High Thread	GIB Ezybrace® or Standard systems to timber
Self Tapping	Standard systems to light gauge steel or timber
Dual Thread Screws	GIBFix®, GIB Ezybrace®, or Standard systems, to light gauge steel or timber
Wafer Head Needle Tip	Light gauge metal to timber not directly under plasterboard
Pancake Head Drill Tip	Light gauge metal to light gauge metal directly under plasterboard

Refer to GIB® requirements for appropriate details.

2.4 TAPE ON TRIMS AND EDGES

GIB® Goldline™ tape-on trims

GIB® UltraFlex® high impact corner mould
GIB® Levelline® Tape on Trim

2.5 METAL ANGLE TRIMS

GIB® galvanized steel slim angle trims.

2.6 CONTROL JOINTS

GIB® Rondo® P35 control joints.

GIB® Goldline™ tape-on trims
GIB® plastic W-profile control joints.

Accessories

2.7 ADHESIVE

Timber frame and/or steel frame:

GIBFix® One ultra low VOC water based wallboard adhesive
GIBFix® All-Bond solvent based wallboard adhesive

2.8 JOINTING COMPOUND

Bedding compound:	GIB Tradeset®, GIB Lite Blue®, GIB MaxSet®, GIB ProMix® All Purpose, GIB Plus 4®
Finishing compound:	GIB ProMix® All Purpose, GIB® Trade Finish®, GIB® Trade Finish® Lite, GIB ProMix® Lite, GIB® U-Mix, GIB Plus 4®, GIB Trade Finish® Multi
Cove:	GIB-Cove® Bond

2.9 JOINTING TAPE

GIB® jointing tape.

2.10 GAP FILLER

GIB® Gap Filler ultra low VOC multi-purpose acrylic flexible filler

3 EXECUTION

Conditions

3.1 DELIVERY, STORAGE & HANDLING OF PRODUCTS

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

3.2 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.

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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 PRE-INSTALLATION REQUIREMENTS - TIMBER FRAMING

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

Framing substrates shall be in accordance to AS/NZS 2589, GIB® Site Guide and GIB X-Block® Radiation Shielding Systems literature.

Check timber framing moisture content is in accordance with requirements of AS/NZS 2589. Refer to NZBC E2/AS1 and GIB® Site Guide.

Timber framing:	18% maximum for fixing plasterboard to timber (8-12% recommended for fixing plasterboard to timber framing if air conditioning and/or central heating are to be installed)

If GIB EzyBrace® systems are used in conjunction with GIBFix® Framing System, ensure that the positioning of the GIB HandiBrac® panel hold-down brackets are to the manufacturers recommended placements for the GIBFix® Framing System.

3.5 PRE-INSTALLATION REQUIREMENTS - STEEL FRAMING

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

Framing substrates shall be in accordance to AS/NZS 2589, GIB® Site Guide and GIB X-Block® Radiation Shielding Systems requirement. Refer to GIB® Site Guide.

3.6 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.

3.7 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.

Application

3.8 INSTALL CEILING BATTENS

Install to GIB® Rondo® Ceiling Batten Systems requirements.

3.9 LINING WALLS AND CEILINGS GENERALLY

Form to GIB® Site Guide. Ensure bulk insulation thickness shall not exceed that of the wall framing.

3.10 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.

3.11 FORM WET AREA SYSTEMS

Form to GIB Aqualine® Wet Area Systems requirements.

3.12 FORM BRACING SYSTEMS

Form bracing systems to:

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- GIB Ezybrace® Systems.

3.13 FORM CONTROL JOINTS

Form control joints to GIB® Site Guide requirements.

3.14 INSTALL TAPE-ON TRIMS

Install to GIB® Goldline™ Tape-on trims literature and/or GIB® Ultraflex high impact corner mould literature.

Finishing

3.15 FINISHING GENERALLY

To GIB® Site Guide and AS/NZS 2589.

Completion & Commissioning

3.16 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
Alkl interior walls where not part of a wet, noise or fire system	GIB® Standard plasterboard	10mm	L4

4.2 GIB® WATER RESISTANT SYSTEMS WALLS

Location	Plasterboard type / Lining requirements	Thickness	Finish Level
To all bathrooms and wet areas	GIB Aqualine® plasterboard	10mm	L4
To all bathrooms and wet aeras that are part of a noise/fire system	GIB Aqualine® plasterboard	13mm	L4

4.3 GIB® STANDARD SYSTEMS CEILINGS

Location	Plasterboard type / Lining requirements	Thickness	Finish Level
Throughout with the exception of wet areas	GIB® Standard plasterboard	13mm	L4

4.4 GIB® WATER RESISTANT SYSTEMS CEILINGS

Location	Plasterboard type / Lining requirements	Thickness	Finish Level
To all wet areas	GIB Aqualine® plasterboard	13mm	L4

4.5 GIB® BRACING SYSTEMS

Refer to:

- GIB Ezybrace® Systems

For bracing element location refer to drawn documentation.

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Accessories

4.6 GIB® RONDO® CEILING BATTENS

Location:	Refer to construction legend
Brand/type:	GIB® Rondo® Ceiling battens
Batten type:	Gib Rondo GR 310DF
Clip type:	NA

4.7 GIB® RONDO® CEILING BATTENS - SUSPENDED

Location:	Refer to construction legend
Brand/type:	GIB® Rondo® Ceiling battens
Batten type:	Gib Rondo GR 129 CF
Clip type:	A239 clip 180mm bolt

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5171G GIB® PLASTERBOARD FIRE & SOUND 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:

- fire rated systems including lift shafts and ducting
- sound rated systems

1.1 RELATED WORK

Refer to 5113G GIB® PLASTERBOARD LININGS for standard linings

1.2 ABBREVIATIONS AND DEFINITIONS

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

The following abbreviations apply specifically to this section:

FRR	Fire resistance rating
IIC	Impact insulation class
STC	Sound transmission class
AWCI NZ	Association of Wall and Ceiling Industries New Zealand

Documents

1.3 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 for buildings other than risk group SH
NZBC E2/AS1	External moisture provisions for timber-framed buildings up to 10 m in height
AS/NZS 2588	Gypsum plasterboard
AS/NZS 2589	Gypsum linings - Application and finishing
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)

1.4 MANUFACTURER/SUPPLIER DOCUMENTS

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

GIB® Site Guide (April 2024)
GIB® Noise Control Systems (September 2017)
GIB® Fire Rated Systems (September 2024)
GIB® Wet Area Systems (February 2021)
GIB Toughline® Aqua (July 2018)
GIB Rondo® Metal Batten System (September 2024)
GIB-Cove®
GIB RocTape®
GIB® Goldline™ Platinum Tape-on Trims
GIB UltraFlex® high impact corner mould
GIB® Tough Systems (November 2014)
BRANZ Appraisal 289 (2024) - GIB® Fire Rated Systems
BRANZ Appraisal 394 (2025) - GIB® Noise Control Systems

Manufacturer/supplier contact details

Company:	Winstone Wallboards
Web:	www.gib.co.nz
Telephone:	0800 100 442

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Requirements

1.5 NO SUBSTITUTIONS

Substitutions are not permitted to any specified GIB® systems, GIB® system components, GIB® plasterboard, associated GIB® products or GIB® accessories.

1.6 QUALIFICATIONS

Refer to 1270 CONSTRUCTION for requirements relating to qualifications.

1.7 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.

1.8 FIRE RATING REQUIREMENTS

Provide the GIB® fire rated systems. Refer to SELECTIONS for system/FRR.

1.9 SOUND INSULATION REQUIREMENTS

Provide the GIB® Noise Control Systems. Refer to SELECTIONS for system/STC. Include for forming and treating of perimeters of openings and penetrations in the elements to ensure the specified performance. Ensure absence of adjoining flanking paths.

Compliance

1.10 COMPLIANCE - BRANZ APPRAISAL 289

GIB® Fire Rated Systems has been appraised as meeting provisions of the NZBC when used within the Conditions and Limitations of its BRANZ Appraisal 289.

1.11 COMPLIANCE - BRANZ APPRAISAL 394

GIB® Noise Control Systems has been appraised as meeting provisions of the NZBC when used within the Conditions and Limitations of its BRANZ Appraisal 394.

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 Ultraline® high quality surface plasterboard
GIB Fyreline® fire resistant plasterboard
GIB Braceline® GIB Noiseline® dual purpose high density sound control plasterboard
GIB Aqualine® wet area plasterboard
GIB Toughline® plasterboard
GIB Toughline® Aqua plasterboard GIB (previously GIB Superline®)

Components

2.2 SCREWS

GIB® Grabber® High tread drywall screws.

GIB® Grabber® Self tapping drywall screws.
GIB® Grabber® Drill Point Fine Thread Screws.
GIB® Grabber® Laminator screws.

2.3 CEILING BATTENS

GIB® Rondo® metal ceiling battens, batten joiners, perimeter channel and clips.

2.4 CONTROL JOINTS

GIB® Rondo® P35 control joints.

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GIB® Goldline™ tape-on trims.

2.5 TAPE ON TRIMS AND EDGES

GIB® Goldline™ tape-on trims and edges or GIB® UltraFlex® high impact corner mould or GIB® Levelline® Tape on trim.

2.6 METAL ANGLE TRIMS

GIB® galvanized steel slim angle trims.

Accessories

2.7 ADHESIVE

Timber frame and/or steel frame:

GIBFix® One ultra low VOC water based wallboard adhesive.
GIBFix® All-Bond solvent based wallboard adhesive.

2.8 JOINTING COMPOUND

Bedding compound:	GIB Tradeset®, GIB Lite Blue®, GIB MaxSet®, GIB ProMix® All Purpose, GIB Plus 4®, GIB Trade Finish® Multi
Finishing compound:	GIB ProMix® All Purpose, GIB ProMix® Lite, GIB Trade Finish®, GIB Trade Finish® Lite, GIB Trade Finish® Multi, GIB® U-Mix, GIB Plus 4®
Cove:	GIB-Cove® Bond

2.9 JOINTING TAPE

GIB® Paper Joint Tape

GIB® RocTape®

2.10 ACOUSTIC/FIRE SEALANT

GIB Fire Soundseal™ low VOC highly flexible multi use acoustic sealant.

2.11 GAP FILLER

GIB® Gap Filler 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 1270 CONSTRUCTION for requirements relating to delivery, storage and handling of products.

3.3 PRE-INSTALLATION REQUIREMENTS - TIMBER FRAMING

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

Framing substrates shall be in accordance to AS/NZS 2589, GIB® Site Guide and GIB Fire Rated System and/or GIB Noise Control System literature.

Check timber framing moisture content is in accordance with requirements of AS/NZS 2589. Refer to NZBC E2/AS1 and GIB® Site Guide.

Timber framing:	18% maximum for fixing plasterboard to timber (8-12% recommended for fixing plasterboard to timber framing if air conditioning and/or central heating are to be installed)

3.4 LEVELS OF PLASTERBOARD FINISH

Provide the selected plasterboard surfaces to the pre decorative Levels of Finish specified in AS/NZS 2589.

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3.5 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.

3.6 PROTECTION

Protect surfaces; cabinetwork, fittings, equipment and finishes already in place from the possibility of water staining and stopping damage. Refer to GIB® Site Guide.

Application

3.7 INSTALL CEILING BATTENS

Install to GIB® Rondo® Ceiling Batten Systems.

3.8 LINING WALLS AND CEILINGS GENERALLY

Form to GIB® Site Guide and in accordance to relevant GIB Fire Rated or Noise Control System. Sheet joins are touch fitted and shall occur over framing where required by system requirements. 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. Ensure plasterboard orientation is in accordance to the relevant GIB Fire Rated or Noise Control System. Where a double layer of GIB plasterboard is required, ensure the outer sheets are offset from the inner layer in accordance with system requirements.

3.10 FORM SOUND INSULATION SYSTEMS

Form to GIB® Noise Control Systems.

3.11 FORM FIRE RATED SYSTEMS

Form to GIB® Fire Rated Systems and Penetrations in GIB® Fire Rated Systems.

3.12 FORM CONTROL JOINTS

Form control joints to AS/NZS 2589 and GIB® Site Guide (September 2018).

3.13 INSTALL TAPE-ON TRIMS

Install to GIB® Goldline™ Tape-on trims literature and/or GIB® Ultraflex® high impact corner mould literature and/or GIB® Levelline® to GIB® Site Guide (September 2018).

Finishing

3.14 FINISHING GENERALLY

To GIB® Site Guide and AS/NZS 2589.

Completion

3.15 COMPLETION MATTERS

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

4 SELECTIONS

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

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Noise control sub-intertenancy wall systems

4.1 GIB® NOISE CONTROL, SUB-INTERTENANCY WALL - SINGLE TIMBER FRAMING

Location:	Between Studio and Main House
System:	GBTLA 45r (load bearing)
Acoustics:	55 STC
Framing:	Timber frame
Insulation:	Pink Batts R2.2 (90mm) glass wool insulation
Lining:	x2 13mm GIB Standard Both Sides
Batten:	Gib Rail to one side
Finish level:	L4

Noise control sub-intertenancy floor/ceiling systems

4.2 GIB® NOISE CONTROL, SUB-INTERTENANCY FLOOR / CEILING SYSTEMS - TIMBER JOISTS

Location:	Refer to Plans and Sections
System:	GBDFA 60b (load bearing)
Acoustics:	57 STC / 56Rw / 47ICC
FRR:	60/60/60
Flooring:	Standfloor
Framing:	Timber joists
Insulation:	Pink Batts Silencer (100mm)
Ceiling batten:	GIB Rondo Metal Ceiling Battens on GIB Quiet Clip
Linings	2x 13mm GIB Fyreline
Finish level:	L3

Fire rated wall systems

4.3 GIB® FIRE RATED WALL SYSTEMS, TWO-WAY - TIMBER FRAMING

Location:	Between Studio and Main House
System:	GBTLA 45r (load bearing)
FRR:	45/45/45
Acoustic:	55 STC / 54Rw
Framing:	Timber
Lining:	x2 13mm GIB Standard Both Sides
Batten:	Gib Rail to one side
Finish level:	L4

4.4 GIB® FIRE RATED WALL SYSTEMS, ONE-WAY - TIMBER FRAMING

Location:	To Exterior from Studio
System:	GBUW 30B
FRR:	30/30/30
Framing:	Timber
Lining:	x2 10mm Fyreline (or equivalent) one side
Finish level:	L4

Fire rated floor/ceiling systems

4.5 GIB® FIRE RATED FLOOR/CEILING SYSTEMS, TIMBER JOISTS

Location:	Studio and L2 Ceiling where applicable
System:	GBFC 30
FRR:	30/30/30
Acoustics:	39 STC / 40 Rw / 32 ICC
Sarking:	12mm Plywood
Joists:	Timber
Lining:	x1 13mm Gib Fyreline
Finish level:	L4

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4.6 GIB® FIRE RATED FLOOR/CEILING SYSTEMS, TIMBER JOISTS/SUSPENDED GRID

Location:	Studio and L2 Ceiling where applicable
System:	GBFC 30
FRR:	30/30/30
Acoustics:	39 STC / 40 Rw / 32 ICC
Sarking:	12mm Plywood
Joists:	Timber
Suspension grid:	Rondo 129 Clib/Hanger System
Lining:	x1 13mm Gib Fyreline
Finish level:	L4

Accessories

4.7 GIB® RONDO® CEILING BATTENS

See 5113G

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5431S STRANDFLOOR TIMBER FLOORS BY LAMINEX

1 GENERAL

This section relates to the supply and fixing of Laminex® New Zealand Strandfloor® flooring in interior applications.
It includes:

- Strandfloor Square Edge
- StrandfloorH3.1 Square Edge

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
pMDI	Polymeric methyl diphenyl diisocyanate
VOC	Volatile organic compounds

Documents

1.2 DOCUMENTS

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

BPS	Building Product Specifications
AS/NZS 1860.1	Particleboard flooring - Specification
NZS 3604	Timber-framed buildings
NASH Standard Part 2	May 2019 Light Steel Framed Buildings

CodeMark Certificate CMNZ10003 ver2 - Strandfloor® Flooring
CodeMark Certificate CMNZ10004 ver2 - StrandfloorH3.1® Flooring

1.3 MANUFACTURER/SUPPLIER DOCUMENTS

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

Strandfloor Technical Manual, Edition 11 May 2024
Strandfloor Product Warranty
Strandfloor Strandboard Fire Test Report
Strandfloor and Strandboard Safety Data Sheet
StrandfloorH3.1 and Strandsarking Safety Data Sheet
Strandfloor VOC Certificate
Strandfloor Formaldehyde Emissions Report
BRANZ Appraisal 676 (2021) - Strandfloor Flooring - Amended 09 July 2025
BRANZ Appraisal 677 (2021) - StrandfloorH3.1 Flooring - Amended 09 July 2025

Manufacturer/supplier contact details

Company:	Fletcher Building Ltd
Trading as:	Laminex New Zealand
Web:	www.laminex.co.nz
Email:	info@laminex.co.nz
Telephone:	0800 303 606

Requirements

1.4 QUALIFICATIONS GENERALLY

Refer to 1270 CONSTRUCTION for requirements relating to qualifications.

1.5 NO SUBSTITUTIONS

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

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Compliance information

1.6 COMPLIANCE - CODEMARK CERTIFICATE CMNZ10004

StrandfloorH3.1 meets the requirements of the NZBC when used within the conditions and limitations of its CodeMark Certificate of Conformity CMNZ10004.

1.7 COMPLIANCE - BRANZ APPRAISAL 677

StrandfloorH3.1 has been appraised as meeting provisions of the NZBC when used within the Conditions and Limitations of its BRANZ Appraisal 677.

Performance - fire

1.8 SURFACE FIRE PERFORMANCE - UNFINISHED FLOORING

Unfinished Laminex Strandfloor / StrandfloorH3.1 has a critical radiant flux 2.2kW/m2 as defined by BPS, Table 8.1.2.1: Generic critical radiant flux values for some substrate and coating combinations.

Performance - bracing

1.9 BRACING REQUIREMENTS

Floor diaphragms on timber joists as part of a structural bracing system to meet the requirements of NZS 3604, Section 5 Bracing Design. Floor diaphragms on steel joists as part of a structural bracing system to meet the requirements of NASH Standard Part 2, Section 5 Bracing.

2 PRODUCTS

Materials

2.1 LAMINEX STRANDFLOORH3.1 SQUARE EDGE FLOORING

StrandfloorH3.1 Square Edge 20mm thick high density wood-based sheet flooring to AS/NZS 1860.1. Manufactured from pMDI resin bonded reconstituted wood strands. Sheets contain a wax emulsion for additional moisture resistance. Available in 2400mm x 1200mm and 3600mm x 1200mm sheets. FSC-COC and PEFC-COC certified. Refer to SELECTIONS.

Components

2.2 MECHANICAL FIXING

Refer to SELECTIONS.

2.3 ADHESIVE

Elastomeric construction adhesive or polyurethane paste adhesive. Refer to SELECTIONS.

Accessories

2.4 WOOD FILLER

Wood dough type filler, tinted to match.

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 1270 CONSTRUCTION for requirements relating to defective or damaged work, removal of protection and cleaning.

3.3 WEATHER EXPOSURE

Laminex Strandfloor flooring not to be exposed to weather for more than 8 weeks.

Laminex StrandfloorH3.1 flooring not to be exposed to weather for more than 12 weeks.

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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: 18% maximum for timber floor structure
Moisture content: 15% maximum for timber substrate flooring
Moisture content: 70% maximum relative humidity at concrete surface

Installation/application general

3.5 STANDARDS AND TOLERANCES

Refer to the general section 1270 CONSTRUCTION for general requirements.

3.6 LAYING PATTERN

Lay flooring sheets printed face down and closely butted in a staggered layout with an 8mm sheet edge clearance to fixed objects including columns and bottom plates.

3.7 INSTALLATION GENERAL - CONCRETE FLOOR

Concrete surface to be clean, sound, dry and dust free with a maximum allowable deviation of 5mm over 3m. Vacuum concrete surface and use damp cloth/sponge/mop to remove loose particles.

3.8 SUPPORT SHEET EDGES AND JOINTS - SQUARE EDGE

Fully support all edges and joints.

Application adhesive

3.9 APPLY ADHESIVE TO JOISTS

Prior to laying flooring sheets, apply adhesive in 5mm beads to top of floor joists and nogs

3.10 APPLY ADHESIVE TO SHEET EDGES

Following fixing of flooring sheets, apply adhesive in 5mm beads to the sheet edge adjacent to the next sheet laid.

Installation/application - Laminex Strandfloor Square Edge - timber/steel joist floors

3.11 INSTALL SQUARE EDGE FLOORING

Place each sheet over adhesive with long edge spanning across at least 3 joists and sheet edges centred over joists. Close butt edges. Mechanically fix to joists and blocking.

3.12 SCREW FIXING - SQUARE EDGE

Screw fix at maximum 150mm centres around sheet perimeter with 10mm clearance from the edge. Screw fix at maximum 200mm centres along intermediate supports. Finish screws flush with sheet surface.

Surface preparation for floor finishes

3.13 PREPARE SURFACE FOR FINISHES

For floor coverings: tighten fixings, punch nails/tighten screws prior to sanding.

Carpet:	Single cut with a drum or belt sander:	60 - 100 grit
Sheet vinyl:	Single cut with a drum or belt sander:	60 - 100 grit

Installation of vinyl floor covering requires the application of a flexible or sheet underlayment. Refer to vinyl manufacturer technical installation data.

For clear finishes: tighten fixings, punch nails/tighten screws, and fill nail holes with wood filler prior to sanding.

Clear coating:	1st cut with a drum sander:	40 - 80 grit
	2nd cut with a disc sander:	100 grit
	3rd cut with disc sander:	120 - 150 grit

Follow coating manufacturers' instructions.

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Completion & Commissioning

3.14 COMPLETION MATTERS

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

4 SELECTIONS

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

4.1 LAMINEX RADIATA PINE CERTIFIED SUSTAINABLE TIMBER

Product:	Laminex Strandfloor products
Certification type:	FSC
Timber species:	Pinus Radiata
Origin:	New Zealand
Claim:	FSC Mix

4.2 LAMINEX STRANDFLOORH3.1 SQUARE EDGE WOOD FLOORING

Location:	refer to construction legend
Supplier:	Laminex New Zealand
Brand:	StrandfloorH3.1 Square Edge
Sheet thickness:	20mm
Sheet size:	As required for fabrication

Fixings

4.3 FIXINGS TO TIMBER JOIST FLOOR

Adhesive:	Sika Nailbond Premium
Mechanical fixing:	Galvanized, 45mm x 8g self-drilling screws

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5571 TIMBER STAIRS

1 GENERAL

This section relates to the fabrication and installation of interior timber stairs and landings.

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
PEFC	Programme for the Endorsement of Forest Certification

Documents

1.2 DOCUMENTS

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

NZBC D1/AS1	Access routes
AS/NZS 1860.1	Particleboard flooring - Specifications
BRANZ BU 497	Stair construction

2 PRODUCTS

Materials

2.1 SOLID TIMBER COMPONENTS

Refer to SELECTIONS/DRAWINGS.

2.2 PARTICLEBOARD

Urea-formaldehyde resin bonded medium density particleboard to AS/NZS 1860.1.

3 EXECUTION

Conditions

3.1 GENERALLY

Execution to include those methods, practices and processes contained in the current syllabus for the National Certificate in Carpentry and the National Certificate in Joinery (cabinetry, exterior joinery, stairs).

Check site dimensions. Carry out machining within the practices recommended for the particular timber, wood product or pre-finished wood product being used. Machine drill and cut holes and recesses and form joints to the componentry manufacturer's recommendations. Work to be accurate, square and true to line and face.

Application

3.2 FABRICATE AND INSTALL TIMBER STAIRS

Fabricate and install stair flights and landings to comply with NZBC acceptable solution D1/AS1:4.0 Stairways, and unless detailed otherwise to BRANZ BU 497. House and wedge treads and risers 15mm into strings, all glued, wedged and blocked. Form nosing overhangs of 25mm by splaying risers forward to finish flush with the front of the treads.

Completion

3.3 LEAVE

Leave work to the standard required by following procedures.

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3.4 REMOVE

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

4 SELECTIONS

4.1 TIMBER STAIRS

Strings:	Depth as required by stair fabricator
Treads:	280mm
Risers:	180mm max.
Finish:	refer to 6312MF

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5574 INTERIOR HANDRAILS & TIMBER BALUSTRADES

1 GENERAL

This section relates to the fabrication and installation of interior timber balustrades.

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
PEFC	Programme for the Endorsement of Forest Certification

Documents

1.2 DOCUMENTS REFERRED TO

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

NZBC B2/AS1	Durability provisions for building elements
NZBC F4/AS1	Safety from falling
NZS 3602	Timber and wood-based products for use in building

2 PRODUCTS

2.1 SOLID TIMBER COMPONENTS

Timber species, grade, installation moisture and treatment to NZS 3602, table 2, and NZBC B2/AS1. Refer to SELECTIONS/DRAWINGS.

2.2 HARDWARE

Handrail brackets, metal supports, angles and sundry fittings, all as shown and described on the drawings.

3 EXECUTION

Conditions

3.1 GENERALLY

Execution to include those methods, practices and processes contained in the current syllabus for the National Certificate in Carpentry and the National Certificate in Joinery (cabinetry, exterior joinery, stairs).

Check site dimensions. Carry out machining within the practices recommended for the particular timber, wood product or pre-finished wood product being used. Machine drill and cut holes and recesses and form joints to the componentry manufacturer's recommendations. Work to be accurate, square and true to line and face.

Application

3.2 BALUSTRADING

Fabricate and install the balustrading as detailed, complete with all associated metal componentry and hardware. Unless otherwise detailed construct to comply with NZBC F4/AS1.

3.3 HANDRAILS

Fabricate and install the handrails as detailed, complete with all associated metal componentry and hardware. Unless otherwise detailed construct to comply with NZBC F4/AS1.

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Completion

3.4 LEAVE

Leave work to the standard required by following procedures.

3.5 REMOVE

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

4 SELECTIONS

4.1 TIMBER BALUSTRADES

Location:	Storage mezzanines
Timber:	/2 24mm Plywood
Finish:	Polyurethane

4.2 TIMBER HANDRAIL

Location:	To main stair
Timber:	Radiata Pine
Dimensions:	40Ø
Finish:	Paint finish - colour TBC

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6192H HARDIE™ CERAMIC TILE UNDERLAY

1 GENERAL

This section relates to the supply and installation of James Hardie™ New Zealand Ltd Ceramic Tile Underlay as an internal flooring underlay.

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:

MS	Modified silane
PEF	Polyethylene foam

Documents

1.2 DOCUMENTS

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

AS/NZS 2908.2	Cellulose-cement products - Flat sheet

1.3 MANUFACTURER/SUPPLIER DOCUMENTS

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

Hardie™ Flooring Installation Manual (July 2021)
Hardie™ Ceramic Tile Underlay Product Technical Statement
Hardie™ Ceramic Tile Underlay Product Warranty

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

1.4 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

15 years	For Hardie™ Ceramic Tile Underlay and components supplied by James Hardie

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

Refer to the general section 1237 WARRANTIES for additional requirements.

1.5 WARRANTY - INSTALLER/APPLICATOR

Provide an installer/applicator warranty:

2 years	For installation

- 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.

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Requirements

1.6 QUALIFICATIONS GENERALLY

Refer to 1270 CONSTRUCTION for requirements relating to qualifications.

1.7 NO SUBSTITUTIONS

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

1.8 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:
Hardie™ Flooring Installation Manual - Section 9, Maintenance

Provide this information prior to practical completion.

2 PRODUCTS

Materials

2.1 CERAMIC TILE UNDERLAY

6mm thick medium density sheet of treated cellulose fibre, Portland cement, and sand, cured by high pressure autoclave, manufactured to AS/NZS 2908.2. Sheets 1800mm x 1200mm. Pre-marked nailing pattern on sheet face.

2.2 TILES

Refer to tiling section(s) for tiles including screeds, grouts and tile adhesive.

Components

2.3 HARDIE UNDERLAY NAILS

25mm x 2.5mm annular threaded galvanized flathead nails.

2.4 UNDERLAY COIL NAILS

25mm x 3.06mm annular threaded galvanized flathead nails.

2.5 UNDERLAY ADHESIVE

Refer to SELECTIONS.

2.6 WATERPROOFING MEMBRANE

Refer to waterproofing section(s) for waterproofing membrane.

Accessories

2.7 SEALANT

Flexible MS sealant. Refer to SELECTIONS.

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 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.

Timber substrate: 16% maximum moisture content

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Installation/application

3.4 STANDARDS AND TOLERANCES

Refer to the general section 1270 CONSTRUCTION for general requirements.

3.5 INSTALLATION GENERALLY

Cut, prepare and install underlay in accordance with James Hardie installation manual.

3.6 SUBSTRATE PREPARATION

Prepare substrates to be flat, with a maximum deviation of 1mm per meter. Sand existing substrates to remove cupping or warping. Clean substrates before fixing underlay.

3.7 APPLY ADHESIVE

Spread adhesive on back of underlay sheet with 3mm notched trowel or in 5mm continuous beads at 50mm centres.

3.8 LAY SHEETS

Lay sheets in staggered (brick) pattern perpendicular to the flooring substrate. Allow a 5mm gap between the wall and sheet edge. Temporarily fix each sheet with two or three nails to avoid movement. Fill gap between underlay and wall with flexible sealant.

3.9 FIX SHEETS

Nail fix sheets from the centre outward following the pre-marked nailing pattern. Finish nail heads flush with sheet surface.

3.10 MOVEMENT JOINTS

Provide movement joints:

- At maximum 5m centres in both directions
- At changes of wall direction (e.g. L-shaped room)
- At doorways where tiled surface continues through to next room
- At structural control joints in the floor substrate

3.11 INSTALL WATERPROOFING MEMBRANE

Refer to waterproofing section(s) for installation of waterproofing membrane.

3.12 INSTALL TILES

Refer to tiling section(s) for installation of tiles.

Completion & Commissioning

3.13 COMPLETION MATTERS

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

4 SELECTIONS

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

4.1 HARDIE™ CERAMIC TILE UNDERLAY

Location:	To all Wet tiled areas
Manufacturer:	James Hardie
Type:	Hardie™ Ceramic Tile Underlay
Thickness:	6mm

4.2 UNDERLAY ADHESIVE

Brand/Type:	Sika Nailbond PB

4.3 SEALANT

Brand/Type:	Sika Sikaflex MS

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6211 WALL TILING SYSTEMS

1 GENERAL

This section relates to the supply and installation of interior and exterior wall tiling systems:
It includes:

- Tiles
- Tile adhesives and grouts
- All relevant underlays, components and accessories necessary to complete installation.

1.1 RELATED WORK

Refer to 6221 FLOOR TILING SYSTEMS for floor tiling systems.

1.2 ABBREVIATIONS AND DEFINITIONS

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

The following abbreviations apply specifically to this section:

WMAI	Waterproofing Membrane Association NZ Inc

Documents

1.3 DOCUMENTS

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

BPS	Building Product Specifications
NZBC E3/AS1	Internal moisture
NZBC E3/AS2	Internal moisture
AS 3958.1	Ceramic tiles - Guide to the installation of ceramic tiles
AS/NZS 4671	Steel reinforcing materials
AS/NZS 4858	Wet area membranes
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
BS EN 12004.1	Adhesives for ceramic tiles. Requirements, assessment and verification of constancy of performance, classification and marking
BS EN 13888.1	Grouts for ceramic tiles. Requirements, classification, designation, marking and labelling.
WMAI	Code of Practice for Internal Wet-area Membrane Systems

Health & Safety at Work Act: 2015

Warranties - tiling

1.4 WARRANTY - INSTALLER/APPLICATOR

Provide an installer/applicator warranty:

2 years	For installation of tiling systems

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

Refer to the general section 1237 WARRANTIES for additional requirements.

Warranties - waterproofing

1.5 WARRANTY - MANUFACTURER/SUPPLIER - FOR WATERPROOFING SYSTEMS

Refer to 6812W for details

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1.6 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 (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

1.7 QUALIFICATIONS GENERALLY - TILING SYSTEMS

Refer to 1270 CONSTRUCTION for requirements relating to qualifications.

1.8 QUALIFICATIONS - WATERPROOFING SYSTEMS

Workers to be approved / accredited / registered / licensed / certified by manufacturer / supplier. Refer to 1270 CONSTRUCTION for additional requirements relating to qualifications.

1.9 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.

1.10 NO SUBSTITUTIONS

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

1.11 HEALTH & SAFETY - SILICA DUST

Comply with Health & Safety at Work Act:2015 and take all necessary precautions as recommended in WorkSafe guidelines for Respirable Crystalline Silica (RCS).

Compliance information

1.12 INFORMATION REQUIRED FOR CODE COMPLIANCE

Provide the following compliance documentation: -

- Manufacturer / supplier warranty -waterproofing membrane
- Installer / applicator warranty -waterproofing membrane
- Producer Statement - Construction (PS3) from the waterproof membrane applicator / installer
- Other information required by the BCA in the Building Consent Approval documents.

Performance

1.13 INTERNAL MOISTURE - WET AREA MEMBRANES

Wet area membranes under tiled areas to comply with NZBC E3/AS1 & sections 1-4 of WMAI Code of Practice for Internal Wet-area Membrane Systems as modified by NZBC E3/AS2 for interior applications.

2 PRODUCTS

Materials

2.1 TILES

Refer to SELECTIONS.

Materials - preparation & underlays

2.2 WATERPROOFING MEMBRANE - INTERIOR

Refer to 6812W

2.3 WATERPROOFING MEMBRANE - INTERIOR

Proprietary interior wet area waterproofing system to AS/NZS 4858.

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Materials - adhesive and grout

2.4 TILE ADHESIVE

Tile adhesive, and if required primer, to suit particular location/use. To AS ISO 13007.1 and BS EN 12004.1.

2.5 PROPRIETARY GROUT

Proprietary grout to suit particular location/use. To AS ISO 13007.3 and BS EN 13888.1.

Accessories

2.6 MOVEMENT JOINT SEALANT

Neutral cured or acid-cured sealant to AS 3958.1, 2.7.5 Sealant.

2.7 TILE EDGE TRIMS

TBC

3 EXECUTION

Conditions

3.1 DELIVERY, STORAGE & HANDLING OF PRODUCTS

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

Inspect tiles on delivery 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 and any tiles that are damaged.

3.2 ROUTINE MATTERS

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 that the substrate, with the preparation called for in this section, are of the quality necessary to allow tiling of the required standard. Ensure all services and accessories are in place and located to suit the tile layout.

Ensure concrete or concrete masonry walls are fully cured and dry. Ensure new concrete has cured for 28 days or more.

If in doubt check for moisture content by hygrometer. Ensure moisture content is:

Concrete	75% relative humidity or less

3.4 CONFIRM LAYOUT

Before commencing work confirm the proposed layout of tiles, movement joints and other visual considerations of the finished work. Minimise in number of cut tiles and where possible, no cut tiles less than half size and only at the perimeter of the work.

3.5 TEMPERATURE

Unless otherwise specified by selected tiling installation product manufacturer, do not carry out tiling where the air temperature is below 5°C or substrate temperature is above 40°C.

3.6 EXTERNAL CONDITIONS

Ensure any areas of external tiling, waterproofing, floor levelling, grouting or concrete repair must be protected from hot windy conditions, rain and/or frosts during application.

3.7 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.

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Installation/application

3.8 STANDARDS AND TOLERANCES

Refer to the general section 1270 CONSTRUCTION for general requirements.

3.9 GENERALLY

Prepare surface and complete tiling installation in accordance with AS 3958.1 and if required complete interior waterproof membrane installation to sections 1-4 of WMAI Code of Practice for Internal Wet-area Membrane Systems as modified by NZBC E3/AS2.

Application - substrate preparation

3.10 PREPARE SUBSTRATES

Prepare backgrounds as described in AS 3958.1, Section 4. All surfaces to be structurally sound, dry, clean and free from movement, dirt, dust, oil, grease, wax and any other loose or contaminating materials. Concrete substrates should also be free of laitance, efflorescence, curing compounds and release agents.

Remove any projections or unevenness. 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.

Suitably prepare backgrounds and substrates in accordance with the manufacturer's instructions of the tiling installation products for the relevant substrate type.

3.11 PRIME SUBSTRATE

If required, surfaces should be primed as per manufacturer's instructions for the selected products and substrate types. Refer to SELECTIONS.

Application - waterproofing

3.12 INSTALL WATERPROOF MEMBRANE - INTERIOR WET AREAS

Refer to 6811 WATERPROOFING MEMBRANE AND ACOUSTIC UNDERLAY SYSTEMS for the installation of interior or exterior wet area membrane.

3.13 INSTALL WATERPROOFING MEMBRANE - INTERIOR WET AREAS

Install interior waterproofing membrane to manufacturers requirements and in accordance with NZBC E3/AS1 and sections 1-4 of WMAI Code of Practice for Internal Wet-area Membrane Systems as modified by NZBC E3/AS2.

3.14 INSPECT - INTERIOR WET AREAS

Prior to application of tiling over, visually inspect waterproof membrane in accordance to WMAI Code of Practice for Internal Wet-area Membrane Systems, 4.0.5. Make good any damage that is identified in accordance with waterproof membrane manufacturer/supplier requirements.

3.15 INSTALL WATERPROOFING MEMBRANE - EXTERIOR WET AREAS

Install to selected exterior waterproofing membrane in accordance with manufacturers requirements.

Application -tiling

3.16 FITTING TILES

Setting out, cutting and fitting of tiles to be as described in AS 3958.1, section 5. If not shown on drawings, confirm set out, bond and pattern before installation.

- 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.

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- Fix accessories level, plumb and true to the designated projection at detailed locations and heights.

3.17 TILE FINISH AND JOINTS

Provide tile finish and joints, including tolerances, as described in AS 3958.1, 5.4.6. Joint widths to be suited to tile and to the manufacturer's instructions.

- Ensure finished surfaces are flat and true to a tolerance of ±4mm in 2 metres from the required plane.
- Lippage between adjacent tiles shall not exceed 2mm and where joint widths are less than 3mm wide lippage shall not exceed 1mm. For tiles ground flat, such as polished tiles, lippage shall not exceed 1.5mm.
- 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 ±4mm in 2 metres from the detailed joint alignment.
- Clean surplus bedding material from joint spaces and tile surface.

3.18 ADHESIVE APPLICATION - THIN BED

Apply a thin bed of selected tile adhesive to the adhesive manufacturer's requirements, generally final bed thickness does not exceed 3mm. Install using the following methods:

Notched trowel method

- Adhesive application to be as described in AS 3958.1, 5.6.2(a) and to adhesive manufacturers requirements. Apply adhesive to substrate to a uniform thickness and rib using notched trowel. Select trowel square notch size to suit tile size and type, to achieve full coverage. Press tile firmly onto substrate and beat into place. Additional back buttering of tiles may also be required, usually required for tiles 400x400mm and larger.

Floating method

- Adhesive application to be as described in AS 3958.1, 5.6.2(b) and to adhesive manufacturers requirements. Apply adhesive to substrate to a uniform thickness. Apply tiles with a twisting or sliding action and tap back firmly into the floated bedding.

Buttering method

- Adhesive application to be as described in AS 3958.1, 5.6.2(c) and to adhesive manufacturers requirements. Apply adhesive evenly to the back of each tile with a flat edged trowel. Press tile firmly onto substrate and tap into place. This method is not suitable for mosaic tile installation.

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.

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.

3.19 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.

3.20 APPLY GROUTING

Remove any spacer inserts, prepare joints and apply grout in accordance with manufacturers requirements and as described in AS 3958.1, 5.7 Grouting. Ensure finish is uniform in colour, smooth and without voids, pinholes or low spots.

Application - movement joints

3.21 FORM MOVEMENT AND EXPANSION JOINTS

Install movement joints in accordance with AS 3958.1, 5.4.5 Movement Joints. Joints to go right through the tile and bed to the background, maintaining any waterproofing.

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Movement joints to walls to be a minimum of 6mm wide and to be located:

- Over existing movement joints
- At junction between different background materials
- Where tiling abuts other materials, including sanitary fixtures and windows/doors frames.
- At inter-storey height horizontally and at 3m to 4.5m apart vertically.
- At internal vertical corners in shower compartments.

3.22 MOVEMENT AND EXPANSION JOINTS, INSTALL COMPOUND/SEALANT FILL

Carefully clean out the joint, if required install bond breaker or backing rod to control width/depth ratio, 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.

Cleaning

3.23 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

3.24 COMPLETION MATTERS

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

4 SELECTIONS

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

Materials - Tiles

4.1 WALL TILES - LARGE FORMAT

Location:	Refer to Internal Elevations
Supplier:	Client Supplied
Tile type:	Marble
Tile colour:	Grey Sandblast or Pink Marble
Tile size:	800mm x 400mm x 20mm
Grout colour:	TBC
Grout width:	TBC
Sealant colour:	to match grout

4.2 WALL TILES - SMALL FORMAT

Location:	Refer to Internal Elevations
Supplier:	Winklemans
Tile type:	Small Format Cermic
Tile colour:	Pale Green VEP
Tile size:	50x50
Grout colour:	TBC
Grout width:	TBC
Sealant colour:	to match grout

Materials - preparation & underlays

4.3 WATERPROOFING MEMBRANE - INTERIOR

Refer to 6812W

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6221 FLOOR TILING SYSTEMS

1 GENERAL

This section relates to the supply and installation of interior and exterior floor tiling systems. It includes:

- Tiles
- Tile adhesives and grouts
- All relevant underlays, components and accessories necessary to complete installation

1.1 RELATED WORK

Refer to 6211 WALL TILING for wall tiling systems.

1.2 ABBREVIATIONS AND DEFINITIONS

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

The following abbreviations apply specifically to this section:

WMAI	Waterproofing Membrane Association NZ Inc

Documents

1.3 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 E2/AS1	External moisture provisions for timber-framed buildings up to 10 m in height
NZBC E3/AS1	Internal moisture
NZBC E3/AS2	Internal moisture
AS/NZS 2908.2	Cellulose-cement products - Flat sheets
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/NZS 4858	Wet area membranes
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
BS EN 12004.1	Adhesives for ceramic tiles. Requirements, assessment and verification of constancy of performance, classification and marking
BS EN 13888.1	Grouts for ceramic tiles. Requirements, classification, designation, marking and labelling.
WMAI	Code of Practice for Internal Wet-area Membrane Systems

Health & Safety at Work Act: 2015

Warranties - tiling

1.4 WARRANTY - INSTALLER/APPLICATOR

Provide an installer/applicator warranty:

2 years:	For installation of tiling systems

- 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.

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Warranties - waterproofing

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

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.6 QUALIFICATIONS - TILING SYSTEMS

Refer to 1270 CONSTRUCTION for requirements relating to qualifications.

1.7 QUALIFICATIONS - WATERPROOFING SYSTEMS

Workers to be approved / accredited / registered / licensed / certified by manufacturer / supplier. Refer to 1270 CONSTRUCTION for additional requirements relating to qualifications.

1.8 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.

1.9 NO SUBSTITUTIONS

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

1.10 HEALTH & SAFETY - SILICA DUST

Comply with Health & Safety at Work Act:2015 and take all necessary precautions as recommended in WorkSafe guidelines for Respirable Crystalline Silica (RCS).

Compliance information

1.11 INFORMATION REQUIRED FOR CODE COMPLIANCE

Provide the following compliance documentation: -

- Manufacturer / supplier warranty -waterproofing membrane
- Installer / applicator warranty -waterproofing membrane
- Producer Statement - Construction (PS3) from the waterproof membrane applicator / installer
- Other information required by the BCA in the Building Consent Approval documents.

Performance

1.12 INTERNAL / EXTERNAL MOISTURE - WATERPROOFING SYSTEMS

Wet area membranes under tiled areas to comply with NZBC E2/AS1 for exterior applications, NZBC E3/AS1 & sections 1-4 of WMAI Code of Practice for Code of Practice for Internal Wet-area Membrane Systems as modified by E3/AS2 for interior applications.

Performance - Slip resistance

1.13 SLIP RESISTANCE - SURFACES EXEMPT FROM TESTING

Walking surfaces comply with NZBC D1/AS1, Table 2 for slip resistance requirements and are exempt from testing.

2 PRODUCTS

Materials

2.1 TILES

Refer to SELECTIONS.

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Materials - preparation & underlays

2.2 FIBRE CEMENT TILE UNDERLAY

Minimum 6mm 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.

Materials - waterproofing

2.3 WATERPROOFING MEMBRANE - INTERIOR

Proprietary interior wet area waterproofing system to AS/NZS 4858. Refer to SELECTIONS.

Materials - adhesive and grout

2.4 TILE ADHESIVE

Tile adhesive to suit particular location/use, and if required primer. To AS ISO 13007.1 and BS EN 12004.1. Refer to SELECTIONS.

2.5 PROPRIETARY GROUT

Proprietary grout to suit particular location/use. To AS ISO 13007.3 and BS EN 13888.1. Refer to SELECTIONS.

Accessories

2.6 MOVEMENT JOINT SEALANT

Neutral cured or acid cured sealant to AS 3958.1, 2.7.5 Sealants. Refer to SELECTIONS.

2.7 UNDERFLOOR HEATING

Refer to 7553 UNDERFLOOR HEATING MAT SYSTEM for underfloor heating section for electric undertile heating system.

3 EXECUTION

Conditions

3.1 DELIVERY, STORAGE AND HANDLING

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

Inspect tiles on delivery 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 and any tiles that are damaged.

3.2 ROUTINE MATTERS

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 that the substrate, with the preparation called for in this section, are of the quality necessary to allow tiling of the required standard and that all services and accessories are in place and located to suit the tile layout.

Ensure concrete floors are fully cured and dry. New concrete must have cured for 28 days or more.

If in doubt check for moisture content by hygrometer. Ensure moisture content is:

Concrete	75% relative humidity or less

3.4 CONFIRM LAYOUT

Before commencing work confirm the proposed layout of tiles and expansion joints and other visual considerations of the finished work. Minimise in number of cut tiles and where possible, no cut tiles less than half size and only at the perimeter of the work.

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3.5 TEMPERATURE

Unless otherwise specified by selected tiling product manufacturer, do not carry out tiling where the air temperature is below 5°C or substrate temperature is above 40°C.

3.6 EXTERNAL CONDITIONS

Ensure any areas of external tiling, waterproofing, floor levelling, grouting or concrete repair must be protected from hot windy conditions, rain and/or frosts during application.

3.7 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.

Installation/application

3.8 STANDARDS AND TOLERANCES

Refer to the general section 1270 CONSTRUCTION for general requirements.

3.9 GENERALLY

Prepare surface and complete tiling installation in accordance with AS 3958.1 and if required complete interior waterproof membrane installation to sections 1-4 of WMAI Code of Practice for Interior Wet Area Membrane Systems as modified by E3/AS2 or exterior waterproofing to NZBC E2/AS1.

Application - substrate preparation

3.10 PREPARE SUBSTRATES

Prepare backgrounds as described in AS 3958.1, Section 4. All surfaces to be structurally sound, dry, clean and free from movement, dirt, dust, oil, grease, wax and any other loose or contaminating materials. Concrete substrates should also be free of laitance, efflorescence, curing compounds and release agents. Remove any projections or unevenness.

Concrete floor substrates, after any levelling compounds or screeds applied, must be even and true with a maximum variation in accordance with AS 3958.1 Table 4.3:

- For adhesive fixing, thin bed 5mm in every 3 m
- For adhesive fixing, thick bed 10mm in every 3 m
- For mortar cement fixing, 5mm in every 3m

Suitably prepare backgrounds and substrates in accordance with the manufacturer's instructions of the tiling installation products for the relevant substrate type.

3.11 PRIME SUBSTRATES

Surfaces should be primed as per manufacturer's instructions for the selected products and substrate types. Refer to SELECTIONS.

3.12 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.

Application - underlays

3.13 INSTALL WATERPROOFING MEMBRANE - INTERIOR WET AREAS

Install waterproofing membrane to manufacturers requirements and in accordance with NZBC E3/AS1 and sections 1-4 of WMAI Code of Practice for Interior Wet Area Membrane Systems as modified by E3/AS2.

3.14 INSPECT & FLOOD TEST - INTERIOR WATERPROOF MEMBRANE

Prior to application of tiling over, visually inspect and flood test waterproof membrane system, in accordance to WMAI Code of Practice for Interior Wet Area Membrane Systems, 4.0.5. Make good any damage that is identified in accordance with waterproof membrane manufacturer/supplier requirements.

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Application - Undertile heating

3.15 INSTALL UNDERTILE FLOOR HEATING

Refer to 7553 UNDERFLOOR HEATING MAT SYSTEM for electric undertile heating system.

Application –tiling

3.16 FITTING TILES

Setting out, cutting and fitting of tiles to be as described in AS 3958.1. If not shown on drawings, confirm set out, bond and pattern before installation.

- 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.

3.17 TILE FINISH AND JOINTS

Provide tile finish and joints, including tolerances, as described in AS 3958.1, 5.4.6. Joint widths to be suited to tile and to the manufacturer's instructions.

- Ensure finished surfaces are flat and true to a tolerance of ±4mm in 2 metres from the required plane.
- Lippage between adjacent tiles shall not exceed 2mm and where joint widths are less than 3mm wide lippage shall not exceed 1mm. For tiles ground flat, such as polished tiles, lippage shall not exceed 1.5mm.
- 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 ±4mm in 2 metres from the detailed joint alignment.
- Clean surplus bedding material from joint spaces and tile surface.

3.18 ADHESIVE APPLICATION - THIN BED

Apply a thin bed of selected tile adhesive to the adhesive manufacturer's requirements, generally final bed thickness does not exceed 3mm. Install using the following methods:

Notched trowel method

- Adhesive application to be as described in AS 3958.1, 5.6.2(a) and to adhesive manufacturers requirements. Apply adhesive to substrate to a uniform thickness and rib using notched trowel. Select trowel square notch size to suit tile size and type, to achieve full coverage. Press tile firmly onto substrate and beat into place. Additional back buttering of tiles may also be required, usually required for tiles 400x400mm and larger.

Floating method

- Adhesive application to be as described in AS 3958.1, 5.6.2(b) and to adhesive manufacturers requirements. Apply adhesive to substrate to a uniform thickness. Apply tiles with a twisting or sliding action and tap back firmly into the floated bedding.

Buttering method

- Adhesive application to be as described in AS 3958.1, 5.6.2(c) and to adhesive manufacturers requirements. Apply adhesive evenly to the back of each tile with a flat edged trowel. Press tile firmly onto substrate and tap into place. This method is not suitable for mosaic tile installation.

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.

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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

3.19 APPLY GROUTING

Remove spacer inserts, prepare joint, apply and finish off grout to the manufacturer's requirements and as described in AS 3958.1, 5.7 Grouting. Ensure grout finish is uniform in colour, smooth and without voids, pinholes or low spots.

Application - movement joints

3.20 FORM MOVEMENT AND EXPANSION JOINTS

Install movement joints in accordance with AS 3958.1, 5.4.5 Movement Joints. Joints to go right through the tile and bed to the background, maintaining any waterproofing.

Joints, except those with reinforced edges, subject to traffic heavier than light pedestrian should not be wider than 10mm. Movement joints to floor to be located at:

- Over existing movement joints
- Intermediate movement joints to be provided to internal floors at approximately 4.5m centres where any floor dimension exceeds 9m or 6m if subjected to direct sunlight.
- Intermediate movement joints to be provided to external floors at approximately 4.5m centres where any floor dimension exceeds 4.5m.
- At perimeter where abutting perimeter walls, columns, curbs and steps. Also, where there is a change of conditions such as under-floor heating, substrate type or tile type.

3.21 MOVEMENT AND EXPANSION JOINTS, INSTALL COMPOUND/SEALANT FILL

Carefully clean out the joint, if required install bond breaker or backing rod to control width/depth ratio, 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.

Cleaning

3.22 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

3.23 COMPLETION MATTERS

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

4 SELECTIONS

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

Materials - Tiles

4.1 FLOOR TILES - LARGE FORMAT

Supplier:	Client supplied
Tile type:	Omani Marble
Tile size:	800x400x20
Colour:	Sandblast Grey or Pink Marble
Grout width:	3mm
Grout colour:	TBC
Sealant colour:	to match grout

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4.2 FLOOR TILES - SMALL FORMAT

Location:	Bath and Ensuite Shower
Supplier:	Winklemans
Tile type:	Cermaic
Tile size:	50x50
Colour:	Pale Green - VEP
Grout width:	TBC
Grout colour:	TBC
Sealant colour:	to match grout

Materials - preparation & underlays

4.3 FIBRE CEMENT TILE UNDERLAY

Location:	To bath and showers
Brand/type:	James Hardie Tile Underlay
Thickness:	6mm

4.4 WATERPROOFING MEMBRANE - INTERIOR

Refer to 6812W

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6312MF MARCHAND OAK FLOORING

1 GENERAL

This section relates to the supply, laying and finishing of the Marchand range of timber overlay flooring.
It includes:

- Prefinished Engineered Wood Flooring
- Associated adhesives and accessories to complete the installation.

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:

CSIRO	Commonwealth Scientific and Industrial Research Organisation
FSC®	Forest Stewardship Council®
ISTS	Independent Slip Testing Services
PEF	Polyethylene Foam
RH	Relative Humidity
UoA	University of Auckland

Documents

1.2 DOCUMENTS

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

NZBC E3/AS1	Internal moisture
AS 4586	Slip resistance classification of new pedestrian surface materials
ISO 9239-1	Reaction to fire tests for floorings - Determination of the burning behaviour using a radiant heat source

1.3 MANUFACTURER/SUPPLIER DOCUMENTS

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

Marchand	Installation Guide Nov 2025
Marchand	Technical Specifications Flooring Wall and Ceilings
Marchand	Acoustic Mat Underlay Specification Sheet and Installation Guide
Marchand	Underfloor Heating specification sheet May 2025
Marchand	Product Guide August 2024
Marchand	Aftercare Guide V2 2025
Marchand	Warranty September 2025
CSIRO	Certificate of Test FNR13211 18 June 2024
UoA	Laboratory measurement of the reduction of transmitted impact sound of a floor covering test report T2514-1 27 May 2025
ISTS	Test report slip resistance classification of new pedestrian surface materials 14 May 2025
Ardex	PU30 rapid datasheet July 2018
Bona	R848T technical data sheet 23.10.2023

Manufacturer/supplier contact details

Company:	Marchand Limited
Web:	www.marchandonline.co.nz
Email:	info@marchandonline.co.nz
Telephone:	027 427 2659

Warranties

1.4 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

25 years	For manufacturing defects - residential

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5 years For manufacturing defects - commercial

- 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 original purchase.

Refer to the general section 1237 WARRANTIES for additional requirements.

1.5 WARRANTY - INSTALLER/APPLICATOR

Provide an installer/applicator warranty:

2 years For workmanship

- 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

1.6 QUALIFICATIONS GENERALLY

Refer to 1270 CONSTRUCTION for requirements relating to qualifications.

1.7 NO SUBSTITUTIONS

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

1.8 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:
Marchand Aftercare Guide V2 2025

Provide this information prior to practical completion.

Compliance information

1.9 COMPLIANCE - PROPOSED ALTERNATIVE SOLUTION

Marchand engineered oak flooring is presented as an alternative solution for:

Clause:	NZBC E3 - Internal Moisture
Performance:	E3.3.3 Floor surfaces containing sanitary fixtures or sanitary appliances must be impervious and easily cleaned.

Excluding the use of Marchand engineered oak flooring in any room with a bath or shower.
Proposed alternative solution is supported by:

- Marchand Product Guide August 2024 E3/AS1 Alternative Solution

Available ~

Performance

1.10 INTERIOR SURFACE FIRE PROPERTIES - FLOORS, CRITICAL RADIANT FLUX

Marchand engineered wood flooring has been tested to ISO 9239-1 and achieves the following minimum Critical Radiant Flux:

Oak veneer over plywood	5.0kW/m²

1.11 SLIP RESISTANCE - PREVIOUSLY TESTED SURFACE - DRY FRICTION TEST

Marchand engineered wood flooring slip resistance has been tested to AS 4586 Appendix B Dry floor friction test method and achieves the following co-efficient of friction:

Oak veneer over plywood	0.50 co-efficient of friction

1.12 SLIP RESISTANCE - PREVIOUSLY TESTED SURFACE - WET PENDULUM TEST

Marchand engineered wood flooring slip resistance has been tested to AS 4586 Appendix A Wet pendulum test method using Slider 96 Rubber and achieves the following SRV classification:

Oak veneer over plywood	40 SRV

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2 PRODUCTS

Materials

2.1 MARCHAND OAK FLOORING

Engineered tongue and groove, timber planks, FSC Mix certified, 6mm solid oak over 14mm Eucalyptus plywood with black Poplar backing. Finished with factory applied 9 coat matt lacquer system. Available in a range of edge finishes, textures and colours. Refer to SELECTIONS.

2.2 MARCHAND OAK STAIR NOSINGS

Engineered timber profile, FSC Mix certified, 6mm solid oak over 14mm Eucalyptus plywood with black Poplar backing and finished with factory applied 9 coat matt lacquer system. Available in a range of textures and colours. Refer to SELECTIONS.

Components

2.3 ADHESIVE

Bona 848T MS Polymer adhesive.

2.4 SEALANT

Low modulus silicone sealant. Refer to SELECTIONS.

2.5 BACKING ROD

Closed cell PEF rod. Refer to SELECTIONS.

Accessories

2.6 FLOOR TRIMS

Copper or polished brass finishing edge. Refer to SELECTIONS.

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 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 work.

Timber substrate:	+/- 4% maximum moisture difference with Marchand oak flooring
Concrete substrate:	70% maximum RH, cured for 28 days minimum.
Surface tolerances:	≤3mm over 1m² of floor area

3.4 ACCLIMATISATION

Stack unopened Marchand flooring packs flat on floor in area of installation, protect from heat, moisture and sunlight for 48 hours at 15°C - 27°C room temperature and 45% - 55% RH. Maintain temperature and humidity range before, during and after installation.

Installation/application

3.5 STANDARDS AND TOLERANCES

Refer to the general section 1270 CONSTRUCTION for general requirements.

3.6 INSTALLATION GENERALLY

Install Marchand engineered oak flooring in accordance with Marchand Installation Guide Nov 2025.

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3.7 SETOUT

Before installation, confirm proposed layout of flooring grain direction and allow 5 - 10mm expansion gaps to fixed vertical surfaces. Minimise number of cut planks and position only at the perimeter of the work.

3.8 APPLY ADHESIVE

Apply an even coat of adhesive to substrate using 6mm grooved trowel for flooring.

3.9 INSTALLATION - PLANKS

Start from left corner and install first row. Use first row off-cut and install second row. Off-cut to be >300mm in length and >300mm from end join on previous row. Continue laying floor, randomly staggering joins. Place temporary spacers to maintain minimum expansions gaps. Place heavy weights to flooring edges, butt ends and corners for 24 hours until adhesive cures.

3.10 INSTALL SEALANT BEAD TO WET AREAS

Compress backing rod into expansion gap and apply sealant to perimeter of flooring within 1.5m of sanitary fixtures and appliances.

3.11 INSTALL FLOOR TRIMS

Install floor trims to cover required expansion gap at transitions from Marchand Oak Flooring to differing floor surfaces.

Completion & Commissioning

3.12 COMPLETION MATTERS

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

4 SELECTIONS

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

Materials

4.1 MARCHAND OAK FLOORING

Location:	Refer to Reference Plans
Brand:	Marchand Oak Flooring
Type:	Flooring Plank - 240mm (w) x 20mm (h) x 2.2m (l)
Colour:	Bordeaux Oak
Texture:	Lightly Knotted
Finish:	Micro Bevelled Edge
Timber certification:	FSC Mix certified
Coating:	Factory applied UV matt lacquer

4.2 MARCHAND OAK FLOORING - STAIR NOSING

Location:	Main Stairs
Brand:	Marchand Oak Flooring
Type:	Stair Nosing
Size:	2200mm x 70mm x 40mm
Colour:	Bordeaux Oak
Texture:	Lightly Knotted
Finish:	Micro Bevelled Edge
Timber certification:	FSC Mix certified
Coating:	Factory applied UV matt lacquer

Components

4.3 SEALANT

Location:	Water splash areas - within 1.5m of sanitary fixtures & appliances
Backing Rod:	Closed cell PEF rod

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Accessories

4.4 FLOOR TRIM

Material/size Copper / 19mm x 3.18mm x 4m lengths

Spec Version ID: 374773-449018
Document authenticity may be verified at masterspec.co.nz/verify/374773-449018
Prepared using Masterspec software
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6511 CARPETING

1 GENERAL

This section relates to the supply and installation of carpet laid conventionally (stretched), direct stuck or double bonded (double direct stuck).
It includes:

- carpet underlay
- woven sheet carpet
- carpet tiles

Documents

1.1 DOCUMENTS

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

NZBC C/AS2	Protection from fire for buildings other than risk group SH
AS/NZS 2270	Plywood and blockboard for interior use
AS/NZS 2455.1	Textile floor coverings - Installation practice - General
BPS	Building Product Specifications

Warranties

1.2 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

1 year: For materials

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

Refer to the general section 1237 WARRANTIES for additional requirements.

1.3 WARRANTY - INSTALLER/APPLICATOR

Provide an installer/applicator warranty:

1 year: For execution

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

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.4 QUALIFICATIONS

Refer to 1270 CONSTRUCTION for requirements relating to qualifications.

1.5 ACCEPTABLE PRODUCT/MATERIAL SUPPLIERS

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

2 PRODUCTS

Materials

2.1 UNDERLAY

To AS/NZS 2455.1 Soft underlay and underlays manufacturer's requirements.

2.2 CARPET

To AS/NZS 2455.1 Textile floor coverings.

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Components

2.3 BINDER BARS

Anodised aluminium section with fluted face.

2.4 DIVIDER STRIPS

Hardwood strips 20mm x 15mm or as specified. Refer to SELECTIONS for type and size.

2.5 EDGE GRIPPER

Timber/plywood to AS/NZS 2270 with steel grippers to carpet manufacturer's requirements, constructed of sufficient pins and nails so as to withstand a minimum stretching force of 6580N over a 1220 mm length.

Accessories

2.6 ADHESIVE, CARPET

To AS/NZS 2455.1, clause 1.5.3. and carpet manufacturer's requirements.

2.7 TAPE

To carpet manufacturer's requirements.

3 EXECUTION

Conditions

3.1 DELIVERY, STORAGE & HANDLING OF PRODUCTS

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

Handle carpet on flat dollies using carpet cradles, with probes on fork- lifts and without sharp bending or folding. Store carpet in flat bins with a maximum height of three rows. Keep dry. Protect from damage.

3.2 ROUTINE MATTERS

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 all fittings and fixtures around which the carpet is to be scribed are in place. Carry out such additional preparatory work as required in bringing the substrate to suitable condition.

Confirm moisture content of substrate in accordance with AS/NZS 2455.1. Appendix B Do not commence laying carpet until readings for the whole area are within acceptable levels as follows:

Moisture Content:	Timber substrate - 8 -12% for air conditioned buildings - 10 -14% for intermittently heated buildings - 12 -16% for unheated buildings
	Concrete substrate 75%RH

3.4 BEFORE COMMENCING WORK

Ensure that the building is enclosed, wet work complete, doors hung and lockable, finishes and trim complete, and good lighting available, before starting work.

3.5 TEMPERATURE

Acclimatise carpet to a room temperature above 15°C through the whole of the installation.

3.6 PROTECTION

Protect adjoining work surfaces and finishes during the carpet installation.

3.7 TAPE

Tape for binding and seaming using type and width required by the carpet manufacturer to suit the specified carpet and the standard of performance required.

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3.8 LAYING GENERALLY

Carry out the whole of the work to AS/NZS 2455.1 and to the flooring manufacturer's requirements.

3.9 LAYOUT

Plan the general layout so that:

- seams run lengthways
- traffic runs along the seam
- light from windows is not across the seam
- pile faces away from the light source.

Application - general / substrate preparation

3.10 STANDARDS AND TOLERANCES

Refer to the general section 1270 CONSTRUCTION for general requirements.

3.11 PREPARING NEW WOOD PRODUCT FLOOR

To be level, sanded smooth and dry with loose material and dust removed.

Application - carpet laying

3.12 INSTALLATION, UNDERLAY

Installation to underlay manufacturer's requirements. Lay at right angles to the carpet direction.

3.13 INSTALLATION, CONVENTIONAL SYSTEM

Tape carpet joints, fix grippers to floor and install underlay and carpet to AS/NZS 2455.1, section 3. Stretch carpet tight in both width and length evenly without bowing, square with walls.

3.14 INSTALLATION, DIRECT STICK SYSTEM

Direct stick install to AS/NZS 2455.1, section 3. Apply adhesive evenly over the entire substrate surface to the carpet manufacturer's requirements. Lay carpet with all edges, selvages and joins tightly butted and completely bonded to the floor surface. Roll the carpet with a clean 25 kg roller and ensure complete contact with adhesive.

3.15 FIXING TRIMS

Fix binder bars, carpet to carpet bars, and trims to all junctions with other materials and to carpet edges, to the carpet manufacturer's requirements. Ensure that junctions with other materials are neatly formed, with bars and trim securely fastened to the substrate, 20mm from each end and at a maximum of 100mm centres.

Completion

3.16 SPECIAL PROTECTION

Self Adhesive carpet protective film.

3.17 COMPLETION MATTERS

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

4 SELECTIONS

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

Materials

4.1 UNDERLAY

High density bonded polyurethane foam (PBF)

4.2 CARPET

Location	Brand/type/weight/code	Installation method
Storage Mezzanines	600x600 Carpet Tile	Adhesive fixed
Bedrooms	Wool Carpet	Standard stretched and bonded

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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 6744D DULUX PROTECTIVE COATINGS for protective 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
BPS	Building Product Specifications
WorkSafe	Guidelines for the provision of facilities and general safety in the construction industry
WorkSafe	Guidelines for the management of lead-based paint
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.

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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.

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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 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.

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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 MPNZA 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,
- 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.

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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:

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- 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.

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6700PP PORTER'S PAINTS GENERAL PAINTING

1 GENERAL

This section relates to the general matters related to **Porter's Paints** painting work.

1.1 RELATED WORK

Refer to 6721PP PORTER'S PAINTS INTERIOR PAINTING

1.2 ABBREVIATIONS AND DEFINITIONS

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

The following abbreviations apply specifically to this section:

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:

NZBC C/AS2	Protection from fire for buildings other than risk group SH
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
BPS	Building Product Specifications
MPNZA	Health and Safety Programme
WorkSafe	Guidelines for the provision of facilities and general safety in the construction industry
WorkSafe	Guidelines for the management of lead-based paint
HSWA	Health and Safety at Work Act 2015

1.4 MANUFACTURER/SUPPLIER DOCUMENTS

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

Porter's Paints	Product Specification Sheets
Porter's Paints	Safety Data Sheets (SDS)

Copies of relevant literature are available from:

Company:	**Porter's Paints**
Web:	www.porterspaints.com
Telephone:	0800 672 468

Warranties

1.5 WARRANTY - MANUFACTURER/SUPPLIER

Product warranty: Products must be applied in accordance with application and preparation procedures according to **Porter's Paints** Product Specifications and DuSpec specification sheets. Contact a **Porter's Paints r**epresentative for project specific and commercial warranties.

Refer to the general section 1237 WARRANTIES for additional requirements.

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Requirements

1.6 QUALIFICATIONS

Painters to be members of MPNZA and experienced competent workers, familiar with the materials and the techniques specified, and with the **Porter's Paints** coating systems. Painters to be selected from the **Porter's** Applicators Guild, or have completed the **Porter's Paints** Professional Skills two day training course. Contact **Porter's Paints** for a list of **Porter's** painters in your area.

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.

1.7 NO SUBSTITUTIONS

Substitutions are not permitted to any of the specified **Porter's Paints** 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.

1.8 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. **Porter's Paints** normally only specify two coats of paint but with certain products, effects and substrates, three coats may be needed - refer to each applicable product Specification Sheet.

1.10 MATERIAL SAFETY DATA SHEETS

Refer to **Porter's Paints** for the material safety data sheets for every applicable product and comply with the safety procedures listed. Keep sheets on the site. Available to view and download at www.porterspaints.com/paints/

Performance

1.11 PORTER'S INSPECTION

Permit representatives of **Porter's Paints** to inspect the work in progress and to take samples of their products from site if requested. Porter's Paint will take care when inspecting the work, but does not accept any responsibility for the proper completion of the work before or after such inspection.

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 on a programme that will facilitate such inspection, including notification when each part and stage of the work is ready for inspection.

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2 PRODUCTS

Materials

2.1 PAINT TYPES

Use the manufacturer's complete system and only the product specified.

2.2 MATERIALS GENERALLY

Use only **Porter's Paints** product which are certified for their consistency and performance under the APAS, prepared, mixed and applied as directed in the Porter's Paints product specification sheets.

2.3 THINNERS/ADDITIVES

Use only if and when expressly directed by **Porter's Paints** 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 PRE-TREATMENTS

Use **Porter's Paints** specific preparatory treatments for surface preparation where required:

- Cement Crack Sealer - For the treatment of unpainted cement render or bagging that shows non-structural cracking. Designed to bridge cracks up to 0.3mm.
- Salt Check - A pre-treatment used to inhibit efflorescence. Water thinnable, solvent-free emulsion that serves as a general purpose water repellent for impregnating and priming mineral surfaces and cementitious substrates such as cement render, bricks, concrete, sandstone and mineral plasters.
- Tannin Check - A pre-treatment to inhibit tannin migration through water based paint systems from tannin rich timber.

Refer to **Porter's Product Specification** sheet for the specified preparation system.

3 EXECUTION

Conditions

3.1 EXECUTION

To conform to manufacturer's requirements and those methods, practices and techniques contained in AS/NZS 2311 and WorkSafe: Guidelines for the provision of facilities and general safety in the construction industry.

3.2 PREPARE

Prepare surfaces to **Porter's Paints** requirements.

3.3 COATED SURFACES

Ensure that substrate surfaces are able to achieve the specified finish.

3.4 PRE-PRIMED SURFACES

Sand down any breakdown or damage of the primer to a sound surface and immediately re-prime.

3.5 BRUSH DOWN

Brush down surfaces immediately before application, to remove dust, dirt and loose material.

3.6 COMPATIBILITY

Check that materials are as required by the paint manufacturers for the particular surface and conditions of exposure, and that they are compatible with each other. Use paint from the same manufacturer for each paint system. If not compatible, obtain instructions before proceeding.

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3.7 TREATED SURFACES

Where surfaces have been treated with preservatives or fire retardants, check with the treatment manufacturer that coating materials are compatible with the treatment and do not inhibit its performance. If they are not compatible, obtain instructions before proceeding.

3.8 BACK PAINTING

Co-ordinate with cladding and/or lining installer as to who will do the work and timing.

Exterior
For exterior cladding and trim that require on site finishing, paint the back and exposed bottom edges at the base of the cladding (generally, bottom plate overhang and horizontal flashings) to the manufacturer's requirements, but at least to 150mm up from base. Coating to match front finish, generally apply 2 coats or 1 coat if pre-primed.
Refer to appropriate exterior paint sections SELECTION clauses for claddings to be back painted.

Interior
For lining and trim that require on site finishing and/or back painting (usually wet areas), paint the back and exposed bottom edges at the base of the lining, to the manufacturer's requirements, but at least to 150mm up from base. Coating to match front finish, generally apply 2 coats or 1 coat if pre-primed, or if no front finish seal to manufacturer's requirements.
Refer to appropriate interior paint sections SELECTION clauses for linings to be back painted.

3.9 ANCILLARY SURFACES

The coatings listed in schedules and elsewhere are of necessity simplified. Coat ancillary exposed surfaces to match similar or adjacent materials or areas, except where a fair-faced natural finish is required or items are completely prefinished. In cases of doubt obtain instructions before proceeding.

3.10 HARDWARE

Do not paint hinges or hardware that cannot be removed. If items can be removed, carefully remove hardware, fixtures and fittings before commencing work. Set aside where they cannot be damaged or misplaced and replace on completion.

3.11 PROTECTION

Use dropsheets, coverings and masking necessary to protect adjoining fixtures, fittings and spaces from paint drops, spots, spray and damage.

Preparation

3.12 PREPARATION

Refer to **Porter's Paints Product Specification Sheets** for detailed substrate preparation notes relating to SELECTIONS contained in:

6711PP PORTER'S PAINTS EXTERIOR PAINTING for exterior painting systems
6721PP PORTER'S PAINTS INTERIOR PAINTING for interior painting systems

Application - preparatory work

3.13 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.

3.14 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.

3.15 CONCEALED JOINERY SURFACES

Apply off-site coatings to all surfaces including those which will be concealed when incorporated into the building.

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3.16 CONCEALED METAL SURFACES

Apply primer to suit the coating system to all metal surfaces which will be concealed when incorporated into the building.

3.17 DOORS

Prime or seal and paint all six faces of doors before hanging.

Application - generally

3.18 PAINTING GENERALLY

Comply with the **Porter's Paints** specification sheets, product data sheets and the additional requirements of this work section.

3.19 MIXING

Thoroughly mix paints in accordance with product instructions. Lift any settled pigment and ensure the paint is homogenous.

3.20 ENVIRONMENT

Paint exterior surfaces only in favourable weather conditions:

- warm dry days without frost or heavy dew
- 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 to 30°C unless paints with the necessary temperature tolerance have been specified
- do not apply in high humidity
- do not apply paint if moisture is present on the surface

3.21 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 undercoats, primers, pre-treatments, sealers, paints, stains, clear coatings and waxes in the sequences laid down by **Porter's Paints**
- Allow the full drying times between coats laid down by **Porter's Paints**
- Do not expose primers, sealers and undercoats beyond a few days before applying the next coat
- Finish broad areas before painting trim, unless noted otherwise in individual Product Specification.
- Ensure batch numbers of tins are matched for whole areas.
- Internally paint ceilings before walls and walls before joinery, trim and other items.

3.22 PAINT APPLICATIONS

Select brush, roller, pad or sprayer and apply paint to the requirements of **Porter's Paints** and to obtain a smooth even coating of correct thickness, uniform gloss and colour, if appropriate to the product being applied and desired finish and effect.

Decorative specialty finishes designed to provide distressed, textured or weathered effects will have variable results depending upon artistic ability and application/burnishing methods and/or expertise. The application method and number of coats applied will affect the way the finish appears upon completion.

3.23 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.

3.24 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.

3.25 DEFECTIVE WORK

Correct defective work immediately and re-coat as required, following precisely the **Porter's Paints** paint system specified.

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3.26 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: Subject to product being applied, desired finish and effect.

Completion

3.27 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.

3.28 CLEAN EQUIPMENT

Use EnviroWash 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.

3.29 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.

3.30 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.

3.31 REPLACE HARDWARE

Replace hardware without damage to it or the adjoining surface. Leave properly fitted and in working order.

3.32 DISPOSAL OF PAINTS

Note: The use and disposal of paint and thinners represents a significant environmental hazard.

Ensure all paint and thinners are disposed of in the following manner:

- When requested hand over part used paint containers to client for maintenance touch ups.
- Recycle left over paint and packaging at a Dulux Trade Centre through the Paint Take-Back Service. See www.painttakeback.co.nz/what-we-do/ for eligible paint. Confirm acceptance criteria with local Dulux Trade Centre prior to return. Water-based architectural/decorative paint coatings in original labelled/printed packaging are eligible.
- Donate left over water based paint to local community groups.
- Paints, textured coatings, and paint thinners (solvents such as turpentine, mineral spirits) require special disposal procedures. Do not pour down sewer or stormwater drains, sinks or into the ground. If they cannot be recycled they must be disposed of in a refuse dump licensed to take toxic waste.

3.33 MAINTENANCE

Porter's Paints product, particularly specialty finishes and waxes, are more delicate than standard paint finishes and have product-specific cleaning recommendations. Confirm paint finish care and inspection requirements with **Porter's Paints** for each specified system.

In general, keep any cleaning to a minimum to avoid damaging the paint finish. Do not wash surfaces for four weeks after painting, as waterborne paints require this period of time to fully cure. Do not vigorously scrub the surface, waterblast or use cleaning agents.

4 SELECTIONS

Materials

4.1 SELECTIONS

Refer to 6721PP PORTER'S PAINTS INTERIOR PAINTING for paint systems selections.

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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.

Masonry and cementitious substrates - new walls

4.1 EXTERIOR MASONRY NEW - WALLS - WATER-REPELLENT SYSTEM

Gloss level:	Matt
Coating type:	Penetrating hydrophobic silane-siloxane surface treatment
System:	Nitocote SN502 | Fosroc
Preparation:	DULUX AcraTex 400/4 Tiltwash @ 7 m²/L
1st coat:	Nitocote SN502
2nd coat:	Nitocote SN502
Details:	The protective coating is to be applied in two flood coats until the recommended total application rate of 0.4 litres / m² is achieved

Timber substrates - new cladding

4.2 EXTERIOR TIMBER NEW - CLADDING - WATER-BASED STAIN

Gloss level:	Matt
Coating type:	Water-based stain
System:	DuSpec+ NZIN00098
Preparation:	INTERGRAIN UltraPrep Timber Cleaner @ up to 10 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 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+ NZDU01192
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

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Timber substrates - new decks

4.4 EXTERIOR TIMBER NEW - DECKS - WATER-BASED STAIN

Gloss level:	Matt
Coating type:	Water-based stain
System:	DuSpec+ NZIN00110
Preparation:	INTERGRAIN UltraPrep Timber Cleaner @ up to 10 m²/L
1st coat:	INTERGRAIN UltraDeck Timber Oil @ 12 m²/L
2nd coat:	INTERGRAIN UltraDeck Timber Oil @ 12 m²/L
3rd coat:	INTERGRAIN UltraDeck Timber Oil @ 12 m²/L (optional)

Metal substrates - new

4.5 EXTERIOR MILD STEEL NEW - DECORATIVE PAINT

Gloss level:	Semi-Gloss
Coating type:	Water-based zinc primer + water-based topcoat
System:	DuSpec+ NZDU02009
1st coat:	DULUX Precision All Metal Primer @ 14.8 m²/L
2nd coat:	DULUX Weathershield @ 16 m²/L
3rd coat:	DULUX Weathershield @ 16 m²/L

4.6 EXTERIOR MILD STEEL NEW - PROTECTIVE COATING

Gloss level:	Gloss
Coating type:	Two pack solvent-based zinc phosphate epoxy primer+ two pack solvent-based acrylic polyurethane
System:	DuSpec+ NZDU03551
1st coat	DULUX Duremax GPE ZP @ 150 microns DFT
2nd coat:	DULUX Weathermax HBR @ 100 microns DFT

4.7 EXTERIOR GALVANIZED NEW - WATER-BASED DECORATIVE PAINT

Gloss level:	Semi-Gloss
Coating type:	Water-based
System:	DuSpec+ NZDU02191
1st coat:	DULUX Precision All Metal Primer @ 14.8 m²/L
2nd coat:	DULUX Weathershield @ 16 m²/L
3rd coat:	DULUX Weathershield @ 16 m²/L

4.8 EXTERIOR GALVANIZED NEW - PROTECTIVE COATING

Gloss level:	Gloss
Coating type:	Two pack solvent-based zinc phosphate epoxy primer + two pack solvent-based acrylic polyurethane
System:	DuSpec+ NZDU03611
1st coat:	DULUX Duremax GPE ZP @ 150 microns DFT
2nd coat:	DULUX Weathermax HBR @ 100 microns DFT

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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.

Paperfaced plasterboard substrates - new ceilings

4.1 INTERIOR PAPERFACED PLASTERBOARD NEW - CEILINGS - PAINT

Gloss level:	Flat
Coating type:	Water-based
System:	DuSpec+ NZPR00175
Fire rating:	Group Number 1-S, Report Number 5054, BPS, Table 8.5.2.1: Material Group Numbers for some substrate and coating combinations.
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

4.2 INTERIOR PAPERFACED PLASTERBOARD NEW - CEILINGS - WET AREAS - PAINT

Gloss level:	Flat
Coating type:	Water-based
System:	DuSpec+ NZDU00589
Fire rating:	Group Number 1-S, Report Number 5054, BPS, Table 8.5.2.1: Material Group Numbers for some substrate and coating combinations.
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

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Paperfaced plasterboard substrates - new walls

4.3 INTERIOR PAPERFACED PLASTERBOARD NEW - WALLS - PAINT

Gloss level:	Low Sheen
Coating type:	Water-based
System:	DuSpec+ NZDU03737
Fire rating:	Group Number 1-S, Report Number 5054, BPS, Table 8.5.2.1: Material Group Numbers for some substrate and coating combinations.
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

4.4 INTERIOR PAPERFACED PLASTERBOARD NEW - WALLS - WET AREAS - PAINT

Gloss level:	Low Sheen
Coating type:	Water-based
System:	DuSpec+ NZDU00834
Fire rating:	Group Number 1-S, Report Number 5054, BPS, Table 8.5.2.1: Material Group Numbers for some substrate and coating combinations.
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

4.5 INTERIOR TIMBER NEW - WALLS, TRIM, DOORS, FRAMES AND CEILINGS - CLEAR

Gloss level:	Satin
Coating type:	Water-based clear
System:	DuSpec+ NZIN00132
Fire rating:	Group Number 3, Report Number 5095, BPS, Table 8.5.2.1: Material Group Numbers for some substrate and coating combinations.
1st coat:	DULUX Intergrain UltraClear Interior @ 13 m²/L
2nd coat:	DULUX Intergrain UltraClear Interior @ 13 m²/L
3rd coat:	DULUX Intergrain UltraClear Interior @ 13 m²/L

Timber substrates - new trim, doors, frames, etc - paint

4.6 INTERIOR TIMBER NEW TRIM, DOORS AND FRAMES - WATER-BASED PAINT

Gloss level:	Semi-Gloss
Coating type:	Water-based enamel
System:	DuSpec+ NZDU01045
Fire rating:	Group Number 3, Report Number 5095, BPS, Table 8.5.2.1: Material Group Numbers for some substrate and coating combinations.
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

Specialty finishes

4.7 SPECIALTY FINISHES

See 6721PP

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6721PP PORTER'S PAINTS INTERIOR PAINTING

1 GENERAL

This section relates to the surface preparation and painting of new and existing interior substrates using **Porter's Paints** interior paint systems.

Related work

1.1 RELATED WORK
Refer to 6700PP PORTER'S PAINTING GENERAL for general matters related to painting work.

2 PRODUCTS

2.1 PRODUCTS
Refer to 6700PP PORTER'S PAINTING GENERAL for product clauses.

3 EXECUTION

3.1 EXECUTION
Refer to 6700PP PORTER'S PAINTING GENERAL for execution clauses.

4 SELECTIONS

For further details on selections go towww.porterspaints.com
Substitutions are not permitted to the following, unless stated otherwise.
Refer to Porter's Paints VOC levels as these are subject to change.

Porter's interior paint systems

4.1 PORTER'S INTERIOR PAINT SYSTEMS
Refer to Porter's Paints Product Specification sheets for each coating type.

Interior specialty finishes - effects

4.2 PORTER'S FRENCH WASH™

Location:	refer to internal elevations
Coating type:	Two step wash system
System:	Preparation and Application detail see Product Specification: PORTER'S FRENCH WASH
Gloss level:	Low sheen
Effect:	Ragged
Substrate:	Plasterboard

Preparation:	See Porter's French Wash™ Product Specification for detail
Spot prime:	Porter's Limeproof Undercoat Sealer
1st coat:	Porter's Limeproof Undercoat Sealer
2nd coat:	Porter's Low Sheen Acrylic (base coat)
3rd coat:	Porter's Low Sheen Acrylic (base coat)
4th coat:	Porter's French Wash

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6745DF DULUX PROTECTIVE COATINGS - STEELWORK

1 GENERAL

This section relates to the preparation and painting of Dulux protective coating systems to steelwork.

1.1 RELATED WORK

Refer to 3411 STRUCTURAL STEELWORK

1.2 ABBREVIATIONS AND DEFINITIONS

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

The following abbreviations apply specifically to this section:

ACA	Australasian Corrosion Association
DFT	Dry film thickness
MPNZA	Master Painters New Zealand Association Inc.
NACE	National Association of Corrosion Engineers

Documents

1.3 DOCUMENTS

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

AS 1627.1	Metal finishing - Preparation and pretreatment of surfaces - Removal of oil, grease and related contamination
AS 1627.2	Metal finishing - Preparation and pretreatment of surfaces - Power tool cleaning
AS 1627.4	Metal finishing - Preparation and pretreatment of surfaces - Abrasive blast cleaning of steel
AS 1627.9	Metal finishing - Preparation and pretreatment of surfaces - Pictorial surface preparation standards for painting steel surfaces
AS/NZS 2312.1	Guide to the protection of structural steel against atmospheric corrosion by the use of protective coatings - Paint Coatings
AS/NZS 2312.2	Guide to the protection of structural steel against atmospheric corrosion by the use of protective coatings - Hot Dip Galvanizing
AS/NZS 2312.3	Guide to the protection of structural steel against atmospheric corrosion by the use of protective coatings - Thermal metal spray coatings
AS 3894.1	Site testing of protective coatings. Non-conductive coatings - Continuity testing - High voltage ('brush') method
AS 3894.2	Site testing of protective coatings. Non-conductive coatings - Continuity testing - Wet sponge method
AS 3894.3	Site testing of protective coatings - Determination of dry film thickness
AS 3894.5	Site testing of protective coatings - Determination of surface profile
AS 3894.6	Site testing of protective coatings - Determination of residual contaminants
AS 3894.10	Site testing of protective coatings - Inspection report - Daily surface and ambient conditions
AS 3894.11	Site testing of protective coatings - Equipment report
AS 3894.12	Site testing of protective coatings - Inspection report - Coating
AS 3894.13	Site testing of protective coatings - Inspection Report - Daily
AS 3894.14	Site testing of protective coatings - Inspection report - Daily painting
AS/NZS ISO 9001	Quality management systems - Requirements

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WorkSafe	Guidelines for the provision of facilities and general safety in the construction industry
WorkSafe	Guidelines for the management of lead-based paint
MPNZA	Health and Safety Programme

Health and Safety at Work Act 2015

1.4 MANUFACTURER/SUPPLIER DOCUMENTS

Manufacturer and supplier documents relating to this part of the work:
Dulux DuSpec+ Specification Sheets
Dulux Product Data Sheets
Dulux Safety Data Sheets

Dulux Protective Coatings Maintenance Guide

Manufacturer/supplier contact details

Company:	Duluxgroup (New Zealand) Pty Ltd
Trading as:	Dulux
Web:	www.dulux.co.nz www.duspecplus.co.nz
Email:	specifier@dulux.co.nz
Telephone:	0800 800 424

Warranties

1.5 WARRANTY

Provide a system warranty:

15 years	For Dulux DuSpec+ systems

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

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.6 QUALIFICATIONS - MANUFACTURER / SUPPLIER REQUIREMENTS

Workers to be accredited by Dulux. Refer to 1270 CONSTRUCTION for additional requirements relating to qualifications.

1.7 NO SUBSTITUTIONS

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

1.8 SAFETY DATA SHEETS

Obtain Dulux Safety Data Sheets for each product used, and comply with the required safety procedures.

1.9 EQUIPMENT

All equipment used by the applicator to comply with:

- WorkSafe: Guidelines for the provision of facilities and general safety in the construction industry,
- Health and Safety at Work Act 2015
- MPNZA Health and Safety Programme
- Dulux Safety Data Sheets

1.10 MANAGEMENT OF LEAD-BASED PAINT

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

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- sanding off paint
- using solvent based paint removers.

1.11 CERTIFY COATINGS

Certify on request, compliance with this specification and support with control and sampling records. Test for dry film thickness to AS 3894.3 using Test Method B for magnetic induction and eddy current methods.
Inspection of the coating to include areas of the structure which are difficult to coat, are masked by structure or areas where double coating or light coating is likely due to the shape of the substrate.

Wet film thickness is to be tested to AS 3894.3 with an approved wet film gauge during application to minimise the possibility of low dry film thickness.

Coating to be tested for film continuity and defects to AS 3894.1 or AS 3894.2.

1.12 RECORDS

Keep records to AS 3894.10-14. Provide a copy to the contract administrator if requested.

1.13 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:
Dulux DuSpec+ Specification Sheets
Dulux Product Data Sheets

Dulux Protective Coatings Maintenance Guide

Provide this information prior to practical completion.

Requirements - Quality Control & Assurance

1.14 PRE-COMMENCEMENT MEETING

Convene a meeting, prior to the commencement of the work, between a representative of the contractor, the applicator and a Dulux representative.
The following topics to be reviewed:

- The coating system
- Site safety and permit to work (hot and cold)
- Inspection and test plan (ITP) Hold Points
- Inspection methods and equipment to be used
- Coating repairs

1.15 QUALITY CONTROL SYSTEM - MANUFACTURER / SUPPLIER REQUIREMENTS

Applicator to maintain quality control system to Dulux requirements, including but not limited to:

- Plan, establish and maintain quality control system to AS/NZS ISO 9001
- Make available quality control records upon request of contract administrator or consenting authority
- Inspections to be made by the applicator's NACE Certified Coatings inspector or ACA Certified Coatings technician under the direction of the NACE inspector
- Inspection of the whole/part of the work at each of the stages set out in INSPECTIONS
- Agree a programme that will facilitate such inspection, including notification when each part and stage of the work is ready for inspection
- Permit representatives of Dulux to inspect the work in progress and take samples of their products from site if requested.

2 PRODUCTS

Materials

2.1 DULUX COATING SYSTEMS

Refer to SELECTIONS.

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3 EXECUTION

Conditions

3.1 DELIVERY, STORAGE & HANDLING OF PRODUCTS

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

3.2 ROUTINE MATTERS

Refer to 1270 CONSTRUCTION for requirements relating to defective or damaged work, removal of protection and cleaning.

3.3 PRE-COATING/FINISHING REQUIREMENTS

Check work previously carried out and confirm it is of the required standard for specified finish. Carry out such additional preparatory work as required to bring the substrate to suitable condition.

3.4 COMPATIBILITY

Confirm compatibility of substrate with specified coating system prior to application.

3.5 CONDITIONS FOR APPLICATION

Apply coatings to steelwork in conditions approved for the application of the specified coatings in accordance with the Product Data Sheets. Carry out off-site preparation and coating application under cover.

Surface temperature:	3°C minimum above dew point temperature during application and curing
Air temperature:	10°C minimum - 25°C maximum
Relative humidity:	85% RH maximum

Application - generally

3.6 STANDARDS AND TOLERANCES

Refer to the general section 1270 CONSTRUCTION for general requirements.

3.7 APPLICATION GENERALLY

Apply coatings in accordance with Dulux DuSpec+ specifications, Product Data Sheets and Safety Data Sheets.

3.8 SEQUENCE OF OPERATIONS

Complete surface preparation before commencing painting. Apply paint in the specified sequence using the specified paint.

3.9 SURFACES NOT TO COAT

Use masking tape to define areas not to be coated after surface preparation. Remove masking tape as soon as coating has been completed prior to curing.

Do not apply the coating system to the following surfaces:

- Faying face of high strength friction grip (HSFG) bolted joints
- 75mm clear all around areas for site welding
- Surfaces for embedding in concrete after erection.

Where steel is only partly encased by concrete, extend priming 30mm maximum into the concrete encasement area

3.10 SUNDRY ATTACHMENTS

Confirm all welded items specified under other work sections are welded in place prior to the application of the coating system. All other sundry attachments such as clips, hangars and supports can be fixed after the application of the coating system.

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Surface preparation - generally

3.11 SURFACE PREPARATION GENERALLY

Remove surface defects including cracks, laminations, deep pitting, weld spatter slag, burrs, fins, sharp edges and other defects. Fill weld porosity, if not deemed defective, with two component epoxy putty compatible with the specified coating system.

Surface preparation - mild steel

3.12 PREPARING MILD STEEL - GENERALLY

Prepare mild steel substrates to AS/NZS 2312.1.

3.13 CLEAN MILD STEEL SURFACE

Remove oil, grease and other contaminants using a free-rinsing, alkaline detergent to AS 1627.1. Wash with fresh potable water and confirm that all soluble salts are removed to AS 3894.6, methods A & C.

3.14 PREPARE MILD STEEL SURFACE - ABRASIVE BLASTING

Grind all sharp edges with a power tool to a minimum radius of 2 mm. Power tool clean welds to AS 1627.2 Class 2 to remove roughness. Remove filings by vacuum or compressed air. Abrasive blast surface to AS 1627.4, to visual standard AS 1627.9 Class 2.5 (equivalent to ISO 8501-1, Sa 2.5). Use a non-metallic medium to achieve a surface profile of between 35-65 microns, measured to AS/NZ 3894.5, method A. Remove all spent abrasive and residual dust using dry compressed air or vacuum cleaning.

Commence application of the protective coating system within four hours of blast cleaning, or before visual tarnishing of the steel occurs.

3.15 TREATMENT OF ON SITE WELDING & SITE JOINING

Remove weld splatter and wash off chemical deposits from welding fumes. Power tool clean welds to AS1627.2 Class 2 to remove roughness. Remove filings by vacuum or compressed air. Proceed with priming welds and areas left clear for site jointing immediately.

Surface preparation - galvanized steel

3.16 PREPARING GALVANIZED STEEL - GENERALLY

Prepare galvanized surfaces to AS/NZS 2312.2.

3.17 CLEAN GALVANIZED STEEL SURFACE

Remove oil, grease and other contaminants using a free-rinsing, alkaline detergent to AS 1627.1 and rinse with fresh potable water. Repeat cleaning until the rinsing water wets out the surface and no longer beads on the surface.

3.18 PREPARE GALVANIZED STEEL SURFACE - ABRADE

Abrade surface thoroughly using an abrasive nylon pad to remove gloss and to provide a suitable key for the coating system to adhere to, taking care not to damage the zinc layer. Remove white rust by abrasion. Wash down residues and allow the surface to dry. Proceed immediately with application of sealer/primer coat.

Application - coating system

3.19 COATING APPLICATION - GENERALLY

Each coat of paint and the completed paint system to have the following qualities and properties:

- Uniform finish, colour, texture, sheen and hiding power
- Be free of defects such as pinholing, alligatoring, blistering, staining, overspray, peeling, runs, sags and wrinkling
- The specified number of coats applied.

3.20 DRYING TIME

Allow full drying time between coats and apply subsequent coats within timeframes stated in the Product Data Sheets.

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3.21 SHOP PRIMING

Confirm surface is clean, corrosion-free and dry immediately prior to application of primer coat. Spray apply primer in accordance with Product Data Sheet to required DFT. Where additional coats are required to achieve DFT, allow previous coat to dry before applying subsequent coat(s) in accordance with product re-coating times.

3.22 PATCH PRIMING OF WELDS & SITE JOINTING

Prime welds and areas left clear for site jointing immediately after cleaning. Apply primer in accordance with Product Data Sheet to required DFT, overlapping the adjacent coating by 25mm minimum, 50mm maximum. Where additional coats are required to achieve DFT, allow previous coat to dry before applying subsequent coat(s) in accordance with product re-coating times.

3.23 INTERMEDIATE AND TOP COATING

Apply intermediate and topcoats in accordance with product application instructions to required DFT. Recoat within the recoat window in accordance with the Product Data Sheet.

Completion & Commissioning

3.24 COMPLETION MATTERS

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

4 SELECTIONS

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

Protective coating systems to exterior mild steel

4.1 EXTERIOR STEEL, PUR5, VERY LONG-TERM SYSTEM, BRUSH / ROLL FINISH

System:	DuSpec+ NZDU03553
Coating type:	Epoxy zinc rich primer/Intermediate coat/Polyurethane topcoat
Preparation:	Abrasive blast to AS 1627.4 Class 2.5
Primer (1st coat):	DULUX Zincanode 402 @ 75 microns DFT (shop applied, sprayed)
Intermediate coat (2nd coat):	DULUX Duremax GPE @ 150 microns DFT
Topcoat (3rd coat):	DULUX Weathermax HBR @ 100 microns DFT
Gloss level:	Gloss
Topcoat colour:	Scoria
Application method:	Brush/Roller

4.2 EXTERIOR STEEL, PUR5, VERY LONG-TERM SYSTEM, SPRAY FINISH

System:	DuSpec+ NZDU00939
Coating type:	Epoxy zinc rich primer/Intermediate coat/Polyurethane topcoat
Preparation:	Abrasive blast to AS 1627.4 Class 2.5
Primer (1st coat):	DULUX Zincanode 402 @ 75 microns DFT (shop applied)
Intermediate coat (2nd coat):	DULUX Duremax GPE @ 200 microns DFT
Topcoat (3rd coat):	DULUX Luxathane SPX @ 50 microns DFT
Gloss level:	Satin
Topcoat colour:	Scoria
Application method:	Spray

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4.3 EXTERIOR STEEL, PUR4, LONG-TERM SYSTEM, SPRAY FINISH

System:	DuSpec+ NZDU00944
Coating type:	Epoxy zinc rich primer/Intermediate/Polyurethane topcoat
Preparation:	Abrasive blast to AS 1627.4 Class 2.5
Primer (1st coat):	DULUX Zincanode 402 @ 75 microns DFT (shop applied)
Intermediate coat (2nd coat):	DULUX Duremax GPE @ 125 microns DFT
Topcoat (3rd coat):	DULUX Luxathane SPX @ 50 microns DFT
Gloss level:	Satin
Topcoat colour:	Scoria
Application method:	Spray

Protective coating systems to exterior galvanized steel

4.4 EXTERIOR GALVANIZED STEEL, 5D, VERY LONG-TERM SYSTEM, SPRAY FINISH

System:	~
Coating type:	Galvanized/Epoxy zinc phosphate primer/Polyurethane topcoat
Preparation:	Clean to AS 1627.1 and lightly abrade
Primer (1st coat):	DULUX Duremax GPE ZP @ 100 microns DFT (shop applied)
Intermediate coat (2nd coat):	DULUX Duremax GPE @ 200 microns DFT (shop applied)
Intermediate coat (3rd coat):	DULUX Luxathane SPX @ 50 microns DFT
Topcoat (4th coat):	DULUX Luxathane SPX @ 50 microns DFT
Gloss level:	Satin
Topcoat colour:	Scoria
Application method:	Spray

4.5 EXTERIOR GALVANIZED STEEL, 4D, LONG-TERM SYSTEM, BRUSH / ROLL FINISH

System:	DuSpec+ NZDU03610
Coating type:	Galvanized/Epoxy zinc phosphate primer/Polyurethane topcoat
Preparation:	Clean to AS 1627.1 and lightly abrade
Primer (1st coat):	DULUX Duremax GPE @ 125 microns DFT (shop applied)
Intermediate coat (2nd coat):	DULUX Duremax GPE @ 125 microns DFT (shop applied)
Topcoat (3rd coat):	DULUX Weathermax HBR @ 100 microns DFT
Gloss level:	Gloss
Topcoat colour:	Scoria
Application method:	Spray

4.6 EXTERIOR GALVANIZED STEEL, 4D, LONG-TERM SYSTEM, SPRAY FINISH

System:	DuSpec+ NZDU00951
Coating type:	Galvanized/Epoxy zinc phosphate primer/Polyurethane topcoat
Preparation:	Clean to AS 1627.1 and lightly abrade
Primer (1st coat):	DULUX Duremax GPE @ 125 microns DFT (shop applied)
Intermediate coat (2nd coat):	DULUX Duremax GPE @ 125 microns DFT (shop applied)
Intermediate coat (3rd coat):	DULUX Luxathane SPX @ 50 microns DFT
Topcoat (4th coat):	DULUX Luxathane SPX @ 50 microns DFT
Gloss level:	Satin
Topcoat colour:	Scoria
Application method:	Spray


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6812W WARMUP WATERPROOFED SHOWER SYSTEM

1 GENERAL

This section relates to the supply and installation of Warmup™ waterproofed shower system comprised of interior tiled shower and wet areas supplied and installed by Warmup New Zealand Ltd or Warmup authorized distributor.
It includes:

- underlay
- waterproofing membrane
- tiled wet areas and showers including proprietary shower tray, wastes, drains and accessories
- undertile heating and thermostat control

1.1 RELATED WORK

Refer to 6221 and 6211 For tiles

Documents

1.2 DOCUMENTS

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

NZBC E3/AS1	Internal moisture
NZBC G9/VM1	Electricity
AS/NZS 1860.1	Particleboard flooring - Specifications
AS/NZS 2269.0	Plywood - Structural - Specifications
AS/NZS 2588	Gypsum plasterboard
AS 3740	Waterproofing of wet areas within residential buildings
NZS 4223.3	Glazing in buildings - Human impact safety requirements
AS/NZS 4858	Wet area membranes
AS/NZS 60335.2.96	Household and similar electrical appliances - Safety - Particular requirements for flexible sheet heating elements for room heating.
NZS 6110	Electrical installations - floor and ceiling heating systems
ASTM C630/C630M-96a	Water-resistant gypsum backing board
BRANZ	Good practice guide: Tiling

Electricity (Safety) Regulations 2010 (Reprint as at 21 January 2019)
New Zealand Electrical Codes of Practice

1.3 MANUFACTURER/SUPPLIER DOCUMENTS

Warmup New Zealand Ltd documents relating to this part of the work:

Warmup™ product technical data sheets
Warmup™ Waterproofed Shower System technical literature
BRANZ Appraisal 644 - Warmup Undertile Heating
BRANZ Appraisal 677 - Strandfloor H3.1 Flooring
BRANZ Appraisal 774 - Warmup Waterproofed Shower System
BRANZ Appraisal 895 - Marmox Building Products

Manufacturer/supplier contact details

Company:	Warmup New Zealand Ltd
Web:	www.warmup.co.nz
Email:	info@warmup.co.nz
Telephone:	09 820 2500

Warranties

1.4 WARRANTY - MANUFACTURER/SUPPLIER

Provide a Warmup™ manufacturer/supplier warranty:

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15 years:	For Marmox Insulation Board
15 years:	For Warmup™ WPM750 Undertile Membrane
15 years:	For Warmup™ Shower drain clamp waste
15 years:	For Warmup™ Square drains and channel (strip) drains
Lifetime warranty:	For Warmup™ Undertile heating elements
5 years:	For Warmup™ Undertile heating controllers
3 years:	For Warmup ™ Programmable Dual Touch Thermostat controller

- Provide this warranty on the Warmup™ New Zealand Ltd 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 a Warmup™ installer/applicator warranty:

15 years:	For Warmup™ Waterproofed Shower System

- Provide this warranty on the Warmup™ New Zealand Ltd 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 - MANUFACTURER / SUPPLIER REQUIREMENTS

Workers to be certified by Warmup New Zealand Ltd. Refer to 1270 CONSTRUCTION for additional requirements relating to qualifications.

1.7 WORK BY WARMUP

Supply and installation of Warmup™ Waterproofed Shower System to be carried out by Warmup New Zealand Ltd, or Warmup™ authorized distributor, except for the following:

- installation of shower drain clamp waste
- installation of square drains and channel (strip) drains
- supply and installation of tiles
- installation of electrical connection of heating controllers (thermostats).

1.8 NO SUBSTITUTIONS

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

Compliance information

1.9 INFORMATION REQUIRED FOR CODE COMPLIANCE

Provide the following compliance documentation: -

- Manufacturer's warranty
- Manufacturer's, importers or 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

1.10 QUALITY ASSURANCE

Maintain quality necessary to assure that work is performed in accordance with this specification and qualifying requirements of Warmup New Zealand Ltd.

1.11 INTERNAL / EXTERNAL MOISTURE

Wet area membranes under tiled areas to AS 3740, NZBC E3/AS1 and to BRANZ Good Tiling Practice.

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1.12 ELECTRICITY

Comply with Electricity (Safety) Regulations 2010, NZBC G9/VM1 Electricity, 1.0 Electrical installations, New Zealand Electrical Codes of Practice, NZS 6110 Electrical installations - floor and ceiling heating systems and AS/NZS 60335.2.96 Household and similar electrical appliances - Safety - Particular requirements for flexible sheet heating elements for room heating.

2 PRODUCTS

Materials - substrate linings

2.1 COMPRESSED FIBRE CEMENT SHEET

18mm thick high density sheet of Portland cement, fine sand, cellulose fibre and water, with a smooth finish both sides. Ensure fibre cement sheeting is wet area grade, minimum Type B, Category 3 and with primed/sealed face and edges.

2.2 FIBRE CEMENT FLOOR AND WALL OVERLAY/UNDERLAY

6mm or 9mm thick sheet of Portland cement, sand, fine cellulose fibre and water, with a smooth finish. Ensure fibre cement sheeting is wet area grade, minimum Type B, Category 3 and with primed/sealed face and edges.

2.3 STRANDBOARD

Laminex New Zealand Strandfloor H3.1® is 20mm thick, Square Edge or Tongue & Groove,®.

2.4 GYPSUM PLASTERBOARD - WATER RESISTANT

Gypsum plaster core containing a wax emulsion encased in a durable face and backing paper formed for standard and fire rated use to AS/NZS 2588 and for water resistance use to ASTM C630/C630M-96a.

Tiles

2.5 TILING

Refer to 6221A ARDEX TILING SOLUTIONS for tiles, adhesives and installation of tiles.

Floor levelling compound

2.6 FLOOR LEVELLING COMPOUND

Warmup™ Thermal Screed, if required.

Primer

2.7 PRIMER

Warmup™ proprietary primer.

Tile underlay

2.8 TILE UNDERLAY / SHOWER TRAY AND UPSTAND HOB THRESHOLD

Marmox Insulation Board, a cement reinforced waterproof underlay, available in sheets 1250mm x 600mm x 6mm or 10mm thick and Marmox shower trays which have a high density topping, sized to suit the application, with an in-built preformed fall to waste of 1:50 for point drains and 1:100 for channel drains. Marmox fillets to increase shower tray sizes and shower hob upstands are also available. Refer to SELECTIONS for details.

Waterproofing membrane

2.9 SHEET WATERPROOFING MEMBRANE

Warmup™ WPM750 Undertile membrane, a single ply sheet membrane, to AS/NZS 4858, available in rolls 1.4m wide x 20m long x 0.5mm thick.

Adhesives

2.10 ADHESIVE

Warmup™ proprietary adhesive.

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2.11 CATALYST

Warmup™ proprietary catalyst.

Sealants

2.12 PROPRIETARY SEALANT

Warmup™ proprietary sealant.

Undertile heating

2.13 HEATING ELEMENTS

Warmup™ heating elements, 2.2mm in diameter comprised of double insulation, full screen earth, teflon primary and multi-stranded heating conductors. Tested to AS/NZS 60335.2.96. Available in a number of lengths, wattages and coverage. Refer to SELECTIONS for options.

2.14 THERMOSTATS

A range of Warmup™models of programmable and non-programmable temperature controllers available with Warmup™ Undertile System.

2.15 ELEMENT MONITOR

Warmup™ "Watchdog" audible alarm connected to the heating element during tiling to advise of any adverse treatment. Once installed the alarm must be left "ON" until removed.

Accessories - Warmup™ Waterproof Shower System

2.16 CLAMP WASTE

Warmup™ Clamp Flange, moulded PVC-U, supplied 80mm standard diameter (overall flange diameter 180mm).

2.17 SHOWER DRAINS

Warmup™ 316 stainless steel drain range, available in standard drain range - square and channel drains. Refer to SELECTIONS for style and size options.

2.18 MARMOX SHOWER NICHES

Marmox Shower and Foot Niches, available in various sizes, refer to SELECTIONS for range.

Thermostat controls

2.19 THERMOSTAT - PROGRAMMABLE DUAL TOUCH MODELS

Warmup™ Programmable Dual Touch Screen model W3115 DT, electronic touch screen thermostat with 3 control modes: Air, floor & air+floor. For underfloor heating and heated towel rail control. Built-in air temperature sensor and external floor temperature sensor, floor model with floor sensor connector. Available in white or black.

3 EXECUTION

Conditions -general

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 INSTALLATION - GENERALLY

Installation must be in accordance with requirements of Warmup™ New Zealand Ltd, the Warmup™ Waterproofed Shower Systems technical literature, installation details and BRANZ Appraisal 774.

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Conditions - substrate

3.4 CHECK SUBSTRATE

Ensure that substrate is level, not subject to movement, deflection and is structurally sound. Ensure all surfaces are clean dry and free from dust and dirt, oil and grease with no projection of sharp materials. Complete all remedial work before commencing installation.

3.5 SURFACE PREPARATION

Ensure surface to receive Marmox insulation board 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 substrate temperature is below 10°C or above 35°C.

3.6 SUBSTRATE - FIBRE CEMENT SHEETING

Ensure fibre cement sheeting is wet area grade and suitable for the membrane installation. Check that fixing, thickness and sheet layout is in accordance with manufacturer's requirements. Minimum Type B, Category 3. With primed/sealed face and edges.

Requirements if used 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.

3.7 SUBSTRATE - SUBSTRATE STRANDFLOOR H3.1

Ensure Laminex New Zealand Strandfloor H3.1® is 20mm thick, Square Edge or Tongue & Groove, H3.1 treated with a maximum period of exposure to the weather of 12 weeks. Installed with minimum 8mm clearance between panel edges and fixed objects such as bottom plates, columns, abutting concrete, etc and provided with continuous edge support at building perimeter, and panel edge support in wet areas.

Strandfloor H3.1® must be dry and the timber substructure to have a maximum moisture content of 16% when the membrane is applied. Consult with Strandfloor® manufacturer for correct testing technique. During the exposed period, do not allow water to pond on the surface. Remove water by sweeping. Do not directly cover panels with sheeting or apply liquid sealers to any surface. Panels should weather in their raw condition to allow release of absorbed moisture.

Requirements if used for:

- Flooring: Installed as per manufacturer's instructions and BRANZ Appraisal 677 - Strandfloor H3.1® flooring (internal applications). Lay across joists with staggered joints (brick bond), with each cut sheet continuous over three joists minimum. Maximum allowable spacing for support floor framing is 600mm for square edge sheets (internal applications) and 450mm for tongue and groove diaphragm floors. Fix with construction adhesive to joists in conjunction with mechanical fixing. 50mm x 4.8mm (10 gauge) stainless steel countersunk head screws (unless diaphragm floor) or stainless steel 60mm x 2.8mm annular grooved flooring nails positioned no closer than 10mm from sheet ends and edges (except Tongue & Groove panels - 15mm from panel edge to clear tongue). Fixed at 150mm centres on sheet edges, and 200mm centres at intermediate supports.

3.8 SUBSTRATE - PLASTERBOARD

Ensure plasterboard wall linings are wet area grade and suitable for the membrane installation. Check that fixing, thickness and sheet layout is in accordance with manufacturer's requirements. Ensure plasterboard is stopped before commencing installation. Must only be used for wet area walls not included in shower enclosure area. Minimum thickness 10mm.

3.9 FALLS FLOOR

All floors, other than Marmox shower tray areas, must have adequate falls either built into the substrate or achieved with a sand/cement screed prior to the installation of the membrane.

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Unless stated otherwise falls to be provided in accordance with requirements of BRANZ Appraisal 774.

Installation - tiles

3.10 INSTALL TILES

Refer to 6221A ARDEX TILING SOLUTIONS tiling section for installation of tiles, adhesives, grouting, movement joints, sealants and accessories.

Installation - Warmup™ Waterproofed Shower System

3.11 INSTALL WARMUP WATERPROOFED SHOWER SYSTEM

Install Warmup™ waterproofed shower system in accordance with Warmup™ installation instructions. Application includes:

- Level entry (set down) shower on concrete or timber
- Threshold shower on concrete or timber.

3.12 INSTALL WASTE OUTLET

Install Warmup™ Shower Drain Clamp waste outlet and set top surface flush with the surface receiving the Warmup™ WPM750 Undertile Sheet Membrane application. Complete with shower gully trap and selected Warmup™ shower drain.

3.13 INSTALL UNDERLAY

Lay Marmox insulation board in accordance with Marmox installation instructions and BRANZ Appraisal 895. Marmox Insulation Board to be glued and screwed on timber floor or adhesive fixed with proprietary flexible tile adhesive.

3.14 INSTALL SHOWER TRAY

Position Marmox shower tray using a proprietary flexible adhesive. Lay tray level with falls to waste (1:100 for channel drain, 1:50 for centre or off-centre waste). Seal all joints between substrate and waterproofing using Warmup™ proprietary sealant.

3.15 INSTALL SHOWER THRESHOLD

Adhesive fix Marmox Insulation Board Upstand Hob threshold using Warmup™ proprietary flexible adhesive. Ensure all joints between tray and threshold are sealed.

3.16 INSTALL WATERPROOFING MEMBRANE

Roll out Warmup™ WPM750 Undertile Sheet Membrane and cut to measured length. Install membrane under the pre-formed shower tray. Smooth the membrane on contact to minimize air entrapment beneath the membrane. Apply adhesive between the clamp waste and membrane prior to clamping.

Extend membrane up wall at least 150mm. Ensure membrane is laid tightly into corners. Overlap wall sheets to the 150mm upstand. Weld seams and laps with the Leister Triac S hot air gun. Roll with rubber roller to ensure seams and laps are secure.

3.17 INSTALL WATERPROOFING MEMBRANE - SHOWER

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.

Conditions - undertile heating

3.18 GENERALLY

All work and materials to be in accordance with Warmup™ undertile heating installation instructions and BRANZ Appraisal 644.

3.19 CONFIRM LAYOUT

Before commencing work confirm the proposed location of heating cables and controls.

3.20 CO-ORDINATE SERVICES

Co-ordinate and co-operate with other sub-trades to avoid any conflict with the installation of the system with other subcontractors work.

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Installation - undertile heating

3.21 PRELIMINARY WORK

Clean and prime floor prior to installing the heating cables. All fixings such as door stops and floor mounted cabinetry to be clearly marked out on the floor.

3.22 INSTALL UNDERTILE HEATING

Install Warmup™ undertile heating system in accordance with Warmup™ installation instructions, ensuring as much of the floor area is covered in each of the zones shown on the plan / Warmup™ schedule.

Install Warmup™ "Watchdog" audible alarm must be installed and remain turned on until tiling, grouting and all perimeters and movement joints are sealed. Electrical connection of heating controller must be carried out by registered electrician once tiling is completed.

Installation - thermostat controls

3.23 INSTALL THERMOSTAT SENSORS

Install thermostat sensors for each zone in accordance with the Warmup™ schedule. Install sensors within a conduit so they are easily replaced after completion. For a timber floor install the sensor higher than the heating cables / directly under the flooring.

3.24 COMMISSION

Allow to commission the system fully to Warmup™ instructions.

3.25 TEST ALL ELEMENTS

All elements to be tested for continuity, resistance and insulation resistance prior installation of flooring, and after installation and prior to livening. Fill out the pre and post floor placement test result sheets and forward these results to the owner. It is recommended that all elements are tested at prewired stage of the installation.

3.26 TEST AND ACTIVATE ALL CONTROLS

All thermostats to be activated and checked for correct operation. Where programmable or intelligent thermostats are installed the correct day and time to be programmed in. Once these thermostats have been checked, leave in manual and off unless instructed otherwise.

3.27 TIMBER FLOORS

For timber overlay floors ensure:

- If a moisture test has not been carried out, turn off the underfloor heating 1 week prior to the test.
- Turn off underfloor heating during and for 48 hours either side of the flooring work period.
- Post flooring installation, turn on heating with thermostat set at 5°C and increase by 5°C increments daily, until desired maximum temperature is reached.
- Ensure the thermostat is fitted with a maximum temperature of 27°C.

3.28 CONNECTION TO POWER SUPPLY

Connect from wall mounted flush box to power supply protected by an RCD. Refer to the appropriate electrical section for electrical connections of the heating mats.

Completion

3.29 COMPLETION MATTERS

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

3.30 PROTECTION

Provide temporary protection of the finished work:

Warmup™ Waterproofed Shower Systems are unsuitable as a trafficable surface.

4 SELECTIONS

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

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Materials

4.1 TILES

Refer to 6221A ARDEX TILING SOLUTIONS tiling section.

Undertile heating

4.2 WARMUP HEATING ELEMENTS

Location:	to all tiled areas
Brand:	Warmup™

Warmup™ Waterproofed Shower System

4.3 WARMUP WATERPROOFED SHOWER SYSTEM

Location:	Shower and tiled Bath
Brand:	Warmup™
Substrate:	fibre cement, Strandfloor H3.1®, plasterboard
Tile underlay:	Wall - James Hardie 6mm Tile Underlay
Tile underlay:	Floor - Marmox shower base as required
Waterproofing:	Warmup™ WPM750 Undertile Sheet Membrane
Sealant:	Warmup™ proprietary sealant
Clamp waste:	Warmup™ Shower Drain clamp waste
Shower drains:	Warmup™ Stainless Steel - type TBC
Niches:	Shower Niche MNVP 630330 - 630mm x 330mm inside dimensions

Thermostat controls

4.4 WARMUP THERMOSTAT - PROGRAMMABLE

Location:	Client to determine locations
Brand / Type:	Warmup™ Warmup™ Programmable Colour Touch models W3WT02 - wi-fi compatible (with floor sensor)
Colour:	White

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7123 HOT & COLD WATER SYSTEM

1 GENERAL

This section relates to piped potable water supply systems from the network utility supply authority water main to designated points and appliances, the installation of hot water heating appliances, distributing piped hot water to other appliances, and the installation of valves.

Documents

1.1 DOCUMENTS

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

NZBC G4/AS1	Ventilation of buildings
NZBC G11/AS1	Gas as an energy source
NZBC G12/AS1	Water supplies
NZBC G12/AS3	Water supplies
AS 1432	Copper tubes for plumbing, gas fittings and drainage applications
AS/NZS 1477	PVC pipes and fittings for pressure applications
AS/NZS 2032	Installation of PVC pipe systems
AS/NZS 2033	Installation of polyethylene pipe systems
AS 2345	Dezincification resistance of copper alloys
AS/NZS 2492	Cross Linked Polyethylene (PE-X) pipe for pressure applications
AS/NZS 2537.1	Mechanical jointing fittings for use with cross-linked polyethylene (PE-X) for pressure applications. Plastic piping systems for hot and cold water installations - Cross linked polyethylene (PE-X) General
AS/NZS 2537.2	Mechanical joining fittings for use with crosslinked Polyethylene (PE-X) for pressure applications - Plastics piping systems for hot and cold water installations - Crosslinked Polyethylene (PE-X) - Fittings
AS/NZS 2537.3	Mechanical jointing fittings for use with cross-linked polyethylene (PE-X) for pressure applications. Plastic piping systems for hot and cold water installations - Cross linked polyethylene (PE-X) fitness for purpose of system
AS/NZS 2537.4	Mechanical jointing fittings for use with cross-linked polyethylene (PE-X) for pressure applications. Plastic piping systems for hot and cold water installations - Cross linked polyethylene (PE-X) Guidance for the assessment of conformity
AS/NZS 2642.1	Polybutylene pipe systems - Polybutylene (PB) pipe extrusion compounds
AS/NZS 2642.2	Polybutylene pipe systems - Polybutylene (PB) pipe for hot and cold water applications
AS/NZS 2642.3	Polybutylene pipe fittings - 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 3000	Electrical installations (known as the Australian/New Zealand Wiring Rules)
AS/NZS 3500.1	Plumbing and drainage - Water services
AS/NZS 3500.4	Plumbing and drainage - Heated water services
NZS 3501	Specification for copper tubes for water, gas and sanitation
AS 3688	Water supply and gas systems - metallic fittings and end connectors
AS/NZS 3879	Solvent cements and priming fluids for PVC (PVC-U and PVC-M and ABS and ASA pipes and fittings

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AS 4032.2	Water supply - Valves for the control of heated water supply temperatures - Tempering valves and end-of-line temperature actuated devices
AS/NZS 4129	Fittings for polyethylene (PE) pipes for pressure applications.
AS/NZS 4130	Polyethylene (PE) pipes for pressure applications
NZS 4305	Energy efficiency domestic type hot water systems
NZS 4602	Low pressure copper thermal storage electric water heaters
NZS 4606.1	Storage water heaters. General requirements
NZS 4606.2	Storage water heaters. Specific requirements for water heaters with single shells.
NZS 4606.3	Storage water heaters. Specific requirements for water heaters with composite shells.
NZS 4607	Installation of thermal storage electric water heaters: valve vented Systems
NZS 4617	Tempering (3-port mixing) valves
AS 4809	Copper pipe and fittings. Installation and commissioning
AS 5200 part 053	Plumbing and drainage products, Stainless steel pipes and tubes for pressure applications.
AS/NZS 5601.1	Gas installations - general installations
AS/NZS 60335.2.35	Household and similar electrical appliances. Safety - Pat 2.35 Particular requirements for instantaneous water heaters

Gas (Safety and Measurement) Regulations 2010
Plumbers, Gasfitters and Drainlayers Act 2006

NZ Backflow Testing Standard:	NZ Backflow Testing Standard 2019, Field testing of backflow prevention devices and verification of air gaps

Warranties

1.2 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 PIPEWORK LAYOUTS

See Sheet A7400

1.5 INFORMATION FOR OPERATION AND MAINTENANCE

Supply maintenance information to requirements set out in the 1239 OPERATION & MAINTENANCE section.

1.6 HOT WATER TEMPERATURES

To NZBC G12/AS1, 6.14

Storage water heaters to store water at not less than 60ºC.

Hot water piping system, with temperature controls where necessary (tempering valve etc), to provide water at the outlet at the following temperatures:

For personal hygiene fixtures (showers, baths, wash hand basins etc) temperatures to be close to but not to exceed:

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- 45ºC - for early child hood centres, schools, elderly facilities, hospitals, psychiatric or disabled institutions.
- 50ºC - for personal hygiene fixtures in all other buildings.

For non-personal hygiene fixtures (kitchen sinks and equipment, laundry tubs, cleaners sinks, industrial fixtures etc) temperatures are:

- Unrestricted - direct from water heater, approx. 60°C, must be less than 65°C (for kitchen sinks and equipment, laundry tubs, cleaners sinks etc) - in all buildings.
- Unrestricted - direct from water heater not tempered (for industrial fixtures and specific items etc) - in all buildings.

This clause excludes boiling units.

1.7 QUALITY CONTROL SYSTEM - LEAD FREE

If requested, by the contract administrator or consenting authority, provide test reports from IANZ or equivalent accredited testing facility confirming products that contain copper alloy and are used in contact with potable water for human consumption are lead free.

Performance

1.8 TESTING - TO NZBC G12/AS1

Test to NZBC G12/AS1, 7.6, 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.

2 PRODUCTS

Materials

2.1 POLYETHYLENE PIPE

To NZBC G12/AS1, 2 Materials. Polyethylene pipes to AS/NZS 4130 and fittings to AS/NZS 4129. Except for solid black PE, protect from sunlight. For cold water applications only.

2.2 DE-ZINCIFICATION RESISTANT WATER SUPPLY SYSTEM COMPONENTS

All copper alloy components to comply with G12/AS1 clause 2.2.3 and AS 2345.

2.3 WATER METER

To the requirements of the network utility operator.

2.4 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.

2.5 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, 3.5 Containment Backflow protection, table 2, Selection of Backflow Protection and table 2A Containment Backflow Protection.

2.6 TEMPERING VALVE

Tempering valve to NZS 4617 or AS 4032.2 to NZBC G12/AS1.

2.7 EXPANSION VESSEL

Expansion vessel to NZBC G12/AS, 6.6.7 Expansion Vessels or AS/NZS 3500.4 5.9 Valves and expansion vessels.

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Materials - Hot water heating appliances

2.8 ELECTRIC HOT WATER CYLINDER, MAINS PRESSURE

To NZS 4305, NZS 4606.1, NZS 4606.2 and NZS 4606.3,electric storage cylinder, insulated and complete with required fittings.

2.9 ELECTRIC HOT WATER CYLINDER, UNDER-SINK, LOW PRESSURE

To NZS 4305, and NZS 4602, copper thermal storage cylinder insulated and complete with required fittings.

2.10 HEAT PUMP WATER HEATER - INTEGRAL SYSTEM

Heat pump water heating system, with insulated storage cylinder and compressor/condenser /evaporator, complete with required fittings.

Components

2.11 INSULATION

Pre-formed pipe sections complete with bends and fittings, with fixing tape to the manufacturer's requirements and to NZS 4305 and AS/NZS 3500.4.

2.12 PROTECTIVE TAPE

Plasticised PVC tape system with primer, mastic fixing and outer coating.

Fire resistant accessories

2.13 FIRE STOPPING SYSTEMS

Refer to 7382 FIRE STOPPING SYSTEMS for fire stopping systems of pipe penetrations through fire walls and floors.

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3 EXECUTION

3.1 EXECUTION GENERALLY

Generally carry out the whole of this work and tests to NZBC G12/AS1 or AS/NZS 3500.1 and AS/NZS 3500.4 as modified by NZBC G12/AS3.

3.2 HANDLE AND STORE

Handle and store pipes, fittings and accessories to avoid damage. Store on site, under cover on a clean level area, stacked to eliminate movement and away from work in progress.

Store tapware in a shelved, dry and securely locked area. Retain tapware in the manufacturer's original packaging, complete with all fixings and installation instructions. Label each unit separately with its space/fixture number to match.

3.3 CORE HOLES AND SLEEVES

Review location and fit core holes and sleeves as needed throughout the structure in conjunction with the boxing, reinforcing and placing of concrete. Strip core holes and make good after installation of pipework.

3.4 CONCEAL

Conceal pipework within the fabric of the building unless detailed otherwise. Satin finish chrome plate exposed work, complete with matching ferrule at the surface penetration.

3.5 CORROSION

Separate all metals subject to electrolytic action from each other and from treated timber, concrete and other lime substances by space, painting of surfaces, taping, or separator strips.

3.6 THERMAL MOVEMENT

Accommodate movement in pipes resulting from temperature change by the layout of the pipe runs, by expansion joints and by sleeving through penetrations.

3.7 PIPE SIZE

Flow rates to each outlet to be no less than those given in AS/NZS 3500.1 and AS/NZS 3500.4 as modified by NZBC G12/AS3 or NZBC G12/AS1, table 3, Acceptable flow rates to sanitary fixtures. Pipe size as determined in NZBC G12/AS1, table 4, Tempering valve and nominal pipe diameters.

3.8 ELECTROLYTIC ACTION

Avoid electrolytic action by eliminating contact or continuity of water between dissimilar metals.

3.9 EXCAVATE

Excavate for the water main to a firm, even trench base in straight runs. Allow to backfill.

Application - Pipework installation

3.10 WATER SUPPLY CONNECTION

Arrange with the network utility operator for a connection to the water main and from there through a water meter and gate valve. Provide back flow prevention to NZBC G12/AS1.

3.11 POTABLE WATER SUPPLY PIPEWORK INSTALLATION

From connection point, run pipes complete with all fittings, support and fixing, joins and install to manufacturers specifications. Size the pipes and branches in straight runs to deliver the acceptable flow rate to AS/NZS 3500.1 and AS/NZS 3500.4 as modified by NZBC G12/AS3 or NZBC G12/AS1, table 3, Acceptable flow rates to sanitary fixtures at each outlet. Allow for the expected concurrent use of adjoining fixtures and size the piping layout to eliminate loss of pressure at any point by simultaneous draw-off. Pipework support spacing to be firmly fixed and buffered to eliminate noise and hammer, with preformed tee-connection take-offs and branches, with machine made 3 diameter bends, complete with necessary valves and fittings. Conceal pipework and pressure test before the wall linings are fixed.

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3.12 HOT WATER PIPEWORK

Use a take-off spigot to give separate branches to each fitting, lay out pipes with support spacing to AS/NZS 3500.4 as modified by NZBC G12/AS3 or NZBC G12/AS1, table 9 Water supply pipework support spacing. Fix firmly and buffer to eliminate noise and hammer, with preformed tee-connection take-offs and branches, and preformed 3 diameter bends, complete with all necessary valves and fittings.

Lag all pipes with rigid insulation to the manufacturer's requirements and AS/NZS 3500.4 as modified by NZBC G12/AS3 or NZBC G12/AS1.

3.13 EQUIPOTENTIAL BONDING METALLIC WATER SUPPLY PIPES

If it is an electrical requirement, before enclosing, ensure metallic water supply pipes and metallic sanitary fixtures are equipotential bonded (or at least conductor cable attached) to NZBC G12/AS1, 9.0.

3.14 IN-LINE FILTER

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.

3.15 PENETRATIONS

Provide and fit collars and escutcheon plates to match the pipework at all penetrations through constructions.

Application - Hot water systems

3.16 HOT WATER CYLINDER INSTALLATION GENERALLY

Install hot water cylinders complete to the manufacturer's requirements and to NZBC G12/AS1, 6. 11, Water heater installation or NZS 4606 for Valve-vented systems.

3.17 SEISMIC RESTRAINTS - NON-GAS WATER HEATING APPLIANCES

Non-gas (electric, wet-back, solar etc) water heating appliances (storage water heaters) to be restrained to manufacturer's requirements and NZBC G12/AS1, 6.11, Water Heater Installation or AS/NZS 3500.4, 5.5.4 Seismic restraints.

3.18 INSTALLING HOT WATER PIPE INSULATION

Insulate all hot water pipes to NZS 4305, AS/NZS 3500.4, 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.

3.19 INSTALL ELECTRIC HOT WATER CYLINDERS AND BOILING CYLINDERS

Install where shown complete with all the necessary fittings to the cylinder manufacturer's requirements and in accordance with NZBC G12/AS1: 6.11 or NZS 4607 for Valve-vented systems.

3.20 INSTALL LOW PRESSURE UNDER-SINK HOT WATER CYLINDER

Install hot water cylinders complete to the manufacturer's requirements and to NZBC G12/AS1, 6.11 Water heater installation. Connect to sink tap.

3.21 INSTALL HEAT PUMP WATER HEATER - INTEGRAL SYSTEM

Install complete with the necessary fittings to the manufacturer's installation instructions.

3.22 INSTALL STORAGE HOT WATER CYLINDER OVERFLOW TRAY

Install drained overflow tray to storage hot water cylinder to NZBC G12/AS1.

3.23 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.

3.24 INSTALL EXPANSION VESSEL

Install expansion vessel to NZBC G12/AS, 6.6.7 Expansion Vessels or AS/NZS 3500.4, 5.9 Valves and expansion vessels.

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Application - Fire resistant work

3.25 FIRE STOPPING SYSTEMS
Refer to 7382 FIRE STOPPING SYSTEMS for fire stopping devices for pipe penetrations through fire walls and floors.

Installation - valves

3.26 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.

3.27 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.

3.28 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

3.29 LABEL
Label all pipework with permanent adhesive markers at 3 metre minimum intervals.

3.30 CLEAN IN-LINE FILTER
Clean all in-line filters on completion of works.

3.31 REPLACE
Replace damaged or marked elements.

3.32 LEAVE
Leave work to the standard required by following procedures.

3.33 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)

Pipework

4.2 PIPEWORK INSULATION
Type: Polyethylene (PE) Foam
Suggested Brand: Thermobreak

Hot water systems

4.3 ELECTRIC HOT WATER CYLINDER, MAINS PRESSURE
See 7126RH

4.4 ELECTRIC HOT WATER CYLINDER, UNDER-SINK
See 7126RH

4.5 HEAT PUMP WATER HEATER - INTEGRAL SYSTEM
See 7126RH

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Valves and accessories

4.6 MAIN ISOLATING VALVE

Location: HWC Cupboard

4.7 FLOOR/ZONE ISOLATING VALVES

Location: Utility/Laundry Cupboards and Kitchen Joinery

4.8 APPLIANCE ISOLATING VALVES - CONCEALED

Appliance: Provide for washing machine, dishwasher and underfloor system

4.9 APPLIANCE ISOLATING VALVES - EXPOSED

Appliance: Washing machine
Brand/type: Refer to tapware selections

4.10 IN-LINE FILTER

Required

Fire resistant work

4.11 FIRE STOPPING SYSTEMS

Refer to 7382 FIRE STOPPING SYSTEMS for fire stopping devices for pipe penetrations through fire walls and floors.

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7126RH RINNAI HOT WATER SYSTEMS

1 GENERAL

This section relates to the supply and installation of Rinnai New Zealand Limited hot water systems. It includes:

- Rinnai storage and electric water heaters
- Rinnai hot water heat pumps.

Documents

1.1 DOCUMENTS

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

NZBC G11/AS1	Gas as an energy source
NZBC G12/AS1	Water supplies
NZBC G12/AS3	Water supplies
AS/NZS 1596	Storage and handling of LP Gas
AS/NZS 3500.1	Plumbing and drainage - Water services
AS/NZS 3500.4	Plumbing and drainage - Heated water services
AS/NZS 5125.1	Heat pump water heaters - performance assessment - part 1: air source heat pump water heaters
AS/NZS 5149	Refrigerating systems and heat pumps - safety and environmental requirements - part 1: definitions, classification and selection criteria
AS/NZS 60335.1	Household and similar electrical appliances - Safety - Part 1: General requirements
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
AS/NZS 5601.1	Gas installations Part 1: General installations

Electricity (Safety) Regulations 2010 (Reprint as at 21 January 2019).
Gas (Safety and Measurement) Regulations 2010
Plumbers, Gasfitters and Drainlayers Act 2006

1.2 MANUFACTURER/SUPPLIER DOCUMENTS

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

Rinnai Operation and Installation Guides

Manufacturer/supplier contact details

Company:	Rinnai New Zealand Limited
Web:	www.rinnai.co.nz
Email:	info@rinnai.co.nz
Telephone:	0800 RINNAI (0800 746 624)

Warranties

1.3 WARRANTY - MANUFACTURER/SUPPLIER

See specific product for warranty.

1.4 WARRANTY - INSTALLER/APPLICATOR

Provide an installer warranty:

1 years: For Workmanship

The installer warranty period will depend on the type, model, parts, labour and application of the selected product. Refer to Rinnai New Zealand Limited for confirmation of appropriate warranty details.

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- Provide this warranty on the installer standard form.
- Commence the warranty from the date of installation.

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.5 NO SUBSTITUTIONS

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

1.6 COMPLY

Comply with the Gas (Safety and Measurement) Regulations 2010, Electricity (Safety) Regulations 2010 and the network utility operator's requirements. Give notices for inspections and carry out tests as required.

1.7 QUALIFICATIONS

Gasfitters to be experienced competent workers, familiar with the materials and the techniques specified. Carry out all work under the direct supervision of a Certifying Gasfitter under the Plumbers, Gasfitters and Drainlayers Act 2006.

1.8 INFORMATION FOR OPERATION AND MAINTENANCE

Supply maintenance information to requirements set out in the 1239 OPERATION & MAINTENANCE section.

1.9 HOT WATER TEMPERATURES

To NZBC G12/AS1,6.14

Storage water heaters to store water at not less than 60ºC.

Hot water piping system, with temperature controls where necessary (tempering valve etc), to provide water at the outlet at the following temperatures:

For personal hygiene fixtures (showers, baths, wash hand basins etc.) temperatures to be close to but not to exceed:

- 45ºC - for early child hood centres, schools, elderly facilities, hospitals, psychiatric or disabled institutions.
- 50ºC - for personal hygiene fixtures in all other buildings.

For non-personal hygiene fixtures (kitchen sinks and equipment, laundry tubs, cleaners' sinks, industrial fixtures etc) temperatures are:

- Unrestricted - direct from water heater, approx. 60°C, must be less than 65°C (for kitchen sinks and equipment, laundry tubs, cleaners sinks etc.) - in all buildings.
- Unrestricted - direct from water heater not tempered (for industrial fixtures and specific items etc.) - in all buildings.

This clause excludes boiling units.

1.10 QUALITY CONTROL SYSTEM - LEAD FREE

If requested, by the contract administrator or consenting authority, provide test reports from IANZ or equivalent accredited testing facility confirming products that contain copper alloy and are used in contact with potable water for human consumption are lead free.

Performance

1.11 FINAL INSPECTION AND TEST

Submit the work for inspection and test and prove to the satisfaction of the network utility operator that the installation complies with all Acts and Regulations and has been tested for leakage and proved to be sound.

Testing should be at the time of completion. Confirm this timing before carrying out any tests. Test and demonstrate the system according to manufacturer's specification.

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2 PRODUCTS

Materials - hot water electric heating units

2.1 ELECTRIC HOT WATER STORAGE CYLINDER, MAINS PRESSURE

Rinnai vitreous enamel mains pressure hot water cylinder constructed from enamel inner and galvanized steel outer casing, complete with fittings, to NZS 4305. Refer to SELECTIONS for element sizes, configurations and thermostat options.

2.2 ELECTRIC HOT WATER CYLINDER, UNDER SINK / MAINS PRESSURE

Rinnai enamel thermal storage cylinder insulated and complete with required fittings, to NZS 4305, and NZS 4602. Refer to SELECTIONS for element sizes, configurations and thermostat options.

Hot water heat pumps

2.3 HYDRAHEAT INTEGRATED - HOT WATER HEAT PUMP

Rinnai HydraHeat™, an integrated hot water heat pump made up of a heat pump unit installed on top of a mains pressure enamel storage cylinder, to AS/NZS 5149 and tested to AS/NZS 60335.1. Water temperature electronically preset by digital controllers. Refer to SELECTIONS.

3 EXECUTION

Installation - general

3.1 HANDLE AND STORE

Handle and store units, cylinders, 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 according to manufacturer's instructions.

3.2 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.

3.3 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.

3.4 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.

3.5 PIPE SIZE

Plumber to check and confirm adequate pipe size, incoming mains and meter on site as a part of the installation. Pipe sizing calculation to NZBC G12/AS1, table 4 Tempering valve and nominal pipe diameters or AS/NZS 3500.1 and AS/NZS 3500.4 as modified by NZBC G12/AS3.

Installation - general, hot water cylinders

3.6 HOT WATER CYLINDER INSTALLATION - GENERALLY

Install hot water cylinders complete to the manufacturer's requirements and to NZBC G12/AS1, 6.11, Water heater installation or AS/NZS 3500.4 as modified by NZBC G12/AS3 or to NZS 4607 for Valve-vented systems.

3.7 SEISMIC RESTRAINTS - NON-GAS WATER HEATING APPLIANCES

Non-gas (electric, wet-back, solar etc.) water heating appliances to be restrained to manufacturer's requirements and NZBC G12/AS1, 6.11, Water Heater Installation or AS/NZS 3500.4, 5.5.4 Seismic restraints.

3.8 INSTALL STORAGE HOT WATER CYLINDER OVERFLOW TRAY

Install drained overflow tray to storage hot water cylinder to NZBC G12/AS1.

3.9 INSTALL TEMPERING VALVE

Install one metre minimum from outlet of hot water cylinder and to manufacturer's instructions.

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Installation - hot water heat pumps

3.10 INSTALL HOT WATER HEAT PUMP

Install hot water heat pump to the manufacturer's installation requirements, to NZBC/AS1, 6.11, in a location that complies with AS/NZS 5149 with clearance around outdoor units for condenser air flow and maintenance access. For equipment at ground level, mount on 100mm high concrete plinth or equivalent impervious material. Where property damage can occur as a result of water leakage, install with a safe tray and drain to AS/NZS 3500.4.

Installation - hot water electric heating units

3.11 INSTALL ELECTRIC HOT WATER CYLINDER, MAINS PRESSURE

Install where shown complete with all the necessary fittings to Rinnai requirements and in accordance with NZBC G12/AS1: 6.11. Valve-vented systems to NZS 4607.

3.12 INSTALL ELECTRIC HOT WATER CYLINDER, UNDER SINK, MAINS PRESSURE

Install hot water cylinders complete to Rinnai requirements and to NZBC G12/AS1: 6.11 Water heater installation. Connect to sink tap.

Completion

3.13 REPLACE

Replace damaged or marked elements.

3.14 LEAVE

Leave work to the standard required by following procedures.

3.15 REMOVE

Remove debris, unused materials and elements from the site.

4 SELECTIONS

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

Hot water heat pumps

4.1 RINNAI – HOT WATER HEAT PUMP

Location:	Under L4 Deck
Brand:	Rinnai HydraHeat™
Model/capacity /number:	Hydraheat 340L, external (RHPN361A340E20)
Dimensions:	1995mm high x 692mm diameter -Hydraheat 340L
Number of units:	1

Electric hot water units

4.2 RINNAI ELECTRIC HOT WATER ENAMEL CYLINDER, MAINS PRESSURE, INDOOR OR OUTDOOR

Location:	Studio Laundry Cupboard
Cylinder type:	Indoor / Outdoor
Construction:	Enamel inner, corrosion resistant outer casing with polyurethane foam insulation
Brand:	Rinnai
Capacity/element /model:	180L, 3.0kW - ME180488E30
Thermostat range:	60° - 75°C

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4.3 RINNAI - ELECTRIC HOT WATER CYLINDER, UNDER SINK, MAINS PRESSURE, INDOOR OR OUTDOOR

Location:	Under Kitchen Bench
Cylinder type:	Indoor / Outdoor
Construction:	Vitreous enamel inner / galvanized steel outer
Brand:	Rinnai
Capacity/element /model:	30L, 2.0 kW - MEU303415E20

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7352 TYPE 1 DOMESTIC SMOKE ALARM SYSTEMS

1 GENERAL

This section relates to the installation and commissioning of Type 1 domestic smoke alarm systems.

It includes:

- Power supply
- Associated components to complete the installation

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:

dB(A)	A-weighted decibel
VAC	Volts alternating current
VDC	Volts direct current

The following definitions apply specifically to this section:

Heat alarm	Integral device containing heat detector and alarm sounding feature.
Hush-button	Feature that temporarily silences audible alarm signals triggered by conditions resembling a fire i.e. steam or dust but not generated by sources of fire (nuisance alarm).
Smoke alarm	Integral device containing smoke detector and alarm sounding feature.
Type 1	To NZBC C/AS1 Type 1 is a single smoke alarm or multiple interconnected smoke alarm devices each containing smoke detector and alarm sounding feature.

Documents

1.2 DOCUMENTS

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

NZBC C/AS1	Protection from fire for buildings with sleeping (residential) and outbuildings (risk group SH)
AS/NZS 1125	Conductors in insulated electric cables and flexible cords
AS 1603.17	Automatic fire detection and alarm systems - Warning equipment for people with hearing impairment
AS/NZS 2201.1	Intruder alarm systems - Client's premises - Design, installation, commissioning and maintenance
AS/NZS 3000	Electrical Installations (known as the Australian/New Zealand Wiring Rules)
AS/NZS 3808	Insulating and sheathing materials for electric cables
NZS 4512	Fire detection and alarm systems in buildings
NZS 4514	Interconnected smoke alarms for houses
AS/NZS 5000.2	Electric cables - Polymeric insulated - For working voltages up to and including 450/750 V
BS 5446.3	Detection and alarm devices for dwellings, specification for fire alarm and carbon monoxide alarm systems for deaf and hard of hearing people

Electricity (Safety) Regulations 2010

Warranties

1.3 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

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5 years For Product Supply

- Provide this warranty on the manufacturer/supplier standard form (if not available then use the standard form in the general section 1237WA WARRANTY AGREEMENT)

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.4 QUALIFICATIONS GENERALLY

Refer to 1270 CONSTRUCTION for requirements relating to qualifications.

1.5 TYPE 1 DOMESTIC SMOKE ALARM SYSTEM

Comply with NZBC C/AS1 providing Type 1 domestic smoke alarm system to NZS 4514.

1.6 NO SUBSTITUTION

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

1.7 INFORMATION FOR OPERATION AND MAINTENANCE

Refer to the general section 1239 OPERATION & MAINTENANCE for provision of manufacturer's operation and maintenance information as electronic PDF format documents. Documents to include maintenance, checks, tests and replacement requirements to NZS 4514, Maintenance.

Provide this information prior to practical completion.

2 PRODUCTS

Alarm devices

2.1 MULTI-SENSOR SMOKE ALARM

Multi-sensor smoke alarm to NZS 4514 comprising two or more detection technologies i.e. ionisation and photoelectric smoke sensor or photoelectric smoke and heat sensor. Completed with alarm sounding feature and hush-button. Available wireless with long-life (minimum 10 years), non-removable, sealed battery or hard wired with back-up battery power supply. Refer to SELECTIONS.

2.2 PHOTOELECTRIC SMOKE ALARM

Photoelectric smoke alarm to NZS 4514 comprising photoelectric smoke detecting technology. Completed with alarm sounding feature and hush-button. Available wireless with long-life (minimum 10 years), non-removable, sealed battery or hard wired with back-up battery power supply. Refer to SELECTIONS.

2.3 HEAT ALARM

Heat alarm to NZS 4514 comprising heat detecting technology. Completed with alarm sounding feature and hush-button. Available wireless with long-life (minimum 10 years), non-removable, sealed battery or hard wired with back-up battery power supply. Refer to SELECTIONS.

Components

2.4 SEALED BATTERY - WIRELESS ALARMS

To NZS 4514, Power Supplies. Long-life (minimum 10 years), non-removable, sealed batteries.

3 EXECUTION

Conditions

3.1 DELIVERY, STORAGE & HANDLING OF PRODUCTS

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

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3.2 ROUTINE MATTERS

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

3.3 PRE-INSTALLATION REQUIREMENTS

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

3.4 COMPATIBILITY

Confirm all interconnected devices are compatible.

Installation - generally

3.5 STANDARDS AND TOLERANCES

Refer to the general section 1270 CONSTRUCTION for general requirements.

3.6 LOCATION & SPACING

Location and spacing of smoke alarms to NZS 4514. Install smoke alarms within 10m of each other and a maximum of 5m away from any wall.

3.7 AUDIBLE ALARM

Install smoke alarms so that audible alarm sound pressure level when measured at 1.8m height is between 75dB(A) and 110dB(A) to NZS 4514, Alarm Signals.

Installation - smoke alarm system

3.8 INSTALL BATTERIES

Install primary and secondary batteries to NZS 4514 and manufacturer's instructions. Indelibly mark batteries with the date of installation.

3.9 INSTALL ALARMS

Install alarm devices to manufacturer's instructions fitted neatly and without damage to the surrounding finish using brackets and mounts supplied or recommended by the manufacturer.

3.10 INTERCONNECT

Interconnect devices so that when one activates all alarms sound.

Completion & Commissioning

3.11 COMPLETION MATTERS

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

3.12 COMPLETION - TESTS & CERTIFICATION

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

Completed smoke alarm system to be inspected, tested and where required for electrical installations certified to NZS 4514, including (but not limited to):

- Correct location of alarm devices
- Correct sound pressure level of audible alarm signals
- Correct installation to manufacturer's installation instructions
- Correct and fault free operation of the smoke alarm system and interconnected devices

4 SELECTIONS

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

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Alarm devices

4.1 MULTI-SENSOR SMOKE ALARM

Location:	Refer to electrical plan
Type:	Multi-sensor smoke alarm
Sensor:	Photoelectric & ionisation smoke sensors
System:	Wireless
Compliance:	NZS 4514

4.2 PHOTOELECTRIC SMOKE ALARM

Location:	Kitchen
Type:	Smoke alarm
Sensor:	Photoelectric smoke sensor
System:	Wireless
Compliance:	NZS 4514

4.3 HEAT ALARM

Location:	Garage
Type:	Heat alarm
Sensor:	Fixed heat sensor
System:	Wireless

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7382 FIRE STOPPING SYSTEMS

1 GENERAL

This section relates to fire rated service penetration systems and control joint fire stopping systems and includes:

- fire resistant barrier for seismic and other movement gaps
- formulated compound of incombustible fibres
- fire-stop composite sheets
- fire-stop collars, grilles and dampers
- fire-stop wraps and pillows
- fire-stop sealants and foams
- fire-stop mortars
- cavity construction intumescent barriers

Documents

1.1 DOCUMENTS

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

NZBC C/AS2	Protection from fire for buildings other than risk group SH
BSEN 1366.4	Fire resistance tests for service installations. Linear joint seals
NZS/AS 1530.1	Methods for fire tests on building materials, components and structures - Combustibility test for materials
AS 1530.4:2005	Methods for fire tests on building materials, components and structures - Fire resistance test of elements of construction
AS 1668.1	The use of ventilation and airconditioning in buildings - Fire and smoke control in buildings
AS 4072.1	Components for the protection of openings in fire-resistant separating elements - Service penetrations and control joints
AS 1682.1	Fire dampers Specification
AS 1682.2	Fire dampers Installation
NZS 4520	Fire resistant doorsets
ASTM C1519 - 10	Standard Test Method for Evaluating Durability of Building Construction Sealants by Laboratory Accelerated Weathering Procedures
BPS	Building Product Specifications

Warranties

1.2 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

5 years:	For manufacture/supply of fire stopping systems

- 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.

1.3 WARRANTY - INSTALLER/APPLICATOR

Provide an installer/applicator warranty:

1 years:	For installation of fire stopping 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.

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Requirements

1.4 QUALIFICATIONS

Installers 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 MANUFACTURERS INFORMATION

Submit type test certificates for each combination of fire stopping system, application, type of service, and substrate and penetration orientation. Include drawings of tested details.

- Submit report to AS 4072.1 appendix C.
- Submit evidence that systems specified without reference to brand conform to specified requirements.
- Submit copies of relevant manufacturers' instructions, for systems specified without reference to brand.
- Material data sheets (MSDS): Submit MSDS for systems specified without references to brand.
- Give notice if substrate or penetrations or both are not suitable for fire stopping.

1.7 LABELLING OF FIRE RATED SERVICES PENETRATIONS

All service penetrations to fire cells and fire separation systems are required to comply with all the designed fire integrity of the specified systems. Label all fire rated service penetrations to AS 4072.1 using the Certified Identification System provided by CID International Ltd.

Each fire stopping installation to have a permanently fixed tag or label containing the following information:

- Manufacturer's name
- Name and address of installer
- Date of installation

Refer to CID International Ltd at www.cidcert.com to record all service penetrations.

1.8 INSPECTIONS

Give sufficient notice so that inspections may be made of the following:

- Service penetrations completed and ready for fire stopping.
- Finish fire stopping, before being concealed.

Compliance information

1.9 FIRE STOPPING SYSTEM COMPLIANCE

To NZBC C/AS2, 2.3 Fire resistance ratings, NZBC C/AS2, 4.3.2 Fire stopping, and NZBC C/AS2, 4.3 **Fire cell construction f**or interior elements, and NZBC C/AS2, 5.5.3 Cavity barriers.

1.10 INFORMATION REQUIRED FOR CODE COMPLIANCE

Provide the following compliance documentation:

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

1.11 CERTIFICATION

Submit evidence of compliance, to the recommendations of AS 4072.1 Appendix B.

Submit a certification document for installed fire stopping penetration and control joints.

- Form: To figure B1 of AS 4072.1

Schedule: Submit a schedule of installed fire stopped penetrations and control joints.

- Form: To figure B2 of AS 4072.1

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2 PRODUCTS

Materials

2.1 FIRE AND ACOUSTIC SEALANT

One part sealant to AS 1530.4, AS 4072.1 and BSEN 1366.4 to provide up to 4 hours fire integrity and up to 3 hours insulation. Tested to ASTM C1519 - 10 for Dynamic movement and artificial age test.

2.2 FIRE RATED EXPANDING FOAM

Expanding polyurethane foam to AS 1530.4 and AS 4072.1. Do not use around plastic or insulated pipes or cables.

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 manufactures requirements.
Reject and replace goods that are damaged or will not provide the required finish.

3.2 GENERAL PREPARATION

Fire stopping after services have been installed through penetrations and properly spaced and supported, after sleeving where appropriate, and after removal of temporary lines, but before restricting access to the penetrations, including before dry lining.

Supply ventilation for non-aqueous solvent-cured materials. Apply fire stopping material to uniform density. Finish surfaces to a uniform and level condition. Maintain cable separation. Protect adjacent surfaces from damage arising through installation of fire stopping.

Allow for thermal movement for the pipes and ducts. Reinforce or support fire stopping materials with non combustible materials when:

- The unsupported span of the fire stopping materials > 100mm.
- The fire stopping materials are non-rigid.

To large openings provide fire stopping capable of supporting the same loads as the surrounding element or provide similar structural support around the opening.

Installation of penetrations through fire walls

3.3 INSTALLATION OF MULTI-CABLE TRANSITS

Encase and separate cables with fire rated sleeve system. Fill remaining space with the sleeves and seal with water repellent UV resistant fire sealant to a depth of 20mm each face. Hollow structures to have a metal cavity constraint system to constrain sealing product.

3.4 INSTALLATION OF CABLE TRAY PENETRATIONS

Separate cables from each other with appropriate size flame retardant rubber sheets. Fill remaining space with flame retardant rubber sheets. If gas and water tightness is required, seal with water repellent UV resistant fire sealant to a depth of 10mm to each exposed face of the sheets. Hollow structures to have a metal cavity constraint system to constrain sealing product.

3.5 INSTALLATION OF MULTI-MIX TRANSITS FOR CABLES AND PIPES

Sleeve cables and pipes with fitting intumescent sleeves Plastic pipes to be sleeved with crushing material. Fill remaining space with filler sleeves and seal with water repellent UV resistant fire sealant to a depth of 20mm each face. Hollow structures to have a metal cavity constraint system to constrain sealing product.

3.6 INSTALLATION OF CABLE, STEEL, COPPER AND PLASTIC PIPE PENETRATIONS

Fit fire resistant plugs to each end of the penetration. Plug to form a tight fit to pipes and cables and to wall of penetration.

Oversized holes or out of line conduit or pipes to be wrapped with intumescent (crushing for plastic pipe) material with excess space filled with fire retardant rubber and sealed with water repellent UV resistant fire sealant to a depth of 20mm.

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Fire rated sealants/foams

3.7 INSTALLATION OF FIRE AND ACOUSTIC SEALANTS/FOAMS

Clean all surfaces from dust , dirt or other contaminants. Mask adjacent areas and remove immediately after tooling. Prime edges if required by sealant manufacturer. Fill all joints to required depth with a backing rod or bond breaker tape prior to sealant application.

Fire rated expandable polyurethane foam to 15mm wide joints maximum in fire walls.

Completion

3.8 ROUTINE CLEANING

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

3.9 DEFECTIVE OR DAMAGED WORK

Repair damaged elements. Replace damaged where repair is not possible or will not be acceptable. Leave fire stopping system to the standard required for following trades.

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7411RI ROOFING INDUSTRIES METAL RAINWATER SYSTEMS

1 GENERAL

This section relates to Roofing Industries metal rainwater disposal systems in various metal substrates.
It includes:

- spouting
- downpipes

1.1 RELATED WORK

Refer to 4311RI ROOFING INDUSTRIES PROFILED METAL ROOFING for profiled metal roofing.

1.2 ABBREVIATIONS AND DEFINITIONS

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

The following abbreviations apply specifically to this section:

BMT	Base metal thickness
NZMRM	New Zealand Metal Roofing Manufacturers Inc

Documents

1.3 DOCUMENTS

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

NZBC E1/AS1	Surface Water: 4.0 Downpipes, 5.0 Roof gutters
NZBC E2/AS1	External moisture provisions for timber-framed buildings up to 10 m in height
AS 1397	Continuous hot-dip metallic coated steel sheet and strip - Coatings of zinc and zinc alloyed with aluminium and magnesium
AS/NZS 2728	Prefinished/pre-painted sheet metal products for interior/exterior building applications - Performance requirements
AS/NZS 3500.3	Plumbing and drainage - Stormwater drainage
NZMRM CoP	NZ Metal Roof and Wall Cladding Code of Practice

1.4 MANUFACTURER/SUPPLIER DOCUMENTS

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

Roofing Industries, Ezi-Flo Rainwater Systems - brochure

Manufacturer/supplier contact details

Company:	Roofing Industries Ltd
Web:	www.roof.co.nz
Email:	techinfo@roof.co.nz
Telephone:	0800 844 822

Warranties

1.5 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

10 years:	For paint will not flake, peel or excessively fade
15 years:	For substrate will not perforate through corrosion

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

Refer to the general section 1237 WARRANTIES for additional requirements.

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1.6 WARRANTY - INSTALLER/APPLICATOR

Provide an installer/applicator warranty:

3 years: For workmanship

- Provide this warranty on the installation 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

1.7 QUALIFICATIONS

Refer to 1270 CONSTRUCTION for requirements relating to qualifications.

1.8 NO SUBSTITUTIONS

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

Performance

1.9 DESIGN - NZBC E1/AS1

Layout, falls and capacity of spouting to falls and the size and position of downpipes to comply with NZBC E1/AS1. Refer to NZMRM CoP recommendations, sections 5.5, Gutters and 5.7, Downpipes.

2 PRODUCTS

Materials

2.1 STEEL - TYPE AM COATING (ALUMINIUM/ZINC/MAGNESIUM ALLOY), PRE-PAINTED

Formability steel sheet G300 for spouting, fascia and downpipes, coated to AS 1397. Prefinished / prepainted to AS/NZS 2728.

Products

2.2 TRADITIONAL SPOUTING

Ezi-Flo™ traditional spouting systems complete with stop-ends, matching brackets and screws. Available in a range of profiles, sizes, metal substrates and finishes, refer to SELECTIONS.

2.3 DOWNPIPES

Ezi-Flo™ round and rectangular downpipe systems, complete with accessories and brackets. Available in a range of sizes, metal substrates and finishes, refer to SELECTIONS.

2.4 RAINWATER HEADS

Ezi-Flo™ Rainwater heads, custom manufactured. Refer to SELECTIONS for size, metal substrates and finishes, refer to SELECTIONS

Components

2.5 FASTENERS GENERALLY

Fixings and fasteners are to be compatible with all materials, the environment and meeting the requirements of the NZ Building Code.

2.6 RIVETS

Minimum diameter 4.0mm sealed rivets. For coated steel and aluminium materials, use aluminium rivets and for copper materials use copper rivets.

2.7 DROPPERS

Material to match spouting, sized to fit inside the downpipe.

2.8 BRACKETS

Material to match the spouting, downpipe or fascia. Refer to SELECTIONS for type.

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2.9 SNOW STRAPS

Type AM (aluminium/zinc/magnesium alloy) steel snows straps coated to AS 1397. Prepainted to AS/NZS 2728 to match gutter.

2.10 SEALANT

Neutral cure silicone or MS Polymer sealant.

3 EXECUTION

Conditions

3.1 DELIVERY, STORAGE AND HANDLING

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

Store on site under cover, on a clean level area, stacked to eliminate movement and away from work in progress. Avoid exposure to sunlight if strippable film is still on the product.

3.2 ROUTINE MATTERS

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

3.3 PRE-INSTALLATION REQUIREMENTS

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

Check that fascias, barges or cladding are level and true to line and face and will allow work of the required standard without distortion to the product alignment. Do not proceed until they are up to standard.

3.4 SEPARATION

Isolate dissimilar materials in close proximity as necessary by painting the surfaces or fitting separator strips of compatible materials. Place isolators between metals and treated timber and cement based materials.

3.5 THERMAL MOVEMENT

Make adequate provision in the fixing and jointing of the spouting for thermal movement in the length of the spouting. NZMRM CoP recommends that gutters with internal sliding clip or external gutter brackets, maximum lengths should be restricted to 25m for steel and 12m for copper or aluminium.

Application - general

3.6 STANDARDS AND TOLERANCES

Refer to the general section 1270 CONSTRUCTION for general requirements.

3.7 INSTALLATION GENERALLY

Install Ezi-Flo™ rainwater systems in accordance with to Roofing Industries requirements and NZMRM CoP recommendations, where not otherwise specified. Ensure a 10mm gap is left between spouting ends and wall cladding and that any overflow from spouting and or overflows direct water to the outside of the building.

3.8 INSTALL STEEL SPOUTING/GUTTERS

Establish minimum falls necessary (minimum 1:500, 2mm in 1 metre) to outlets to prevent ponding and screw fix brackets true-to-line at 750mm centres maximum for spouting less than 180mm wide and 600mm centres maximum for spouting 180-300mm wide. . Install brackets close to all stop ends, at both ends of sumps and rainheads.

In areas where snow fall is possible the centres should be 600mm maximum and snow straps fitted and this also applies for High and Extra High wind loads. Cut out neatly for and fit the pre-formed downpipe dropper and seal/solder and rivet around the joint. All installation to NZMRM CoP recommendations section 5.4, Gutters.

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3.9 INSTALL STEEL DOWNPIPES

Form downpipes complete with offsets and shoes as needed with all joints lapped and sealed as required. Screw fix with matching pipe clips to rigidly stand plumb to the wall, and discharging into the stormwater gully or pipe inlet. All installation to NZMRM CoP recommendations section 5.7,Outlets & Downpipes.

3.10 INSTALL RAINWATER HEADS

Install Ezi-Flo™ rainwater heads where required to NZMRM CoP, clause 5.6.1 Rainwater Heads and to NZBC E2/AS1, Figure 8.5.4.1B: Rainwater head and scupper opening in membrane.

3.11 INSTALL OUTLETS AND OVERFLOWS

Install outlets and overflows where required to NZMRM CoP, clauses 5.6.3 Overflows and section 5.7, Outlets & Downpipes.

Completion & Commissioning

3.12 TEST

Test the completed rainwater disposal system with water to ensure spouting / gutters are laid to correct falls, that both spouting / gutters and downpipes are unobstructed and that no ponding occurs in spouting/gutter.

3.13 REMOVE STRIPPABLE FILM

If rainwater system components are supplied with strippable film, remove film from any underlaps whilst installing and remove strippable film entirely upon completion prior to UV making it difficult to remove.

3.14 COMPLETION MATTERS

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

4 SELECTIONS

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

Products

4.1 ROOFING INDUSTRIES - EZI-FLO™ TRADITIONAL SPOUTING

Manufacturer:	Roofing Industries
Profile:	Ezi-Flo™ ½ Round - 150mm
Area:	8835mm²
BMT/Material:	0.55mm / STEEL
Coating system:	ColorCote® MagnaFlow™
Colour:	Weathered Copper
Brackets:	½ Round external bracket - colour matched
Fixings:	Waffer tek screw and or tek screw with a 30mm embedment Class 5 screw or fixings to suite application

4.2 ROOFING INDUSTRIES - EZI-FLO™ CUSTOM RAINWATER HEADS

Manufacturer:	Roofing Industries
Profile:	Custom made 300x300x100
BMT/Material:	0.55mm / Steel
Coating system:	ColorCote® MagnaFlow™
Colour:	Weathered Copper

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4.3 ROOFING INDUSTRIES - EZI-FLO™ ROUND DOWNPIPES

Manufacturer:	Roofing Industries
Downpipe:	Ezi-Flo™ Round - 80Ømm
BMT/Material:	0.55mm / steel
Coating system:	ColorCote® MagnaFlow™
Colour:	Weathered Copper
Brackets:	80mm Adjustable Ali Downpipe Bracket (2 piece) - powdercoated aluminium

Accessories

4.4 ROOFING INDUSTRIES - SNOW STRAPS

Manufacturer:	Roofing Industries
Material:	Type AM (aluminium/zinc/magnesium alloy) steel
Coating system:	ColorCote® MagnaFlow™
Colour:	Weathered Copper

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7421 SANITARY SYSTEMS

1 GENERAL

This section relates to above ground gravity flow sanitary systems;

- for foul water
- from sanitary fixtures to first underground drain connection
- including system wastes, floor wastes, floor waste gullies, traps, vents and valves
- with associated components and accessories to make the system work

1.1 RELATED SECTIONS

Refer to 7123 HOT AND COLD WATER SYSTEM for potable water systems.

Refer to 7431 DRAINAGE COMMON REQUIREMENTS for underground drains.

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 provisions for timber-framed buildings up to 10 m in height
NZBC G1/AS1	Personal hygiene
NZBC G13/AS1	Foul water - Sanitary plumbing
NZBC G13/AS3	Foul water - Sanitary plumbing and drainage
AS 1589	Copper and copper alloy waste fittings
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 3000	Electrical installations (known as the Australian/New Zealand Wiring Rules)
AS/NZS 3500.2	Plumbing and drainage - Sanitary plumbing and drainage
AS/NZS 4401	Plastic piping systems for soil and waste discharge (low and high temperature) inside buildings - polyethylene (PE)
AS/NZS 7671	Plastic piping systems for soil and waste discharge (low and high temperature) inside buildings - Polypropylene (PP)
BS EN 1124 .1	Pipes and fitting of longitudinally welded stainless steel pipes with spigot and socket for waste water systems. Requirements, testing, quality control.
BS EN 1124 .2	Pipes and fitting of longitudinally welded stainless steel pipes with spigot and socket for waste water systems. System S, forms and dimensions.

Plumbers, Gasfitters and Drainlayers Act 2006

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 OPERATION AND MAINTENANCE MANUALS

Supply maintenance manual information to requirements set out in the 1239 OPERATION & MAINTENANCE section.

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Performance

1.5 TESTING

Confirm timing before carrying out any tests. Supply potable water and apparatus needed. Test to NZBC G13/AS1, 7.1 Test Methods or AS/NZS 3500.2, section 15 Testing of Sanitary Plumbing and Sanitary Drainage Installations, as required. Carry out and record a visual inspection that each joint showed no evidence of leaks.

2 PRODUCTS

Materials

2.1 PVC-U WASTE PIPES AND TRAPS

To AS/NZS 1260, complete with fittings and accessories to the pipe manufacturer's requirements, all brand matched.

2.2 PVC-U VENT PIPE

To AS/NZS 1260, complete with fittings and accessories to the pipe manufacturer's requirements and all brand matched.

2.3 EXPOSED PLASTIC PIPES AND TRAPS

Plastic traps and fittings to AS 2887.

2.4 CHROME EXPOSED PIPES AND TRAPS

Chrome plate on copper pipes and associated copper and brass fittings, or chromed plastic.

2.5 FLOOR WASTES

Floor wastes and floor waste gullies to AS/NZS 3500.2, complete with chrome grates to suit flooring.

Components

2.6 PROTECTIVE TAPE

Plasticised PVC tape system with primer, mastic fixing and outer coating.

3 EXECUTION

Conditions

3.1 EXECUTION GENERALLY - AS/NZS 3500.2

Carry out this work to AS/NZS 3500.2, as modified by NZBC G13/AS3, and complete all tests to AS/NZS 3500.2, section 15 Testing of Sanitary Plumbing and Sanitary Drainage Installations.

3.2 ELECTROLYTIC ACTION

Avoid electrolytic action by eliminating actual contact or continuity of water between dissimilar metals.

3.3 EQUIPOTENTIAL BONDING METALLIC WASTE PIPES

Before enclosing, co-ordinate with electrician to provide for equipotential bonding to ensure metallic waste pipes connected to metallic drains and attached metallic sanitary fixtures, using an earth bonding conductor to requirements of AS/NZS 3000, 5.6 Equipotential bonding.

3.4 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.

3.5 SETTING OUT

Set out location of all stacks, discharge pipes, fittings and vent pipes and the completeness of their discharge into the drainage system.

3.6 CORE HOLES AND SLEEVES

Fit core holes and sleeves as needed throughout the structure in conjunction with the boxing, reinforcing and placing of concrete. Sleeve diameter to be 25mm larger than outside diameter of pipe accommodated. Strip core holes and make good after installation of pipework.

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3.7 PIPE ACCESS

Fit and fix stacks, wastes and pipes in ducts independent of all other services so they are easily replaceable for their full length. Wrap or tape pipes buried in concrete.

3.8 FITTINGS ACCESS

Fit and fix traps and wastes to enable access for cleaning and for maintaining the total system.

3.9 CONFIRM LOCATIONS

Unless the location and height are clearly delineated on the drawings, confirm installation height and plan locations of sanitary fittings before commencing the piping installation.

3.10 TRAPS AND WASTES

Conceal traps and wastes in the fabric of the building unless detailed otherwise. Fit and fix satin chrome plated exposed pipes, traps and wastes unless detailed otherwise.

Refer to 7150 SANITARY FIXTURES, TAPWARE & ACCESSORIES for locations and types of traps.

3.11 CORROSION

Separate metals subject to electrolytic action from each other and from treated timber, concrete and other lime substances by space, painting of surfaces, taping, or separator strips.

Application - jointing

3.12 JOINTING PVC-U PIPE

Prime and solvent weld joints using spigots and sockets, flanged joints and seal ring compression joints to AS/NZS 2032.

Application - fixing

3.13 THERMAL MOVEMENT

Accommodate longitudinal movement in pipes resulting from temperature changes. Incorporate expansion joints in copper and PVC-U pipes. Install PVC pipes to AS/NZS 2032. Take particular care to allow for movement at horizontal take-off locations from stacks.

3.14 TRAPS AND FIXTURE DISCHARGE PIPES - AS/NZS 3500.2

Size traps and pipes as required for each fixture or appliance. Establish the developed length of waste pipes. Vent and allow access for cleaning as required. Follow the most direct line with the least number of bends to AS/NZS 3500.2, table 3.3.1, for fixture loading and AS/NZS 3500.2, table 10.2.1, distance between supports.

3.15 DISCHARGE STACKS AND VENTS - AS/NZS 3500.2

Size stacks and vents to AS/NZS 3500.2, table 6.3(A), for fixture discharge pipe sizes and discharge units and AS/NZS 3500.2, table 3.9.3.1, vent pipe sizes. Extend up past the highest branch to form a discharge stack vent terminating to AS/NZS 3500.2, section 6.9 Vents, and finishing at the base with a 45 degree bend. Support system to AS/NZS 3500.2, table 10.2.1, for distances between supports.

3.16 FLASH ROOF PENETRATIONS

Flash or arrange for roofer to flash all penetrations to NZBC E2/AS1.

For profiled metal roofs, fit proprietary EPDM pipe collar flashings to NZBC E2/AS1, 8.4.12 Roof penetrations, and manufacturer's requirements.

Completion

3.17 REPLACE

Replace damaged or marked elements.

3.18 LEAVE

Leave the whole of this work free of blemishes, undamaged and to the standard of finish required for following procedures.

3.19 REMOVE

Remove debris, unused materials and elements from site.

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7431 DRAINAGE COMMON REQUIREMENTS

1 GENERAL

This section relates to common requirements to do with the supply and laying of gravity subsoil, surface water and foul water drains.

1.1 RELATED WORK

Refer to 7441 GROUNDWATER DRAINAGE for subsoil drainage

Refer to 7451 SURFACE WATER DRAINAGE for storm/surface water drainage
Refer to 7461 FOUL WATER DRAINAGE for waste/foul water drainage

Documents

1.2 DOCUMENTS

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

NZBC E1/AS1	Surface water
NZBC E1/AS2	Surface water
NZBC G13/AS2	Foul water
AS/NZS 3500.3	Plumbing and drainage - Stormwater drainage
NZS 3604	Timber-framed buildings
NZS 4229	Concrete masonry buildings not requiring specific engineering design
WorkSafe	Good Practice Guidelines - Excavation Safety

Plumbers, Gasfitters and Drainlayers Act 2006
Health and Safety at Work Act 2015
Health and Safety at Work (Hazardous Substances) Regulations 2017

Requirements

1.3 QUALIFICATIONS

Drainlayers to be experienced, competent and familiar with the materials and techniques specified. Carry out all work under the direct supervision of a certifying drainlayer under the Plumbers, Gasfitters and Drainlayers Act 2006.

1.4 INFORMATION FOR OPERATION AND MAINTENANCE

Supply maintenance manual information to requirements set out in the general section 1239 OPERATION & MAINTENANCE.

1.5 AS BUILT DOCUMENTS

Supply as-built drawings to requirements set out in the general section 1238 AS BUILT DOCUMENTATION.

Performance

1.6 SITE MEETING

Meet with the territorial authority drainage inspector to confirm the drainage layout in relation to site conditions. Confirm changes resulting and seek written site instruction before carrying out any work.

1.7 CHECK LOCATION

Check the location of existing on and off-site, private and public services with the network utility operator. Follow their requirements for safety and protection where laying drainage.

1.8 SITE CONDITIONS

Before starting work check on site the drainage layout, dimensions, levels and invert levels and ensure that line, level, falls and cover are correct.

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1.9 ADJOINING PROPERTIES

Take precautions to protect adjoining property from damage or risk of damage arising from excavation and drainage work.

1.10 SAFETY

To the Health and Safety at Work Act 2015.

Carry out excavation and trenching to WorkSafe, Good Practice Guidelines - Excavation Safety. Prevent material rolling into trenches.

1.11 EXPLOSIVES

Do not use explosives except with the written approval of the territorial authority / WorkSafe. Comply with their safety requirements and use construction blasters holding a current, appropriate Approved Handler Certificate and Controlled Substance Licence issued by WorkSafe, to the Health and Safety at Work (Hazardous Substances) Regulations 2017.

1.12 TESTS

Using the method agreed with the territorial authority inspector, test and inspect pipelines before backfilling to ensure required acceptance levels are achieved. Test again after backfilling to confirm acceptance levels and for final acceptance of the works.

Refer to RELATED WORK sections for specific requirements.

1.13 RECORDS

Records to be kept of all tests.

2 PRODUCTS

2.1 PRODUCTS

Refer to the RELATED WORK sections for products.

3 EXECUTION

Application

3.1 EXCAVATION

Open not more than 120 metres of trench at any one time. Excavated trench to a minimum width of pipe diameter plus 300mm. Do not batter or cut the trench wider above the top of the pipe.

For deep excavation, trench width to be sufficient to provide safe access and to accommodate shoring to WorkSafe, Good Practice Guidelines - Excavation Safety. Width of bottom of trench up to 300mm above top of pipe to be pipe diameter plus 300mm.
Maintain free of water and free of all falling material.

3.2 TRENCHING - PARALLEL TO FOUNDATIONS TO NZS 3604 OR NZS 4229

Trenches running parallel, below and close to foundations of buildings to NZS 3604 or NZS 4229 to be separated to:

- NZBC E1/AS1, 3.9.7, Proximity of Trench to Building, for stormwater and subsoil drains.
- AS/NZS 3500.3, 6.2.8, Installation near and under buildings, as modified by NZBC E1/AS2.
- NZBC G13/AS2, 5.6, Proximity of Trench to Building, for foul water drains.

3.3 TEMPORARY BRIDGES

Provide temporary bridges over trenches to prevent heavy construction traffic damaging pipes after backfilling.

3.4 CLEAN

Clean and flush out the whole installation and remove all silt and debris before handing over.

Completion

3.5 REPLACE

Replace damaged or marked elements.

3.6 LEAVE

Leave work to the standard required by following procedures.

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3.7 REMOVE

Remove debris, unused materials and elements from the site.

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7441 GROUNDWATER DRAINAGE

1 GENERAL

This section relates to the supply and laying of gravity flow groundwater drains for:

- ground water removal

1.1 RELATED WORK

Refer to 7431 DRAINAGE COMMON REQUIREMENTS for general matters

Refer to 7451 SURFACE WATER DRAINAGE for storm/surface water drainage
Refer to 7461 FOUL WATER DRAINAGE for waste/foul water drainage
Refer to 7462 WASTEWATER TREATMENT SYSTEM for waste water disposal

Documents

1.2 DOCUMENTS

Documents referred to in this and the above sections are:

AS 2439.1	Perforated Plastics Drainage and Effluent Pipes and Fittings - Perforated drainage pipe and associated fittings
AS/NZS 3500.3	Plumbing and drainage - Stormwater drainage
NZS 3111	Methods of test for water and aggregate for concrete
NZS 4402.2	Methods of testing soils for civil engineering purposes - Soil classification tests
NZTA F2	Specification for pipe subsoil drain construction

2 PRODUCTS

Materials

2.1 PERFORATED GROUNDWATER PIPING

Perforated corrugated coil high density polyethylene groundwater drainage pipe to AS 2439.1 with polypropylene geotextile filter sock over.

Accessories

2.2 FILTER FABRIC

Polymeric fabric formed from a plastic yarn or a long chain synthetic polymer composed of at least 85% by weight of propylene, ethylene, amide, ester or vinylidene chloride. Fibres to be rot proof, chemically stable and have low water absorbency.

The filter network, (woven or non-woven) must be dimensionally stable and resistant to delamination.

2.3 DRAINAGE MATERIAL

Free draining crushed stone, 7mm to 20mm in size.

2.4 DRAINAGE MATERIAL - SIMPLE STANDALONE CONCRETE MASONRY RETAINING WALLS

Free draining imported hardfill to the NZTA F2 specification.

Filter material comprised of clean, durable stone having a crushing resistance of not less than 100 kN when tested in accordance with NZS 3111, or a mixture of such material with clean hard sand. The filter material when tested in accordance with NZS 4402.2, shall comply with the following gradings:

TEST SIEVE APERTURE	PERCENTAGE PASSING
26.5mm	100
13.2mm	85-100
9.5mm	80-95
4.75mm	65-85
2.36mm	50-70

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1.18mm	35-55
600µm	18-40
300µm	3-25
150µm	8 maximum
75µm	0

3 EXECUTION

Conditions

3.1 EXISTING DRAINS/SERVICES

Report existence of existing drains/services to the contract administrator for direction.

Application

3.2 HANDLING

Store and handle perforated groundwater drainage piping as per the manufacturer's requirements. Reject any damaged product.

3.3 SETTING OUT

Use string line, boning rod or laser equipment methods.

3.4 APPLICATION GENERALLY

To AS/NZS 3500.3, 6.4 Subsoil Drains.

3.5 FILTER FABRIC TO DRAINAGE MATERIAL

Where details require drainage material to be encapsulated in filter fabric to prevent fines from blocking the aggregate, place fabric and carefully hold in place by pinning and/or by controlled use of aggregate as ballast. After drain installation and required backfilling, complete encapsulation with fabric. Ensure filter fabric is correctly placed, sufficiently overlapped and pinned and/or secured.

3.6 LAY PERFORATED DRAINAGE PIPING TO BASEMENT WALLS

Ensure any required waterproofing and protection sheets are in place before starting work.

Lay perforated groundwater drainage piping with filter sock, firmly on a bed of drainage material screeded to the required gradient. The pipe must not excessively elongate during installation. Lay in straight runs to 1:150 gradients with invert of the highest horizontal point 50mm minimum below floor slab level, discharging into surface water drainage system. Carry drainage material up and over the pipes without disturbing them. Carry the high end of all lines up to the surface in capped, solid pipe to provide for flushing out.

3.7 LAY PERFORATED DRAINAGE PIPING TO RETAINING WALLS

Lay perforated groundwater drainage piping with filter sock, firmly on a bed of drainage metal comprising of filter material to the NZTA F2 specification. Pipe bedding not less than 75mm deep. Backfill not less than 300mm deep. The pipe must not excessively elongate during installation. Lay in straight runs to correct gradients , discharging into surface water drainage system. Carry drainage material up and over the pipes without disturbing them. Place granular fill in layers not exceeding 150 mm thick loose depth, to full height of wall, with an allowance for the thickness of the surface finish. Compact to provide support of not less than that of the adjacent material. Where geocomposite drain is used, the backfill shall follow the manufacturer's recommendations. Carry the high end of all lines up to the surface in capped, solid pipe to provide for flushing out.

3.8 BACKFILLING

Complete backfilling with drainage material.

3.9 CLEAN OUT PIPING INSTALLATION

Clean and flush out the whole piping installation and remove silt and debris before handing over.

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4 SELECTIONS

4.1 PERFORATED DRAINAGE PIPING

Pipe brand/type: DN 110 HDPE
Diameter: 110mm

4.2 DRAINAGE MATERIAL

Type: Free draining crushed stone, 7mm to 20mm in size

4.3 TRENCH BACKFILLING MATERIAL

Type: Free draining crushed stone, 7mm to 20mm in size

4.4 FILTER FABRIC

Required.

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7451 SURFACE WATER DRAINAGE

1 GENERAL

This section relates to below ground, gravity flow stormwater pipework complete with maintenance access and fittings and connected to network utility operators system.

1.1 RELATED WORK

Refer to 7431 DRAINAGE COMMON REQUIREMENTS for general matters

Refer to 7441 GROUNDWATER DRAINAGE for sub-soil drainage
Refer to 7461 FOUL WATER DRAINAGE for waste/foul water drainage

Documents

1.2 DOCUMENTS

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

NZBC E1/AS1	Surface water
NZBC E1/AS2	Surface water
NZBC G13/AS2	Foul water
AS/NZS 1254	PVC-U pipes and fittings for Stormwater and Surface Water applications
AS/NZS 2032	Installation of PVC pipe systems
AS/NZS 2033	Installation of Polyethylene pipe systems
AS/NZS 2566.1	Buried Flexible Pipelines - Structural Design
AS/NZS 2566.2	Buried Flexible Pipelines - Installation
AS/NZS 3500.3	Plumbing and drainage - Stormwater drainage
NZS 3104	Specification for concrete production
AS/NZS 4058	Precast concrete pipe (pressure & non pressure)
NZS 4442	Welded steel pipes and fittings for water, sewage and pressure gas
AS/NZS 4671	Steel reinforcing materials
AS/NZS 5065	Polyethylene and polypropylene pipes and fittings for drainage and sewerage applications

Performance

1.3 TESTING - NZBC E1/AS1

Complete all tests to NZBC E1/AS1, 8.0, Drain Leakage Tests.

1.4 TESTING - AS/NZS 3500.3 & NZBC E1/AS2

Complete all tests to AS/NZS 3500.3 as modified by NZBC E1/AS2.

2 PRODUCTS

Materials

2.1 REINFORCING STEEL

Plain round and/or deformed steel bars, Grade 300 to AS/NZS 4671.

2.2 PVC-U PIPES AND FITTINGS

Unplasticised PVC pipe and fittings to AS/NZS 1254.

Underground PVC-U pipe to comply with AS/NZS 1254 and Classified as follows:

Classification	Use
SN4 - SN6	Domestic & light load areas
SN8 - SN10	Commercial & Industrial medium load areas
SN16	Public roads & high load areas

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2.3 SURFACE WATER SUMPS - NZBC E1/AS1

Precast concrete complete with lift-up cast iron grate and frame to NZBC E1/AS1 3.6, Surface water inlets to drains.

2.4 SURFACE WATER SUMPS - AS/NZS 3500.3 & NZBC E1/AS2

Precast concrete complete with lift-up cast iron grate and frame to AS/NZS 3500.3 as modified by NZBC E1/AS2.

2.5 CHANNEL DRAIN, GRATING AND SUMPS

Proprietary PVC channel or precast concrete drain complete with friction fit grating sections and matching sumps.

2.6 INSPECTION CHAMBERS - NZBC E1/AS1

Circular precast concrete or plastic to NZBC E1/AS1, 3.7, Access for maintenance, complete with removable cast iron lid and frame.

2.7 INSPECTION CHAMBERS - AS/NZS 3500.3 & NZBC E1/AS2

Circular precast concrete or plastic to AS/NZS 3500.3 as modified by NZBC E1/AS2, complete with removable cast iron lid and frame.

Accessories

2.8 BEDDING SURROUND AND FILLING MATERIALS

Granular:	Clean gravel or crushed stone or a blend of these. Particle size from minimum 7mm to maximum 20mm.
Selected:	Fine grain soil or granular material suitable for bedding and excluding topsoil, organic matter and rubbish.
Ordinary:	Top soil or other excavated materials excluding organic matter and rubbish.

2.9 CONCRETE

To NZS 3104.

Prescribed mix 17.5 MPa:	For in situ bases, anchors and pipe surrounds.
Prescribed mix 14 MPa:	For bedding only.

3 EXECUTION

3.1 EXECUTION GENERALLY - NZBC E1/AS1

Carry out this work to NZBC E1/AS1 and complete all tests to E1/AS1, 8.0, Drain Leakage Tests.

3.2 EXECUTION GENERALLY - AS/NZS 3500.3 & NZBC E1/AS2

Carry out this work to AS/NZS 3500.3 as modified by NZBC E1/AS2 and complete all tests to AS/NZS 3500.3, section 9, as modified by NZBC E1/AS2.

Application

3.3 BEDDING - NZBC E1/AS1

Place to NZBC E1/AS1, 3.9, Bedding and backfilling, using compacted granular material to avoid differential settlement and to obtain longitudinal support of the pipe.

3.4 BEDDING - AS/NZS 3500.3 & NZBC E1/AS2

Place to AS/NZS 3500.3 as modified by NZBC E1/AS2, using compacted granular material to avoid differential settlement and to obtain longitudinal support of the pipe.

3.5 SURROUND AND BACKFILL - NZBC E1/AS1

Place to NZBC E1/AS1, 3.9, Bedding and backfilling, using compacted granular material and compacted fill. Compact in layers not exceeding 100mm.

3.6 SURROUND AND BACKFILL - AS/NZS 3500.3 & NZBC E1/AS2

Place to AS/NZS 3500.3 as modified by NZBC E1/AS2, using compacted granular material and compacted fill. Compact in layers not exceeding 100mm.

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3.7 SETTING OUT

Use string line, boning rod or laser equipment methods. Use surveying and levelling equipment to accurately set out design invert levels.

3.8 LAYING AND JOINTING

Lay in straight lines between changes of line or grade from the lower end of the pipeline with sockets pointing uphill, each pipe set true to line and grade and each joint completed before the next pipe is laid. Install PVC Pipes to AS/NZS 2032 or AS/NZS 2566.1 and AS/NZS 2566.2. Install polyethylene Pipes to AS/NZS 2033. To prevent entry of foreign matter cap ends of uncompleted runs each day. Test drains and backfill progressively to minimise site disruption. Concrete cap trenches to all drains with less than 375mm cover.

3.9 LAYING STORM WATER SYSTEM

From the building rainwater system, sealed yard areas and including all access chambers, sumps, bends and junctions, lay the drainage system as detailed to discharge into the network utility operator water system and to their requirements.

3.10 DIFFERENTIAL SETTLEMENT

Provide flexible jointing, bedding and surrounding of pipes at junctions with manholes, foundation walls and other points where differential settlement may occur.

Application - fittings

3.11 CONSTRUCT INSPECTION CHAMBERS - NZBC E1/AS1

Construct as detailed on a poured concrete footing to NZBC E1/AS1, 3.7, Access for maintenance. Provide all necessary haunching to channels.

3.12 CONSTRUCT INSPECTION CHAMBERS - AS/NZS 3500.3 & NZBC E1/AS2

Construct as detailed on a poured concrete footing to AS/NZS 3500.3 as modified by NZBC E1/AS2. Provide all necessary haunching to channels.

3.13 CONSTRUCT SUMPS

Bed in concrete to the manufacturer's recommendations.

3.14 INSTALL CHANNEL DRAIN

Excavate for, provide bedding to fall and install channel drains and sumps complete with grated covers, to the manufacturer's requirements.

Application - connections

3.15 CONNECT TO SURFACE WATER - PUBLIC MAINS

Locate, excavate and expose the existing drain, connect new pipework to existing drain to the requirements of the network utility operator.

3.16 CONNECT TO SURFACE WATER - PUBLIC MAINS ACCESS OR INSPECTION CHAMBER

Locate, excavate and break into the existing chamber, modify as necessary and connect new pipes to the requirements of the network utility operator.

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7461 FOUL WATER DRAINAGE

1 GENERAL

This section relates to below ground, non-pressure foul water pipework complete with all maintenance access and fittings and connected to network utility operator sewers.

1.1 RELATED WORK

Refer to 7431 DRAINAGE COMMON REQUIREMENTS for general matters

Refer to 7421 SANITARY SYSTEMS for above ground pipework
Refer to 7441 GROUNDWATER DRAINAGE for sub-soil drainage
Refer to 7451 SURFACE WATER DRAINAGE for storm/surface water drainage

Documents

1.2 DOCUMENTS

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

NZBC G13/AS2	Foul water - Drainage
NZBC G13/AS3	Foul water - Sanitary plumbing and drainage
AS/NZS 1260	PVC-U pipes and fittings for drain, waste and vent applications
AS/NZS 2032	Installation of PVC pipe systems
AS/NZS 2033	Installation of Polyethylene pipe systems
AS/NZS 2566.1	Buried Flexible Pipelines - Structural Design
AS/NZS 2566.2	Buried Flexible Pipelines - Installation
NZS 3104	Specification for concrete production
AS/NZS 3500.2	Plumbing and drainage - Sanitary plumbing and drainage
AS/NZS 4058	Precast concrete pipe (pressure & non pressure)
NZS 4229	Concrete masonry buildings not requiring specific engineering design
AS/NZS 4671	Steel reinforcing materials
AS/NZS 5065	Polyethylene and polypropylene pipes and fittings for drainage and sewerage applications
BS EN 1124 .1	Pipes and fitting of longitudinally welded stainless steel pipes with spigot and socket for waste water systems. Requirements, testing, quality control.
BS EN 1124 .2	Pipes and fitting of longitudinally welded stainless steel pipes with spigot and socket for waste water systems. System S, forms and dimensions.

Performance

1.3 TESTING

Confirm timing before carrying out any tests. Supply potable water and apparatus needed. Test to NZBC G13/AS2,6.1 Testing or AS/NZS 3500.2, section 15 Testing of Sanitary Plumbing and Sanitary Drainage Installations, as required. Carry out and record a visual inspection that each joint showed no evidence of leaks.

2 PRODUCTS

Materials

2.1 PVC-U PIPES AND FITTINGS

Unplasticised PVC pipe and fittings to AS/NZS 1260, buried pipes classified as follows:

Classification	Use
SN4 - SN6	Domestic & light load areas
SN8 - SN10	Commercial & Industrial medium load areas

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SN16	Public roads & high load areas

2.2 GULLY TRAPS - AS/NZS 3500.2

Gully traps complete with grating to AS/NZS 3500.2, 4.6 Gullies, as modified by NZBC G13/AS3.

2.3 INSPECTION OPENINGS & SMALL CHAMBERS - AS/NZS 3500.2

Circular precast concrete or plastic to AS/NZS 3500.2, 4.7 Inspection Openings and/or 4.8 Inspection Chambers, as modified by NZBC G13/AS3, complete with cast iron lid and frame. All joints watertight (base/pipes, base/riser, riser/riser, riser/lid, lid throat and throat/frame). Use epoxy mortar joints in concrete chambers. Use ring seals in plastic chambers.

Accessories

2.4 TRENCH BACKFILLING MATERIAL - NZBC G13/AS2

Bedding and backfilling material to NZBC G13/AS2, 2.0 Materials, or methods shown in NZBC G13/AS2, figure 7, Bedding and backfilling.

2.5 TRENCH BACKFILLING MATERIAL - AS/NZS 3500.2

Bedding and backfilling material to AS/NZS 3500.2, 5.4, Bedding of drains, and for concrete, if required, AS/NZS 3500.2, 5.3 Concrete Support.

2.6 CONCRETE

To NZS 3104.

Prescribed mix 17.5 MPa:	For in situ bases, anchors and pipe surrounds.
Prescribed mix 14 MPa:	For bedding only.

3 EXECUTION

Conditions

3.1 EXECUTION GENERALLY - AS/NZS 3500.2

Carry out this work to AS/NZS 3500.2 as modified by NZBC G13/AS3 and complete all tests to AS/NZS 3500.2, section 15 Testing of Sanitary Plumbing and Sanitary Drainage Installations.

Bedding, backfilling and encasement

3.2 TRENCH BACKFILLING GENERALLY - FOUL & SURFACE WATER

Granular bedding and selected fill shall be placed in layers no greater than 100 mm loose thickness and compacted. Base bedding (beneath the pipe) shall be placed and compacted before pipes are laid. Up to 300mm above the pipe, compaction shall be by tamping by hand tool over the entire surface of each layer to produce a compact layer without obvious voids, without disturbing or distorting the drain. Run marker tape along line of the pipe on top of the bedding.

More than 300 mm above the pipe, compaction shall be by at least four passes of a mechanical tamping foot compactor (whacker type) with a minimum weight of 75 kg. For plastic based pipes, ensure care taken to avoid impact loading of the pipe.

3.3 FOUL WATER TRENCH BACKFILLING - NZBC G13/AS2

Carry out foul water trench backfilling to NZBC G13/AS2, 5.3 to 5.5 and fig 7.

UPVC pipe to AS/NZS 2032 and polyethylene pipes to AS/NZS 2033.

3.4 FOUL WATER TRENCH BACKFILLING - AS/NZS 3500.2

Carry out foul water trench backfilling to AS/NZS 3500.2, 5.1, 5.2 and 5.5 as modified by NZBC G13/AS3.

UPVC pipe to AS/NZS 2032 and polyethylene pipes to AS/NZS 2033.

3.5 CONCRETE ENCASEMENT

Concrete encase shallow drains and drains under driveways, on a 100mm deep 17.5 MPa concrete bed reinforced with three 10mm mild steel bars. Surround pipes with a polythene membrane to allow movement and encase in 100mm 17.5 MPa concrete.

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Application

3.6 SETTING OUT

Use string line, boning rod or laser equipment methods. Use surveying and levelling equipment to accurately set out design invert levels.

3.7 LAYING AND JOINTING

Lay in straight lines between changes of line or grade from the lower end of the drain with sockets pointing uphill. Set each pipe true to line and grade and each joint completed before the next pipe is laid. Install PVC-U pipes to AS/NZS 2032 or AS/NZS 2566.1 and AS/NZS 2566.2. Install polyethylene Pipes to AS/NZS 2033. Cap ends of uncompleted runs each day to prevent entry of foreign matter. Test drains and backfill progressively to minimise site disruption. Concrete cap trenches to drains with less than 375mm cover.

3.8 LAYING FOUL WATER DRAINS

Lay the drainage system from soil stacks and gully traps, including access chambers, inspection chambers, bends, junction inspections, and vents (fresh air inlets). Discharge into the network utility operator foul water system to their requirements.

3.9 DIFFERENTIAL SETTLEMENT

Provide flexible jointing, bedding and surrounding of pipes at junctions with manholes, foundation walls and other points where differential settlement may occur.

Application - fittings

3.10 CONSTRUCT GULLY TRAPS - AS/NZS 3500.2

Set in a minimum 100mm thick concrete with top surround 25mm above paving and 75mm above other surfaces, to AS/NZS 3500.2, 4.6,Gullies.

3.11 CONSTRUCT SMALL INSPECTION CHAMBERS - AS/NZS 3500.2

Construct as detailed on a poured concrete footing to AS/NZS 3500.2, 4.7 Inspection openings and 4.8 Inspection chambers, as modified by NZBC G13/AS3. Provide all necessary haunching to channels.

Application - connections

3.12 CONNECTION TO FOUL WATER - PUBLIC MAINS

Locate, excavate and expose the existing drain, connect new pipework to existing drain to the requirements of the network utility operator.

3.13 CONNECTION TO FOUL WATER - PUBLIC MAINS ACCESS CHAMBER

Locate, excavate and break into the existing chamber, modify as necessary and connect new pipes to the requirements of the network utility operator.

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7612 RESIDENTIAL EXTRACT SYSTEMS

1 GENERAL

This section relates to the supply and installation of extract systems for residential applications. It includes:

- Kitchen extract systems
- Whole of home MVHR system

1.1 RELATED WORK

Refer to the electrical section(s) for general electrical requirements.

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 provisions for timber-framed buildings up to 10 m in height
NZBC E3/AS1	Internal moisture
NZBC G4/AS1	Ventilation of buildings
NZBC G9/VM1	Electricity

Electricity (Safety) Regulations 2010

1.3 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

2 years	For All components

- 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.

1.4 WARRANTY - INSTALLER/APPLICATOR

Provide an installer/applicator warranty:

2 years	For Installation

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

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.5 CO-ORDINATE WORK

Co-ordinate all items with the main contractor, in particular cutting of penetrations and waterproofing. Exterior penetrations to NZBC E2/AS1 as consistent with the project requirements.

1.6 QUALIFICATIONS GENERALLY

Refer to 1270 CONSTRUCTION for requirements relating to qualifications.

1.7 ELECTRICAL QUALIFICATION

Registered electrician to carry out work to Electricity (Safety) Regulations 2010.

1.8 NO SUBSTITUTIONS

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

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Compliance information

1.9 INFORMATION REQUIRED FOR CODE COMPLIANCE

Provide the following compliance documentation:

- Manufacturer, importers or distributors warranty
- Installer warranty
- Other information required by the BCA in the Building Consent Approval documents.

2 PRODUCTS

Kitchen extract systems

2.1 MECHANICAL VENTILATION WITH HEAT RECOVERY (MVHR)

Refer to attached Steibel Eltron Design and product Data

Kitchen extract systems

2.2 KITCHEN RANGEHOOD EXTRACT - TO EXTERIOR WALL / SOFFIT

Mechanical rangehood extract system comprised of rangehood canopy, extract fan, filters, lighting, controls, metal ducting, solid duct wall sleeve, exterior grille and weatherproof cowl.

Refer to SELECTIONS for options.

Bathroom and laundry extract systems

2.3 WALL MOUNTED FAN, DUCTED TO EXTERIOR WALL / SOFFIT

Mechanical fan ducted system comprised of wall fan, solid duct sleeve sloped to remove condensation, exterior weatherproof grille and flashing.

Refer to SELECTIONS for options.

Component

2.4 ELECTRICAL FAN SWITCH

Independent switch connected to socket outlet located near fan / unit.

Refer to SELECTIONS for run on timer requirements.

3 EXECUTION

Conditions

3.1 DELIVERY, STORAGE & HANDLING OF PRODUCTS

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

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.

Installation - mechanical ventilation

3.3 INSTALL KITCHEN RANGEHOOD

Install rangehood to NZBC G9/VM1 and manufacturer installation instructions. Connect unit with ducting to exit either through roof or exterior wall / soffit. Plug into electrical socket.

3.4 INSTALL BATHROOM / TOILET / LAUNDRY EXTRACT FANS

Install exterior ducted fans to manufacturer requirements to NZBC G9/VM1 and NZBC G4/AS1. Duct through to roof or exterior wall / soffit. Plug into electrical socket.

3.5 INSULATION CLEARANCE

Provide 50mm clearance between insulation and motor unit / electrical enclosure. Insulation can abut ducts.

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3.6 ELECTRICAL INSTALLATION

Install switch and socket outlets to NZBC G9/VM1. Refer to electrical section(s) for requirements.

Completion & commissioning

3.7 COMPLETION MATTERS

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

3.8 COMPLETION - TESTS & CERTIFICATION

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

3.9 COMMISSIONING - TESTS & CERTIFICATION

Refer to 1270 CONSTRUCTION for general test and certification requirements for commissioning.

3.10 AIRTIGHTNESS TESTING

Upon completion of the project, as a minimum, airtightness testing shall be completed as per Method 1, per ISO 9972.

Target Airtightness is 3 ac/h

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7673 SPLIT UNIT HEAT PUMP SYSTEMS

1 GENERAL

This section relates to heat pump air conditioning 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:

L10 :	Centile Level, sound level that is equalled or exceeded for 10% of the time.
HFC:	Hydro-fluorocarbon
mm Hg:	mm mercury - unit of pressure
NIWA	National Institute of Water and Atmospheric Research
ASHRAE	American Society of Heating and Air Conditioning Engineers
IRHACE	Institute of Refrigeration, Heating and Air Conditioning Engineers

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 provisions for timber-framed buildings up to 10 m in height
NZBC G4/AS1	Ventilation of buildings
AS 1324.2	Air filters for use in general ventilation and air conditioning - methods of test
AS 1397	Continuous hot-dip metallic coated steel sheet and strip - Coatings of zinc and zinc alloyed with aluminium and magnesium
AS/NZS 1571	Copper - seamless tubes for air conditioning and refrigeration
AS/NZS 2107	Acoustics - Recommended design sound levels and reverberation times for building interiors
AS/NZS 3666.1	Air handling and water systems of buildings - Microbial control - Design, installation and commissioning
AS/NZS 3823.1.1	Performance of electrical appliances - Airconditioners and heat pumps - Part 1.1: Non-ducted airconditioners and heat pumps - Testing and rating for performance
AS/NZS 3823.1.2	Performance of electrical appliances - Airconditioners and heat pumps - Part 1.2: Ducted airconditioners and air-to-air heat pumps - Testing and rating for performance
AS/NZS 3823.2	Performance of electrical appliances - Air conditioners and heat pumps - Energy labelling and minimum energy performance standard (MEPS) requirements
AS 4254.1	Ductwork for air handling systems in buildings - Flexible duct
NZS 4303	Ventilation for acceptable indoor air quality
AIRAH DA9, ASHRAE or Carrier	Manual calculation methods
ACADS-BSG Camel, Carrier E20	Electronic calculation methods

Warranties

1.3 WARRANTY - INSTALLER/APPLICATOR

Installer's warranty for the system under normal environmental and use conditions against failure.

1 years	Execution warranty

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Provide this warranty on the installer's standard form.

1.4 WARRANTY - MANUFACTURER/SUPPLIER

Manufacturer's warranty for the system under normal environmental and use conditions against failure.

7 years: Warranty

Provide this warranty on the manufacturer's standard form.

Requirements

1.5 CO-ORDINATE WORK

Co-ordinate all items with the main contractor, in particular cutting of penetrations and waterproofing. Exterior penetrations to NZBC E2/AS1 as consistent with the project requirements.

1.6 DRAWINGS AND BROCHURES

Submit, on request for review drawings and brochures of units, grilles and any other elements that affect the interior finishes.

1.7 QUALIFICATIONS

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

Handling or recovering refrigerant to be carried out by the appropriate Approved Filler and/or Handler, with a test certificate under the HNSO Act.

1.8 AIR CONDITIONING LOAD CALCULATIONS

General: Calculate the cooling and heating loads using one of the following:

- Manual methods: AIRAH DA9, ASHRAE or Carrier.
- Electronic methods: ACADS-BSG Camel, or Carrier E20

1.9 AIR CONDITIONING DESIGN BASIS

General

Outside design conditions: Use outdoor design conditions listed in publications from NIWA, ASHRAE, IRHACE or other reliable sources for weather data, for the location geographically closest and most relevant to the site.

Inside design conditions

Summer: 22°C dry bulb, 50% relative humidity.
Winter: 21°C dry bulb.
Limit the temperature difference in air conditioned spaces served by the same zone or system to ± 1.5°C when measured:

- Between any 2 points in the space from floor level to 1500mm above floor level, > 2000mm from cooking equipment and > 1000mm from any other appliance.
- When outside conditions are in the range specified above.
- After the plant has been operating for one hour.
- In the same 5 minute period.

Divide the systems into temperature controlled zones to meet the specified permissible temperature variation and documented system divisions.
Where ventilation requirements are not met by natural means and do not comply with NZBC G4/AS1, supply fresh air to spaces with air conditioning systems via the air handling system, or separate mechanical ventilation system in accordance with NZS 4303.

Heating

Reverse cycle.

Noise

Indoor noise emitted - to AS/NZS 2107, depending on space served, occupancy and activity.

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Noise received in all habitable rooms shall not exceed that permitted by the applicable Territorial Authority for the time of day or day of the week for the zoning of the site. Not more than L10: 35dbA between 2300 and 0700 hours. This shall apply to both the property in question and the neighbouring properties.

1.10 SHOP DRAWINGS

Refer to the general section 1235 SHOP DRAWINGS for the requirements for submission and review and the provision of final shop drawings.

Provide shop drawings to show the general arrangement including, but not be limited to:

- general location and layout drawings, and installation details of units, pipes, ducts and grilles.

1.11 INFORMATION FOR OPERATION AND MAINTENANCE

Provide the following general operation and maintenance information as electronic PDF format documents:

All units, filters, controls, pumps, traps, drain trays, refrigerant

1.12 MAINTENANCE CONTRACT PROPOSAL

Provide a proposed contract for the ongoing servicing of the heat pump system. Refer to SELECTIONS.

2 PRODUCTS

Material

2.1 REVERSE CYCLE UNITS

Split system heat pumps shall meet the requirements of AS/NZS 3823.1.1 and AS/NZS 3823.1.2 with minimum energy performance standards (MEPS) in accordance with AS/NZS 3823.2.

Provide effective outdoor coil defrost facility that prevents room temperature dropping more than 2°C during defrost.

2.2 CABINETS

Aluminium, powder coated steel or moulded acrylonitrile-butadiene-styrene (ABS) plastic with zinc - coated steel or stainless steel fasteners. Insulate and vapour seal cabinet and drain trays to prevent external condensation under all operating conditions.

2.3 DRAIN TRAYS

Aluminium, stainless steel or plastic to collect all moisture inside indoor and outdoor units.

2.4 FILTERS

Washable panel type.(85% of arrestance when tested to AS 1324.2, Test Dust No.4 or Class EU2 rated.

2.5 COILS

Copper tube with aluminium plate fins.

2.6 CONTROLS

Provide as a minimum the following functions:

- Temperature control for each zone located to accurately sense zone temperature.
- Fan speed selection for multi and variable speed fans.
- Day/night zone changeover if scheduled.
- Time switch for each system with (6 temperature programs per day, separate programs for each day of the week, manual set point over ride and 'Vacation' or 'Holiday' temperature set back.

2.7 REFRIGERATION PIPEWORK KIT

Split system manufacturer's standard pre-charged piping kit.

2.8 REFRIGERATION PIPEWORK CUSTOM

Copper tubing, de-oxidised seamless refrigeration quality, either half hard or soft drawn. Jointing shall be brazed or flared connections to equipment.

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2.9 REFRIGERANT

Refrigerant HFC type with no phase out date, such as R410a or R407a, unless approved otherwise.

3 EXECUTION

Conditions

3.1 DELIVERY

Keep materials and equipment dry in transit. Take delivery of materials and equipment in an undamaged condition. Reject all damaged materials.

3.2 STORAGE

Store materials and accessories on a level, firm base, in dry conditions, out of direct sunlight and completely protected from weather and damage. Ensure storage areas are away from current work areas. Cover to keep dry until installed.

3.3 CONFIRM LAYOUT

Before commencing work confirm the proposed location of pipes, ducts and controls.

3.4 CONCEALED PIPING

All refrigeration and condensate piping shall be concealed within the building structure unless stated otherwise.

3.5 CO-ORDINATE SERVICES

Co-ordinate and co-operate with other sub-trades to avoid any conflict with the installation of the system with other subcontractors work.

3.6 PROTECT SURFACES

Protect surfaces, equipment and finishes already in place from the possibility of damage during the installation process.

Application

3.7 INSTALLATION PIPE WORK

Install general pipe work to AS/NZS 1571

Purge the system at all times with dry nitrogen when brazing or heating pipework.

Pipes to be installed to manufacturer's requirements, adequately supported, also arranged and sized to prevent excessive pressure drop and ensure correct circulation of refrigerant and oil.

All refrigeration pipework test to 1800 kPa.

Insulate all refrigerant and drain piping that may sweat with chemically blown closed cell elastomeric insulation. Suction lines are to be insulated over the entire length between connections to indoor and outdoor units. Protect insulation from sunlight and mechanical damage.
Insulation thickness: 13mm for pipes < DN 20, 19mm otherwise.

Provide trapped (DN 20 condensate drains to AS/NZS 3666.1 from each indoor coil and safety tray, to an approved drain point. Provide drains from each reverse cycle outdoor coil unless casing freely drains to a roof or other location where condensate will not cause damage or pond.

3.8 INSTALLATION UNIT

Provide clearance around outdoor units for condenser air flow and maintenance access, to manufacturer's requirements. Ensure discharge air does not short-circuit to condenser intake.

For equipment at ground level, ensure they are mounted on 100mm level concrete plinth or equivalent impervious material.
Provide internal or external flexible duct connections at indoor unit.

For vibration isolation of suspended units, provide (4 metal spring or rubber-in - shear isolation mountings with (25mm static deflection and 98% isolation efficiency. For floor mounted units, provide neoprene waffle pads. Bolt in place.

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If leaks or condensation from equipment could cause nuisance or damage to the building or its contents provide a galvanized steel safety tray under the equipment.

3.9 INSTALLATION REFRIGERANT

The completed system including all pipework, to be evacuated to 0.2mm Hg or better with a vacuum pump and maintained at this pressure for 2 hours, then broken with refrigerant.

Completion

3.10 COMMISSIONING

Commission the systems to manufacturer's recommendations using instruments calibrated in the last 12 months. Submit signed commissioning check list on completion.

3.11 CLEANING

Clean filters, outdoor coils, grilles and diffusers.

Remove debris, unused materials and elements from the site. Clean soiled or marked work. Replace damaged, cracked or marked elements. Leave the whole of this work to the standard required by following procedures.

3.12 PROTECT

Protect new work from damage.

4 SELECTIONS

4.1 SPLIT UNIT HEAT PUMP MANUFACTURER / MODEL

Manufacturer:	Rinnai
Indoor Unit Model:	Varies - refer to attached Rinnai Design
Outdoor Unit Model:	Varies - refer to attached Rinnai Design

4.2 MAINTENANCE CONTRACT PROPOSAL

Contract to commence from:	Commissioning
Contract period:	1 year

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7702 ELECTRICAL STANDARD

1 GENERAL

This section relates to the wiring for complex/large residential and medium scale commercial/industrial installations, including:

- supply - national grid
- distribution & protection
- switches & sockets
- lighting circuits - residential
- light fittings
- exterior light fittings, switches, & sockets
- alarms - residential
- heating systems
- mechanical
- electrical automation system
- security system
- fire rated sealers and liners
- fire rated 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
COC	Certificate of Compliance
ELV	Extra Low Voltage
ESC	Electrical Safety Certificate
IP	International (ingress) Protection classification
MCB	Miniature Circuit Breaker
NUO	Network Utility Operator
PCB	Printed Circuit Board
PIR	Passive InfraRed
RCCB	Residential Current operated Circuit-Breakers with integral overcurrent protection for household and similar uses
RCD	Residual Current Device
SIA	Security Integration Architecture
TCF	Telecommunications Carriers' Forum
FFL	Finished Floor Level

Documents

1.2 DOCUMENTS

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

NZBC B1/VM1	Sructural design of buildings
NZBC E2/AS1	External moisture provisions for timber-framed buildings up to 10 m in height
NZBC F6/AS1	Visibility in escape routes
NZBC F8/AS1	Signs
NZBC G4/AS1	Ventilation of buildings
NZBC G9/AS1	Electricity
AS/NZS 1125	Conductors in insulated electric cables and flexible cord
AS/NZS 1768	Lightning protection
AS/NZS 2053	Conduits and fittings for electrical installations - series
AS/NZS 2201.1	Intruder alarm systems - Client's premises - Design, installation, commissioning and maintenance

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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 2648.1	Underground marking tape - Non-detectable tape
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 3105	Approval and test specification - Electrical portable outlet devices
AS/NZS 3111	Approval and test specification - Miniature overcurrent circuit-breakers
AS/NZS 3112:2017	Approval and test specification - Plugs and socket-outlets
AS/NZS 3113	Approval and test specification - Ceiling roses
AS/NZS 3123	Approval and test specification - Plugs, socket-outlets and couplers for general industrial application
AS/NZS 3131	Approval and test specification - Plugs and socket-outlets for stationary appliances
AS/NZS 3199	Approval and test specification — Cord extension sets
NZS 3604	Timber framed buildings
NZS 4219	Seismic performance of engineering systems in buildings
NZS 4246	Energy efficiency - installing bulk thermal insulation in residential buildings
AS/NZS 5000.2	Electric cables - Polymeric insulated - for working voltages up to and including 450/750v
AS/NZS 60898	Electrical accessories - Circuit-breakers for overcurrent protection for household and similar installations - Series
AS/NZS 61386	Conduit systems for cable management - Series
AS/NZS 61439.1	Low-voltage switchgear and controlgear assemblies - Part 1: General rules.
AS/NZS 61439.3	Low-voltage switchgear and controlgear assemblies - Part 3: Distribution boards intended to be operated by ordinary persons (DBO).
IEC 60309	Plugs, socket-outlets and couplers for industrial purposes
IEC 61008.1	Residual current operated circuit-breakers without integral overcurrent protection for household and similar uses (RCCBs) - Part 1: General rules
IEC 61009.1	Residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCBOs) - Part 1: General rules
IEC 61643	Low-voltage surge protective devices
IEC 62423	Type F and type B residual current operated circuit-breakers with and without integral overcurrent protection for household and similar uses
IEC 62606	General requirements for arc fault detection devices

Electricity (Safety) Regulations 2010
NZ Telecommunications Forum (TCF) Premises Wiring Guidelines

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

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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 Guidelines for listed and prescribed work and with the utility network operator requirements. Apply for the service connection. Arrange for the required inspections of listed work. Pay all fees.

1.5 QUALIFICATIONS WORKER - LICENSED UNDER STATUTE

Electrical workers holding a current Practising Licence (with an appropriate Registration class) to carry out prescribed electrical work. An Electrical Worker who holds a Trainee Limited Certificate or a Limited Certificate to be supervised by a licensed electrical worker with an appropriate Registration class. Refer to 1270 CONSTRUCTION for additional requirements relating to qualifications.

1.6 CONFIRM SELECTIONS

Confirm selections of all outlet fittings and hardware with the owner in writing before ordering.

1.7 ELECTRICAL CERTIFICATE OF COMPLIANCE

At the completion of electrical work provide a Certificate of Compliance (CoC) to Electricity (Safety) Regulations 2010, regulation 65-67. Provide a copy to the Contract Administrator and NUO prior to connection and when required to the BCA for Code Compliance.

- 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 Electricity (Safety) Regulations 2010, regulation 70 High-risk prescribed electrical work to be inspected.

1.8 ELECTRICAL SAFETY CERTIFICATE

Provide an Electrical Safety Certificate (ESC), as required by the Electricity (Safety) Regulations 2010, Reg 74A, to the Contract Administrator and when required the BCA. To be provided no later than 20 working days after connection and prior to Practical Completion.

1.9 COMPLIANCE SCHEDULES - SPECIFIED SYSTEMS

For specified systems, provide all requested information for completion of compliance schedules to the satisfaction of the building consent authority.

2 PRODUCTS

Supply, distribution, and protection

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 PROPRIETARY CABLE SUPPORT SYSTEMS

Proprietary galvanized steel or aluminium cable trays / cable ladder systems complete with all required supports, fixings, bends, risers, curves etc to support cables to AS/NZS 3000, 3.9.3 Support and fixing. Size 20% over width for designed cable loading including spaces between to avoid de-rating cables. Refer to SELECTIONS.

2.3 UNDERGROUND CONDUIT

For underground wiring, conduit to requirements of AS/NZS 3000, 3.11 Underground Wiring Systems, and AS/NZS 2053 series or AS/NZS 61386 series. Fittings and accessories brand matched to the conduit manufacturer requirements.

2.4 CONDUIT

To requirements of AS/NZS 3000, 3.10.2 Wiring enclosures and AS/NZS 2053 series or AS/NZS 61386 series. Fittings and accessories brand matched to the conduit manufacturer requirements.

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2.5 CABLES

Tough plastic sheathed copper conductors to AS/NZS 5000.2, stranded above 1.0mm², and to AS/NZS 3008.1.2. Minimum sizes as below. Increase sizes if the method of installation, thermal insulation, cable length or load will reduce the cable rating below that of the MCB rating, or produce an excessive Voltage drop.

Lighting circuits:	Domestic: 1.5mm² on 10 amp MCBs
Lighting circuits:	Commercial: 1.5mm² on 16 amp MCBs
Power circuits:	2.5mm² on 16 amp MCBs for domestic and unenclosed or unfilled cavity construction
	2.5mm² on 16 amp MCBs for domestic insulated construction, or filled cavity
	2.5mm² on 20 amp MCBs for unenclosed or unfilled cavity construction
	2.5mm² on 16 amp MCBs for insulated construction, or filled cavity, or lengths over 30 metres
Hot water cylinder circuits:	Single phase: 2.5mm² on 20 amp MCBs
Range/oven/hob circuits:	Single phase: 6mm² high temperature cable on 32 amp MCBs

Heat resistant cable for final connections to all heated appliances, and high temperature cable in ambient conditions that may be above 35°C (roof spaces above insulation etc).

2.6 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.

Refer to SELECTIONS

2.7 SWITCHBOARDS - GENERAL

General arrangement, door access, and signage to comply with AS/NZS 3000, 2.10 Switchboards.

2.8 SWITCHBOARD - RESIDENTIAL

Distribution Boards (DBO), manufactured to AS/NZS 61439.3 and installed in accordance with AS/NZS 3000, 2.10 Switchboards. Complete with neutral and earth busbars, and insulated comb phase bar. Distribution Boards to have 20% spare capacity for future additions and alterations. Refer to SELECTIONS

2.9 CIRCUIT PROTECTION

General requirements including main switch to AS/NZS 3000, 2.3.3 Main Switches & 2.3.4 Additional Isolating Switches, including for outbuildings, subcircuits greater than 100A, alternative supply and some appliances.

Residual current protection, maximum sensitivity of 30mA, to AS/NZS 3000, 2.6 Additional Protection by Residual Current Devices, as modified by Electricity (Safety) Regulations 2010. RCD and RCCBs' to meet Type A to IEC 61009.1 / IEC 61008.1 or Type F or Type B RCD to IEC 62423.

Miniature Circuit Breakers (MCB) to AS/NZS 60898 series or AS/NZS 3111, 4.5kA domestic or 6kA for commercial.

2.10 CIRCUIT PROTECTION - ARC FAULT DETECTION DEVICES

Arch Fault Detection Devices (AFDD) to IEC 62606 and AS/NZS 3000, 2.9 Protection against fire hazard due to Arching Faults. Provide to all final subcircuits not exceeding 20A.

2.11 SURGE PROTECTION

Provide surge protection device(s) to AS/NZS 3000, Appendix F Surge Protection Devices. 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 DEGREES OF PROTECTION - DAMP CONDITIONS

For electrical equipment installed in classified zones (baths, showers, and other fixed water containers), provide a degree of protection to AS/NZS 3000, clause 6.2.4.1.

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Zone 0	IPX7
Zones 1 and 2	IPX4
Zone 3	no specific degree of protection

Refer to AS/NZS 3000, Table 6.1 for requirement for selection and installation of electrical equipment.

For other damp situations such pools, water features, saunas, refrigeration rooms and in areas used for sanitization or general hosing-down operations, refer to AS/NZS 3000, section 6 for required degree of protection.

Switches & sockets

2.13 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.

2.14 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.

2.15 SWITCH PANELS

To accommodate switches to separate circuits and phases and flush mounted within a metal wall box with selected colour powder coated flush plate 2.5mm thick. Switches individually secured within a mounting plate behind the flush plate. Engrave the flush plate to indicate the use of each switch. Permanently label circuit numbers on back of plate.

2.16 SWITCHED SOCKET-OUTLETS - GENERAL

To AS/NZS 3000, 4.4 Socket-Outlets, 10 amp minimum, 230 Volt a.c., flat 3 pin socket outlets fitted with safety shutters to AS/NZS 3112 clause 3.12 as modified by Electricity (Safety) Regulation. Socket-outlet manufactured, tested, and approved to AS/NZS 3112, and AS/NZS 3100. Single or multi-gang as detailed.

For mounting height and orientation, refer to SELECTIONS.

2.17 SWITCHED SOCKET-OUTLETS - INDUSTRIAL/NON-RESIDENTIAL

Socket outlets manufactured, tested, and approved to AS/NZS 3123, and AS/NZS 3100.

For mounting height and orientation, refer to SELECTIONS.

2.18 SWITCHED SOCKET-OUTLETS - STATIONARY APPLIANCES

To AS/NZS 3000, 4.4 Socket-Outlets, manufactured to AS/NZS 3100, safety and testing requirements to AS/NZS 3131.

For mounting height and orientation, refer to SELECTIONS.

2.19 HOT WATER SYSTEM SWITCH

To AS/NZS 3000, 4.8.2 Water heaters, with one way 20 amp switch complete with cable clamp for flexible PVC conduit to element enclosure.

Lighting subcircuits

2.20 LIGHTING SUBCIRCUITS - RESIDENTIAL

Combination fan, light and heater unit, smoke alarms, exhaust and ceiling sweep fans, are included in residential lighting subcircuits with additional protection by RCD to AS/NZS 3000, clause 2.6.3.3.1.

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Light fittings - interior

2.21 LIGHT FITTINGS

To AS/NZS 3000, 4.5 Lighting Equipment and Accessories and if required, complete with lamps and, if required, transformer and control gear for dimming. Refer to SELECTIONS.

2.22 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 SELECTIONS.

Switches & sockets - exterior

2.23 SWITCHES & SOCKETS - EXTERIOR

Exterior grade, 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. Refer to SELECTIONS.

Light fittings - exterior

2.24 LIGHT FITTINGS - EXTERIOR

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

Refer to SELECTIONS.

Alarms

2.25 FIRE & SMOKE ALARM SYSTEM

Refer to SELECTIONS.

Electrical appliances

2.26 HEATED TOWEL RAILS

Fixed wired heated towel warmers, IPX4 splash-proof, compliant with Electrical (Safety) Regulations, Schedule 4, 1 Household & similar appliances. Refer to SELECTIONS. Refer to SELECTIONS.

Mechanical

2.27 SUPPLY AND EXHAUST FANS

Ceiling, wall or duct mounted supply/exhaust fans for ventilation to NZBC G4/AS1 and compliant with Electrical (Safety) Regulations 2010, Schedule 4, 1 Household & similar appliances. Refer to SELECTIONS.

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.

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3.3 CONNECTIONS TO ELECTRICAL EQUIPMENT

To AS/NZS 3000, Section 4.3 Connection of Electrical Equipment and to manufacturer's requirements. Connections between installation wiring and electrical equipment must be as close as practicable, and protected against mechanical damage or interference. Electrical accessories to AS/NZS 3105, AS/NZS 3122, or AS/NZS 3199 are not permitted for use connecting equipment wiring to installation wiring, where the location is not readily accessible.

Installation

3.4 STANDARDS AND TOLERANCES

Refer to the general section 1270 CONSTRUCTION for general requirements.

3.5 MAINS SUPPLY

Lay underground mains to the NUO requirements and AS/NZS 3000, 3.11 Underground Wiring Systems requirements. Excavate trench to ensure minimum depth of cover to AS/NZS 3000 Table 3.6 Under-Ground Wiring Systems - Minimum Depth of Cover, install cable and marker tape complying with AS/NZS 2648.1 and backfill. If required, provide permanent cable marker signs to indicate the point where a cable enters or leaves a structure.

3.6 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, Figure 9.1.8.3B: General meterbox and similar penetrations. Arrange for meter installation and connection.

3.7 SWITCHBOARD

2.10 Switchboards Location and installation to AS/NZS 3000, 2.10 Switchboards and board manufacturer requirements. Recess into wall, surface or floor mount plumb and level. Ensure fire containment properties of the enclosure are maintained.

3.8 CIRCUIT PROTECTION

Install MCBs at switchboard to AS/NZS 3000 to protect each final sub circuit.

3.9 EARTHING CONDUCTIVE STRUCTURE & MATERIALS

Earth all at risk structural metalwork and conductive building materials to AS/NZS 3000, 5.4.6, and the Electricity (Safety) Regulations 2010.

If they form part of the building, this includes:

- Structural steel frames or members
- Light steel framing
- Exposed conductive materials, like metal sink/tub or vanity benches etc, with attached electrical units or equipment

3.10 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.

3.11 MAIN EARTH

Install main earthing conductor to AS/NZS 3000, 5.5.1 Main Earthing conductor. Provide a plastic toby box to contain and protect the earth electrode. Fix the connecting earth wiring closely and securely against wall surfaces.

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3.12 EARTH LEAKAGE PROTECTION

Install RCD protection to AS/NZS 3000, 2.6 Additional Protection by Residual Current Devices, as modified by the Electricity (Safety) Regulations 2010.

3.13 RCD - RESIDENTIAL INSTALLATIONS

Install 30mA RCD protection at the switchboard for all final sub circuits to control outlets (except for fixed or stationary cooking equipment), lighting & directly connected handheld electrical equipment, to AS/NZS 3000, 2.6.3.3.1 Residential installations - New Zealand only.

3.14 RCD - DAMP SITUATIONS

Install 30-mA RCD protection as required to AS/NZS 3000, section 6 for damp situations, including in the following higher risk areas:

- Wet areas: bathrooms, laundries, kitchens.
- Near pools and water features.
- Where intended for use with cleaning equipment.

3.15 SET-OUT - OUTLETS & EQUIPMENT

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.

3.16 CABLING

Install wiring systems to AS/NZS 3000, Section 3 Selection and Installation of Wiring Systems. All cabling to run concealed (or in cable ladders / trays) fix in position by suitable clips, saddles or clamps. Where possible, run cabling horizontally / vertically in straight line.

Locate holes in timber framing for the passage of cables at the centre line of the member, ensuring structural strength in maintained to NZS 3604 requirements. In steel studs/ structural steel, ensure aperture is brushed and shaped to minimize abrasion of cable. Cables may be supported by suspended ceiling systems unless not permitted by suspended ceiling manufacturer. Install cable in conduits where required to pass through concrete or underground.

3.17 CABLING CIRCUITS

Install all circuits with the appropriately rated cable and circuit protection. Install with a maximum of, 8 light switch units or 8 amps, or 4 double or single switched socket-outlets, on any circuit. Minimum 2 lighting circuits per domestic floor. Separate circuits for all electric heating appliances. Kitchen sockets to be on at least two different circuits. Dedicated circuits for security systems, fire panels, data panels etc.

3.18 PROTECTION OF CABLING NEAR BUILDING SURFACES

Protect concealed wiring to AS/NZS 3000, 3.9.4 Protection against mechanical damage, where wiring is fixed in position by fastening or held in position by thermal insulation or passes through an opening in a structural member and they are located within 50mm form the surface of a wall, roof, ceiling or floor.

3.19 WALL BOXES

Mount flush in cavity construction size to fit products selected. Fix vertically mounted wall boxes to studs. Screw fix horizontally mounted switched socket outlet wall boxes to solid blocking or nogs. Fix switch panel wall boxes to solid blocking.

3.20 SWITCHES AND SOCKET-OUTLETS

Fit all switch units and socket-outlets to the manufacturer requirements with heights and mounting directions as indicated in SELECTIONS.

3.21 PERMANENTLY CONNECTED EQUIPMENT

Supply and set into position. Install an isolating switch of the correct current rating, weatherproof flush mounted in a metal wall box, flush plate or protected type surface mounted to suit the location, with conductors between conduit and equipment enclosed in PVC flexible conduit.

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3.22 ISOLATING SWITCHES

Locate isolating switches in positions as confirmed by the Contract Administrator, when not specifically shown on the drawings.

Installation - lighting

3.23 LIGHT FITTINGS - GENERALLY

Install light fittings in locations and at heights as confirmed by the Contract Administrator, when not specifically shown on the drawings. Install to the luminaire manufacturer's requirements and to AS/NZS 3000, in correct orientation for light output, complete with lamps. Fix through linings to structure or framing, provide additional nogs, trim and packing if required. Ensure transformers/drivers and luminaires are adequately ventilated and clear of any building elements, to AS/NZS 3000.

3.24 EXTRA-LOW VOLTAGE LIGHTING

Install extra-low voltage lighting to AS/NZS 3000, 7.5 Extra-Low Voltage Electrical Installations and fitting manufacturer's requirements. 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.

3.25 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, rigid Polyiso foam, 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.

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3.26 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.

3.27 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.

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3.28 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	Manufacturers 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

3.29 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.

3.30 ELECTRIC HOT WATER SYSTEM

Install to AS/NZS 3000, 4.8.2 Water heaters and to manufacturer's requirements 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 7123 HOT AND COLD WATER SYSTEMS section.

3.31 SPACE HEATERS

Install to AS/NZS 3000, 4.9 Room Heaters and to the heater manufacturer requirements. 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. Isolation switch shall be provided adjacent to entrance of room or area the heating system is located or installed in switchboard.

3.32 AIR CONDITIONING & HEAT PUMP SYSTEMS

Connect to electricity supply to manufacturer's requirements and to AS/NZS 3000, 4.19 Air Conditioning & Heat Pump Systems. Any system incorporating a compressor shall be provided with a lockable isolating switch installed adjacent to the unit.

3.33 COOKING APPLIANCES

Install cooking appliances to AS/NZS 3000, 4.7 Cooking appliances and manufacturer's requirements. Provide a switching device to all cooking appliances that have an open cooking surface such as a hob in a visible and accessible position within 2m of appliance, but not in prohibited location, refer to Figure 4.17.

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3.34 ELECTRIC FIXTURES

Install all electrical fixtures and connect to AS/NZS 3000 and manufacturers requirements. If required, provide operating or isolating switches.

3.35 EV CHARGING STATIONS

Connect EV charging station to electricity supply to manufacturer's requirements and to AS/NZS 3000, 7.9 Supplied for Electric Vehicles. Install a 30mA RCD Type B for Mode 3 EV car charger circuits for domestic applications and for all EV car charging circuits in other electrical installations. Refer to relevant 7765 ELECTRIC VEHICLE (EV) CHARGING STATIONS for supply and fittings of charging station.

3.36 BATHROOM ELECTRICAL FIXTURES

Install all electrical fixtures. Connect the following bathroom and toilet electrical items:

Heated towel rails:	Install to manufacturer 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.
Hair dryers:	Install to manufacturer requirements.
Hand dryers:	Install to manufacturer requirements.

3.37 OUTDOOR/EXTERIOR SERVICES

Provide circuits and connections for exterior installations, including ELV 12/24 Volt path lighting and electronic irrigation systems, in accordance with AS/NZS 3000 and the fixture/fitting manufacturer's recommendations.

Where underground, ensure appropriate protection, such as thickness of sheathing, conduit, depth of cabling, and proximity to other services to AS/NZS 3000, 3.11 Underground Wiring Systems.

Use the appropriate rated fittings for power control and power supply. Weather protected switches and sockets to IP56 minimum. 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.

3.38 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.

3.39 SEISMIC RESTRAINT

Seismically restrain electrical service equipment, including recessed light fittings, switchboards, cabinets, machinery and racks to NZBC B1/VM1, 4.3.1.1 and NZS 4219.

Completion & Commissioning

3.40 COMPLETION MATTERS

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

3.41 COMPLETION - TESTS & CERTIFICATION

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

Testing:	To Electricity (Safety) Regulations 2010 and AS/NZS 3000, 8.3 testing
Certificate of Compliance:	To Electricity (Safety) Regulations 2010; Verification Records to AS/NZS 3000, clause 8.4 - to be available at or on main switchboard

3.42 COMMISSIONING - TESTS & CERTIFICATION

Refer to 1270 CONSTRUCTION for general test and certification requirements for commissioning.

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Certificate of Compliance:	To Electricity (Safety) Regulations 2010; Verification Records to AS/NZS 3000, clause 8.4.

4 SELECTIONS

Materials

4.1 SELECTIONS - FITTINGS AND HARDWARE

Confirm selections of all outlet fittings and hardware with the owner in writing before ordering.

4.2 METER BOX

Location:	TBD - electrician to discuss with client
Brand / type:	ABS plastic box

4.3 SWITCHBOARD

Location:	Services Wall
Brand / type:	DBF surface mounted

Switch & socket-outlets - fittings

4.4 SWITCHES & SOCKET-OUTLETS - INTERIOR

- Item	Height to centre of unit	Orientation	Location
Switch	refer to internal elevations	vertical	Refer to drawings
Socket outlet	refer to internal elevations	horizontal	Refer to drawings

Item	Brand / type
Switch / socket outlets:	PDL Iconic
Coverplate colour:	PDL Iconic
Switch module colour:	White

Item	Brand / type
Light dimmers:	PDL Iconic - refer to Lightplan schedule - to Living area/Bed area lights
Symbol switch:	PDL Iconic - To heated towel rail & kitchen appliances
PIR sensor switch:	PDL Iconic

4.5 SWITCHES & SOCKET-OUTLETS - INTERIOR (DAMP/WET CONDITIONS)

Interior damp/wet conditions - heights of units with restrictions subject to exclusion zones and/or protected unit/equipment, to AS/NZS 3000, 6.0 Damp Situations.

Item	Height to centre of unit	Orientation	Location
Switch	refer to internal elevations	vertical	Refer to drawings
Socket outlet	refer to internal elevations	horizontal	Refer to drawings

Item:	Brand / type / protection:
Switch / socket outlets:	PDL Iconic
Coverplate colour:	PDL Iconic
Switch module colour:	White

Item - RCD:	Brand / type / protection:
Socket outlet:	PDL Iconic - beside vanity only

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4.6 LIGHT FITTINGS - INTERIOR

Fittings	Brand / type	Controls
Pendant lights:	refer to Light Schedule	Manual switch - refer to light schedules
Ceiling lights:	refer to Light Schedule	Manual switch - refer to light schedules
Recessed ceiling lights:	refer to Light Schedule	Manual switch - refer to light schedules
Wall lights:	refer to Light Schedule	Manual switch - refer to light schedules
Spotlights:	refer to Light Schedule	Manual switch - refer to light schedules
Strip lights:	refer to Light Schedule	Manual switch - refer to light schedules
High/low bay lights:	refer to Light Schedule	Manual switch - refer to light schedules

4.7 SMOKE ALARMS - RESIDENTIAL

Location:	refer to RCP
Brand / type:	Type 1 Domestic Alarm

4.8 LIGHT FITTINGS - EXTERIOR

Fitting	Brand / type / protection	Controls
Wall lights:	refer to Light Schedule	Manual switch - refer to light schedules
Recessed wall lights:	refer to Light Schedule	Manual switch - refer to light schedules

4.9 MISCELLANEOUS ITEMS

Item	Brand / type
Extractor fan:	refer to 7612
Air supply:	refer to 7687
Water heating	refer to 7123
Underfloor Heating Coil:	Electrician to advise

4.10 HEATED TOWEL RAILS

Location:	Brand / type
In Bathroom	TBC

4.11 MIRROR DE-MISTERS

Location:	Brand:	Size:	Wattage:
Behind Mirror in Bathroom	TBC	1100 mm x 550mm	90 Watts

4.12 APPLIANCES

Item	Brand / type
Cooker top/hob:	TBC
Range hood:	TBC

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8231 SEGMENTAL PAVING

1 GENERAL

This section relates to the bedding and laying of:

- interlocking concrete pavers
- interlocking brick pavers
- flagstones
- setts

to form paving for pedestrians and light vehicular traffic.

1.1 RELATED WORK

Refer to concrete section/s for concrete work.

Documents

1.2 DOCUMENTS

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

AS/NZS 1428.4.1	Design for access and mobility - Means to assist the orientation of people with vision impairment - Tactile ground surface indicators
NZS 3104	Specification for concrete production
NZS 3116	Concrete segmental and flagstone paving
AS/NZS 4455.2	Masonry units, pavers, flags, and segmental retaining wall units - Pavers and flags
AS/NZS 4456	Masonry units, segmental pavers and flags - Methods of test

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

Requirements

1.3 QUALIFICATIONS

Pavers to be experienced competent workers, familiar with the materials and the techniques specified.

1.4 CONFIRM APPEARANCE

Before commencing work confirm the layout and any elements affecting the visual appearance of the work. Pavers should be mixed on site from several pallets to ensure blending and avoid colour contrasts. Ensure extra paving is required to be from the same batch number to avoid colour variation.

2 PRODUCTS

Materials

2.1 INTERLOCKING CONCRETE PAVING BLOCKS

To AS/NZS 4455.2.

Components

2.2 STABILISED BEDDING SAND

Hard, durable, angular particles to NZS 3116 and to the grading limits of table 4, Grading limits for bedding sand, with 5% Portland cement added and well mixed.

2.3 STABILISED JOINTING SAND

Proprietary, hard, durable, angular particles, with no pumice particles and to NZS 3116 and to the grading limits of table 5, Grading limits for jointing sand.

2.4 CONCRETE

Prescribed mix to NZS 3104 (except where specified otherwise).

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Haunching concrete: 17.5 MPa
Infill concrete: 25 MPa.

3 EXECUTION

Conditions

3.1 STORAGE

Take delivery of blocks and pavers in protected pallets, undamaged and dry. Store on level hard standings, protect from damage and keep dry until laid.

3.2 DELIVERY OF SANDS

Do not deliver to site any sands which cannot be immediately placed in final locations.

3.3 INSPECTION

Before starting paving work inspect the area to ensure that kerbing, edge restraints, drainage, cesspits, channels, basecourse and other services are in place to correct falls and to allow work of the required standard.

3.4 SURFACE TOLERANCES

Final surface of paving:	±10mm of design level
Surface level above drainage:	5mm minimum above drainage channels or gully entries and continuously graded towards them
Maximum deviation:	8mm in 3 metres without ponding
Between adjacent blocks:	< 2mm

Application

3.5 FORM EDGE RESTRAINT

Excavate for and set edge restraint in concrete haunching to the levels shown. Allow concrete to cure before making good the adjoining basecourse.

3.6 LAY BEDDING SAND

Loose lay sand using screeds over the prepared basecourse to a depth dependent on the sand and its water content to give a nominal compacted thickness of 30mm. Compact to give a uniform density and thickness. Check the finished level over a small area using paving and then correct the total area before proceeding. Screed the compacted surface to finish completely level.

3.7 LAY PAVING ON SAND

Set up string lines in 2 directions at 5 metre centres maximum to ensure joint lines are straight and square. Lay whole pavers first within the string line grid with joint widths in the range of 2mm to 4mm over 90% of the work and a minimum/maximum of 1mm to 5mm. For segmental pavers compact to NZS 3116, clause 310.4 Laying and Initial Compaction.

Pedestrian areas: Standard plate compactor
Private driveways: 60 - 120 kg static weight and 10 24 kN centrifugal force

3.8 CUTTING PAVING

Cut paving, neat and tidy with a diamond-tipped saw blade. Do not use cut units less than half a paver. Adjust pattern to suit as necessary.

3.9 HAUNCHING

Cut away base course to at least 50mm below bedding sand and place haunching concrete. Do not allow traffic on adjacent paving while work is being carried out and until concrete has set.

3.10 JOINT FILLING

On completion of the paver compaction, spread joint filling sand dry over the surface and broom in to fill joints completely. Once haunching has set, compact the pavers using a suitable vibrating plate compactor.

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Compact large pavers 400mm x 400mm using a rubber mallet. Keep topping up the joints as the jointing sand settles until they are completely full and the pavers locked in. Sweep off the excess sand and compact again. Inspect after 3 days and re-sand and re-vibrate again as necessary.

Repeat at 2 week intervals once the pavers have had traffic, until 2 such inspections show no loss or settlement of joint sand.

Finishing

3.11 PROTECTION

Protect the completed work from damage and from dropping other materials during the remainder of the construction period. Do not use the completed work as a building platform or for material storage.

Special Features

3.12 SPECIAL FEATURES

Allow for cutting around all features - bollards, light columns, handrails, posts, water fountains etc.

3.13 MAKE UP STRIPS

Where paving will be laid against irregular structures, make the interface regular with the construction of a concrete make-up strip.

Construct the make-up strip prior to the preparation and laying of paver units. Build it between 75mm and 150mm wide and a minimum of 150mm deep, laid with the surface flush with the proposed pavers. Form the vertical face which will receive the pavers straight and true, to ensure the pavers will abut closely.

Completion

3.14 REPLACE

Replace damaged, cracked or marked elements.

3.15 LEAVE

Leave work to the standard required by following procedures.

3.16 REMOVE

Remove debris, unused materials and elements from the site.

4 SELECTIONS

4.1 INTERLOCKING CONCRETE PAVING BLOCKS

Brand:	Viblock
Style:	Turf Block
Dimensions:	600mm x 400mm x 80mm thick
Colour:	Charcoal
Bed:	Sand

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