

Hogan Gully Clubhouse

Hogan Gully Stage 02 - Project Specification

420 McDonnell Road, Arrowtown, Queenstown, New Zealand
Project Ref: 17008
Date: 18 September 2026

BC2

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:	Patterson Associates Ltd
Postal Address:	PO Box 8778 Newmarket
Street Address:	22 Garfield Street
City:	Auckland
Telephone:	09 3034004
Email:	

1.2 DOCUMENT DETAILS

Project Name:	Hogan Gully Clubhouse
Project Number:	17008
File Reference:	
Client:	
Client Contact:	
Version:	

1.3 REVISION CONTROL

Issue:	Building Consent
Revision:	
Amendment Details:	
Issued to:	
Date of Issue:	18th September 2026
Reviewed by:	
Approved by:	

1.4 AUDIT CONTROL

Date:	Friday 18th Septemger 2026
Author:	
Approved by:	

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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

Golf Club Clubhouse with part basement. Refer to General Arrangement drawings 2001 and 2002.

1.3 NO RESTRICTED BUILDING WORK

This project does not include Restricted Building Work.

Design Construction Safety

1.4 DESIGN CONSTRUCTION SAFETY

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

Principal's Health & Safety Matters

1.5 PRINCIPAL'S KNOWN SITE HAZARDS

Site hazards known to the principal are:

~

1.6 PRINCIPAL'S SITE HEALTH AND SAFETY PLAN

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

Site

1.7 SITE

The site consists of: 27.6 ha2
As shown on drawing: 1001 - refer also Survey documentation

1.8 LEGAL DESCRIPTION

Lot 3 DP 356270 - 420 McDonnell Road, Queenstown.

1.9 SITE FEATURES

~

Site environment - Durability

1.10 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 ~

Site environment - Wind

1.11 WIND DESIGN PARAMETERS - SPECIFIC DESIGN

The design wind pressures are to AS/NZS 1170.2:2011

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SLS	+/- 1.65kPa
ULS	+/- 1.23kPa

Site environment - Seismic

1.12 EARTHQUAKE - SPECIFIC DESIGN

The earthquake design is to NZS 1170.5, in particular the intent of NZS 1170.5, 1.2 **Determination of earthquake actions**.

~	Building type, importance level (to AS/NZS 1170.0, table 3.2)

Archaeological discovery

1.13 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.
Known archaeological information relating to this site includes the following: -
~

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1222 PROJECT PERSONNEL

1 GENERAL

This general section provides a list of the parties who are involved with the project. Communications to these personnel are to be sent to them at the address as listed. Refer to the construction contract for:

- the roles that they have under the contract; and
- address details for notices being given under the contract.

Principal

1.1 PRINCIPAL

Name:	Trojan Holdings Ltd
Postal:	~
Street:	~
Telephone:	~
Represented by:	Shane Muir
Mobile:	021 797784
Email:	shane.muir@trojanholdings.co.nz

Contractor

1.2 CONTRACT MANAGER

Person:	~
Mobile:	~
Telephone:	~
Email:	~

1.3 SITE FOREMAN

Person:	~
Mobile:	~
Telephone:	~
Email:	~

Consultants

1.4 CONTRACT ADMINISTRATOR

Practice:	~
Postal:	~
Street:	~
Telephone:	~
Represented by:	~
Mobile:	~
Email:	~

1.5 INDEPENDENT CERTIFIER

Practice:	~
Postal:	~
Street:	~
Telephone:	~
Represented by:	~
Mobile:	~
Email:	~

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1.6 ARCHITECT

Practice:	Patterson Associates Ltd
Postal:	PO Box 8778 Newmarket, Auckland 1149
Street:	Luminous Building 2, 22 Garfield Street, Parnell, Auckland, 1052
Telephone:	+64 9 303 4004
Represented by:	Richard Andrews
Mobile:	+64 21 460002
Email:	richard@pattersons.com

1.7 STRUCTURAL ENGINEER

Practice:	Holmes Structures
Postal:	PO Box 1266, Queenstown, 9348
Street:	Level 2, 41 Ballarat Street, Queenstown
Telephone:	+64 3 441 0747
Represented by:	Peter Hogan
Mobile:	+64 27 433 1057
Email:	peterh@holmesgroup.com

1.8 MECHANICAL ENGINEER

Practice:	Mesh Consulting
Postal:	
Street:	Level 1, 272 Richmond Road, Grey Lynn, Auckland, 1021
Telephone:	
Represented by:	James Donald
Mobile:	+64 21 043 2951
Email:	james.donald@meshconsulting.co.nz

1.9 ELECTRICAL ENGINEER

Practice:	Mesh Consulting
Postal:	
Street:	Level 1, 272 Richmond Road, Grey Lynn, Auckland, 1021
Telephone:	
Represented by:	James Donald
Mobile:	+64 21 043 2951
Email:	james.donald@meshconsulting.co.nz

1.10 HYDRAULIC ENGINEER

Practice:	Mesh Consulting
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Street:	Level 1, 272 Richmond Road, Grey Lynn, Auckland, 1021
Telephone:	
Represented by:	James Donald
Mobile:	+64 21 043 2951
Email:	james.donald@meshconsulting.co.nz

1.11 FIRE ENGINEER

Practice:	Mesh Consulting
Postal:	
Street:	Level 1, 272 Richmond Road, Grey Lynn, Auckland, 1021
Telephone:	
Represented by:	James Donald
Mobile:	+64 21 043 2951
Email:	james.donald@meshconsulting.co.nz

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1.12 CIVIL ENGINEER

Practice:	Clark Fortune McDonald
Postal:	PO Box 550, Queenstown
Street:	309 Lower Shotover Road, Queenstown
Telephone:	+64 3 441 6044
Represented by:	Sam Lees
Mobile:	
Email:	slees@cfma.co.nz

1.13 FIRE ENGINEER

Practice:	Holmes
Postal:	PO Box 1266, Queenstown, 9348
Street:	Level 2, 41 Ballarat Street, Queenstown
Telephone:	+64 3 441 0745
Represented by:	Jamie Crum
Mobile:	+64 27 3323056
Email:	jamie.crum@holmesgroup.com

Territorial Authority

1.14 BUILDING CONSENT AUTHORITY

Name:	QLDC
Postal:	Queenstown Lakes District Council, Private Bag 50072, Queenstown 9348
Street:	10 Gorge Street, Queenstown, 9300
Telephone:	+64 03 441 0499
Mobile:	
Email:	

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1232 INTERPRETATION & DEFINITIONS

1 GENERAL

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

Definitions

1.1 DEFINITIONS

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

1.2 PERSONNEL

Principal:	The person defined as "Principal" in the conditions of contract.
Contractor:	The person contracted by the principal to carry out the contract.
Contract administrator:	The person appointed by the principal to administer the contract on the principal's behalf. Where no person has been appointed by the principal, it means the principal or the principal's representative.

1.3 ABBREVIATIONS

The following abbreviations are used throughout the specification:

AAMA	American Architectural Manufacturers Association
AS	Australian Standard
AS/NZS	Joint Australian/New Zealand Standard
ASTM	American Society for Testing and Materials

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

1.4 DEFINED WORDS

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

1.5 WORDS IMPORTING PLURAL AND SINGULAR

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

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1232S1 EXPLANATION OF SCHEDULE SECTIONS

1 GENERAL

This general section provides an explanation of schedule sections and their relationship to general sections and work sections. Specific schedule sections contained within this specification are also identified.

1.1 EXPLANATION OF SCHEDULE SECTIONS

A schedule section identifies work sections that contain common requirements, as identified in the title of the schedule section. For example 1235S1 SCHEDULE OF SHOP DRAWINGS identifies work sections that have requirements for shop drawings. Details of the requirements are contained in the identified work sections with additional requirements contained in the general section 1235 SHOP DRAWINGS.

Some schedule sections are identified by the 4 digit CBI (Co-ordinated Building Information) number of the general section that they relate to, followed by the letter "S" followed by a numeral (1-9). The numeral allows for multiple schedule sections to be associated with the same general section.

Other schedule sections that do not share a common CBI number with a general section, have their own unique 4 digit CBI number, followed by the letter "S" followed by a numeral. These schedule sections contain additional subject content relating to the schedules and the identified work sections.

1.2 SCHEDULE SECTIONS

The following Schedule sections are contained within the specification:

1235S1 Schedule of Shop Drawings
1238S1 Schedule of As Built Documentation



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1233 REFERENCED DOCUMENTS

1 GENERAL

1.1 REFERENCED DOCUMENTS

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

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

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

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

1.2 DOCUMENTS

Documents referred to in the GENERAL sections are:

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

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

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

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1234 DOCUMENTATION

1 GENERAL

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

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

Building Consent Authority documentation

1.1 BUILDING CONSENT

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

1.2 BUILDING CONSENT COMPLIANCE

It is an offence under the Building Act 2004

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

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

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

1.3 PROJECT PERSONNEL

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

Compliance information

1.4 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.

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1.5 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.

Substitutions

1.6 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.

1.7 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.

1.8 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.

1.9 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

1.10 ACCEPTANCE OF SUBSTITUTIONS

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

Amendments to issued Building Consent

1.11 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:

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- 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.

1.12 PRINCIPAL AMENDMENTS TO BUILDING CONSENT

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

The principal will:

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

Manufacturer's documents

1.13 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.

1.14 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.

1.15 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

1.16 BRANDED PRODUCTS / SYSTEMS

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

1.17 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

1.18 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.

1.19 REVISIONS TO CONSTRUCTION ISSUE

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

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

1.20 RETURN DOCUMENTS ISSUED FOR CONSTRUCTION

On completion of the contract works:

- Keep such copies of the plans, specification and other documents as reasonably required for contractor’s record purposes.

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- Retrieve all other copies no longer required by parties.
- Agree method of disposal of such documents with the Contract Administrator.

The Contract Administrator will advise whether such documents shall be:

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

Confidentiality of documents

1.21 CONFIDENTIALITY OF DOCUMENTS

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

2 SELECTIONS

Receipt of construction documents

2.1 INITIAL ISSUE & REVISIONS - HARD COPIES

Initial issue:	1 at full size. 1 at reduced size
Revisions:	1 at full size. 1 at reduced size

2.2 DOCUMENT RECEIPT - HARD COPIES

Hard copies of plans, specifications and other documents issued for construction shall be sent to the contractor by courier

2.3 DOCUMENT RECEIPT - ELECTRONIC DOCUMENTS

Electronic documents issued for construction shall be obtained from a file hosting service.

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1235 SHOP DRAWINGS

1 GENERAL

This general section relates to common requirements for the preparation, submission and review of shop drawings referred to in this specification and in separate specifications/documents relating to this project. Detailed requirements for shop drawings for particular parts of the work are included in the specific work section.

1.1 SCHEDULE SECTION

Refer to 1235S1 SCHEDULE OF SHOP DRAWINGS for work sections contained in this specification that have requirements for shop drawings.

1.2 SHOP DRAWING FORMAT

Prepare shop drawings at appropriate scales to enable good legibility. Unless otherwise specified in a work section, submit shop drawings in the format as listed in SELECTIONS.

1.3 PROGRAMME FOR SHOP DRAWINGS

Allow time in the programme for the preparation, coordination and review of shop drawings. Allow also for such resubmission and further review as may be required prior to fabrication. No extension of time will be allowed for resubmission and further review.

1.4 COMMUNICATION WITH SHOP DRAWING DETAILER

Agree and arrange for such direct contact as is appropriate between detailer, consultant and others whose input may be required in the preparation of the shop drawings. Such direct communication does not relieve the contractor of the need to carry out their own coordination and check of shop drawings.

1.5 CONTRACTOR COORDINATION OF SHOP DRAWINGS

Before submitting the shop drawings for review, carry out coordination to ensure that allowance has been made for all other parts of the work that relate to the work detailed in the shop drawings.

1.6 COORDINATION WITH SITE MEASURE

The contractor is solely responsible for coordination of shop drawing dimensions with site measurements. The reviewer's dimensional review is limited to visual/aesthetic matters only

1.7 SHOP DRAWING REVIEW

Submit shop drawings to the named reviewers for review, in due time to ensure conformance with the contract programme.

- Where no time is stated in a specific section allow 10 working days for review by the reviewer. Where a large number of drawings are involved more time will be necessary.
- Where no person is named as the reviewer, submit the shop drawings to the contract administrator.

Shop drawing review indicates only that the shop drawing interpretation of the design concept has been reviewed without the need for further modification, other than the corrections indicated by the reviewer.
The reviewer may advise that:

- The shop drawings have been reviewed and work may proceed; or
- The shop drawings have been reviewed and work may proceed subject to notes, annotations or comments provided; or
- The shop drawings have been reviewed and work may proceed subject to notes, annotations or comments provided. Resubmitted revised shop drawings shall be provided for the record, or
- Work may not proceed. Revise and resubmit shop drawings

1.8 RESPONSIBILITY

Review of shop drawings does not relieve the contractor of responsibility for the correctness of the shop drawings, site dimensions, the overall design, coordination and performance, or for ensuring the work is carried out in compliance with the contract documents. It does not remove the need for the contractor to comply with the stated requirements, details and specifications of the manufacturers and suppliers of individual components, materials and finishes. Review cannot be construed as authorising departures from the contract documents.

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1.9 RESUBMISSION OF SHOP DRAWINGS

Reviewed drawings which are required to be resubmitted to correct comments or notations indicating where the shop drawings are at variance with the contract documents, are to be modified and resubmitted to the reviewer for re-review. Allow 5 working days for re-review by the reviewer.

1.10 WORK MAY PROCEED

Before proceeding with any fabrication, installation or erection, advice must be obtained from the named reviewers that work may proceed. Where no named reviewer has been nominated advice must be obtained from the contract administrator.

1.11 BIM MODEL

BIM (Building Information Model) is being used for the construction of the works. Refer to SELECTIONS for details of the BIM model and the information required to be included.

2 SELECTIONS

2.1 SHOP DRAWING FORMAT

Submit the shop drawings in the following format

	Format/Size
Hardcopy	~
Electronic copy	PDF & DWG & IFC (3d model)
CAD file	Vendor Neutral "IFC 3d BIM model file" (IFC = Industry Foundation Classes)

2.2 BIM (BUILDING INFORMATION MODEL) FORMAT

IFC model files are to be provided for 3d coordination and reviewing.

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1235S1 SCHEDULE OF SHOP DRAWINGS

1 GENERAL

This schedule section identifies work sections in the specification that have requirements for the preparation, submission and review of shop drawings.

1.1 ASSOCIATED SECTIONS

Read in conjunction with:

- 1232S1 EXPLANATION OF SCHEDULE SECTIONS
- 1235 SHOP DRAWINGS
- Identified Work Sections

Shop drawings

1.2 SHOP DRAWINGS

Refer to the following sections:

3130	Precast Concrete
3361	Stonework
3410	Structural Steel
3415	Architecturally Exposed Structural Steel
4521AC	APL Commercial Aluminium Windows & Doors
4911	Steel Metalwork
7938PB	Monkeytoe Fall Protection Systems

1.3 SHOP DRAWINGS - ADDITIONAL ITEMS

Refer to separate documentation for shop drawing requirements 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
7430	Drainage
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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1240 ESTABLISHMENT

1 GENERAL

This general section relates to site establishment including:

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

Notices and approvals

1.1 STATUTORY OBLIGATIONS

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

1.2 BUILDING CONSENT AUTHORITY AND NETWORK UTILITY APPROVALS

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

1.3 NOTIFY NETWORK UTILITY OPERATORS

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

Inspections

1.4 CARRY OUT INSPECTIONS

~

Site preparation

1.5 SITE ACCESS

Access to the site is limited to: ~

1.6 WORKING AREA

Limited to the following designated working areas on the site:
Working area to be clearly demarcated at the start of contract works. Refer to future drawing.

1.7 SITE AND SOIL SURVEYS

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

1.8 GROUND CONDITIONS

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

Temporary construction

1.9 TEMPORARY BUILDINGS

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

1.10 TEMPORARY SITE FENCING

Provide and maintain a temporary site fence, 2 metres high from ground level on the side accessible to the public. Construct to comply with NZBC F5/AS1 Construction and demolition hazards.

1.11 SITE - SAFETY SIGNAGE

Provide hazard board and other safety signage as required.



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1.12 SITE - PROJECT SIGN

Obtain approval to, provide and erect a timber framed sign board 2400mm x 1200mm. Sign to be, fully painted with vinyl lettering or fully printed, and displaying:

- Title of contract
- Patterson Associates
- Contractor's name
- Consultants as listed in general section 1222 PROJECT PERSONNEL
- If the contractor wishes, names of subcontractors.

Note draft of sign board to be submitted for Architect's approval or will be provided by Architect at their discretion.

First aid

1.13 FIRST AID EQUIPMENT

Provide first aid equipment.

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1250 TEMPORARY WORKS & SERVICES

1 GENERAL

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

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

Temporary works

1.1 COSTS RELATING TO TEMPORARY WORKS

Pay all rates/fees in respect of temporary works.

1.2 MAINTENANCE OF TEMPORARY WORKS

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

1.3 SAFEGUARD THE SITE, THE WORKS AND MATERIALS

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

1.4 CONSULTANTS TEMPORARY SITE OFFICE

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

1.5 SITE FENCING

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

Construct the fence with:

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

1.6 SITE FENCING - NON-PUBLIC AREAS

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

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

1.7 SITE HOARDINGS

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

Construct hoardings with continuous cladding of:

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

1.8 GANTRIES, PLANKED FOOTWAYS, GUARD RAILS

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

1.9 PROVIDE SEDIMENT AND SILT RUN OFF PROTECTION

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

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Prevent silt run off by:

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

Provide sediment control by:

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

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

1.10 PROVIDE CONCRETE WASHWATER RUN OFF PROTECTION

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

Control run off from:

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

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

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

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

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

Spilt or surplus material:

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

Pump washwater away from drains, waterways and adjoining property.

1.11 EXCAVATION SAFETY

To the Health and Safety at Work Act 2015.

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

Scaffolding

1.12 SCAFFOLDING

Provide scaffolding for the efficient execution of the works.

Comply with:

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

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Temporary services

1.13 WATER

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

1.14 ELECTRICITY

To AS/NZS 3012.

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

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

1.15 TELEPHONE

Provide on-site temporary telephone facilities.

1.16 COMPUTER FACILITIES

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

1.17 PRINTER

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

1.18 IMAGING

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

Care and protection - Site

1.19 LOCATE AND PROTECT SURVEY MARKS

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

1.20 LOCATE EXISTING SERVICES

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

1.21 PROTECT EXISTING SERVICES

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

1.22 PROTECT EXISTING LANDSCAPE ELEMENTS

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

1.23 MAKE GOOD - SITE

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

Care and protection - Project

1.24 TEMPORARY PROTECTION

Provide and maintain temporary protection as required to protect products during transport, storage and handling. Provide temporary protection as required to protect the work in progress and the finished work. Refer to 1270 CONSTRUCTION for removal of protection.

1.25 SPECIAL PROTECTION GENERAL

Refer to individual work sections for any special protection requirements.

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1.26 SPECIAL PROTECTION PROJECT

Refer to Resource Consent conditions of consent and Geotechnical Report for any specific protection requirements.

Care and protection - miscellaneous

1.27 CONSTRUCTION KEYING AND SECURITY

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

1.28 TEMPORARY STORAGE

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

Rubbish removal

1.29 PERIODIC RUBBISH REMOVAL

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

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1260 PROJECT MANAGEMENT

1 GENERAL

This general section relates to project management requirements including:

- Meetings
- Reporting
- Cost control
- Communicating and records
- Confidentiality
- Programming
- Hold points and notification points
- Working hours
- Health and safety

Site Meetings

1.1 PURPOSE OF SITE MEETINGS

The purpose of site meetings is to:

- Ensure that the Contractor has all information required to construct the work
- To address and clarify aspects of construction of the work including quality
- To address issues relating to project delivery including, site progress and cost.

1.2 SITE MEETING ATTENDANCE

The following persons to attend:

- Principal
- Contract administrator
- Project manager
- Contractor
- Architect
- Designer
- Engineer
- Quantity surveyor
- Services consultants when needed
- Subcontractors when needed (contractor to inform them)

1.3 REPORTING

The following reports are required to be presented at site meetings:

Contractor: A detailed status report

1.4 SITE MEETING MINUTES

The contract administrator is to keep full minutes of all site meetings and arrange distribution to all those involved within 3 working days.

The minutes are to record

- Documentation and information issued and required
- Directions and variations issued
- Confirmation of contract insurances
- Programme items
- General business
- Site health and safety
- Payment claim processing including costing variations

Project Control Group (PCG) meetings

1.5 PURPOSE OF PCG MEETINGS

The purpose of PCG meetings is:

- To consider matters arising from the regular site meetings that fall outside of the scope of those meetings.
- To address issues relating to project delivery including quality, programme and cost.

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- To allow reporting by consultants.

1.6 PCG ATTENDANCE

The following persons to attend:

- Principal
- Contract administrator
- Project manager
- Contractor
- Architect
- Engineer
- Quantity surveyor
- Other consultants

1.7 PCG REPORTING

The following reports are required to be presented at PCG meetings:

Contract administrator:	A report on matters addressed at the site meetings
Contractor:	A detail status report
Consultants:	A status report

1.8 PCG MINUTES

The designated person is to keep full minutes of all PCG meetings and arrange distribution to all those involved within 5 working days.

Design meetings

1.9 PURPOSE OF DESIGN MEETINGS

The purpose of design meetings is to:

- consider matters arising from design by the contractor in relation to parts of the work being carried out on a design build or performance specification basis by the contractor.
- review and assess design aspects of such work on other designed parts of the work.
- provide value engineering advice on parts of the work where design changes are required or are being considered to meet the project financial performance requirements.

1.10 DESIGN MEETING ATTENDANCE

The following persons to attend:

- Principal
- Contract administrator
- Project manager
- Contractor
- Architect
- Designer
- Engineer
- Quantity surveyor
- Other consultants

1.11 DESIGN MEETING MINUTES

The designated design manager is to keep full minutes of all design meetings and arrange distribution to all those involved within 5 working days.

Reporting

1.12 CONTRACTORS DETAILED STATUS REPORT

A contractor's detailed status report is to address the following:

- Progress performance, addressing actual progress against the programme and any variance from the programme.
- Procurement progress on parts of the work being undertaken under a monetary allowance including the time by which direction must be given on monetary allowances to conform to the programme.
- Details of measures being taken to get work back on programme where there has been a

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delay and details of any future events that will or are likely to affect compliance with the programme.
- Compliance with the issued Building Consent and notification of any work or inspections that have not been passed by the BCA inspector.
- Compliance with the issued Resource Consent and any compliance issues.
- Site health and safety including any notifiable incidents.
- Details of any discrepancies in the contract documents that require clarification or determination
- A list of information requests by the contractor, the date when they were made, the person who they were directed to and the date by which a response is required.
- A variation report including progress on agreed variations, variations to be agreed and anticipated variations and the time implication of variations.
- Variation costing and the adjusted contract price including an assessment of the cost of known and potential variations.
- Review of sums not yet directed for expenditure.

Cash flow estimates

1.13 CASH FLOW ESTIMATES

The contractor is required to submit to the contract administrator a detailed cash flow estimate of all payments to which the contractor considers they will be entitled to under the contract. Where no time is stated in the conditions of contract, provide the cash flow estimate within 20 working days of the date of award of the contract. The contractor shall subsequently submit such revised cash flow estimates at 3 month intervals.

Cost control

1.14 MEASUREMENT

Give reasonable notice to the contract administrator before covering up work which requires to be measured.

1.15 DAYWORK VOUCHERS

To be signed by the contractor's representative as confirming the labour, times and materials used, before being supplied to the contract administrator.

Communicating and records

1.16 MEANS OF COMMUNICATION

Communications between the parties shall be as follows: -

Directions:	In writing delivered by email with a copy by post or hand
Meeting minutes:	In writing delivered by email
RFI's:	(Requests for information) by email or in writing to the contract administrator

1.17 DELIVERY OF COMMUNICATIONS

Deliver communications to the addresses listed in the contract agreement by means as allowed.

Where such addresses are not included in the contract agreement:
- deliver to the addressee by hand; or
- post to the postal address stated in the project directory; or
- deliver to the street address as stated in the Project Directory; or
- send by email to the email address stated in the Project Directory; or
- where agreed, deliver via a file hosting service or an electronic project management system.

1.18 SERVICE OF NOTICES

Serve notices to the addresses listed in the contract agreement by means as allowed.

1.19 CHANGE OF ADDRESS

The principal, contractor and the contract administrator must notify the others if they change their address for delivery or transmission of communications.

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1.20 RECORDS

Ensure all records specified are kept, held and collated on site in a form that makes the information easily accessible when it is needed. Distribute copies as and when necessary to those persons entitled under the contract to that information.

1.21 EXISTING STRUCTURES PHOTOGRAPHS

Before commencing work take digital photographs recording existing conditions of existing buildings and structures, including adjacent areas that may be affected by the carrying out of the contract works. Include adjacent roadways and footpaths and neighbouring buildings and the like. Where there is existing damage to adjacent buildings and/or structures, ensure that the photographs adequately record the extent of the damage or failure. Refer to SELECTIONS.

1.22 PROGRESS PHOTOGRAPHS

Take digital photographs recording progress. Refer to SELECTIONS.

1.23 SPECIFIC PHOTOGRAPHS

Take digital photographs recording specified subject matter. Refer to SELECTIONS.

Confidentiality

1.24 CONFIDENTIALITY - PUBLICITY

Unless specifically agreed photographs and other images of the work are not to be used by the contractor, subcontractors, material suppliers and others involved in the construction of the works.

Photographs taken for record purposes may be kept but must not be passed to other persons.

1.25 CONFIDENTIALITY AGREEMENT

Where required as a condition of the contract arrange for workers to provide a confidentially agreement. Workers who have not provided such an agreement shall be excluded from the site.

Programming

1.26 PROGRAMME

Include the proposed sequence of all significant on-site and off-site activities, including any intermediate key dates mentioned in the contract. Identify the critical path. Provide a tabulated schedule of information for each activity in order of:

- brief description
- duration in suitable time unit
- earliest start and latest finish time
- total float
- key dates for the supply of information or materials by others.

Identify the dates by which particular information, material or plant need to be supplied or arranged by the contract administrator. Also identify any constraints which may have been imposed by the programme.

Supply copies of the programme to the following:

Contract administrator	1
Architect	1
Designer	1
Principal	1
Quantity surveyor	1
Site supervisor	1

Monitor the programme by:

- recording progress regularly on the site chart
- informing the contract administrator promptly of any circumstances affecting any part of the programme structure and timing
- reviewing the programme once a month making alterations as needed and agreed to and re-issuing the required copies.

Hold Points and Notification Points

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Refer to section 1232 INTERPRETATION & DEFINITIONS for definition of hold points and notification points.

1.27 HOLD POINTS

The following hold points are in addition to hold points nominated in work sections. Notify of hold point work/item, do not to proceed further with work/item until advised to continue.

Notify: Contract administrator
Notification: 2 working days prior to work/item being carried out.

Hold Point Schedule

Location	Hold Point	Requirement
~	~	~
~	~	~

1.28 NOTIFICATION POINTS

The following notification points are in addition to notification points nominated in work sections. Notify of notification point work/item, continue with the work/item and subsequent work unless advised otherwise.

Notify: Contract administrator
Notification: 2 working days prior to work/item being carried out.

Notification Point Schedule

Location	Notification Point	Requirement
~	~	~
~	~	~

Working hours

1.29 WORKING HOURS

Work on site is not restricted. Comply with territorial authority consent conditions and noise and nuisance controls.

1.30 WORKING HOURS RESTRICTIONS

Comply with territorial authority consent conditions and noise and nuisance controls, in addition work on site is restricted to:

Weekdays: ~
Saturdays: ~
Sundays: ~
Public holidays: ~

Work outside these hours may be permitted with the contract administrators consent. Allow a minimum of 24 hours notice (in writing) when seeking the contract administrators consent. If the contract administrator consent is given obtain any required permits and permission for such work

Health and safety

1.31 HEALTH AND SAFETY LEGISLATION

Refer to the requirements of the Health and Safety at Work Act 2015. Comply also with all other relevant New Zealand safety legislation.

The Contractor will ensure, so far as is reasonably practicable, that, each subcontractor they engage and each separate contractor is aware of and complies with its obligations under health and safety-related law.

For the purpose of health and safety-related law, the contract administrator and others involved in contract administration and observation and construction monitoring will not at any time have management or control of the Workplace.

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1.32 HEALTH AND SAFETY REGULATIONS, CODES AND GUIDES

Comply with:

- Relevant New Zealand safety legislation including, Health and Safety at Work (General Risk and Workplace Management) Regulations 2016, also Health and Safety in Employment Regulations 1995 as amended by that Regulation and the appropriate Health and Safety at Work Regulations.
- WorkSafe publications including "Guidelines for the provision of facilities for general safety in the construction industry".
- Relevant codes of practice, guides, guidelines and standards.

Until further regulations are made under the Health and Safety at Work Act 2015 to cover them, the transitional provisions of the Act continue in force until revoked or amended.

1.33 HEALTH AND SAFETY IMPLEMENTATION

Take all practical steps to make the site and the contract works safe and to provide and maintain a safe working environment. Ensure that all those working on or visiting the site are aware of the rules governing site safety, are properly supervised and are not unnecessarily exposed to hazards and risks.

Co-operate, consult and co-ordinate health and safety matters with each PCBU including all subcontractors, suppliers, separate contractors, others engaged on the project and others who may be affected by the construction of the works.

Identify any significant hazards and risks.

Maintain proper procedures for dealing with any emergencies that may arise. Immediately investigate accidents, identify their cause and maintain a register of accidents and serious harm. Provide a copy of any report which the contractor is required to make to a public authority on any accident which is associated with carrying out the contract works and results in serious harm to any person.

Refer to individual work sections for detailed requirements on this project.

1.34 SUSPENSION OF HAZARDOUS WORK

On the request of the contract administrator, acting on reasonable grounds, suspend any identified hazardous activities and proceed to eliminate, isolate or minimise them in order to comply with the Act, without prejudice to any other rights of the principal under the contract.

1.35 SITE SAFETY PERSON

Appoint a suitably qualified site safety person to co-ordinate site safety and to attend all site meetings.

1.36 HEALTH AND SAFETY PLAN

Prepare and submit a health and safety plan to the contract administrator before commencing work on site. Include in that plan all people on site and the general public, as well as the following items and any other necessary items:

- identification of existing and potential construction hazards and risks
- Any design construction safety matters identified in section 1220 PROJECT and/or any separate project design construction safety report.
- safety procedures to eliminate, isolate or minimise construction hazards and risks
- the equipment to be used to minimise the hazards and risks
- the maintenance of a register of hazards and risks for the site
- the name and qualifications of the site safety person
- emergency procedures
- first aid facilities and safety equipment
- the methodology for notifying, recording and investigating accidents and injuries.

Advise the contract administrator of unusual or atypical features in the Plan in addition to any features already identified in section 1220 PROJECT and/or any separate project design construction safety report. Keep a copy of the plan in the site office.

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1.37 MAINTAIN HEALTH AND SAFETY PLAN

Maintain health and safety plan and alter to accommodate changing situations and /or substitutions. Advise contract administrator of changes.

1.38 COMPLY WITH SITE SAFETY PLAN

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

1.39 INFORM WORKERS OF HAZARDS AND RISKS

Inform workers and others on the site of:

- hazards and risks they may be exposed to while working or other legitimate activities
- hazards and risks they may create while working which could harm others
- how these hazards and risks may be minimised
- emergency procedures
- the location of first aid facilities and safety equipment.

1.40 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.

1.41 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.

2 SELECTIONS

Meetings

2.1 SITE MEETINGS

Frequency:	To be determined in concert with the Client, the Project manager and Architect.
Start date:	~
Time:	~
Venue:	~
Convener:	~

2.2 PCG MEETINGS

Frequency:	~
Start date:	~
Time:	~
Venue:	~
Convener:	~

2.3 DESIGN MEETINGS

Frequency:	~
Start date:	~
Time:	~
Venue:	~
Convener:	~

Photographs

2.4 EXISTING STRUCTURES PHOTOGRAPHS

Copies required:	~
Recipient:	~

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2.5 PROGRESS PHOTOGRAPHS

Position:	To each area under construction.
Frequency:	Daily photography
Copies required:	~
Recipient:	Shared project Dropbox location (or similar) to be agreed.

2.6 SPECIFIC PHOTOGRAPHS

Subject matter:	1x High Definition Time-lapse site camera will be established at permanent fixed location. 1x Continous High Definition live stream web camera To be determined on site in concert with Architect.
Frequency:	Continuous - (live stream)
Copies required:	2x Time lapse. 1 provided to client. 1 provided to Architect.
Recipient:	~

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1270 CONSTRUCTION

1 GENERAL

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

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

1.1 SCHEDULE SECTION

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

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

Quality control and assurance

1.2 QUALITY ASSURANCE

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

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

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

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

1.3 PROVIDE QUALITY PLAN

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

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

1.4 REVIEW OF QUALITY PLAN

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

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

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

1.5 COMMENCEMENT OF WORK

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

1.6 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.

1.7 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

1.8 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.

1.9 ACCEPTABLE NOISE LEVELS

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

1.10 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.

1.11 ADDITIONAL NOISE CONSTRAINTS

As well as complying with the preceding clauses, comply with the following on this contract:

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1.12 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.

1.13 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.

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1.14 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.

1.15 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.

1.16 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.

1.17 SMOKE FREE REQUIREMENTS

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

1.18 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

1.19 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.

1.20 DATUM

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

1.21 SET-OUT

Set out the work to conform with the drawings.

1.22 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.

1.23 USE OF SET-OUT INSTRUMENTS

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

1.24 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.

1.25 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

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	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

1.26 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.

1.27 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.

1.28 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.

1.29 EXECUTION - NO DETAIL IS PROVIDED

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

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

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

1.30 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.

1.31 MINIMISE DELAYS DUE TO WEATHER

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

Defective or damaged work

1.32 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

1.33 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.

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

1.34 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.

1.35 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.

1.36 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.

1.37 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

1.38 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.

1.39 QUALIFICATIONS WORKERS – RESTRICTED BUILDING WORK

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

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

1.40 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.

1.41 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.

1.42 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.

1.43 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.

1.44 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.

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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

1.45 NEW PRODUCTS

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

1.46 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.

1.47 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.

1.48 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.

1.49 INSTALLING PRODUCTS

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

1.50 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.

1.51 CONDITION OF PRODUCTS

To be in perfect condition when incorporated into the work.

1.52 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

1.53 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.

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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.

1.54 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.

1.55 OTHER SAMPLE REQUIREMENTS

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

Prototypes

1.56 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.

1.57 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.

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1.58 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

1.59 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

1.60 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.

1.61 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.

1.62 SPECIAL SITE CLEANING

~

Remove protection

1.63 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

1.64 SPECIAL REQUIREMENTS

Refer to individual work sections for any special completion requirements.

1.65 LEAVE WORK

Leave work to the standard required for the following procedures.



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1.66 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.

1.67 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.

1.68 COMPLETE ALL SERVICES

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

1.69 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

1.70 SPECIAL REQUIREMENTS

Refer to individual work sections for any special commissioning requirements.

1.71 MOVING PARTS

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

1.72 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.

1.73 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.

1.74 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.

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Practical completion submission

1.75 ADDITIONAL PRACTICAL COMPLETION INFORMATION

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

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

1.76 ADDITIONAL PRACTICAL COMPLETION REQUIREMENTS

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

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

- ~

Defects period submissions

1.77 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

1.78 FINAL COMPLETION - SUBMISSIONS

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

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

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2210 PREPARATION & GROUNDWORK

1 GENERAL

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

- footings and floor slabs
- backfilling behind basement retaining walls

Documents

1.1 DOCUMENTS

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

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

1.2 MANUFACTURER/SUPPLIER DOCUMENTS

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

Manufacturer/supplier contact details;

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

1.3 SITE SAFETY

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

1.4 ARCHAEOLOGICAL DISCOVERY

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



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2 PRODUCTS

2.1 EXCAVATED CLEAN FILL

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

2.2 VOLCANIC TUFF FILL

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

2.3 ROCK FILL

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

2.4 SAND FILL

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

2.5 HARD FILL

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

2.6 GRANULAR FILL

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

2.7 DRESSING COURSE

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

2.8 FREE-DRAINING AGGREGATE

Scoria or crushed gravel graded 50 to 14 clean.

3 EXECUTION

3.1 WASHOUT BAY FOR TRUCK

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

3.2 EXCAVATION GENERALLY

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

3.3 BURNING OF MATERIALS

Burning of materials is not permitted on site.

3.4 PROTECT EXISTING WORK

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

3.5 EROSION CONTROL

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

3.6 SURFACE PREPARATION

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

3.7 UNDERGROUND ELEMENTS AND SERVICES

Break out and remove old foundations, slabs, drainage pipes, manholes, tanks, cables and redundant services. Report for instructions when any unexpected voids, made-up ground or services are encountered. Seal off the ends of drains or remove to territorial authority approval.

3.8 STOCKPILE TOPSOIL

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

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3.9 GENERAL EXCAVATION

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

3.10 ROCK EXCAVATION

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

3.11 FOUNDATION EXCAVATION

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

3.12 INADEQUATE BEARING

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

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

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

3.13 STANDARD OF COMPACTION

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

3.14 GRANULAR BASE FOR SLABS

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

3.15 GENERAL BACKFILLING

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

3.16 RETAINING WALLS

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

3.17 SURPLUS MATERIAL

Remove surplus and excavated material from the site.

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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.

Related work

1.1 RELATED SECTIONS

Refer to ~ for ~.

Documents

1.2 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

1.3 ARCHAEOLOGICAL DISCOVERY

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

Performance

1.4 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 ~.

1.5 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.

1.6 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.

1.7 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.

1.8 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.

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1.9 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.

1.10 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.

1.11 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.

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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.

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 UNDERPINNING

~

3.15 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.

3.16 OVER EXCAVATION

Make good with well compacted backfill.

3.17 EXCAVATED BACKFILL

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

Finishing

3.18 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.



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Completion

3.19 LEAVE

Leave work to the standard required by following procedures.

3.20 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.

3.21 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.

4 SELECTIONS

4.1 BORE LOGS

Copies of bore logs are located in the Geotechnical Report.



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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.

Related work

1.1 RELATED SECTIONS

Refer to ~ for ~.

Documents

1.2 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

1.3 MANUFACTURER'S DOCUMENTS

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

~

Copies of the above literature are available from ~

Web:	~
Email:	~
Telephone:	~
Facsimile:	~

Requirements

1.4 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

1.5 CONTROL TESTING FOR FILLS - NZS 4431

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

1.6 INSPECTION NOTIFICATION - NZS 4431

Notify the inspecting engineer of the times required for inspection.

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1.7 INSPECTION NOTIFICATION

Notify the inspecting engineer of the times required for inspection.

1.8 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 – COMMERCIAL AND INDUSTRIAL DEVELOPMENTS

Earth fill as specified/identified by the geo-professional. Refer to SELECTIONS.

Granular fill materials - Specific Design

2.2 GRANULAR FILL MATERIAL – SPECIFIC DESIGN

Refer to SELECTIONS.

2.3 BLINDING LAYER – SPECIFIC DESIGN

Refer to SELECTIONS.

Granular fill materials - NZS 3604

2.4 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.

2.5 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.

Granular fill materials - NZS 4229

2.6 GRANULAR ROCK FILL MATERIAL – NZS 4229

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.

Fill shall not be subjected to deterioration nor significant expansion when in contact with water. Demonstration of these properties shall be to the satisfaction of the building consent authority.

2.7 BLINDING LAYER FOR POLYTHENE SHEET DPM – NZS 4229

Sand to a nominal thickness of 5-10mm with a maximum compacted thickness of 25 mm.

Dressing course

2.8 DRESSING COURSE

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

Site concrete

2.9 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

2.10 GRANULAR BEDDING

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

2.11 GRANULAR BEDDING AND SURROUND

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

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2.12 ORDINARY FILL
Use material previously excavated from the trench.

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

2.14 BEDDING & SURROUND – WATER PIPES
Sand.

2.15 BACKFILL – WATER PIPES
Backfill free from organic matter, rock and other hard matter, containing no soil lumps larger than 75mm.

2.16 MARKING TAPE
Marking tape, refer to SELECTIONS

Drainage materials

2.17 FREE-DRAINING AGGREGATE
Scoria or crushed gravel graded 50 to 14 clean.

2.18 NO FINES DRAINAGE METAL
GAP metals with the fines washed out. Refer to SELECTIONS.

2.19 FREE DRAINING HARDFILL – NZS 4229
Free draining imported hardfill to NZTA F2 specification.

2.20 NO FINES CONCRETE
Single-sized coarse aggregate without fines material, bound together with a cement paste to achieve a specified void content. Refer to SELECTIONS.

2.21 EXPANDED POLYSTYRENE FOAM DRAINAGE SHEET
Expanded polystyrene (EPS) sheets offering drainage. Refer to SELECTIONS.

Protection Sheets

2.22 PROTECTION SHEET
Rot proof sheets used to protect tanking from damage (particularly from backfill), refer to SELECTIONS.

2.23 EXPANDED POLYSTYRENE FOAM SHEET
Expanded polystyrene (EPS) sheet used to protect tanking from damage (particularly from backfill). Refer to SELECTIONS.

Geotextile Fabric

2.24 GEOTEXTILE FABRIC
Geotextile fabric. Refer to SELECTIONS.

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 SPREAD SURPLUS
Spread and level surplus imported filling materials where directed.

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

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3.5 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.

3.6 DIFFERING MATERIALS

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

3.7 EARTHMOVING EQUIPMENT

Do not use earthmoving equipment for compaction.

3.8 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.

3.9 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

3.10 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.

3.11 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.

3.12 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

3.13 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.

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

3.14 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.

3.15 SPREAD AND COMPACT GRANULAR FILL - NZS 4229

Place granular fill in layers between 100 to 150 mm thick. Compact with a vibrating plate compactor for small areas and in confined shapes, compact with a vibrating roller for large areas.

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3.16 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.

3.17 AP 7 BLIND SURFACE

Blind surface of area being covered with a concrete with AP 7 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

3.18 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.

3.19 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

3.20 MARKING TAPE

Install marking tape at required level during backfilling process.

Application - Geotextile Fabric

3.21 GEOTEXTILE FABRIC

Install geotextile fabric to manufacturer's requirements.

Application - Retaining wall backfill

3.22 PROTECT RETAINING WALL TANKING

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

3.23 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.

3.24 BACKFILL TO RETAINING WALL - NZS 4229

Place free draining hardfill in layers not exceeding 150 mm loose depth. Positively compact to provide support of not less than that of the adjacent material.

Completion

3.25 LEVELLING POINTS - NZS 4431

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

3.26 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.

3.27 LEAVE

Leave work to the standard required by following procedures.

3.28 REMOVE

Remove all debris and unused materials from the site.

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4 SELECTIONS

Earth fill

4.1 EARTH FILL – COMMERCIAL AND INDUSTRIAL DEVELOPMENTS

Location: Refer to the Geotechnical, Structural, and Architectural drawings in conjunction with one another for location and specification of all fill.

Type: ~

Granular fill - specific design

4.2 GRANULAR FILL MATERIAL – SPECIFIC DESIGN

Location: Refer to the Geotechnical, Structural, and Architectural drawings in conjunction with one another for location and specification of all fill.

Type: ~

4.3 BLINDING LAYER – SPECIFIC DESIGN

Location: Refer structural documentation

Type: ~

Granular fill - NZS 3604

4.4 GRANULAR FILL MATERIAL – NZS 3604

Location: ~

Type: ~

Granular fill - NZS 4229

4.5 GRANULAR FILL MATERIAL – NZS 4229

Location: ~

Type: ~

Blinding layer

4.6 BLINDING LAYER

Location: ~

Type: Sand

Thickness: Nominal 5 mm minimum thickness, maximum 25mm compacted thickness

Site concrete

4.7 SITE CONCRETE

Location: ~

Type: Prescribed mix 10.0 MPa

Service trench backfill material

4.8 SERVICE TRENCH - GRANULAR BEDDING

Location: ~

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

4.9 SERVICE TRENCH - GRANULAR BEDDING AND SURROUND

Location: ~

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

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4.10 SERVICE TRENCH - ORDINARY FILL

Location: ~
Type: Use material previously excavated from the trench.

4.11 SERVICE TRENCH - COMPACTED SELECTED FILL

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

4.12 BEDDING & SURROUND – COLD WATER PIPES

Location: ~
Type: Sand

4.13 BACKFILL – COLD WATER PIPES

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

Marking Tape

4.14 MARKING TAPE

Location: ~
Type: ~

Drainage materials

4.15 FREE-DRAINING AGGREGATE

Location: ~
Type: ~

4.16 NO FINES DRAINAGE METAL

Location: ~
Type: ~

4.17 FREE DRAINING HARDFILL – NZS 4229

Location: ~
Type: Free draining imported hardfill to NZTA F2 specification.

4.18 NO FINES CONCRETE

Location: ~
Type: ~
Void content: ~

4.19 EXPANDED POLYSTYRENE FOAM DRAINAGE SHEET

Location: ~
Type: ~

Protection Sheets

4.20 PROTECTION SHEET

Location: ~
Type: ~

4.21 EXPANDED POLYSTYRENE FOAM SHEET

Location: ~
Type: ~

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Geotextile Fabric

4.22 GEOTEXTILE FABRIC

Location: Refer Geotechnical Engineer documentation
Type: ~

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2361 STRIP FOOTINGS

1 GENERAL

This section relates to the supply and installation of concrete strip footings of non-specific design to NZS 3604 and NZS 4229, including;

- formwork, reinforcement, concrete mixes and the placing of concrete

1.1 RELATED WORK

Refer to ~ for ~

Documents

1.2 DOCUMENTS

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

NZS 3104	Specification for concrete production
NZS 3109	Concrete construction
NZS 3121	Water and aggregate for concrete
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
AS/NZS 4671	Steel reinforcing materials
NZCMM	NZ Concrete Masonry Manual section 6.1 Masonry Retaining Walls

Requirements

1.3 QUALIFICATIONS

Concrete workers to be experienced, competent and familiar in the fabrication and erection of formwork and with the materials and the techniques specified.

All work to be installed or supervised by a Registered Mason or licensed building practitioner (LBP): Licensed for Bricklaying and Blocklaying 2: Structural Masonry. RBW must be supervised by an LBP.

1.4 QUALITY RECORDS

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

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2 PRODUCTS

2.1 NORMAL CONCRETE

Normal concrete 17.5, 20 or 25 MPa grade (refer to SELECTIONS), maximum aggregate size 19mm ready-mixed to NZS 3104. Retain delivery dockets listing mix and despatch details. Mass concrete 10 MPa grade.

2.2 REINFORCEMENT

To AS/NZS 4671 Grade 300E deformed mild steel except for ties in plain round mild steel and as detailed.

2.3 TYING WIRE

Mild drawn steel wire not less than 1.2mm diameter.

2.4 WATER

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

2.5 SPACERS AND CHAIRS

Precast concrete or purpose made moulded PVC.

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3 EXECUTION

3.1 STORAGE

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

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

3.2 SOIL BEARING

To NZS 3604 or NZS 4229, Section 3, **Site Requirements**.
All soil bearing surfaces of footings shall be horizontal and may be stepped to accommodate variations in cleared ground level. Bearing shall be upon solid bottom in undisturbed good ground to NZS 3604 or NZS 4229, or firm fill with a "Statement Of Suitability...." to NZS 4431.

3.3 DEPTH OF FOOTINGS

As shown on drawings with minimum depth of footings below cleared ground level, to NZS 3604 or NZS 4229, clause 3.4.2.

- 200mm.

3.4 WIDTH OF FOOTINGS

Footing to be centred on foundation wall above. Refer to drawings or SELECTIONS for minimum dimensions.

3.5 FORMWORK

Use formwork of sufficient strength to retain and support the wet concrete to the required profiles and tolerances. Select formwork finish to produce the specified finished quality. Water blast to clean formwork. Keep formwork wet before concrete is placed.

3.6 REINFORCEMENT

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.
Longitudinal reinforcing and ties, refer to SELECTIONS for size and quantity.
Stepped footings to NZS 4229, at least 50% of the lower footing reinforcement shall be turned up the step to a minimum of 450mm beyond the rebar intersection, and at least 50% of the upper footing reinforcement shall be carry on into the lower foundation wall to a minimum of 450mm (350 with hook) beyond the rebar intersection.

3.7 REINFORCING LAPS

To NZS 3604, 6.11.7, **Foundation wall reinforcement.** Horizontal reinforcing bars lapped 500mm minimum.
To NZS 4229, 6.6.3, 40 diameter laps for deformed bars.
Tie all lapping bars to each other.

3.8 STARTER BARS

Vertical starter reinforcement to NZS 4229, to match vertical wall reinforcement in size, type, location and spacing. Starters to penetrate foundation wall by 600mm minimum, and in the footing to be bent through 90° and tied to longitudinal reinforcing.

3.9 COVER

Minimum cover 75mm.

3.10 OPENINGS

Footings to be continuous under openings unless shown otherwise.

3.11 PUMPING CONCRETE

Set up and supervise pump operation, placing and compaction of the mix to, NZS 3109: **7.4 Handling and placing** and **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.

3.12 STRIKE FORMWORK

Strike formwork without damaging or overloading structure to NZS 3109. Do not remove formwork before the following minimum periods under average temperature conditions:

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12 hours: Sides of beams, walls and columns

Completion

3.13 PROGRESSIVE CLEANING

Clean off concrete spills as they occur, making good any damage at the same time.

3.14 FINAL CLEANING

Clean down exposed walls and remove waste material from adjoining surfaces at completion.

3.15 REMOVE

Remove from the site materials not used.

4 SELECTIONS

4.1 CONCRETE

Refer to the structural engineer specifications and documentation for concrete strength

4.2 FOOTING SIZE AND REINFORCING

The following are minimum requirements.

Location:	Refer to the structural engineer documentation for footing size and general location . Refer to architectural drawings for set out
Footing width:	
Footing height/depth:	Refer to the structural engineer documentation
Longitudinal steel:	~ / D~
Stirrups:	R6 ties @ 600mm centres minimum (to NZS 4229 table 6.2)

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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 RELATED WORK

Refer to ~ for ~.

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:

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

1.3 DOCUMENTS

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

NZBC B1/AS1	Structure
NZBC E2/AS3	External moisture
AS 1366.3	Rigid cellular plastics for thermal insulation - Rigid cellular polystyrene - Moulded (RC/PS - M)
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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1.4 MANUFACTURER/SUPPLIER DOCUMENTS

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

~

Manufacturer/supplier contact details

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

Requirements

1.5 QUALIFICATIONS

Refer to 1270 CONSTRUCTION for requirements relating to qualifications

1.6 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

1.7 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.

1.8 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

1.9 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.

1.10 INSPECTIONS

Reviewer:	Stage:	Hold/Notification Point:
Construction Reviewer:	~	~

1.11 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



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- 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.

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 PRESCRIBED MIX CONCRETE

Prescribed mix concrete 10, 15, 17.5, 20 or 25 MPa grade minimum strength, using either builder's mix or separate batching of sand and aggregate to NZS 3104, section 3 Provisions for Prescribed Mix Concrete. Refer to SELECTIONS.

2.10 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.

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2.11 MASS CONCRETE

Concrete having a minimum strength of 10 MPa at 28 days

Reinforcement

2.12 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.

2.13 GRADE 500E STEEL

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

2.14 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.

2.15 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).

2.16 TYING WIRE

Mild drawn steel wire not less than 1.2mm diameter.

2.17 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.

Formwork

2.18 TIMBER BOARDS

Dressing or merchantable grade radiata pine to NZS 3631 for shutter face, to obtain the concrete finish specified.

2.19 PROPRIETARY STEEL

An approved proprietary steel formwork and shutter system.

2.20 STRUCTURAL PLYWOOD

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

2.21 TIMBER FALSEWORK

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

2.22 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

2.23 DAMP-PROOF MEMBRANE

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

Accessories

2.24 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.

2.25 CELLULAR POLYSTYRENE INSULATION

Proprietary polystyrene foam board to AS 1366.3. Refer to SELECTIONS.



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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 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/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

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.

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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 insulation

3.14 INSTALL UNDERSLAB POLYSTYRENE INSULATION

Install polystyrene insulation system to manufacturer's requirements.

Install reinforcing / cast-in items

3.15 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.

3.16 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.

3.17 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.

3.18 ADJUSTMENTS

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

3.19 TOLERANCES

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

3.20 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.

3.21 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).

3.22 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:

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

Do not count bar extensions beyond the outermost cross wire

3.23 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

3.24 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.

3.25 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.

3.26 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

3.27 CASTING IN

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

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

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

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

3.28 EQUIPOTENTIAL BONDING REINFORCING

If required by AS/NZS 3000 clause 5.6, ensure that reinforcing is electrically equipotential bonded (or at least conductor cable attached) before the concrete is poured. For bonded reinforcing ensure all reinforcing is interconnected with good contact at joints and tight conductive ties.

Place concrete

3.29 CONSTRUCTION JOINTS

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

3.30 PRE-PLACEMENT INSPECTION

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

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3.31 UNFAVOURABLE CONDITIONS

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

3.32 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.

3.33 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.

3.34 TRANSPORT CONCRETE

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

3.35 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.

3.36 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.

3.37 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).

3.38 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.

Floor slabs to NZS 3604 or NZS 4229

3.39 FLOOR SLABS TO NZS 3604

Generally for slabs on ground to NZS 3604 as modified by NZBC B1/AS1 and NZBC E2/AS3. Construct to NZS 3604, 4.5 Concrete and concrete masonry and NZS 3604, 7.5, Concrete slab-on-ground floors in timber buildings as modified by NZBC B1/AS1, 3.0 Timber. Lay to true and straight surfaces, screeded, floated and steel (manual or power) trowelled finish.

Allow for free joints maximum 24m centres to NZBC B1/AS1, 3.1.13 **NZS 3604**New clause.

3.40 FLOOR SLABS TO NZS 4229

Generally for slabs on ground to NZS 4229 as modified by NZBC B1/AS1 and NZBC E2/AS3. Construct to NZS 4229, 6, Footings and NZS 4229, 7, Foundation walls and concrete slab-on-ground as modified by NZBC B1/AS1, 2.0 Masonry. Lay to true and straight surfaces, screeded, floated and steel (manual or power) trowelled finish.

Allow for free joints maximum 18m centres to NZS 4229, 7.8.5.3 Free joints.

Finishing

3.41 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.

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3.42 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.

3.43 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).

3.44 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.

3.45 CLEAN OUT SAWCUTS

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

Curing

3.46 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.

3.47 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

3.48 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.

3.49 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.

Defects

3.50 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.

3.51 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

3.52 COMPLETION MATTERS

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

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4 SELECTIONS

4.1 FORMWORK

Location: ~
Type: ~
Finish: ~

4.2 DAMP-PROOF MEMBRANE

Location: Refer drawings
Brand/type: ~
Thickness: ~

4.3 CELLULAR POLYSTYRENE INSULATION

Location: Under slab and to exterior of basement walls. Refer drawings.
Brand: ~
Type/grade: ~
Thickness: Refer drawings
R-value:

4.4 SAW CUTS

Location: ~
Spacing: ~

4.5 LOCATION OF CONSTRUCTION JOINTS

Location: ~
Spacing: ~

4.6 REINFORCEMENT LAPS

Where reinforcement laps are not shown on the drawings, lap as follows:

Bar Diameter	Grade 300E deformed	Grade 500E deformed
10mm	400mm	650mm
12mm	500mm	750mm
16mm	650mm	1000mm
20mm	800mm	1250mm
25mm	1000mm	1600mm
32mm	1200mm	2000mm

4.7 WELDED WIRE FABRIC

Location: ~
Type: ~
Wire diameter: ~mm
Pitch: ~mm

4.8 NORMAL CONCRETE (N)

Location: ~
28 day strength: ~ MPa
Aggregate size: ~mm maximum
Pigments: ~

4.9 PRESCRIBED MIX CONCRETE (P)

Location: ~
Slump: ~mm maximum
28 day strength: ~ MPa
Pigments: ~

4.10 SITE CONCRETE

Location: ~
Type/grade: Prescribed Mix Concrete (P) / 10MPa

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4.11 MASS CONCRETE

Location:

Type/grade: Prescribed Mix Concrete (P) / 10MPa

4.12 SURFACE FINISHES

Location:	Surface finish to NZS 3114:
~	~
~	~
~	~

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3114E EXPOL UNDERSLAB INSULATION

1 GENERAL

This section relates to the supply and installation of Expol insulation foam boards for concrete slabs on ground.

It includes:

- EPS and XPS under slab insulation foam boards
- XPS slab edge insulation foam boards

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
EPS	Expanded polystyrene
XPS	Extruded polystyrene

Documents

1.2 DOCUMENTS

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

NZBC H1/AS1-AS2	Energy efficiency
AS 1366.3	Rigid cellular plastic sheets for thermal insulation - Rigid cellular polystyrene - Moulded (RC/PS - M)
NZS 4246	Energy efficiency - Installing bulk thermal insulation in residential buildings
AS/NZS 4859.1	Thermal insulation materials for buildings - General criteria and technical provisions

1.3 MANUFACTURER/SUPPLIER DOCUMENTS

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

Expol under slab / slab edge insulation brochures
Expol technical product guide
Expol technical data sheets
Expol ThermaSlab edge installation instructions
Expol BPIR

Company	Expol Ltd
Web:	www.expol.co.nz
Email:	tech@expol.co.nz
Telephone:	09 634 3449 / 0800 863373
Facsimile:	09 634 0756

Warranties

1.4 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

20 years	For EPS insulation products
15 years	For XPS insulation products

- 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 installation

Refer to the general section 1237 WARRANTIES for additional requirements.

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1.5 WARRANTY - INSTALLER/APPLICATOR

Provide an installer/applicator warranty:

1 year 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

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.

2 PRODUCTS

Materials - under slab insulation

2.1 EXPOL-X

Expol-X, XPS dense rigid foam insulation board. Available in 2500mm x 600mm and a range of thicknesses. 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.

3.3 PROTECT

Do not subject the polystyrene to prolonged saturation or exposure to sunlight. Do not allow the polystyrene to come into contact with solvents.

3.4 PRE-INSTALLATION REQUIREMENTS

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

Installation/application

3.5 STANDARDS AND TOLERANCES

Refer to the general section 1270 CONSTRUCTION for general requirements.

3.6 INSTALLATION - GENERAL

Install under slab insulation to NZBC H1/AS1-AS2 and Expol Ltd installation requirements. Also install to NZS 4246 for all housing and buildings up to 300m².

3.7 INSTALL UNDERSLAB INSULATION

Install the polystyrene sheets once the polythene DPM has been laid. Place the polystyrene sheets on top of the polythene DPM and butt together. Do not place the polystyrene under any footings or slab thickenings. Cut holes in the polystyrene with a sharp knife to accommodate any services. Lay reinforcing steel mesh over the polystyrene on mesh chairs

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Completion

3.8 COMPLETION MATTERS

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

4 SELECTIONS

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

Materials - under slab insulation

4.1 EXPOL-X

Location:	Slab on grade
Brand:	Expol-X
Size:	2500mm x 600mm
Thickness:	40mm
Compressive resistance at 10%:	250kPa
R value:	1.45

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3130 PRECAST CONCRETE

1 GENERAL

This section relates to the off site manufacture and on site installation of precast panels for housing and small scale commercial projects.

1.1 RELATED WORK

Refer to the appropriate concrete section for concrete requirements.

1.2 ABBREVIATIONS AND DEFINITIONS

The following definitions apply specifically to this section:

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

ACRS Web site - www.steelcertification.com

1.3 DOCUMENTS

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

NZBC B1/VM1	Structure
NZBC D1/AS1	Access routes
NZS 3104	Specification for concrete production
NZS 3109	Concrete construction
NZS 3112.1	Methods of test for concrete - Tests relating to fresh concrete
NZS 3114	Specification for concrete surface finishes
NZS 3121	Water and aggregate for concrete
AS/NZS 4671	Steel reinforcing materials
AS/NZS 4672.1	Steel prestressing materials - General requirements
AS/NZS 4672.2	Steel prestressing materials - Testing requirements
AS/NZS ISO 9001	Quality management systems - Requirements
WorkSafe	Safe work with precast concrete: Handling, transportation and erection of precast concrete elements (Good Practice Guidelines).

1.4 MANUFACTURER'S DOCUMENTS

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

~

Copies of the above literature are available from ~

Web:	~
Email:	~
Telephone:	~
Facsimile:	~

Requirements

1.5 PREPLANNING

Prior to shop drawing/manufacture of the precast panels the Contractor, Precaster and other relevant parties, must liaise, to ensure handling, installation and on site requirements are coordinated with the panel production.

1.6 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:

- size, spacing and cover of reinforcement

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- details, position and layout of cast in items, including those for, lifting, handling, fastening and connecting
- details of panel edges
- surface finish requirements and locations
- location and size of rebates, recesses and penetrations
- grout ducts
- concrete grade and other mix requirements
- concrete volume and weight of finished unit for lifting
- for insulated panels, details of insulation, low conduction connectors/ties, vapour barrier

if requested provide the following additional information:
~

Submit shop drawings for review to ~.

- ~ working days (at least) before fabrication is planned to commence, provide shop drawings for review.
- Do not commence fabrication of any panel before shop drawing review of the panel is complete.
- Shop drawing review (and subsequent fabrication) can be carried out on an agreed sectional/staged basis.

1.7 MANUFACTURERS STATEMENT OF COMPLIANCE

Provide a Manufacturer's Statement of Compliance from: Safe work with precast concrete: Handling, transportation and erection of precast concrete elements (Good Practice Guidelines).

1.8 PANEL SURFACE

Use appropriate mould materials, moulding systems and casting methods to achieve the specified surface finishes. Refer to SELECTIONS for surface finishes.

1.9 SAMPLES

Refer to the general section 1270 CONSTRUCTION for details of how samples will be reviewed and how instructions to proceed will be given. Provide the following samples for review:

	Sample A	Sample B	Sample C
Sample description:	~	~	~
Sample type:	~	~	~
Number:	~	~	~
Location:	~	~	~
Supporting documentation:	~	~	~
Reviewer:	Contract administrator ~	Contract administrator ~	Contract administrator ~
Time for review:	10 working days ~	10 working days ~	10 working days ~
Review criteria:	~	~	~

1.10 QUALIFICATION, PRECAST MANUFACTURE

Precast concrete panels manufactured by either;

- a Concrete NZ Certified Plant
- or an off-site precast manufacturer with, an established record of panel production to a similar standard, suitable plant and a quality assurance system to AS/NZS ISO 9001

Use only precast concrete workers skilled and experienced in precast panel production.

1.11 QUALIFICATION, ON SITE WORK

Use only concrete tilt up panel, crane and rigging, contractors skilled and experienced in the erection of tilt up panels.

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Performance

1.12 STEEL REINFORCING COMPLIANCE

Steel reinforcing and steel prestressing materials for concrete to AS/NZS 4671 or AS/NZS 4672.1, respectively. 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.

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.

1.13 CONFIRM STEEL REINFORCING COMPLIANCE

Certification from the supplier confirming that the steel reinforcing supplied complies with the grades specified on the drawings by producing test results to AS/NZS 4671 or AS/NZS 4672.1 and AS/NZS 4672.2. For overseas manufactured steel provide NZ S Mark or ACRS certificate details or approved equivalent.

1.14 TESTING - CONCRETE

Carry out sampling and concrete acceptance tests during construction to NZS 3109: section 9, Concrete acceptance tests during construction.

Conduct 7 day strength tests. After a 7 day test result of less than 60% of the specified strength, concrete placement to stop until it is shown the suspect concrete complies with the specification.

Carry out slump tests, yield tests and air content tests to NZS 3112.1, sections 4, 5 and 9, and evaluate to NZS 3104.2.15. Control tests and their evaluation. Make available all test records to the contract administrator on request.

1.15 QUALITY ASSURANCE

Carry out the whole of this work to the requirements of NZS 3109 and under the regime of a quality systems for quality assurance in production and erection.

Advise the name of the suitably experienced and qualified representative who is responsible for quality control of the concrete work. The representative is to sign a written quality control checklist for each concrete pour.

1.16 INSPECTION NOTIFICATION REQUIREMENTS

~

1.17 INSPECTIONS BY CONSTRUCTION REVIEWER

~

1.18 INSPECTIONS BY BUILDING CONSENT AUTHORITY

~

1.19 WATERPROOFING FOR EXTERNAL OPENINGS

The waterproofing for openings system is covered in the following section:

~

To be done by others.

1.20 WEATHERTIGHTNESS SYSTEM

The weathertightness system is covered in the following section:

~

To be done by others.

1.21 SITE LOADINGS, PERMANENT STRUCTURE

Prevent damage to supporting structure from stacking of precast items.

Performance – Slip resistance

1.22 SLIP RESISTANCE - SURFACES EXEMPT FROM TESTING

Walking surfaces comply with NZBC D1/AS1, Table 2 for slip resistance requirements and are exempt from testing.



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1.23 SLIP RESISTANCE - PREVIOUSLY TESTED SURFACE

The following walking surfaces have previously been tested for slip resistance, and comply with NZBC D1/AS1 requirements.

~

1.24 TEST - SLIP RESISTANCE

Test walking surfaces for slip resistance, refer to SELECTIONS for test condition.

2 PRODUCTS

2.1 CONCRETE

To NZS 3104.
Refer to CONCRETE section for concrete supply and to SELECTIONS for concrete strength.

2.2 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.

2.3 GRADE 500E STEEL

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

2.4 WELDED WIRE FABRIC

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

2.5 SPACERS AND CHAIRS

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

Components

2.6 LIFTING INSERTS

Proprietary lifting inserts to: Safe work with precast concrete: Handling, transportation and erection of precast concrete elements (Good Practice Guidelines). Minimum finish galvanized mild steel.

Ensure all cast-in insert systems used are capable of allowing the insert void finish required in SELECTIONS.

2.7 CAST IN STEEL ITEMS

Cast in items as detailed and required. Ensure items are pre-finished where required.

2.8 LEVELLING SHIMS

Rigid plastic or other suitable levelling shims to: Safe work with precast concrete: Handling, transportation and erection of precast concrete elements (Good Practice Guidelines).

2.9 SEALANTS

Polysulphide, polyurethane or silicone gap filling proprietary sealants.

3 EXECUTION

Conditions

3.1 HANDLE, TRANSPORT AND STACK

Handle, transport and stack panels to ensure support that avoids distortion and stress and at the same time protects the finished surfaces from chipping, scoring, cracking or other disfigurement. Storage methods and packing between panels should minimise colour variations to exposed surfaces.

Arrange delivery and erection of precast panels to minimise handling, storage or restacking on site.

Manufacture

3.2 TOLERANCES, OFF-SITE PRECAST, CRITICAL

Manufacture panels to the following tolerances:

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Item			Tolerance
Length and height:		< 3.0 metres	± 3mm
	Generally	> 3.0 metres	± 5mm
	Cladding	> 3.0 metres	± 3mm
Thickness overall:			± 3mm
Deviation from square:	Length	< 4.0 metres	0.0015 L
(difference in length between two diagonals)			
Twist:			± 3mm
(any one corner out of plane passing through other three corners)			
Position of panel openings and cast in items:			± 3mm

Other tolerances to NZS 3109, Table 5.1 - Tolerances for Pre-cast components reduced by 40%. Before casting, ensure moulds will result in the finished panels complying with tolerances.

3.3 TOLERANCES, OFF-SITE PRECAST, STANDARD

Manufacture panels with tolerances to NZS 3109, table 5.1, Tolerance for precast components.

3.4 SECURE REINFORCEMENT

Secure adequately with tying wire, spacers or other suitable means, and place accurately where detailed, supported and secured against displacement. Ensure minimum concrete cover is maintained.

3.5 CONCRETE PLACING

Carefully place concrete to ensure all parts of the mould are completely filled and full contact is made with the mould surface. Use appropriate compaction techniques to achieve the required finish.

3.6 CASTING IN ITEMS

Accurately cast in all embedded items and fixings as detailed, all securely located to avoid displacement during concrete placement and compaction. Where bolts are cast in, also provide the nut (free moving on the bolt).

3.7 CURING

Confirm in writing the system to be used for curing concrete. Cure panels, for a minimum of 7 days and until minimum strength is achieved for safe lifting, handling, transportation and erection.

Installation

3.8 INSTALLATION

Carry out work in accordance with: Safe work with precast concrete: Handling, transportation and erection of precast concrete elements (Good Practice Guidelines). Where proprietary lifting inserts are being used, ensure that lifting clutches are the correctly sized and from the same supplier.

Prior to lifting any panels from the truck, check and make a record of any damage to the panels, and obtain approval from the Contract Administrator before incorporating a damaged panel into the work.

3.9 SETTING OUT

Confirm panel dimensions, set out and site conditions. Also check starter bars, grout tube positions and fixing points. Check all temporary support work is ready, correct and capable of taking imposed loads.

3.10 TOLERANCES, ON - SITE EXECUTION

Locate precast items to the following tolerances:

Plan:	± 10mm
Vertical:	± 1mm/metre
Panel Joint width:	± 1mm/metre; but no panel joint shall be less than 10mm, or more than 20mm (unless indicated otherwise on drawings)

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3.11 LIFTING

Mobile crane positions to be arranged and prepared prior to panel delivery to provide safe lifting. Ensure that all cranes can provide safe and easy movement of panels, as well as careful positioning. Check that rigging, straps, etc, suit the panel design and lifting points. Panels are to remain attached to the crane until they are either fully fixed into their final position or adequately secured by temporary means.

3.12 PROPPING AND BRACING

Provide temporary adjustable props or braces to secure the panel in position until final support is provided. They must be able to withstand the expected wind loads on the panel for the site and position.

3.13 PLACING

On positioning of the panel, check that all reinforcing and fixings line up with the appropriate items on the preceding work. Also check fixings will function as intended, in particularly fixings required to accommodate seismic movement. Ensure that there is no damage caused to the panel, surrounding surfaces or fixings during placing.

3.14 FINAL POSITION

Adjust panels into final position, check alignment, verticality, joint widths etc, and fix into place.

3.15 GROUT DUCTS

Fill grout ducts with expansive grout, ensure ducts are completely filled.

3.16 POST PLACING ADJUSTMENTS

After permanent placing check and adjust as necessary;

- all fixings for correct alignment and operation, and check the torque on all nuts and bolts - not less than 1 day after final fixing.
- recheck that all props, braces and fastenings are secure and capable of performing as required - not less than 1 day and not more than 7 days after a panel is fixed into position and held by temporary means.
- if panels are subject to, high wind loads, unintended or accidental loads during construction, recheck props braces and fastenings.

3.17 SEALANTS

Ensure at time of erection, that the limits of acceptable joint variation (from the manufacturer's requirements) for each product are maintained. Prepare joints, protect adjoining surfaces, seal joint surfaces, fit limiting rods and insert sealant to the manufacturer's requirements and temperature limits.

3.18 CLEAN AND DRESS

Clean and dress panels externally and internally to leave them to the standard of finish specified and without blemish, ensuring following work can be completed to the required standard. Refer SELECTIONS for insert void finish.

3.19 CLEAN UP

Clean up surrounding areas of trade waste and remove temporary works required for the installation of the precast concrete items.

3.20 REMOVE

Remove debris, unused materials and elements from the site.

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4 SELECTIONS

4.1 TEST - SLIP RESISTANCE

Test walking surface for slip resistance to comply with NZBC D1/AS1, 2.1 Slip resistance. Refer to 1278SR SCHEDULE OF SLIP RESISTANCE TESTING for test method, minimum test value required and general reporting requirements.

Location: ~
Surface: ~
Test condition: ~
Level / slope: ~
Specific reporting requirements: ~

4.2 PRECAST CONCRETE STRUCTURAL PANELS

Location: ~
Supplier: ~
Aggregate size: ~mm
Slump: ~mm maximum
Cement content: ~ kg/m³ maximum
28 day strength: ~ MPa
Admixture: ~
Formed finish: F5
Unformed finish: U3

4.3 PRECAST CONCRETE STAIR

Location: As shown in drawings (2x locations)
Supplier: ~
Aggregate size: ~mm
Slump: ~mm maximum
Cement content: ~ kg/m³ maximum
28 day strength: ~ MPa
Admixture: ~
Tread finish: ~
Riser finish: ~
Soffit finish: ~
Side finish: ~

4.4 PRECAST CONCRETE STAIR LANDING

Location: As shown in drawings (2x locations)
Supplier: ~
Aggregate size: ~mm
Slump: ~mm maximum
Cement content: ~ kg/m³ maximum
28 day strength: ~ MPa
Admixture: ~
Landing surface finish: ~
Soffit finish: ~
Side finish: ~

4.5 INSERT VOID FINISH

Lifting/cast-in insert voids to have the following finish.

Location: ~
Finish: ~

Note: inserts must not permanently project beyond panel face unless stated otherwise and for any flush finishes inserts must be removable or recessed well back from the panel face.

4.6 LEVELLING SHIMS

Manufacturer: ~

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Brand name: ~

4.7 FLASHINGS

~

4.8 SEALANTS

Location: ~

Manufacturer/type: ~

4.9 WATERPROOFING FOR EXTERNAL OPENINGS

The waterproofing for openings system is covered in the following section:

~

To be done by others.

4.10 WEATHERTIGHTNESS SYSTEM

The weathertightness system is covered in the following section:

~

To be done by others.



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3151C STEEL & TUBE COMFLOR COMPOSITE FLOOR SYSTEM

1 GENERAL

This section relates to the supply and installation of composite steel/concrete floor systems:

- **ComFlor SR (CFSR)**
- **ComFlor 60 (CF60)**
- **ComFlor 80 (CF80)**
- **ComFlor 210 (CF210)**

1.1 RELATED WORK

Refer to ~ for ~.

1.2 DOCUMENTS

Refer to the general section 1233 REFERENCE 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 1397	Continuous hot-dip metallic coated steel sheet and strip - Coatings of zinc and zinc alloyed with aluminium and magnesium
AS 1554.2	Structural steel welding - Stud welding (steel studs to steel)
AS/NZS 2327	Composite Structures - Composite steel-concrete construction in buildings
AS/NZS 3000	Electrical installations (known as the Australian/New Zealand Wiring Rules)
NZS 3101.1	Concrete structures standard
NZS 3104	Specification for concrete production
NZS 3109	Concrete construction
NZS 3114	Concrete surface finishes
NZS 3121	Water and aggregate for concrete
NZS 3122	Portland and blended cements (General and special purpose)
NZS 3404.1	Steel Structures Standard
AS/NZS 4671	Steel reinforcing materials
AS/NZS ISO 9001	Quality management systems - Requirements
AS/NZS ISO 13918	Welding - studs and ceramic ferules for arc stud welding
HERA R4-107	Composite Floor Construction Handbook - 2005
CMP 1004	Suspended slabs flatness tolerances (Steel Advisor, SCNZ)
CMP 1005	Suspended slabs level tolerances (Steel Advisor, SCNZ)

1.3 MANUFACTURER/SUPPLIER DOCUMENTS

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

Steel and Tube ComFlor Design Information ComFlor SR
Steel and Tube ComFlor Product Guide ComFlor 60
Steel and Tube ComFlor Product Guide ComFlor 80
Steel and Tube ComFlor Product Guide ComFlor 210
Steel and Tube Design Details
ComFlor Quick reference load span tables - ComFlor SR, ComFlor 60, ComFlor 80, ComFlor 210
ComFlor Instructional Video Series on www.comflor.co.nz

Manufacturer/supplier contact details

Company:	Steel & Tube Holdings Limited
Web:	www.comflor.co.nz
Email:	comflortechnical@steelandtube.co.nz
Telephone:	0800 266 356

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Requirements

1.4 NO SUBSTITUTIONS

Substitutions are not permitted to any specified ComFlor composite steel/concrete floor systems, or associated components and products.

1.5 QUALIFICATIONS

Carry out work with experienced, competent installers familiar with the installation of composite steel/concrete floor systems.

For approved ComFlor installers contact:

- Composite Floor Decks Ltd, Nationwide, telephone +64 9 273 1111
- email: comflorsales@steelandtube.co.nz
- website: www.studwelders.co.nz

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.

Compliance information

1.7 INFORMATION REQUIRED FOR CODE COMPLIANCE

Provide the following compliance documentation: -

- Producer Statement - Construction from the applicator / installer
- Producer Statement - Construction Review from an acceptable suitably qualified person
- Other information required by the BCA in the Building Consent Approval documents.

Performance - Fire

1.8 PROTECTION FROM FIRE

Specific design for fire rating to NZS 3101.1 and AS/NZS 2327, Section 7.

1.9 SURFACE FIRE PROPERTIES

ComFlor composite steel/concrete floor systems can be assigned a Group Number 1-S to BPS, Table 8.5.2.1: Material Group Numbers for some substrate and coating combinations.

2 PRODUCTS

Materials

2.1 COMFLOR SR COMPOSITE FLOOR DECKING

Roll formed G500 and G550 high tensile galvanized steel interlocking flat soffit re-entrant profiled panels 600mm cover x 55mm high, 0.75mm, 0.9mm, 1.0mm and 1.25mm nominal thickness with Z275 and Z450 zinc coating to AS 1397. Refer to SELECTIONS.

2.2 COMFLOR 60 COMPOSITE FLOOR DECKING

Roll formed G500 high tensile galvanized steel interlocking trapezoidal profiled panels 600mm cover x 60mm high (75mm overall), 0.75mm, 0.9mm, 1.0mm and 1.2mm nominal thickness with Z275 and Z450 zinc coating to AS 1397. Refer to SELECTIONS.

2.3 COMFLOR 80 COMPOSITE FLOOR DECKING

Roll formed G500 high tensile galvanized steel interlocking trapezoidal profiled panels 600mm cover x 80mm high (95mm overall), 0.9mm and 1.2mm nominal thickness with Z275 and Z450 zinc coating to AS 1397. Refer to SELECTIONS.

2.4 COMFLOR 210 COMPOSITE FLOOR DECKING

Roll formed G500 high tensile galvanized steel interlocking trapezoidal profiled panels 600mm cover x 210mm high, 1.25mm nominal thickness with Z275 and Z450 zinc coating to AS 1397. Refer to SELECTIONS.

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Components - supplied by ComFlor

2.5 PROFILED END CAP

ComFlor profiled end closure, folded G250 galvanized steel, 0.9mm nominal thickness with Z275 and Z450 zinc coating to AS 1397, supplied in 2.4m lengths. Refer to SELECTIONS.

2.6 NON-PROFILED CLOSURE ANGLE

Folded G250 galvanized steel, 0.9mm nominal thickness with Z275 and Z450 zinc coating to AS 1397, supplied in 2.4m lengths. Refer to SELECTIONS.

2.7 COMFLOR 210 END SUPPORT DIAPHRAGM

Folded G250 galvanized steel, 1.5mm nominal thickness with Z275 and Z450 zinc coating to AS 1397, supplied in 2.4m lengths. Refer to SELECTIONS.

2.8 COMFLOR 210 SHEAR-BOND CLIPS

1.2mm gauge galvanized steel clips.

2.9 EDGE TRIM, Z TRIM AND FLAT PLATE

ComFlor edge trim, Z trim and flat closure plate, G250 galvanized steel, 0.9mm, 1.2mm, 1.6mm and 2.0mm nominal thickness with Z275 and Z450 zinc coating to AS 1397, supplied in 2.4m lengths. Refer to SELECTIONS.

2.10 RESTRAINT STRAP

G250 galvanized steel, 0.55mm nominal thickness with Z275 zinc coating to AS 1397, supplied in 2.4m lengths.

2.11 CONSTRUCTION JOINT FORMER

G250 galvanized steel profile 0.55mm nominal thickness with Z275 zinc coating to AS 1397, supplied in 1.2m lengths.

2.12 HANGER FIXINGS

Galvanized steel M10 wedge nut, M10 40mm x 3.0mm fender washer, M10 lock nut and M102ZTR threaded rod.

Components - supplied by others

2.13 SHEAR CONNECTORS

Shear connectors are either welded or connected directly to the beam or through the ComFlor to the project engineer's design. Alternative connectors can be used by specific design.

Material for arc stud welding to AS/NZS ISO 13918. Supplied studs shall comply with SD1 requirements of AS/NZS ISO 13918. Studs shall be supplied with type 3.1 inspection documentation, made available to Construction Reviewer upon request. Refer to SELECTIONS.

2.14 REINFORCING STEEL

Grade 500 deformed bars to AS/NZS 4671.

2.15 STEEL MESH

Hard drawn steel wire spot welded to AS/NZS 4671, deformed and to mesh dimensions shown on the drawings.

2.16 TYING WIRE

Mild steel drawn wire not less than 1.2mm diameter.

2.17 CONCRETE

The concrete producer is responsible for mix design and properties to NZS 3104.

Cement:	To NZS 3122
Aggregate:	To NZS 3121
Rate of sampling:	For compressive strength testing - refer to SELECTIONS.

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Accessories - supplied by others

2.18 SCREWS & FASTENERS

Shot fired pins, self-drilling screws and fasteners as scheduled/shown on the drawings.

2.19 EXPANDING FOAM

Self-expanding flexible polyurethane foam.

2.20 TEMPORARY BEARERS AND PROPS

Design of propping by others. Refer to SELECTIONS/drawings for type and location.

2.21 TIMBER FORMWORK

No. 2 framing and dressing or merchantable grade radiata pine boards to obtain the concrete finish specified for adjoining concrete work.

3 EXECUTION

Conditions

3.1 DEFECTS

Discard material showing visual defects or damage affecting its structural integrity and/or appearance.

3.2 DELIVERY, STORAGE AND HANDLING

Keep all components dry in transit. Store on a level firm base, clear of the ground on timber bearers, protected from weather, contamination and damage and away from current work areas. Prevent water and condensation from being trapped between adjacent surfaces.

Do not drag sheets across each other or other materials. Protect edges and surfaces from damage and ensure that section shape is not damaged during handling, storage or installation.

3.3 CONFORM

Conform to NZS 3101.1, NZS 3404.1, AS/NZS ISO 9001 and AS/NZS 2327 in the design, materials and manufacture of the steel decking.

Application - Generally

3.4 MODIFICATIONS

Cutting, drilling or modification of steel decking unless shown on the drawings, may only be carried out after receiving written approval from the design engineer.

3.5 CUTTING

Cut steel decking with a grinder, nibbler or plasma only. Remove debris and detritus from the ComFlor surface prior to concrete pour.

3.6 PROPPING

Locate bearers and props as shown on the drawings. Propping to be level, vertical and rigidly braced to support the entire width of the steel decking and the construction work. Do not remove the propping structure until the concrete has reached at least 75% of its required design strength, or all construction loading has been removed and written direction of the design engineer has been obtained.

Application - ComFlor decking

3.7 FIX COMFLOR 60 PROFILED END CAP

Fit and fix ComFlor 60 profiled end cap strips to the supporting structure, using a minimum of 3 fixings per 2.4 metre length in accordance with ComFlor 60 Product Guide.

3.8 FIX COMFLOR 80 PROFILED END CAP

Fit and fix ComFlor 80 profiled end cap strips to the supporting structure, using a minimum of 3 fixings per 2.4 metre length in accordance with ComFlor 80 Product Guide.

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3.9 FIX COMFLOR 210 END SUPPORT DIAPHRAGMS

Fit and fix ComFlor 210 end support diaphragms to the supporting structure, using a minimum of 3 fixings per 2.4 metre length in accordance with ComFlor 210 Product Guide.

3.10 ERECT & PLACE COMFLOR SR

Erect and place the ComFlor SR decking as shown on the drawings with continuous seating at support lines with 50mm minimum end bearing of the sheets on steel (75mm on masonry). Lay sheets square and true to line and level and screw together using 12g - 14tpi x 20mm self drilling screws, one every second pre-punched hole, to ComFlor requirements. Decking sheets shown as continuous on the decking layout should never be cut into more than one sheet. Fasten to permanent support structure as detailed on the drawings. Fill open dovetail ends with expanding foam.

3.11 ERECT AND PLACE COMFLOR 60

Erect and place the ComFlor 60 decking as shown on the drawings with continuous seating at support lines with 50mm minimum end bearing of the sheets on steel (75mm on masonry). Lay sheets square and true to line and level and screw together using 12g - 14tpi x 20mm self-drilling screws, one every second pre-punched hole, to ComFlor requirements. Decking sheets shown as continuous on the decking layout should never be cut into more than one sheet. Fasten to permanent support structure as detailed on the drawings.

3.12 ERECT AND PLACE COMFLOR 80

Erect and place the ComFlor 80 decking as shown on the drawings with continuous seating at support lines with 50mm minimum end bearing of the sheets on steel (75mm on masonry). Lay sheets square and true to line and level and screw together using 12g - 14tpi x 20mm self-drilling screws, one every second pre-punched hole, to ComFlor requirements. Decking sheets shown as continuous on the decking layout plan should never be cut into more than one sheet. Fasten to permanent support structure as detailed on the drawings.

3.13 ERECT AND PLACE COMFLOR 210

Erect and place to ComFlor requirements. Manually place the ComFlor decking onto the CF210 end support diaphragm as shown on the drawings with 50mm minimum end bearing of the sheets on steel (75mm on masonry). The pre-punched hole along the side lap should remain visible from above if the lap is correctly oriented. Lay sheets square and true to line and level. As each sheet is placed, fix crest section of the deck to the top of the end support diaphragm using one self-drilling screw per sheet end. Once the sheets for a whole bay are in place, secure the deck to the beams using one heavy-duty shot fired fixing or self-drilling screw per trough.

3.14 FIX SHEAR BOND CLIPS COMFLOR 210

Fit and fix shear bond clips along the bottom of the trough of each sheet at 350mm centres using minimum 5.5mm diameter self-drilling fasteners through every pre-punched hole.

3.15 FIX NON-PROFILED CLOSURE ANGLE

Cut non-profiled closure angle to length, position over open ends of ComFlor profile and fix to ComFlor in accordance with ComFlor Product Guide.

3.16 FIX COMFLOR EDGE TRIM

Fit and fix galvanized steel edge trim, fixed to the support structure, with the top of the trim connected to the decking with restraint straps at 600mm centres using pop-rivets or self-drilling fasteners in accordance with ComFlor Product Guide. Prop unsupported edges.

3.17 FIT COMFLOR Z TRIM AND FLAT PLATE

Fit and fix galvanized steel Z trim and flat closure plates, fixed to the support structure and to the decking in accordance with ComFlor Product Guide. Prop unsupported edges.

3.18 INSTALL SHEAR CONNECTORS

Site flash weld steel studs or shear connectors to AS/NZS 5131 and AS 1554.2 as scheduled/shown on the drawings. Provide a Producer Statement confirming compliance with the control procedures.

3.19 FORM OPENINGS AND PENETRATIONS IN THE SLAB

Form openings and penetrations as detailed and in accordance with ComFlor Product Guide, ensuring no trough reinforcing is severed, unless specifically designed for.



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3.20 CONSTRUCTION JOINTS

Position the ComFlor Construction Joint Former as shown on the drawings and in accordance with ComFlor Product Guide, fixed in place through every pre-punched hole.

Application - Reinforcement and concrete

3.21 PLACE REINFORCEMENT

Place mesh and reinforcement as detailed and to the requirements of 3112 REINFORCEMENT FOR CONCRETE. Top cover 30mm, unless specifically detailed otherwise.

3.22 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.

3.23 CONCRETE PLACEMENT

Before commencing the concrete pour, ensure the decking is clean, free of dirt, grease, debris and water.

Discharge concrete in a controlled manner from no higher than 300mm.
Spread the concrete evenly without excessive heaping.
Maintain a 1 metre working zone between workers in order to minimise local loading of any one part of individual sheets.
Never exceed a construction load of 1.5kPa.

Refer to the ComFlor Instructional Video Series on www.comflor.co.nz, ComFlor Product Guides, HERA R4-107, and CMP 1004 and CMP 1005 in addition to NZS 3109 for full instructions on placement and finishing of the concrete.

For assistance with pour sequencing for individual projects, contact comflortechnical@steelandtube.co.nz or 0800 266 356.

3.24 SLAB FINISHING

Screed and provide a finish to NZS 3114: table 2, Classes of floor, exterior pavement, invert finishes, and 3121 CONCRETE PLACEMENT. Refer also to CMP 1004 and CMP 1005 for specific comment regarding concrete finishes on suspended floor systems.

3.25 CONCRETE CURING

To minimise cracking and shrinkage deflections, keep concrete damp for seven days. Keep time between placing and start of curing concrete to an absolute minimum.

3.26 PROP REMOVAL

Do not remove temporary props until the concrete has achieved at least 75% of the design strength or all construction loading has been removed and the written direction of the design engineer has been obtained.

3.27 CLEAN DOWN

At completion of concrete placement, clean the underside of the steel decking of any grout loss to ensure surface is not damaged or marked.

Application - Hanger fixings

3.28 INSTALL HANGER FIXINGS

Thread M10 lock nut and M10 40mm x 3mm flange washer onto threaded rod before threading M10 wedge nut until rod meets the reverse side of the wedge nut. Insert wedge nut into dovetail of ComFlor profile. Continue threading rod through the wedge nut until rod meets the top of the dovetail and the wedge nut rotates 90° to lock into position. Tighten lock nut and washer to underside of ComFlor profile to secure.

Completion

3.29 COMPLETION MATTERS

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

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4 SELECTIONS

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

ComFlor SR

4.1 COMPOSITE FLOOR DECKING - COMFLOR SR

Location:	Roof substrate between Grids L-M as shown in Architectural and Structural drawings
Brand/type:	ComFlor SR150 (CFSR)
Profile height:	55mm
Gauge/grade:	1.25mm thick
Coating thickness:	Z275 Galvanized Zinc Coating
Sheet length:	Refer to structural drawings
Edge trim gauge:	~
Edge trim height:	~mm
End closure:	~

4.2 SHEAR CONNECTORS - COMFLOR SR

Stud height:	Refer to structural drawings
Diameter:	Refer to structural drawings
Number per pan:	Refer to structural drawings

Steel reinforcement and concrete

4.3 REINFORCING STEEL

Trough bar:	Refer to structural drawings
Bottom cover:	Refer to structural drawings
Bar grade:	Refer to structural drawings
Mesh size:	Refer to structural drawings
Mesh cover:	Refer to structural drawings

4.4 CONCRETE

Mix:	Refer to structural drawings
Strength:	Refer to structural drawings
Thickness:	Refer to structural drawings
Aggregate size:	Refer to structural drawings
Admixture:	Refer to structural drawings
Slump:	Refer to structural drawings
Rate of sampling:	For compressive strength testing - one sample per ~ m^3 (but not less than one for each day of use).
Slab Finish:	~

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3321F FIRTH CONCRETE MASONRY

1 GENERAL

This section relates to the laying, reinforcing and grouting of **Firth** hollow concrete masonry. It includes:

- **Firth** hollow block masonry
- including mortar, reinforcement and ready-mix grout

1.1 RELATED WORK

Refer to ~ for ~

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:

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

1.3 DOCUMENTS

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

AS/NZS 3000	Electrical installations (known as the Australian/New Zealand Wiring Rules)
NZS 3104	Specification for concrete production
NZS 3109	Concrete construction
NZS 3112.1	Methods of test for concrete - Tests relating to fresh concrete
NZS 4210	Masonry construction - Materials and workmanship
AS/NZS 4455.1	Masonry units, pavers, flags, and segmental retaining wall units - Masonry units
AS/NZS 4671	Steel reinforcing materials
CCANZ CP 01	Code of Practice for Weathertight Concrete and Concrete Masonry Construction

1.4 MANUFACTURER/SUPPLIER DOCUMENTS

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

Firth Industries documents relating to work in this section are:
Firth Masonry Homes Construction Manual
Firth Cantilever Masonry Retaining Walls Manual
Firth Hollow Masonry Document
Firth Design Masonry Control Joint Specification

Manufacturer/supplier contact details

Company:	Firth Industries Limited
Email:	info@firth.co.nz
Web:	www.firth.co.nz
Telephone:	09 583 2121 0800FIRTH 1 (0800347841)

Requirements

1.5 NO SUBSTITUTIONS

Substitutions are not permitted to any specified **Firth** hollow concrete masonry or associated products.

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1.6 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.

1.7 CONSTRUCTION OBSERVATION BY ENGINEER

Where required as a condition of the building consent, advise the engineer when inspections are required.

Obtain the producer statements required from the engineer relating to the masonry construction and keep with the building consent documentation.

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.

1.9 SELECTED MASONRY

Refer to the drawings for areas of masonry, which require select quality blocks to both sides, water resistant masonry or mortarless masonry.

1.10 CERTIFICATION - SEALERS FOR MASONRY

Paints and clear sealers to CCANZ CP 01. The sealer applicator is to certify that the sealer application is in accordance with the design and manufacturer's specification. Provide certification to the Contract Administrator.

1.11 CERTIFICATION - PLASTERING FOR MASONRY

Plaster coatings to CCANZ CP 01. The plaster applicator is to certify that the plaster application is in accordance with the design and manufacturer's specification. Provide certification to the Contract Administrator.

1.12 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.

Performance - tests

1.13 TESTS

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

1.14 RECORDS OF TESTS

To NZS 4210 and kept on site:

- spread of grout tests
- grout supplier test certificates.
- mortar

1.15 TESTING PROCEDURES

Provide advance notice of cell filling work. If requested maintain on site all equipment necessary for taking and preparing samples for test. Retain records of test results and supply on request.

1.16 SPREAD OF GROUT

If requested, carry out tests to NZS 3112.1, to the requirements of NZS 4210.

1.17 COMPRESSIVE STRENGTH OF GROUT

If requested, carry out tests to NZS 4210: appendix 2A, Compressive strength tests for mortar and grout, with 3 specimens per test.

1.18 COMPRESSIVE STRENGTH OF MORTAR

If requested, carry out tests to NZS 4210: appendix 2A, Compressive strength tests for mortar and grout, with 3 specimens per test.


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1.19 EXPANSION OF GROUT

If requested, carry out tests to NZS 4210: appendix 2C, Test for expansion of grout.

2 PRODUCTS

Materials

2.1 MASONRY

Firth masonry blocks to AS/NZS 4455.1. Use appropriate masonry for intermittently filled construction where vertical reinforcement is placed prior to laying of masonry. Refer to SELECTIONS for type, size and bond.

2.2 REINFORCEMENT

To AS/NZS 4671, deformed mild steel except for ties in plain round mild steel.

2.3 JOINT REINFORCEMENT

Galvanized steel twin 4mm diameter rods spaced 60mm apart by a 2mm diameter lattice welded on.

Accessories

2.4 MORTAR

Dricon Trade Mortar to NZS 4210: 2.2 Mortar. Refer to SELECTIONS for colour.

2.5 COARSE AGGREGATE GROUT

Firth Certified ready-mixed blockfill to NZS 4210: 2.3 and NZS 3104.

Strength:	17.5 MPa
Aggregate:	4.75mm to 13.2mm maximum

2.6 FINE AGGREGATE GROUT

Firth Certified ready-mixed grout to NZS 4210: 2.3 and NZS 3104.

Strength:	17.5 MPa (unless subject to seaspray zone)
Aggregate:	4.75mm to 6mm maximum

2.7 EXPANSIVE AGENT

Proprietary admixture based on aluminium powder providing controlled expansion prior to initial set. Use in strict accordance with the manufacturers requirements. Add the required measured dose of agent to the agitator truck on site, immediately prior to grouting. Ensure thorough mixing for 3 to 5 minutes before discharge.

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 PROGRESSIVE CLEANING

Clean off mortar splashes and grout spills as they occur.

3.4 COMPLIANCE

Comply with NZS 4210.

3.5 TOLERANCES

Construct within the tolerances set out in NZS 4210: clause 2.6.5, Tolerances and clause 2.7, Laying the units, unless specified otherwise on the drawings or in this specification. Lay blocks with jointing of consistent thickness throughout.

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Lay masonry to an even, plane surface with no deviation exceeding 3mm in 3 metres on any surface in view in the finished work.

3.6 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.

3.7 CONSTRUCTION JOINTS

Ensure the structural integration of all masonry with adjacent concrete work by providing well roughened, retarded construction joints at all junctions.

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.

3.8 COVER

All cover shall be in accordance with NZS 3109: 3.8 Cover and 3.9 Tolerances for reinforcement.

3.9 STARTER POSITIONS

Check the location of starter reinforcement before block laying commences, or by a dry trial lay up of the first course. Do not attempt to correct misplacement by cranking bars. Where misplacement exceeds the location tolerance obtain written directions before proceeding further.

3.10 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.

3.11 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. Keep masonry on the pallet and protected from the weather prior to use.

3.12 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 and protected from weathering prior to sealing to avoid instances of efflorescence and staining.

3.13 WEATHER PRECAUTIONS

When extreme temperatures prevail, either below 4°C or above 27°C, make adjustments to construction as listed in NZS 4210: clause 2.18, Cold weather construction, and clause 2.19, Hot weather construction. Do not use expansive grout for filling in temperatures below 5°C.

Application

3.14 SELECTION

For fair face walls select blocks for consistent colour, texture and lack of imperfections. Refer to clause PROTECTION.

3.15 BONDING PATTERN

Unless specifically shown or described otherwise in SELECTIONS/drawings, lay masonry in stretcher bond with full masonry bonding at intersections.

3.16 OPEN-ENDED DEPRESSED WEB MASONRY

Use open-ended depressed web masonry throughout all courses in fully grouted walls.

3.17 CUTTING

Cut using a masonry saw to provide clean, accurate cuts.



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3.18 BEDDING FOR PARTIALLY FILLED WALLS

Lay blocks on shell bedding, with full bedding of the cross webs at positions of filled cells of intermittently filled walls.

3.19 FACE SHELL BEDDING

Lay masonry on full mortar beds under face shells only where fully grouted.

3.20 BOTTOM COURSE

For fully grouted walls use inverted open-end depressed web bond beam masonry for the first course, to permit clean-out of grout space at the base.

3.21 CLEAN OUT HOLES

Use special clean-out masonry or saw off a 100mm x 200mm high section of face shell at the base of all cells containing reinforcement, to form clean out and inspection holes.

3.22 GROUT SPACE

Ensure that grouting cells at reinforcement locations are continuously clear by removal of projecting mortar.

3.23 TIE REINFORCING STEEL

Tie vertical reinforcing steel to starter bars. Lay and tie horizontal bars as the work proceeds.

3.24 REINFORCEMENT LAPS

Lap at 40 diameters for 300 grade and 70 diameters for 500 grade, except as noted otherwise on the drawings.

Plain bars lapped splices must be hooked.
For shrinkage control joint reinforcing refer to clause CONTROL JOINTS.

3.25 BRACING

Provide temporary lateral bracing to the wall where necessary to ensure stability and until final supporting construction is in place.

3.26 NON EXPOSED MASONRY

To be laid to the same tolerances as fair face masonry. Joints to be tooled and struck off flush.

3.27 TOOLED JOINTS

Finish joints on exposed masonry by tooling to produce a neat, tight joint. Refer to the drawings for details.

3.28 CONTROL JOINTS

Refer to NZS 4210: clause 2.10, Methods of controlling wall movements, generally and to clause 2.10.2, Vertical control joints, for location; not more than 6 metres apart.

Debond reinforcement passing through control joints 150mm each side for single walls and 300mm one side for 2 walls. Rake out and prime adhesion faces of vertical control joints between masonry and between masonry and concrete as required by the sealant manufacturer. Use masking tape to avoid over-run of sealant onto the block face. Provide a backing strip to limit sealant depth to 10mm, and insert sealant, all to the manufacturer's requirements.
Construction of control joints to NZS 4210.

Grouting of bond beams at control joint locations to be discontinuous unless specifically noted otherwise.

Application - grouting

3.29 INSPECTION

Inspect clean-out holes prior to grouting. Ensure that cells are clean and reinforcement is correctly placed. Mortar back the clean-out hole shell. If holes are covered in the completed work, boxing across the face may replace the shell infill. Brace hole infills to prevent blowouts during grouting.

Notify when work is ready for inspection.



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3.30 EXTENT OF GROUTING

For partial fill applications, only those cells with reinforcing or where fixing devices occur shall be filled with grout.

3.31 GROUTING, HIGH LIFT WITH EXPANSIVE

Fill masonry walls using the "high lift with expansive admixture method" to NZS 4210 up to a maximum height of 3600mm in a semi-continuous operation. Consolidate by rodding. Wait for expansion to take place and locally re-compact the top of the wall by trowelling, or place a weighted board on top of the wall to contain the expansion. For fair face masonry clean wall thoroughly to avoid staining.

3.32 GROUTING, HIGH LIFT WITHOUT EXPANSIVE

Fill masonry walls to NZS 4210: clause 2.12, The high lift without expansive admixture method, up to a maximum height of 3600mm in maximum lifts of 1200mm. Consolidate by mechanical vibrator. Wait between each lift until grout settles, but before any set takes place (between 15 and 60 minutes) before pouring the next lift. Consolidate by mechanical vibrator with 300mm penetration into the previous lift. Wait after the final lift as before and reconsolidate the top 300mm by mechanical vibrator.

3.33 GROUTING, LOW LIFT

Fill masonry walls to NZS 4210: clause 2.14, The low lift grouting method, up to a maximum height of 1200mm. Consolidate by rodding and then prepare a construction joint to NZS 4210: clause 2.16, Horizontal construction joints, before repeating the sequence.

3.34 LIMIT RATE

Limit rate of pour to avoid hydrostatic blowouts.

Application - ancillary work

3.35 HOLES AND CUT MASONRY

Provide all necessary holes, pockets and chases. Cut blocks when non-standard shapes are required. When cut masonry units are used, ensure vertical joints in adjacent courses are no closer than 100mm. Subsequent cutting away of masonry to form holes is not permitted.

3.36 BUILT IN ELEMENTS

As the work proceeds, mortar in place elements such as sills, copings, lintels, and steps.

3.37 BUILT IN FIXINGS

Build in all necessary plugs, bolts, ties, metal flashings, dowels, fastenings and fixings required by this and other work sections. Co-operate with others to meet this requirement. Fixings only permitted into filled cells.

3.38 ELECTRICAL WORK

Ensure that provision for and fitting of boxes, conduit and pre-wiring are made and done as the work proceeds under the direction of the electrician.

3.39 WEATHERTIGHTNESS

Apply appropriate coating to the manufacturer's specifications. Coatings may include paint or clear sealer to CCANZ CP 01.

3.40 WEATHERPROOFING AROUND OPENINGS

Refer to architectural drawings for weatherproofing details around openings.

3.41 PLASTER

Apply appropriate plaster system where required to the manufacturer's specifications. Plaster to CCANZ CP 01.

Completion & Commissioning

3.42 FINAL CLEANING

At completion, clean down block work, remove efflorescence and remove waste materials from adjoining surfaces and floors.



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3.43 COMPLETION MATTERS

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

4 SELECTIONS

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

4.1 FIRTH - STANDARD MASONRY UNITS

Brand:	**Firth**
Series:	15, 20, 25 series
Type/size:	refer drawings for size and locations
Bonding pattern:	Stretcher bond

4.2 MORTAR

Type/colour:	Dricon Trade Mortar
Colour:	Standard

4.3 FIRTH MASONRY BLOCKFILL

Type:	**Firth** ~
Strength:	17.5MPa
Aggregate:	~

4.4 EXPANSIVE AGENT

Grout expansion:	Refer to NZS 4210
Note:	To avoid staining ensure wall is washed with fresh water immediately after completion of grouting

4.5 METAL TIES

Brand:	~
Material:	~

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3361 STONEWORK

1 GENERAL

This section relates to the supply, laying and fixing of non-load bearing stone, fixed to a rigid structural backing or erected as a freestanding low wall.

1.1 RELATED WORK

Refer to ~ for ~.

Documents

1.2 DOCUMENTS

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

AS/NZS 2699.1	Built in components for masonry construction - Wall ties
NZS 3103	Sands for mortars and plasters
NZS 4210	Masonry construction: materials and workmanship

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

1.3 MANUFACTURER/SUPPLIER DOCUMENTS

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

~

Copies of the above literature are available from ~

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

Requirements

1.4 SAMPLES

Refer to the general section 1270 CONSTRUCTION for details of how samples will be reviewed and how instructions to proceed will be given. Provide the following samples for review:

	Sample A	Sample B	Sample C
Sample description:	~	~	~
Sample type:	~	~	~
Number:	~	~	~
Location:	~	~	~
Supporting documentation:	~	~	~
Reviewer:	Contract administrator ~	Contract administrator ~	Contract administrator ~
Time for review:	10 working days ~	10 working days ~	10 working days ~
Review criteria:	~	~	~

1.5 QUALIFICATIONS

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

1.6 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 including, but not be limited to:
- set-out of blocks or panels complete with method of bedding and fixing

If requested provide the following additional information:
~

Submit shop drawings for review to ~.

- ~ 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.

2 PRODUCTS

Materials

2.1 STONE
Refer to SELECTIONS/drawings for type.

2.2 FLEXIBLE DAMP-PROOF MEMBRANE
Heavy kraft, strip laminates saturated and coated with bitumen, butyl rubber sheet and adhesive, or equivalent.

2.3 MALLEABLE DAMP-PROOF MEMBRANE
Lead not less than 1.8mm (20 kg/m²) thick bitumen coated.

Components

2.4 ANCHORS, CRAMPS, DOWELS
Non-corrodible, non-ferrous metal, suitably stamped.

2.5 TIES
Non-corrodible, non-ferrous metal suitably stamped, to AS/NZS 2699.1 for spacing, strength, stiffness and ductility.

Accessories

2.6 SEALANT
Elastomeric joint non-staining sealing compound of approved type and colour. Backing rods closed cell semi-rigid compressible plastic from the type sized to compress 33% in the joint and to the sealant manufacturer's requirements.

2.7 JOINTING MATERIAL
Suitable for the location and type of stone, non-staining, and to the manufacturer's requirements.

2.8 SAND FOR MORTAR
Sand to NZS 3103. Chloride levels to not exceed 0.04% by dry weight of sand.

2.9 MORTAR
Provide details of the proposed mix for approval not less than 7 days before commencing work. Generally the mix to have a strength less than the stone it is bedding and a porosity equal to or greater than the stone.

Finishes

2.10 DAMP-PROOF MEMBRANE, BITUMEN
Water based bitumen emulsion heavy duty sealer.

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3 EXECUTION

Conditions

3.1 TOLERANCES

To NZS 4210, table 2.2 Maximum tolerances.

3.2 TOLERANCES AS SHOWN

Construct the stone work within the tolerances shown on the drawings.

3.3 BUILDING IN

Make provision for building into the structure those elements required for the erection and laying of stone.

3.4 BUILT IN ITEMS

Make provision as the work proceeds for elements that need to be built in or keyed to the stone work, including partitions, straps, handrails, beams, trusses and plates.

3.5 SUBSTRATE WATERPROOFING

Check substrate waterproofing is suitable, complete and undamaged before commencing stonework.

3.6 TRANSPORT

Transport, unload and handle all stone units to avoid any damage or disfigurement. Stack carefully in the vehicle with packing material to prevent damage.

3.7 STORE

Store stone clear of the ground on its natural bed, protected from the weather and atmospheric pollution on supports that avoid local overstressing and to promote good seasoning without staining, contamination, marking or damage.

Application

3.8 CUTTING

Cut and shape stone to profiles generally as detailed and including all weathering, jointing, chasing, forming mortises, grooves and drilling for handling and fixing. Work the bed, face and back joints of the stone square and true.

3.9 LAY FLEXIBLE DAMP-PROOF MEMBRANE

Apply mortar to a flush even bed and lay the flexible membrane horizontally and to steps in a continuous strip with 150mm laps and no edges visible at the face.

3.10 MEMBRANES AT OPENINGS

Provide flexible membranes to heads, 150mm beyond jambs and to jambs and sills, to discharge moisture to the outer face and with no edges visible at the face.

3.11 INSTALL FLASHINGS

Refer to 4911 STEEL METALWORK and install flashings provided to the locations as detailed and shown on the drawings.

Application - facing work

3.12 SOLID BEDDING

Adequately support and restrain cladding with durable fixings and continually and solidly fill between backs and supporting structure with mortar.

3.13 SPOT BEDDING

Adequately support and restrain cladding with durable fixings and provide mortar bedding continuously around fixings and in the form of mortar dabs elsewhere.

3.14 JOINTING

Prime surfaces in contact, fit backing rods to ensure correct depths of jointing material and/or sealant, keeping panel surfaces completely clear and unmarked by masking, all to the jointing manufacturer's requirements.

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Application - walling work

3.15 BED AND JOINT

Bed and joint stone where possible in one operation on a full bed of mortar. Solidly fill and grout vertical joints, joggles, cramps and the like as the work proceeds and point up joints around flashings.

3.16 SET STONE

Set stone on its natural bed.

3.17 BEDDING SEDIMENTARY STONE

Clean the bed area of dust and impurities and thoroughly damp it down before laying the mortar bed.

3.18 RACKING

Raise advanced work no more than 1m above the general level and rack back. Do not tooth stonework unless shown on the drawings or when approved in writing.

3.19 SUPPORT

Provide support to the stone while mortar cures by bracing or joint spacers of non-staining softwood. When curing is complete remove spacers without damage to the stonework and point to match.

Finishing

3.20 PROGRESSIVE CLEANING

Keep the stone faces clean as the work proceeds. Prevent mortar or jointing material from coming into contact with the external face of the stone. Perform the cleaning procedure, including removal of stains as necessary, without damage to the work.

3.21 COMPLETE DAMP-PROOFING

Damp-proof the back and not less than 25mm on return of bedding faces with two coats of bitumen sealer. Avoid contact of bitumen with the face of the stone.

Completion

3.22 PROTECT

Protect newly erected stonework against inclement weather.

3.23 KEEP FACEWORK CLEAN

Keep facework clean during construction and until completion of the contract works. Clean off, rub down and leave stonework in the specified condition, immediately before handing over.

3.24 REPLACE

Replace damaged, cracked or marked elements.

3.25 LEAVE

Leave work to the standard required by following procedures.

3.26 REMOVE

Remove debris, unused materials and elements from the site.

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4 SELECTIONS

4.1 SCHIST

Selected metamorphosed sedimentary stone.

Name/source:	Site recovered and quarried Schist stone
Colour:	Mix of blue, green, grey and brown (sample of workmanship to be provided for architect review. Includes representative stone colour and size selection, and grouting/pointing colour and depth.
Thickness:	180-190mm
Finish:	To approved sample

4.2 FLEXIBLE DAMP-PROOF MEMBRANE

Brand:	Refer to Architectural Drawings

4.3 MALLEABLE DAMP-PROOF MEMBRANE

Brand:	Refer to Architectural Drawings

4.4 DAMP-PROOF MEMBRANE, BITUMEN

Brand:	Refer to Architectural Drawings

4.5 ANCHORS, CRAMPS, DOWELS

Brand/maker:	Refer structural drawings
Type/number:	Refer structural drawings
Metal:	Refer structural drawings

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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 RELATED WORK

Refer to ~ for ~.

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:

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

1.3 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

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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
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

1.4 MANUFACTURER DOCUMENTS

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

~

Copies of the above literature are available from ~

Web:	~
Email:	~
Telephone:	~
Facsimile:	~

Requirements

1.5 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.

1.6 TOLERANCES

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

1.7 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 ~.

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

1.8 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.

1.9 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)

1.10 HOT WORK - FIRE SAFETY

Refer to section 1270 CONSTRUCTION



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Architecturally Exposed Structural Steelwork (AESS)

1.11 AESS - SEPARATE SECTION

Refer to the separate section 3415 ARCHITECTURALLY EXPOSED STRUCTURAL STEEL for additional requirements of AESS, which are to be read in conjunction with this section.

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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 STEEL STUDS AND SHEAR CONNECTORS - FOR COMPOSITE SLAB TO STEEL

Material for arc stud welding to AS/NZS ISO 13918.

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Supplied studs shall comply with SD1 requirements of AS/NZS ISO 13918. Studs shall be supplied with type 3.1 inspection documentation, made available to Construction Reviewer upon request.

2.6 GROUT

To AS/NZS 5131, 5.8.

2.7 CORROSION PROTECTION - HOT DIP GALVANIZED

Hot dip galvanizing to AS/NZS 2312.2.

2.8 CORRISION PROTECTION - THERMAL METAL SPRAY

Themal metal spray coatings to AS/NZS 2312.3.

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

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

3.11 WELDING THERMAL METAL SPRAYED STEEL

Where possible, welding to be carried out prior to thermal metal spraying. Where welding to be carried out after thermal spraying, the weld zone to be masked and not coated with thermal metal spray for approximately 100mm from the weld zone to AS/NZS 2312.3. Carry out standard weld, then subsequent thermal spraying and coating processes.

3.12 WELDING - STEEL STUDS AND SHEAR CONNECTORS - FOR COMPOSITE SLAB TO STEEL

Site flash weld steel stud shear connectors to AS/NZS 5131 and AS 1554.2.

Mechanical fastening

3.13 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.
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.

3.14 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.

3.15 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

3.16 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.

3.17 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.

3.18 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.

3.19 SITE WORK

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

3.20 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.

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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.

3.21 DRIFTING

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

3.22 INSTALLATION OF PURLINS AND GIRTS

Provide trimming members to support edges of roof sheeting along hips, valleys and roof/wall penetrations etc.

~

Finishing - galvanizing

3.23 GALVANIZING

Refer to the separate section 6781 HOT DIP GALVANIZING for galvanizing requirements.

3.24 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

3.25 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 - thermal metal spray

3.26 THERMAL METAL SPRAY

Refer to the separate section 6782 METAL SPRAY CORROSION PROTECTION for metal spray requirements.

3.27 STEELWORK BEING THERMAL METAL SPRAYED

To AS/NZS 2312.3.

- Mask areas not to be coated prior to blasting and spraying.
- Abrasive blast clean steel surfaces to be sprayed with zinc or zinc alloy thermal metal spray to AS 1627.4 class 2½, to produce a sharp angular profile 65-100µm.
- Abrasive blast clean steel surfaces to be sprayed with aluminium or aluminium alloy thermal metal spray to AS 1627.4 class 3, to produce a sharp angular profile 75-100µm.
- Apply spray coating to dry surfaces, before discoloration and within 8 hours of surface preparation.
- Brush or vacuum surface so completely free of loose particles and dust.
- For application, steel temperature to be 3°C minimum above dew point and when air temperature is below 5°C.
- Apply thermal spray coating uniformly over the entire surface. Apply coating in multiple overlapping layers.
- Where sealing is specified, sealer to be applied as soon as possible after metal spraying.
- Where sanding is required to denib or reduce surface roughness, this to be carried out after the application of a sealer coat.

Finished dry film thickness to AS/NZS 2312.3, Table 2 Recommended values for the nominal thickness of the metallic coatings in microns - Life to first maintenance >25 years, for the specified corrosivity category.

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3.28 REPAIR WELD DAMAGED THERMAL SPRAY

All repairs to AS/NZS 2312.3, section 9, Repair of thermal sprayed coatings.

- Damage to zinc or zinc alloy thermal metal spray up to 10cm² but less than 10mm wide, repair by mechanical cleaning to equivalent of Sa 2½ to AS 1627.4 and apply zinc rich paint conforming to AS/NZS 3750.9
- Damage to zinc areas greater than 10cm² and any damage to aluminium thermal metal spray should be re-prepared forming a feathered edge onto sound metal by spot blasting to original cleanliness & blast profile, then finish with metal thermal spray to match original.

Finishing - preparation

3.29 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.

3.30 POWER TOOL CLEANING

To AS/NZS 5131, Section 9.

Remove oil and grease by the use of solvents. Scrape, wire brush and power tool clean 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 the full coating thickness being attained.

3.31 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

3.32 PROTECTIVE COATINGS

Refer to the separate section 6745 PROTECTIVE COATINGS - STEELWORK for protective coating requirements .

3.33 PAINTING

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

3.34 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.

3.35 PRIMING GENERALLY

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

3.36 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.

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3.37 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%.

3.38 TOUCH-UP

Touch up primer. Apply protective coatings as specified.

Finishing - fire rated coatings

3.39 FIRE RATED COATINGS - SEPARATE SECTION

Refer to the separate section 6742 FIRE RATED COATINGS - STEELWORK for fire rated coating requirements.

3.40 FIRE RATED COATINGS - MANUFACTURER'S REQUIREMENTS

Refer to the separate manufacturer's information for rated coating requirements.

3.41 TEMPORARY CONNECTIONS

Remove temporary elements on completion and restore the surface.

Completion & Commissioning

3.42 COMPLETION MATTERS

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

4 SELECTIONS

4.1 CONSTRUCTION CATEGORY

Construction category (to AS/NZS 5131)	Location
CC ~	~
CC ~	~

Finishing - galvanizing

4.2 STEELWORK BEING GALVANIZED

Item: ~

Finishing - thermal metal spray

4.3 STEELWORK BEING THERMAL METAL SPRAYED

Item: ~
Thermal metal spray: TS~~
Sealer: ~

Finishing - preparation

4.4 STEEL PREPARATION

Item: ~
Preparation: ~

Finishing - paint and protective coatings

4.5 PRIMER

Brand/type: ~

4.6 SHOP PRIMING

Dry film build: ~ microns

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4.7 PAINT COATINGS

Brand:	~
Paint type:	~
System:	~
1st coat:	~
2nd coat:	~
3rd coat:	~
Gloss level:	~
Colour:	~

4.8 PROTECTIVE COATINGS

Brand:	~
Coating type:	~
System:	~
1st coat:	~ / ~ DFT
2nd coat:	~ / ~ DFT
3rd coat:	~ / ~ DFT
Gloss level:	~
Colour:	~

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3412DH DHS PURLINS & GIRTS

1 GENERAL

This section relates to the fabrication, erection and finishing of the **Dimond** Hi-Span (DHS) cold formed, galvanized steel purlin and girt system; incorporating **Dimond** fastBRACE lock-in bracing.

1.1 RELATED WORK

Refer to ~ for ~.

Documents

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/NZS 1252.1	High-strength steel fastener assemblies for structural engineering - Bolts, nuts and washers - Technical requirements
NZS 3404.1	Steel Structures Standard
AS/NZS 4680	Hot-dip galvanized (zinc) coatings on fabricated ferrous articles
AS/NZS 5131	Structural steelwork - Fabrication and erection
AS/NZS ISO 9001	Quality management systems - requirements
AS 1111.1	ISO metric hexagon bolts and screws - Product grade C - Bolts
AS 1112.1	ISO metric hexagon nuts - Style 1 - Product grades A and B
AS 1397	Continuous hot-dip metallic coated steel sheet and strip - Coatings of zinc and zinc alloyed with aluminium and magnesium
AS 1897	Electroplated coatings on threaded components (metric coarse series)
WorkSafe	Guidelines for the provision of facilities and general safety in the construction industry

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

1.3 MANUFACTURER DOCUMENTS

Dimond Structural Systems Manual (web based Manual with dated update pages)

Dimond Installation Guide - Purlin Systems

Copies of the above literature are available from:

Web: www.dimond.co.nz

Freephone: 0800 346 663.

Requirements

1.4 NO SUBSTITUTIONS

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

1.5 CO-ORDINATION

Refer to architectural, electrical and services drawings to ensure details and fixings required are provided for in the structural steel work.

1.6 VERIFY DIMENSIONS

Verify dimensions against site measurements prior to fabrication.

Performance

1.7 PROJECT STRUCTURAL STEELWORK REQUIREMENTS

Refer to the appropriate Structural Steelwork section for project steel requirements, Categories and Classes to AS/NZS 5131.



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1.8 QUALITY ASSURANCE

Maintain quality assurance programmes to AS/NZS ISO 9001 for both fabrication and erection as necessary to ensure that work is performed in accordance with this specification and the qualifying requirements of the contract documents.

1.9 INSPECTION

Inspect stages of fabrication and construction of the structure to AS/NZS 5131.

2 PRODUCTS

Materials

2.1 PURLINS AND GIRTS

Dimond Hi-Span (DHS) roll formed purlins and girts, pre-punched for installation of bracing channels and for connection to the purlin cleats. Manufactured from G450-500, Z275 galvanized steel to AS 1397. Size and thickness for the various locations as scheduled/as detailed on the drawings.

2.2 PURLINS - SPECIAL GRADE

Special grade Dimond Hi-Span (DHS) roll formed purlins for high risk areas, pre-punched for installation of bracing channels and for connection to the purlin cleats. Manufactured from G450-500, Z450 galvanized steel to AS 1397. Size and thickness for the various locations as scheduled/as detailed on the drawings.

2.3 DIMOND FASTBRACE BRACING SYSTEM

Dimond fastBRACE roll formed channels complete with end cleats and locking tabs. Manufacture from G250, Z450 galvanized steel to AS 1397. Channel length for the various locations as scheduled/as detailed on the drawings.

2.4 BOLTED CHANNEL BRACING

Dimond DB 89/12 roll formed channels, complete with end cleats pre-punched for bolting. Manufacture from G250, Z450 galvanized steel to AS 1397. Channel length for the various locations as detailed on the drawings. Fully bolt between all DHS purlins up the rafter length.

2.5 TIE RODS

Engineering round bar as scheduled/as detailed on the drawings.

Components

2.6 BOLTS, NUTS AND WASHERS

Grade 4.6 bolts to comply with 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 galvanized to AS/NZS 4680, bolts, nuts and washers forming a permanent part of a structure subject to a protective coating. Alternatively electrogalvanize to AS 1897.

3 EXECUTION

Conditions

3.1 GENERALLY

Construct to AS/NZS 5131, section 6, Preparation, Assembly and Fabrication and AS/NZS 5131, section 11, Erection. Identify steel to NZS 3404.1 and AS/NZS 5131.

3.2 DEFECTS

Discard material showing visual defects affecting its structural integrity and/or appearance.

3.3 DELIVERY, STORAGE AND HANDLING

Keep components dry in transit. Store on a level firm base, clear of the ground, protected from weather, contamination and damage and away from current work areas. Prevent water and condensation from being trapped between adjacent surfaces.

Do not drag components across each other and other materials. Protect edges and surfaces from damage and ensure that section shape is not damaged during handling, storage or installation.

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3.4 ERECTION GENERALLY

Carry out the erection of DHS purlins, girts or associated bracing to the requirements of AS/NZS 5131. Comply with NZBC F5 1: Construction and demolition hazards, and the WorkSafe publication: Guidelines for the provision of facilities and general safety in the construction industry.

3.5 NO GAS CUTTING OR WELDING

Gas cutting of holes or welding of DHS purlins and girts is not permitted.

3.6 NO PREMATURE LOADING

Correctly position and complete bracing and connections to primary structure before any loads are applied.

Do not rely on bracing to perform structurally during craneage or pre-assembly. Provide additional temporary bracing as required.

Application

3.7 BOLTING

Bolting to AS/NZS 5131.

3.8 INSTALLATION OF DHS PURLINS

Install and bolt into position as detailed on the drawings.

3.9 INSTALLATION OF DHS GIRTS

Install and bolt into position as detailed on the drawings.

3.10 INSTALLATION OF DIMOND FASTBRACE SYSTEM

Install tie rods to ridge purlins as detailed.

Starting from the ridge, place the fastbrace with the bolted end nearest the ridge and bolt up. Pass the other end through the bracing holes typically at mid span and lock into position with the next brace. Repeat and work down the roof slope.

3.11 INSTALLATION OF BOLTED CHANNEL BRACING

Install bracing channels and bolt between alternate purlins, as shown on the drawings.

Install lock-in Dimond fastBRACE channels progressively from ridge to eaves in locations shown on the drawings.

4 SELECTIONS

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

4.1 DIMOND DHS PURLINS

Size:	DHS 350/18@900crs, DHS 200/15@900crs
Coating:	Z275

4.2 DIMOND DHS PURLINS - SPECIAL GRADE

Location:

Size:	DHS ~
Coating:	Z450

4.3 DIMOND DHS GIRTS

Size:	DHS ~
Coating:	Z275

4.4 DIMOND BRACING

Type:	~
Coating:	Z450

4.5 TIE RODS

Diameter:	~mm
Finish:	~

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4.6 BOLTS, NUTS AND WASHERS

Grade: ~
Coating: Galvanized
Size: ~mm

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3415 ARCHITECTURALLY EXPOSED STRUCTURAL STEEL

1 GENERAL

This section relates to the fabrication and erection to AS/NZS 5131 of Architecturally Exposed Structural Steelwork (AESS), with higher than normal appearance requirements than Standard Structural Steel (SSS).

Refer to PROJECT AESS CATEGORY SCHEDULE clause for project AESS Category(s).

This section is to be read in conjunction with the following SSS section:

- ~

1.1 RELATED WORK

Refer to ~ for ~.

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:

AESS:	Architecturally Exposed Structural Steelwork
SSS	Standard Structural Steel

Documents

1.3 DOCUMENTS

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

NZS 3404.1	Steel Structures Standard
AS/NZS 3678	Structural steel - Hot-rolled plates, floorplates and slabs
AS/NZS 3679.1	Structural steel - Hot-rolled bars and sections
AS/NZS 5131	Structural steelwork - Fabrication and erection

1.4 MANUFACTURER'S DOCUMENTS

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

~

Copies of the above literature are available from ~

Web:	~
Email:	~
Telephone:	~
Facsimile:	~

1.5 GENERAL

Architecturally Exposed Structural Steel (AESS) requirements are to AS/NZS 5131 Section 10, and are additional to Standard Structural Steel (SSS) requirements. This AESS section does not specify all structural requirements for a project, it modifies those in the SSS sections. Areas to be treated as AESS and the AESS Category (1,2,3, or 4) are designated on the Project Drawings or in the specification. Steel not designated AESS on the drawings or in the specification are to be treated as SSS.

1.6 PROJECT AESS CATEGORY SCHEDULE

AESS Category(s) to AS/NZS 5131, 10.2.

AESS Category	Location/elements
AESS ~	~
AESS ~	~

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1.7 MEETING - PRE-SHOP DRAWING

If required attend meeting to discuss expectations of form, fit and finish of the AESS steel.

Attendees to be:

- Contract Administrator (Convener)
- Fabricator (including shop drawing provider if different)
- Erector
- Contractor
- Architect/Designer
- Engineer

Submissions

1.8 SHOP DRAWINGS

Read in conjunction with the SSS section and integrate the requirements of this clause into the main 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 the main final shop drawings.

Provide additional shop drawing information to show, but not be limited to:

- Identify all AESS members and items to a Category, either AESS 1, 2, 3, 4.
- Identify tack welds, temporary braces, fixtures used in fabrication.

Submit shop drawings as per requirements of SSS section.

Complete shop drawing review before commencing fabrication.

1.9 ALTERNATIVE CAST CONNECTIONS

Alternative cast steel connections to replace complex AESS multi member connections may be proposed by the fabricator at the shop drawing stage (or earlier), if they will be more economical. Add to shop drawings if approved.

1.10 ALTERNATIVE BOLTED CONNECTIONS

Alternative discreet bolted connections to replace complex AESS field welded connections or obtrusive spliced bolted connections may be proposed by the fabricator at the shop drawing stage (or earlier), if they will be more desirable and/or economical. Add to shop drawings if approved.

1.11 ALTERNATIVE ADJUSTABLE CONNECTIONS

To overcome the difference at connections between AESS tighter tolerances and normal SSS (or other structure) tolerances, adjustable connections may be required. Show proposed or alternative proposed adjustable connections on shop drawings. If issues arise during erection, erector to propose alternative adjustable connections for approval.

1.12 SAMPLES - AESS ITEMS

Refer to the general section 1270 CONSTRUCTION for details of how samples will be reviewed and how instructions to proceed will be given. Provide the following AESS samples for review:

	Sample A	Sample B	Sample C
Sample description:	~	~	~
Sample type:	~	~	~
Number:	~	~	~
Location:	~	~	~
Supporting documentation:	~	~	~
Reviewer:	Contract administrator~	Contract administrator~	Contract administrator~
Time for review:	10 working days ~	10 working days ~	10 working days ~
Review criteria:	~	~	~

Hold Points and Notification Points

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Refer to section 1232 INTERPRETATION & DEFINITIONS for definition of terms.

1.13 NOTIFICATION POINTS

Notify of Notification Point AESS work/item, continue with the work/item and subsequent work unless advised otherwise.

Notify: Contract administrator
Notification: 2 working days prior to work/item being carried out.

Give notice so that inspection may be made of the following AESS items;

Location	Notification Point	Requirement
Off Site	commencement of AESS shop fabrication	~
Off Site	completion of AESS fabrication	before surface preparation
Off Site	AESS surface preparation	before shop surface finishes
Off Site	completion of AESS surface finishes	before delivery to site
~		
On Site	AESS steelwork on site before erection	~
On Site	AESS steelwork and column bases erected on site	before grouting, encasing, site finishes or cladding
On Site	AESS items after any grouting, encasement, fire protection or site finishes are completed	~
~		

1.14 HOLD POINTS

Notify of Hold Point AESS work/item, do not to proceed further with work/item until advised to continue.

Notify: Contract administrator
Notification: 2 working days prior to work/item being carried out.

Hold Point Schedule

Location	Hold Point	Requirement
~	~	~
~	~	~



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2 PRODUCTS

2.1 AESS MILL SURFACE APPEARANCE

To AS/NZS 5131, Section 10.

- For AESS 1, 2 and 3, the quality surface as delivered by the mills should be acceptable.
- For AESS 4, the steel surface imperfections should be filled and sanded.

2.2 AESS TOLERANCES FOR ROLLED SHAPES

To AS/NZS 5131, Section 10, Tolerance Class 1.
Tolerances for depth, width, and out of square, camber and sweep of rolled shapes to AS/NZS 3678 or AS/NZS 3679.1, and AS/NZS 5131, as appropriate for depth, flange width, flange and web thickness, out of square and web off centre. Built up section, tension or compression member to NZS 3404.1 and AS/NZS 5131. The following exceptions apply:

- For AESS 3 and 4, the matching of abutting cross-sections is required
- For AESS 2, 3 and 4, the as-fabricated straightness tolerance of a member is one-half of the standard camber and sweep tolerance in AS/NZS 5131, Appendix F.

2.3 SURFACE PREPARATION AND TREATMENT - PAINT & PROTECTIVE COATING

AESS items to be painted or have protective coatings, Treatment Grade P3 and surface preparation Sa2.5 to AS/NZS 5131, 9.8.4, co-ordinate with applicator to ensure best outcome, refer to appropriate painting or protective coating section.

2.4 SURFACE PREPARATION AND TREATMENT - FIRE RATED COATING

AESS items to have fire rated coatings, Treatment Grade P3 and surface preparation Sa2.5 to AS/NZS 5131, 9.8.4, co-ordinate with applicator to ensure best outcome, refer to appropriate fire rated coating section.

2.5 SURFACE PREPARATION AND TREATMENT - GALVANIZING

AESS items to be hot-dip galvanized, Treatment Grade P3 and surface preparation Sa2 to AS/NZS 5131, 9.8.4, co-ordinate with galvanizer to ensure best outcome, refer to 6781 HOT DIP GALVANIZING.

2.6 SURFACE PREPARATION AND TREATMENT - METAL SPRAY

AESS items to be thermal metal sprayed, Treatment Grade P3 and surface preparation Sa2.5 to AS/NZS 5131, 9.8.4, co-ordinate with thermal metal sprayer to ensure best outcome, refer to 6782 METAL SPRAY CORROSION PROTECTION.

3 EXECUTION

3.1 HANDLING AESS STEEL

Take special care in handling the steel to avoid, marking or distorting the steel members, and damaging any shop finishing, paint or coating.
All slings and tie-downs to be nylon type or chains with softeners or wire rope with softeners.

3.2 AESS GENERALLY

To AS/NZS 5131, Section 10.

3.3 TEMPORARY ITEMS

With AESS work any temporary braces or fixtures required during fabrication, during shipment, or to facilitate erection, special care must be taken avoiding and/or repairing any blemishes or unsightly surfaces resulting from use or removal of those elements.
Tack welds to be ground smooth.

AESS preparation, assembly and fabrication

3.4 AESS FABRICATION TOLERANCES

To AS/NZS 5131, Section 10, Table 10.2, Tolerance Class 1:

- For AESS 1 to AS/NZS 5131, Appendix F
- For AESS 2, 3 and 4, to one-half of the tolerances in AS/NZS 5131, Appendix F.

3.5 AESS FABRICATION

Additional requirements to AS/NZS 5131, 10.4.

Grind smooth sharp, marred, or roughened corners and edges.

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Deburr and ground smooth rough surfaces.

3.6 JOINTS

For Categories AESS 3 and 4, copes, mitres and butt cuts exposed to view to have uniform gaps if open jointed, or to have uniform contact if closed jointed.

3.7 WELDS

To AS/NZS 5131, Table 10.2 and the welding requirements in AS/NZS 5131, 10.4, including:

- For corrosive environments, all joints to be seal welded.
- For AESS 1, 2 and 3, smooth uniform welds. For Category AESS 4, welds to be contoured and blended.
- For AESS 1, 2, 3 and 4, weld spatter to be avoided/removed where exposed to view.
- For AESS 1 and 2, weld projection up to 2 mm is acceptable for butt and plug welded joints. For Categories AESS 3 and 4, welds will be ground smooth/filled.

3.8 WELD SHOW-THROUGH

To AS/NZS 5131, Table 10.2 and AS/NZS 5131, 10.4, including:

- For AESS 1, 2 and 3, the members or components are acceptable as produced.
- For AESS 4, the fabricator to minimize weld show-through.

3.9 HOLLOW STRUCTURAL SECTIONS (RHS AND CHS) SEAMS

To AS/NZS 5131, Section 10.4 (q).

For AESS 1 and 2, seams to be acceptable as produced.
For AESS 3, seams to be oriented away from view or as indicated on the drawings.
For AESS 4, seams to be treated so they are not apparent.

Erection of AESS structural steel

3.10 AESS ERECTION TOLERANCES

To AS/NZS 5131 Section 12 and Appendix F:

- For AESS 1 and 2 to Appendix F, Tolerance Class 1
- For AESS 3 and 4, to Appendix F, Tolerance Class 1

3.11 AESS ERECTION

Additional requirements to AS/NZS 5131, 10.5.

3.12 TACK WELDS & HOLES

Tack welds to be ground smooth and holes to be filled with weld metal or body filler and smoothed by grinding or filling to the original applicable fabrication standards.

3.13 BACKING BARS

Remove backing bars and grind smooth, repair any coatings.

3.14 BOLT HEADS

All bolt heads to be on the same side of the connection as detailed, and all connections to be consistent.

Repairs

3.15 GENERAL REPAIRS

Repairs to AESS elements to be not apparent when completed

Completion

3.16 SPECIAL PROTECTION OF AESS WORK

Provide the following temporary protection of the finished AESS work:

~

Refer to the general section 1250 TEMPORARY WORKS & SERVICES for the general care and protection requirements.

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3.17 VERIFY TOLERANCES OF AESS WORK

After completing erection, verify conformance of AESS work with AS/NZS 5131 Section 12 and Appendix F as modified by AESS requirements.

4 SELECTIONS

4.1 STEELWORK SELECTIONS

For steelwork selections and other standard requirements refer to the Standard Structural Steel (SSS) section listed at the beginning of this section.



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3813NT NELSONPINE® LVL STRUCTURAL FRAMING

1 GENERAL

This section relates to the supply and installation of **NelsonPine® LVL NP Frame** and **NelsonPine® P11** engineered wood products. Structural framing product suitable for residential and light commercial applications
The range includes:

- NelsonPine® NP Frame LVL 8
- NelsonPine® NP Frame LVL 11
- NelsonPine® P11
- NelsonPine® NP Frame LVL 13

1.1 RELATED WORK

Refer to: ~

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®
LVL	Laminated Veneer Lumber

Documents

1.3 DOCUMENTS

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

NZBC B1	Structure
NZBC B2/AS1	Durability provisions for building elements
NZS 1170.5	Structural design actions - Earthquake actions - New Zealand
NZS 3602	Timber and wood-based products for use in buildings
NZS 3604	Timber-framed buildings
NZS 3640	Chemical preservation of round and sawn timber
AS/NZS 1170.0	Structural design actions - General principles
AS/NZS 1170.1	Structural design actions - Permanent, imposed and other actions
AS/NZS 1170.2	Structural design actions - Wind actions
AS/NZS 4357.0	Structural laminated veneer lumber - Specifications
AS/NZS 4364	Timber - Bond performance of structural adhesive

CodeMark™ CMNZ70199 - NelsonPine P 11
Documents listed above and cited in the clauses that follow are part of this specification. However, this specification takes precedence in the event of it being at variance with the cited document.

1.4 MANUFACTURER'S DOCUMENTS

NelsonPine® LVL documents relating to work in this section are:

- Specific Engineering Design Guide
- NelsonPine® LVL8 H1.2 General Framing
- LVL Framing Technical Data Sheet
- Paint and Stains Systems Brochure
- NelsonPine® LVL NP Frame Framing Solutions
- LVL Product Technical Statement
- NelsonPine® P11 Product Technical Statement
- Durability Statement
- Carbon Footprint of NZ Laminated Veneer Lumber
- Moisture Meter Correction Figures for NelsonPine® LVL Framing
- Holes and Notches Guide
- Safety Data Sheet (H1.2)
- Nail Laminating/Screwing Double Sections Guide

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Manufacturer/supplier contact details
Company: Nelson Pine Industries Limited
Web: www.nelsonpine.co.nz
Email: LVL@nelsonpine.co.nz
Telephone: 0800 800 438 or 03 543 8800

Requirements

1.5 NO SUBSTITUTIONS

Substitutions are not permitted to any specified NelsonPine® LVL engineered wood product, associated components or accessories.

1.6 QUALIFICATIONS GENERALLY

Refer to the general section 1270 CONSTRUCTION for requirements relating to qualifications.

1.7 CO-ORDINATION

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

1.8 INFORMATION REQUIRED FOR CODE COMPLIANCE

Provide the following compliance documentation: -

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

Performance

1.9 DESIGN CRITERIA

NelsonPine® LVL product to be designed to comply with NZS 3604, AS/NZS 1170.0, AS/NZS 1170.1, AS/NZS 1170.2, AS/NZS 1170.3, and NZS 1170.5 and NZS 3603. To specific design.

1.10 DURABILITY

Timber species and/or treatment selected in accordance with NZBC B2/AS1, NZS 3602, Tables 1, 2 or 3. The adhesive to be Type 1 to AS/NZS 4364, for Service Class 3 conditions (exterior non-protected) to AS/NZS 1328.1, Table A1, Type of adhesive for given service conditions. The adhesive manufacturer's information states that the adhesive can match the durability of the timber up to 50 years

Performance - Wind (design by Consultant)

1.11 DESIGN PARAMETERS WIND - DESIGN BY CONSULTANT

Design the installation to NelsonPine® requirements as determined by clause 5.2.1 of NZS 3604.

Compliance information

1.12 COMPLIANCE - CODEMARK CERTIFICATE

NelsonPine® P11 meets the requirements of NZBC when used within the conditions and limitations of its CodeMark™ Certificate of Conformity CMNZ70199 - NelsonPine P 11.

2 PRODUCTS

Materials - Laminated Veneer Lumber (LVL)

2.1 NELSONPINE® LVL NP FRAME

High stiffness Radiata Pine structural NelsonPine® LVL NP Frame manufactured to AS/NZS 4357.0, engineered wood composite made from rotary peeled veneers, laid up with parallel grain orientation and bonded with an exterior grade structural adhesive.
NelsonPine® LVL NP Frame is an Acceptable Solution as per NZS 3640 for treatment and NZS 3604 Clause 2.3.9 for timber framing.

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2.2 NELSONPINE® P11

Structural NelsonPine® LVL manufactured in accordance with AS/NZS 4357.0, subsequently secondary bonded into thicker product using PUR adhesive in accordance with the Glued Laminated Structural Timber standard AS/NZS 1328.1 or with PRF adhesive in accordance with AS/NZS 4357.0. Suitable for internal framing applications within the scope of NZS 3604 and by specific design with NelsonPine® Design Software. NelsonPine® P11 is suitable to be designed in accordance with NZS AS 1720.1 as an alternative solution.

Components

2.3 JOIST HANGERS

Mild steel galvanized or stainless steel strap , brackets, Tyvek plates and joist hangers to the requirements of NZS 3604, section 4, 'Durability', to suit application and NelsonPine® LVL technical documentation.

2.4 STEEL STRAPS

Mild steel galvanized or stainless steel strap , brackets, Tyvek plates and joist hangers to the requirements of NZS 3604, section 4, 'Durability', to suit application and NelsonPine® LVL technical documentation.

3 EXECUTION

Conditions

3.1 DELIVERY, STORAGE & HANDLING OF PRODUCT

Refer to the general section 1270 CONSTRUCTION for requirements relating to delivery, storage and handling of product.

NelsonPine® LVL:

- Keep dry during storage and transport.
- Store under a ventilated cover.
- Stack clear of the ground on bearers set at 2m maximum centres.
- Place bearers vertically in line to provide even support.

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.

Application

3.3 ERECTION

Lift, place and fix NelsonPine® LVL without over-stressing or deformation. Use temporary supports as needed without causing damage. Fix NelsonPine® LVL to NZS 3604 and/or to NelsonPine® LVL requirements for specific design. Ensure all members are correctly located, plumb and true to line and face.

3.4 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.

3.5 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 to NZS 3604 or to engineering specific design.

3.6 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, to NZS 3604 or to engineering specific design guide.

3.7 HOLES AND NOTCHES IN LVL FLOOR JOISTS

Holes and notches in NelsonPine® LVL floor joists to NZS 3604 and/or NelsonPine® Holes & Notches Guide.

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3.8 RAFTERS AND OVERHANGS

Refer to NZS 3604 for details of rafter tie down, restraint at supports, lateral restraint for rafters, ridge support detail, fascia connection detail and overhang details. For sloping soffit with rafters birds-mouthed at supports, cut notch to provide 45mm minimum bearing. Flange must not overhang support. Do not cut beyond flange.

3.9 BEARING AND SUPPORT DETAILS

Refer to NZS 3604 for details of bearing and support, nailing down to supports, installation of joist hangers, web stiffeners, web stiffeners for double joists, for joists oblique to bearer, concentrated loads from jamb studs or posts and limited notching at end supports.

3.10 JOIST HANGERS FOR JOISTS

To NZS 3604 for specific design.

3.11 LINTEL END CONNECTIONS

Design and installation for lintel end connections and cantilevered lintel connections, trimming stud connections and tie down where required for uplift construction details to NZS 3604 for specific design.

Completion & Commissioning

3.12 COMPLETION MATTERS

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

4 SELECTIONS

Substitutions are not permitted to the following NelsonPine® LVL product, unless stated otherwise.

4.1 NELSONPINE® RADIATA PINE CERTIFIED SUSTAINABLE TIMBER

Product:	NelsonPine® LVL products
Certification type:	FSC
Timber species:	Pinus Radiata
Origin:	New Zealand
Claim:	~

Materials

4.2 NELSONPINE® LVL NP FRAME LVL 8

Location:	~
Size/Grade:	~
Treatment:	H1.2

4.3 NELSONPINE® LVL NP FRAME LVL 11

Location:	Refer structural and architectural drawings
Size/Grade:	190mm x 45mm
Treatment:	H1.2

4.4 NELSONPINE® P11

Location:	~
Size/Grade:	~mm x ~mm
Treatment:	H1.2

4.5 NELSONPINE® LVL NP FRAME LVL 13

Location:	~
Size/Grade:	~mm x ~mm
Treatment:	H1.2

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Accessories

4.6 FIXINGS

Location:	Refer to structural drawings
Manufacturer / Supplier:	~
Type:	Refer to structural drawings
Material:	Refer to structural drawings

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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 ~ for ~.

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

1.2 ABBREVIATIONS AND DEFINITIONS

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

The following abbreviations apply specifically to this section:

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 MANUFACTURER/SUPPLIER DOCUMENTS

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

~

Manufacturer/supplier contact details

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

1.5 DIMENSIONS

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

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Requirements

1.6 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.

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 EXTERIOR CAVITY WALL BATTENS - PROPRIETARY - NON-STRUCTURAL

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

2.7 DPC

Refer to 4161 UNDERLAYS, FOIL AND DPC section

Components

2.8 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.

2.9 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.

2.10 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.

2.11 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.

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2.12 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.

2.13 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.

2.14 POWDER ACTUATED FASTENERS

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

2.15 CORROSION RISKS

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

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

3 EXECUTION

Conditions

3.1 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

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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.

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.

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3.21 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.

3.22 DPC TO LOSP TREATED TIMBER

Refer to 4161 UNDERLAYS, FOIL AND DPC section

3.23 DPC TO TIMBER

Refer to 4161 UNDERLAYS, FOIL AND DPC section

Completion

3.24 COMPLETION MATTERS

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

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4 SELECTIONS

4.1 CERTIFIED SUSTAINABLE TIMBER

Product: ~
Certification type: ~
Timber species: ~
Origin: ~
Claim: ~

4.2 SUB-FLOOR FRAMING - RADIATA PINE

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

4.3 SUB-FLOOR FRAMING - DOUGLAS FIR

Member	Species	Grade	Treatment
Bearers:	Douglas fir	Structural	H1.2
Ground floor joists:	Douglas fir	Structural	H1.2

4.4 FLOOR FRAMING - RADIATA PINE

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

4.5 FLOOR FRAMING - DOUGLAS FIR

Member	Species	Grade	Treatment
Mid floor joists:	Douglas fir	Structural	H1.2
Boundary joists:	Douglas fir	Structural	H1.2

4.6 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

4.7 EXTERIOR WALL FRAMING - DOUGLAS FIR

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

4.8 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

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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

4.9 ROOF FRAMING - DOUGLAS FIR

Member	Species	Grade	Treatment
Rafters:	Douglas fir	SG8	H1.2
Trusses:	Douglas fir	SG8	H1.2
Purlins:	Douglas fir	SG8	H1.2
Valley boards:	Douglas fir	Merch	H1.2
Sarking:	Douglas fir	Merch	H1.2
Skillion roof framing:	Douglas fir	SG8	H1.2
Enclosed flat roof framing:	Douglas fir	SG8	H1.2

4.10 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

4.11 INTERIOR WALL FRAMING - DOUGLAS FIR

Member	Species	Grade	Treatment
Non structural walls:	Douglas fir	SG8	H1.2
Structural and braced walls:	Douglas fir	SG8	H1.2

4.12 CEILING FRAMING - RADIATA PINE

Member	Species	Grade	Treatment
Ceiling joists:	Radiata pine	SG8	H1.2
Timber ceiling battens:	Radiata pine	SG8	H1.2
Proprietary ceiling battens:	Manufacturer ~	Type ~	Reference ~

4.13 CEILING FRAMING - DOUGLAS FIR

Member	Species	Grade	Treatment
Ceiling joists:	Douglas fir	SG8	H1.2
Timber ceiling battens:	Douglas fir	SG8	H1.2
Proprietary ceiling battens:	Manufacturer ~	Type ~	Reference ~

4.14 EXTERIOR EXPOSED TIMBER

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

Note: All CCA preservative code 01 or 02

4.15 CAVITY BATTENS

Cavity battens	Species	Grade	Treatment
Timber - Structural	Radiata pine	Merch	H3.2
Timber - Non Structural	Radiata pine	Merch	H3.1
Proprietary - non structural:	Manufacturer ~	Type ~	Reference ~
Cavity closer:	Manufacturer ~	Type ~	Reference ~

4.16 SPECIAL FRAMING ELEMENTS

Member	Species	Grade	Treatment
~	~	~	~

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4.17 DPC

Refer to 4161 UNDERLAYS, FOIL AND DPC section

4.18 NAILS

Location	Type	Material	Finish
~			

4.19 SCREWS

Location	Type	Material	Finish
~			

4.20 BOLTS AND COACH SCREWS

Location	Type	Material	Finish
~			

4.21 NAIL PLATES

Location	Type	Material	Finish
~			

4.22 CONNECTORS

Location	Type	Material	Finish
~			

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4131N NURALITE NURAPLY 3P COVERED TANKING SYSTEMS

1 GENERAL

This section relates to the application of NURALITE NURAPLY 3P Covered Tanking Systems for basement and retaining wall tanking.

It includes:

- NURAPLY 3PT for below ground walls and footings with moderate hydrostatic pressure
- NURAPLY 3PTM for underslab, footings and blindside wall tanking
- NURAPLY 3PG for root-resistant membrane for below ground walls and footings

1.1 RELATED WORK

Refer to ~ for ~.

Documents

1.2 DOCUMENTS

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

NZS 3604 Timber-framed buildings
CodeMark CM70033 - The Nuraply 3P Waterproof Tanking Membrane system

1.3 MANUFACTURER/SUPPLIER DOCUMENTS

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

NURALITE NURAPLY 3P Technical Data Sheets
NURAPLY 3P Covered Membrane Installation Manual 2024
NURAPLY 3P Covered Check Sheets and Maintenance Programme
NURALITE Waterproofing Limited: CAD Tanking drawings®
Nuraply Bitumen Membranes Terminating Below Grade Method Statement

Manufacturer/supplier contact details

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

Warranties

1.4 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

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

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

Refer to the general section 1237 WARRANTIES for additional requirements.

1.5 WARRANTY - INSTALLER/APPLICATOR

Provide an installer/applicator warranty:

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

- Provide this warranty on the installer/applicator standard form (if not available then use the standard form in the general section 1237WA WARRANTY AGREEMENT

- Commence the warranty from the date of completion of application

Refer to the general section 1237 WARRANTIES for additional requirements.

1.6 FULL SYSTEM WARRANTY – SUPPLIER & INSTALLER/APPLICATOR (OPTIONAL)

A Nuralite Full System Warranty (20 years for materials and installation under normal environmental and use conditions against failure) is available upon application for this specific project. Contact Nuralite for further information. Written Nuralite approval of acceptance for full system warranty must be obtained during the design phase of the project.

Conditions apply for a Full System Warranty, including but not limited to:

- Nuralite is engaged from design through to completion.
- Design and specification review and confirmation of the project-specific Nuralite system build-up and details.
- Pre-start meeting.
- Hold-point inspections as reasonably required.
- Practical Completion sign-off.
- System installed strictly to Nuraply 3P Covered Membrane System Codemark Certification and specifications.
- Only Nuralite approved components/accessories are used, no incompatible products.
- Nuraply 3P Covered Check Sheets and standard quality assurance (QA) records provided at practical completion.

Requirements

1.7 NO SUBSTITUTIONS

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

1.8 QUALIFICATIONS WORKERS – MANUFACTURER / SUPPLIER REQUIREMENTS

Workers to be licensed by NURALITE Waterproofing Limited.

For the Nuralite Full System Warranty, installation must be carried out by pre-approved Nuralite licensed installer/applicators. Contact Nuralite for a short list of qualified approved applicators. The Main Contractor shall select and engage the applicator from the shortlist unless otherwise agreed in writing by Nuralite.

Refer to 1270 CONSTRUCTION for additional requirements relating to qualifications.

Conditions

1.9 EXCAVATION CONDITIONS FOR WATERPROOFING

Ensure that excavations are free of running water during dry weather. If running water is present the Contract Administrator is to be notified before any waterproofing work is started. This specification is not suitable for high hydrostatic pressure conditions or installation below the water table.

2 PRODUCTS

Waterproofing

2.1 NURALITE UNDERSLAB AND FOOTINGS WATERPROOFING MEMBRANE

NURAPLY 3PTM reinforced fibre asphalt with a mineral chip face to key into slab. A flexible, tough, waterproofing system applied and joined by traditional NURALITE techniques. Thickness not less than 3mm.

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Waterproofing near plants

2.2 NURAPLY 3PG WALL MEMBRANE NEAR PLANTING

Nuraply 3PG is a modified bitumen with a 180g/m² spun bound composite polyester reinforcement, with a thin thermofusible film on one side and mineral chip on the other. Incorporated into the membrane is an inbuilt root inhibitor. The chip surface on the Nuraply 3PG makes the membrane suitable for exposure to UV light where the membrane transferrers above ground to the termination point.

Components

2.3 PRIMER

NURAFLUX QD surface primer for the tanking system, to prepare the substrate for optimum adhesion.

2.4 INSULATION SHEET – ENERTHERM PIR

Enertherm PIR is a closed cell rigid polyisocyanurate insulation board exhibiting a high compressive strength, clad on both sides with a multi-layer gastight aluminium complex.

Available in a range of sizes and thicknesses. Refer to SELECTIONS for options.

2.5 NURADRAIN POLYETHYLENE PROTECTION SHEET

Dimpled rot-proof board for use as a protective barrier and drainage medium behind retaining walls.

Accessories

2.6 ALUMINIUM TAPE

3M 150mm and 48mm wide aluminium tape.

2.7 BITUMEN FILLET

NURALITE triangular fillet.

2.8 LEVELLING COMPOUND

NURAFLUSH levelling compound.

2.9 EXPANDING FOAM

Holdplast Gorilla Nailpower fire rated expanding foam.

2.10 SEALANTS

IKO Stickall Bitumen.

2.11 TERMINATION BAR

NURALITE pre-formed termination bar.

2.12 FIXINGS

NURALITE self-adhesive mechanical fixings to secure Enertherm PIR and Nuradrain to the substrate.

2.13 VERTICAL OR IRREGULAR PENETRATIONS

NURACOAT BG forms a durable, highly elastic film that adheres well to most common substrates such as Enertherm PIR, Nuraply bitumen membranes, concrete, cementitious products, uPVC, metals, timber. Nuracoat BG is highly resistant to chlorides and sulphates commonly present in soil.

2.14 HYDROPHYLIC SWELLABLE GASKET

NURASWELL a controlled hydrophilic swellable gasket that expands in a controlled fashion when exposed to moisture, forming a seal in concrete joints. May be used at the junction of a poured concrete wall and a concrete floor slab.

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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- Store NURALITE waterproofing systems rolls and accessory materials under conditions that ensure no deterioration or damage.

Store in shade or cover in hot sun. Protect liquid components from freezing.

3.2 ROUTINE MATTERS

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

3.3 COMPLY

Comply with the NURALITE Waterproofing LIMITED requirements and instructions.

3.4 STORE

Store NURALITE waterproofing systems rolls and accessory materials under conditions that ensure no deterioration or damage. Store in shade or cover in hot sun. Protect liquid components from freezing.

3.5 WEATHER CONDITIONS

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

3.6 DE-WATERING

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

3.7 DRAINAGE

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

3.8 CHECK SUBSTRATE

Check that the substrate will allow work of the required standard with adequate safe working space for applicators. Complete any remedial work identified and allow to cure before commencing tanking application.

3.9 CURING OF NEW CONCRETE

Allow concrete and masonry to dry to the NURALITE Waterproofing LIMITED requirements before applying tanking. Minimum curing of new concrete: 28 days. This is not applicable for blockwork or site lean concrete.

Application - Preparation

3.10 ENSURE SUBSTRATE

Ensure all surfaces are clean and free from voids, spalled areas, loose particles, and sharp protrusions. Ensure no projections of sharp materials exist that will cause damage to tanking. Check that masonry joints are struck off flush.

Ensure form oils or release agents and curing compounds are completely removed.

3.11 PREPARE SUBSTRATE

Remove projections, wire-brush and remove all debris, leaving the surface dust-free, oil-free and clean, with nothing that could diminish the adhesion of primers. Fill tie holes flush and smooth with NURAFLUSH. Grind off steps or sharp protrusions caused by formwork joints.

3.12 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 NURALITE bitumen triangular fillets.

3.13 TURN DOWNS

Where NURAPLY 3PT is turned over an external corner, first grind the corner to produce a smooth 25mm radius or chamfer.



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3.14 CLEAN SURFACES

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

3.15 DRESS OFF HARDFILL SURFACE

Dress off surface of hardfill with a 15mm layer of fine, clean sand rolled to a smooth surface. Ensure concrete surface is a smooth steel trowel U3 surface to NZS 3114. Grind off any steps or sharp protrusions.

3.16 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..

3.17 PRIMING

Ensure concrete or masonry substrates are sufficiently cured and dry to permit the intended performance of the NURAFLUX QD primer. Apply NURAFLUX QD primer at the coverage rate recommended by NURALITE Waterproofing LIMITED.

3.18 ALLOW PRIMER TO DRY

Allow the primer to dry. Do not prime more than can be covered in one working day. Prevent contamination of the primed surface prior to application of the tanking system.

Waterproofing application - loose Lay for underslab

3.19 LOOSE LAY NURAPLY 3PTM

Loose lay NURAPLY 3PTM as a water-proof membrane under a concrete slab and/or footings. The membrane to be laid with mineral chips face up. Ensure the maximum non specific design of hardfill is up to 600mm in depth. Ensure granular fill, sand blinding and compaction to comply with the requirements of NZS 3604. Alternatively, a screed of site concrete no less than 50mm thick, can be used in place of compacted sand.

Take care when placing reinforcing steel to avoid puncture or damage to the NURAPLY 3PTM membrane.
Fully heat weld all sheet joints by gas torch. Ensure all joints are well sealed with a minimum lap of 80mm for sides and 150mm for sheet ends. This is indicated by the presence of a thin bead of melted bitumen at all sheet joints after torching. Ensure excess membrane is provided to fold up beyond the footings.

The tilt slabs or pre-cast concrete must be left to cure for a minimum 4 day period before lifting takes place, to enable the chemical bond between the surface of the membrane and concrete to occur and allow correct curing of concrete. This is critical to the success of the waterproofing membrane.

3.20 NURAPLY FLOOR TO WALL JUNCTION

Protrude the under slab NURAPLY 3PTM membrane minimum of 150mm beyond the perimeter of the footing. When wall is struck, bring this portion of membrane up and torch to wall base. Install the wall membrane down over the top to form a sound seal. Ensure the 150mm flap is adequately protected from damage during construction of the walls and that foreign matter is not able to contaminate the critical lap area.

Waterproofing - walls near planting

3.21 NURAPLY 3PG APPLICATION - WATERPROOFING

Apply the NURAPLY 3PG waterproofing system with laps and joints and reinforcing pieces at junctions to provide a waterproof finish.

3.22 WELD NURAPLY 3PG JOINTS

Heat fuse joints minimum laps side 75mm, ends 150mm, using NURALITE Waterproofing LIMITED self checking lap welding techniques.

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Application - general

3.23 ADDITIONAL THICKNESS

Provide a double layer of tanking around pipes and penetrations and at all junctions and changes of direction. Seal edges to NURALITE Waterproofing LIMITED requirements.

3.24 SEALING EDGES WITH TERMINATION BAR

At edges of the membrane, adhere firmly on to the substrate and NURALITE TERMINATION BAR on all top edges of tanking.

3.25 SEALING EDGES WITH TERMINATION BAR BELOW-GRADE

Where terminating NURAPLY MEMBRANE below-grade, the termination bar is mechanically fitted 100mm in from where the membrane terminates. Once fitted a reinforcing strip of the specified Nuraply membrane 228mm wide or greater is then torch applied over the termination bar a minimum of 100mm in each direction. If the specified Nuraply membrane has a mineral aggregate finish, a raw bitumen selvedge must be created by heating a trowel and embedding the aggregate into the membrane. This brings up the raw bitumen needed for the selvedge edge. Refer to the Nuraply Bitumen Membranes Terminating Below Grade Method Statement for further information.

3.26 SECTIONAL COMPLETION

As sections of tanking are completed, arrange for inspection of the work before covering with protective sheets, walls, or slabs.

3.27 PROTECT VERTICAL SURFACES

Protect vertical surfaces from damage before covering with NURADRAIN protective sheets.

3.28 PROTECT HORIZONTAL SURFACES

Protect the horizontal tanking from damage during laying by ensuring applicators wear soft soled shoes. Except for inspection purposes do not allow traffic on the tanking after installation and before protection sheets have been laid.

3.29 INSTALL ENERTHERM PIR INSULATION SHEETS

Impale the PIR onto NURALITE self-adhesive mechanical fixings if required. Tape any exposed edges of PIR with150mm foil tape before installing. Tape all PIR joins with 48mm foil tape once installed, to NURALITE requirements for this work, to fully protect and insulate the whole of the tanking area.

3.30 INSTALL NURADRAIN PROTECTION SHEETS

Fix sheets with Nuralite self-adhesive mechanical fixings to NURALITE requirements for this work, to fully protect the whole of the tanking from backfill.

3.31 SUPERVISION OF BACKFILLING

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

Completion

3.32 COMPLETION MATTERS

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

3.33 CLEAN UP

Clean up as the work proceeds.

4 SELECTIONS

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

4.1 PRESSURE RATING FOR WATERPROOFING

Designated water pressure head: ~ metres

For waterproofing systems only (not for damp-proofing systems).



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Waterproofing - Underslab

4.2 NURAPLY 3PTM TANKING SYSTEM - UNDERSLAB AND/OR FOOTINGS

Location:	Refer to the latest Architectural Drawings
Supplier:	NURALITE Waterproofing LIMITED
Brand:	NURAPLY 3PTM

Waterproofing underground walls - near planting

4.3 NURAPLY 3PG SYSTEM

Location:	Refer to the latest Architectural Drawings
Supplier:	NURALITE Waterproofing LIMITED
Brand:	NURAPLY 3PG
Protection level:	Waterproofing

Components

4.4 NURAPLY INSULATION SHEETS

Location:	Refer to the latest Architectural Drawings
Supplier:	NURALITE Waterproofing LIMITED
Brand:	ENERTHERM PIR Insulation Board
Thickness:	Refer to the latest Architectural Drawings

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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 ~ for ~

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
SIPs	Structural Insulated Panels

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® Installation Guide
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 876 (2020) - SOLITEX MENTO 1000 Roofing Underlay
BRANZ Appraisal 953 (2024) - KAFLEX and ROFLEX Grommets

BRANZ Appraisal 989 (2023) - SOLITEX EXTASANA ADHERO® Self-adhesive Underlay - Amendment 1
BRANZ Appraisal 1163 (2021) - SOLITEX EXTASANA® Wall Underlay
SOLITEX MENTO® 1000 CONNECT Roof Underlay Installation Guide
SOLITEX UM CONNECT Application Instructions
Specification Guidelines 30 January 2026
Early-Close-In with SOLITEX EXTASANA®
SOLITEX EXTASANA® Early Close-In Application Guide for Brick Cladding
SOLITEX EXTASANA® Early Close-In Application Guide for Horizontal Cladding
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 - CODEMARK CERTIFICATE

SOLITEX EXTASANA Wall Underlay meets the requirements of the NZBC when used within the conditions and limitations of its CodeMark Certificate of Conformity CMNZ30032.

1.8 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.

1.9 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.

1.10 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.

1.11 COMPLIANCE - BRANZ APPRAISAL 1163

SOLITEX EXTASANA® Wall Underlay has been appraised as meeting provisions of the NZBC when used within the Conditions and Limitations of its BRANZ Appraisal 1163.

Requirements

1.12 NO SUBSTITUTIONS

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

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 - MECHANICAL FIX

SOLITEX EXTASANA® 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. Watertight to >10,000mm water column pressure, with low MVTR (vapour 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, 3.1 in accordance with CodeMark™ Certificate CMNZ30032. Refer to BRANZ Appraisal 1163 for details. Supplied in rolls 1.5m x 36.5m long (55m²), 1.5m x 50m long (75m²) and 2.74m wide x 36.5m long (100m²). SOLITEX EXTASANA® must be covered and protected against weather or ultraviolet light within 180 days.

2.2 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.

2.3 WALL UNDERLAY - MEDIUM WEIGHT, TYPE R4, VERY HIGH EXPOSURE (90 DAYS)

SOLITEX MENTO® 3000 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 or 3m wide x 50m long. Self-supporting to 1200mm (for roof applications).

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

Components

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.

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.

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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.

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 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.

3 EXECUTION

Conditions

3.1 DELIVERY, STORAGE & HANDLING OF PRODUCTS

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

3.2 ROUTINE MATTERS

Refer to 1250 TEMPORARY WORKS & SERVICES for protection requirements.

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

3.3 GENERAL REQUIREMENTS

Design application and installation of 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 - WALL PROTECTION MEMBRANE OVER RIGID WALL UNDERLAYS

SOLITEX EXTASANA® 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 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.

3.8 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.

Application - wall underlay - SOLITEX MENTO 3000

3.9 FIX WALL UNDERLAY - TIMBER FRAMING

Fix wall underlay in accordance with SOLITEX MENTO® 3000 Application Guide and as follows:

- Apply underlay to exterior walls from below bottom plate to top plate. Fix securely with fasteners e.g. "LITTLE GRIPPERS", 6mm - 8mm staples or 20mm large head galvanized clouts at 300mm centres horizontally and vertically. Provide additional fixings around window and door openings.
- In sea spray zone (Zone D) all fixings to be stainless steel.
- Allow a 150mm minimum lap at joins and all vertical overlaps over studs and tape with Pro Clima TESCON EXTORA® to increase weathertightness. Repair any forced tears using TESCON EXTORA®.

- Pro Clima recommendation: Apply ORCON® Classic adhesive to perimeter at footing level to prevent wind wash over insulation.
- Pro Clima recommendation: Apply TESCON EXTORA® to horizontal laps to prevent wind wash over insulation.
- 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 MENTO® 3000 flaps inside and fasten to frame.
- Apply TESCON EXTOSEAL® sill tape.

3.10 METAL CLADDING ON TIMBER CAVITY BATTENS

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

Application - tape systems

3.11 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

3.12 INSTALL GROMMETS AND DETAIL SOLUTIONS

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

Completion

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.proclima.co.nz.
Substitutions are not permitted to the following.

Materials

4.1 PRO CLIMA SOLITEX EXTASANA® MEMBRANE - MECHANICAL FIX

Location:	LVL timber framed walls and stone clad walls
Manufacturer:	Pro Clima NZ Limited
Type:	SOLITEX EXTASANA® Wall Protection Membrane
Jointing & sealing tape:	TESCON EXTORA® weathertight sealing tape
	TESCON EXTOSEAL® sill tape (for window openings if relevant)
	TESCON NAIDECK butyl sealing tape
Adhesive:	ORCON® Classic multi-purpose adhesive (sealing at base of wall)
Accessories: (if needed)	KAFLEX mono sealing grommets for cables ∅ 6-12mm
	KAFLEX multi-sealing grommet for multiple cables ∅ 6-12mm
	ROFLEX 20 sealing grommet for pipes and conduit ∅ 15-30mm
	ROFLEX 20 multi-sealing grommet for multiple pipes and conduit ∅ 15-30mm
	ROFLEX 30 / 50 / 100 / 150 / 200 / 250 / 300 sealing grommets for pipes ∅ 30-320mm

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

Location:	Concrete block walls and other wall types
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 (for window openings if relevant)
	TESCON NAIDECK butyl sealing tape
Adhesive:	ORCON® Classic multi-purpose adhesive (sealing at base of wall)
Accessories: (if needed)	KAFLEX mono sealing grommets for cables ∅ 6-12mm KAFLEX multi-sealing grommet for multiple cables ∅ 6-12mm ROFLEX 20 sealing grommet for pipes and conduit ∅ 15-30mm ROFLEX 20 multi-sealing grommet for multiple pipes and conduit ∅ 15-30mm ROFLEX 30 / 50 / 100 / 150 / 200 / 250 / 300 sealing grommets for pipes ∅ 30-320mm

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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.

AEORSANA® VISCONN Intelligent Air Barrier

2.4 AEROSANA VISCONN SEALANT

Humidity variable vapour control and airtight sealant, comprised of modified aqueous acrylate polymer dispersion.

2.5 AEROSANA VISCONN FIBRE SEALANT

Humidity variable vapour control and airtight sealant, comprised of fibre-reinforced modified aqueous acrylate polymer dispersion.

2.6 AEROSANA FLEECE

Malleable PET fleece. Supplied in rolls 150mm wide x 25m long.

DASATOP® Intelligent Air Barrier for roof retrofits

2.7 DASATOP MEMBRANE

Airtightness and vapour control membrane with high humidity-variable MVTR, comprised of a polyethylene copolymer with tear resistant PP fleece reinforcement. Supplied in rolls 1.5m wide x 50m long.

2.8 DASATOP FIX FIXING BATTEN

40mm wide x 3mm thick MDF/HDF fibreboard batten. Supplied in 1m lengths.

Components

2.9 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.

2.10 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.

2.11 TESCON PRIMER RP

Acrylic copolymer primer.

2.12 ORCON CLASSIC ADHESIVE

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

2.13 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.

2.14 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.

2.15 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.

2.16 STAPLES

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

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Accessories

2.17 KAFLEX SEALING GROMMETS

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

2.18 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.

2.19 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 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.

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.

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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.

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.

AEORSANA® VISCONN Intelligent Air Barrier installation

3.16 PREPARE SURFACES

Clean loose material and debris from surface with coarse brush.

For cracks and joints 8mm to 20mm wide, brush AEROSANA VISCONN FIBRE sealant into crack filling the gap.
For cracks and joints 20mm to 70mm wide, brush 40mm wide, 1mm thick layer of AEROSANA VISCONN FIBRE sealant around the gap. Embed a layer of AEROSANA FLEECE into the sealant bridging the gap. Brush on second layer of sealant over embedded fleece.

3.17 APPLY AEROSANA VISCONN SEALANT

Apply a 1mm minimum thick coat to surface by brush or spray. Allow to dry. Apply a second 1mm thick coat.

DASATOP® Intelligent Air Barrier for roof retrofits installation

3.18 INSTALL DASATOP MEMBRANE

Remove sharp edges (e.g. protruding nails) and clean loose material from roof framing. Install DASATOP membrane over the roofing framing from the exterior. Lay membrane horizontally (i.e. perpendicular to the roof framing) with 100mm overlap between membrane layers and 40mm overhang at edges. Fit DASATOP FIX battens over membrane along each side of roof framing members. Staple fix through batten into base of roof framing membrane.

3.19 SEAL DASATOP MEMBRANE LAPS

Seal all membrane laps with a continuous layer of TESCON VANA adhesive tape.

Seal the 40mm membrane overhang to building elements with a continuous layer of TESCON VANA adhesive tape.

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Quality control

3.20 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.

3.21 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

3.22 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: < ~

4.2 DESIGN AIR CHANGE RATE

Airtightness level: < ~

4.3 INTELLO INTELLIGENT AIRTIGHTNESS SYSTEM

Location:	~
Manufacturer:	Pro Clima NZ Limited
System:	INTELLO IAS
Membrane:	~
Connection strip:	INTELLO ConneX
Jointing tape:	TESCON VANA
Corner tape:	TESCON PROFIL
Adhesive:	ORCON Classic
Joinery tape:	~
Junction tape:	~

4.4 AEROSANA VISCONN INTELLIGENT BARRIER SYSTEM

Location:	~
Manufacturer:	Pro Clima NZ Limited
System:	AEROSANA VISCONN IAB
Membrane:	AEROSANA VISCONN

4.5 DASATOP INTELLIGENT BARRIER SYSTEM

Location:	~
Manufacturer:	Pro Clima NZ Limited
System:	DASATOP IAB
Membrane:	DASATOP
Jointing tape:	TESCON VANA

4.6 PRO CLIMA PENETRATION GROMMETS

Location:	~
Manufacturer:	Pro Clima NZ Limited
Grommet type:	~
Size:	~
Jointing tape:	~

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

1 GENERAL

This section relates to the supply and installation of Kingspan's Thermakraft product range including DPC, DPM, Wall & Roof Underlays, Foils, Flashing Tapes, and accessories.

1.1 ABBREVIATIONS AND DEFINITIONS

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

The following abbreviations apply specifically to this section:

DPC	Damp proof course
DPM	Damp proof membrane
EPDM	Ethylene propylene diene monomer

The following definitions apply specifically to this section:

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

Documents

1.2 DOCUMENTS

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

NZBC E2/AS1	External moisture provisions for timber-framed buildings up to 10 m in height
AS 1530.2	Methods for fire tests on building materials, components and structures - Test for flammability of materials
AS/NZS 2904	Damp-proof courses and flashings
NZS 3604	Timber-framed buildings
NZS 4229	Concrete masonry buildings not requiring specific engineering design
AS/NZS 4347	Damp-proof courses and flashings - Methods of test
AS/NZS 4389	Roof safety mesh
AS/NZS 4534	Zinc and zinc/aluminium-alloy coatings on steel wire
CodeMark CMNZ10002 ver5	Watergate Plus Wall Underlay
CodeMark CMNZ30028 verK	Thermakraft Covertek 407 Roof and Wall Underlay
CodeMark CMNZ30030 verJ	Thermakraft Covertek 405 Roof and Wall Underlay
CodeMark CMNZ30069 verI	Thermakraft Covertek 403 Roof and Wall Underlay

1.3 MANUFACTURER/SUPPLIER DOCUMENTS

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

Thermakraft's Product Data Sheets
Thermakraft's Installation Guides
BRANZ Appraisal 329 (2022) - Supercourse 500 Damp-Proof Course and Concealed Flashing - Amendment 29.08.2023
BRANZ Appraisal 651 (2024) - Thermakraft Covertek 407 Roof and Wall Underlay - Amended 01.07.2025
BRANZ Appraisal 695 (2023) - Watergate Plus Wall Underlay - Amended 01.07.2025
BRANZ Appraisal 743(2025) - Thermakraft Covertek 405 Roof and Wall Underlay
BRANZ Appraisal 878 (2025) - Thermakraft Aluband Window Flashing Tape
BRANZ Appraisal 912 (2021) - Thermakraft 220 Synthetic Wall Underlay - Amended 01.07.2025
BRANZ Appraisal 917(2025) - Thermakraft Covertek 403 Roof and Wall Underlay

BRANZ Appraisal 942 (2022) - OneSeal Multi-fit Pipe and Cable Penetration Seals - Amendment 04.06.2024
BRANZ Appraisal 943 (2021) - Thermakraft Covertek 401 Roof and Wall Underlay - Amended 01.07.2025
BRANZ Appraisal 1000 (2023) - Thermakraft Thermabar 397 Light Diffusing Reflective Underlay - Amended 01.07.2025
BRANZ Appraisal 1029 (2023) - Thermakraft Ausnet Hexagonal Wire Mesh
BRANZ Appraisal 1104 (2020) - Thermathene Orange Concrete Underlay - Amendment 06.09.2024
BRANZ Appraisal 1122 (2026) - Thermaflash Flashing Tape
BRANZ Appraisal 1229 (2023) - Thermakraft Covertek 215 Roof Underlay - Amended 19.06.2025
BRANZ Appraisal 1277 (2025) - Thermakraft RainArmor Self Adhesive Roof Underlay and Wall Underlay

Manufacturer/supplier contact details

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

Warranties

1.4 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

15 years	For Kingspan Thermakraft product range.

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

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.5 QUALIFICATIONS GENERALLY

Refer to 1270 CONSTRUCTION for requirements relating to qualifications.

1.6 NO SUBSTITUTIONS

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

Compliance information - CodeMark certified

1.7 CODEMARK CERTIFICATE - THERMAKRAFT WATERGATE PLUS

Thermakraft Watergate Plus wall underlay meets the requirements of the NZBC when used within the conditions and limitations of its CodeMark Certificate of Conformity CMNZ10002.

1.8 CODEMARK CERTIFICATE - THERMAKRAFT COVERTEK 407

Thermakraft Covertek 407 roof and wall underlay and Covertek 407 Early Close Wall Application meet the requirements of the NZBC when used within the conditions and limitations of its CodeMark Certificate of Conformity CMNZ30028.

1.9 CODEMARK CERTIFICATE - THERMAKRAFT COVERTEK 405

Thermakraft Covertek 405 roof and wall underlay meets the requirements of the NZBC when used within the conditions and limitations of its CodeMark Certificate of Conformity CMNZ30030.

1.10 CODEMARK CERTIFICATE - THERMAKRAFT COVERTEK 403

Thermakraft Covertek 403 roof and wall underlay meets the requirements of the NZBC when used within the conditions and limitations of its CodeMark Certificate of Conformity CMNZ30069.

Compliance information - BRANZ appraised

1.11 BRANZ APPRAISED - THERMAKRAFT SUPERCOURSE 500

Thermakraft Supercourse 500 DPC has been appraised as meeting provisions of the NZBC when used within the Conditions and Limitations of its BRANZ Appraisal 329

1.12 BRANZ APPRAISED - THERMAKRAFT COVERTEK 407

Thermakraft Covertek 407 roof and wall underlay has been appraised as meeting provisions of the NZBC when used within the Conditions and Limitations of its BRANZ Appraisal 651

1.13 BRANZ APPRAISED - THERMAKRAFT WATERGATE PLUS

Thermakraft Watergate Plus wall underlay has been appraised as meeting provisions of the NZBC when used within the Conditions and Limitations of its BRANZ Appraisal 695

1.14 BRANZ APPRAISED - THERMAKRAFT COVERTEK 405

Thermakraft Covertek 405 roof and wall underlay has been appraised as meeting provisions of the NZBC when used within the Conditions and Limitations of its BRANZ Appraisal 743

1.15 BRANZ APPRAISED - THERMAKRAFT ALUBAND

Thermakraft Aluband flashing tape has been appraised as meeting provisions of the NZBC when used within the Conditions and Limitations of its BRANZ Appraisal 878

1.16 BRANZ APPRAISED - THERMAKRAFT 220

Thermakraft 220 wall underlay has been appraised as meeting provisions of the NZBC when used within the Conditions and Limitations of its BRANZ Appraisal 912

1.17 BRANZ APPRAISED - THERMAKRAFT COVERTEK 403

Thermakraft Covertek 403 roof and wall underlay has been appraised as meeting provisions of the NZBC when used within the Conditions and Limitations of its BRANZ Appraisal 917

1.18 BRANZ APPRAISED - THERMAKRAFT ONESEAL

Thermakraft OneSeal multi-fit pipe and cable penetration seal has been appraised as meeting provisions of the NZBC when used within the Conditions and Limitations of its BRANZ Appraisal 942

1.19 BRANZ APPRAISED - THERMAKRAFT COVERTEK 401

Thermakraft Covertek 401 roof and wall underlay has been appraised as meeting provisions of the NZBC when used within the Conditions and Limitations of its BRANZ Appraisal 943

1.20 BRANZ APPRAISED - THERMAKRAFT THERMABAR 397

Thermakraft Thermabar 397 roof and wall underlay has been appraised as meeting provisions of the NZBC when used within the Conditions and Limitations of its BRANZ Appraisal 1000

1.21 BRANZ APPRAISED - THERMAKRAFT AUSNET

Thermakraft Ausnet wire netting has been appraised as meeting provisions of the NZBC when used within the Conditions and Limitations of its BRANZ Appraisal 1029

1.22 BRANZ APPRAISED - THERMAKRAFT THERMATHENE ORANGE

Thermathene Orange DPM has been appraised as meeting provisions of the NZBC when used within the Conditions and Limitations of its BRANZ Appraisal 1104

1.23 BRANZ APPRAISED - THERMAKRAFT THERMAFLASH

Thermakraft Thermaflash flashing tape has been appraised as meeting provisions of the NZBC when used within the Conditions and Limitations of its BRANZ Appraisal 1122

1.24 BRANZ APPRAISED - THERMAKRAFT COVERTEK 215

Thermakraft Covertek 215 roof underlay has been appraised as meeting provisions of the NZBC when used within the Conditions and Limitations of its BRANZ Appraisal 1229

1.25 BRANZ APPRAISED - THERMAKRAFT RAINARMOR

Thermakraft RainArmor self-adhesive roof underlay has been appraised as meeting provisions of the NZBC when used within the Conditions and Limitations of its BRANZ Appraisal 1277

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2 PRODUCTS

DPC

2.1 THERMAKRAFT SUPERCOURSE 500

BRANZ appraised, 0.5mm thick embossed black film DPC composed of recycled alloyed polyethylene. Tested to AS/NZS 4347 in accordance with AS/NZS 2904. Available in various width. Refer to SELECTIONS.

2.2 THERMAKRAFT PERIMETER

Sand coated black paper DPC composed of cardboard, bitumen and fine sand. Tested to AS/NZS 4347 in accordance with AS/NZS 2904. Available in various width. Refer to SELECTIONS.

DPM

2.3 THERMAKRAFT THERMATHENE ORANGE

BRANZ appraised, 0.3mm thick x 4000mm wide orange DPM composed of recycled alloyed polythene. Membrane has a vapour flow resistance of at least 90MNs/g to NZS 3604 and NZS 4229 Damp-Proof Membranes. Refer to SELECTIONS.

2.4 THERMAKRAFT THERMATHENE BLACK

0.25mm x 4000mm wide black DPM composed of recycled alloyed polythene. Membrane has a vapour flow resistance of at least 90MNs/g to NZS 3604 and NZS 4229, Damp-Proof Membranes. Refer to SELECTIONS.

Synthetic underlays - fire retardant

2.5 THERMAKRAFT 220

BRANZ appraised synthetic wall underlay, white with light grey logo print, composed of a water resistant vapour permeable film laminated to a non-woven polypropylene sheet. Fire retardant, tested to AS 1530.2 and assigned a Flammability Index of ≤5. Available in 1370mm and 2740mm width. Refer to SELECTIONS.

2.6 THERMAKRAFT WATERGATE PLUS

CodeMark certified and BRANZ appraised synthetic wall underlay, white with blue logo print, composed of a water resistant vapour permeable film laminated to a non-woven polyolefin sheet. Fire retardant, tested to AS 1530.2 and assigned a Flammability Index of ≤5. Available in 685mm, 1370mm and 2740mm width. Refer to SELECTIONS.

2.7 THERMAKRAFT COVERTEK 407

CodeMark certified and BRANZ appraised self-supporting synthetic roof and wall underlay, white with red logo print, composed of a water resistant vapour permeable film laminated to two layers of non-woven, spun bonded polyolefin sheet. Fire retardant, tested to AS 1530.2 and assigned a Flammability Index of ≤5. Available in 1250mm, 2550mm and 2740mm width. Suitable for use as an Early Close Wall Application providing up to 120 days temporary weather protection. Suitable for use as temporary weather protection for up to 30 days on roofs. Refer to SELECTIONS.

2.8 THERMAKRAFT COVERTEK 405

CodeMark certified and BRANZ appraised self-supporting synthetic roof and wall underlay, white with yellow logo print, composed of a water resistant vapour permeable film laminated to two layers of non-woven, spun bonded polyolefin sheet. Fire retardant, tested to AS 1530.2 and assigned a Flammability Index of ≤5. Available in 1250mm and 2550mm width. Refer to SELECTIONS.

2.9 THERMAKRAFT COVERTEK 403

CodeMark certified and BRANZ appraised synthetic roof and wall underlay, white with green logo print, composed of a water resistant vapour permeable film laminated to two layers of non-woven, spun bonded polyolefin sheet. Fire retardant, tested to AS 1530.2 and assigned a Flammability Index of ≤5. Available in 1350mm width. Refer to SELECTIONS.

Synthetic underlays - not fire retardant

2.10 THERMAKRAFT COVERTEK 401

BRANZ appraised self-supporting synthetic roof and wall underlay, light grey with dark grey logo print, composed of a water resistant vapour permeable film laminated to two layers of non-woven, spun bonded polyolefin sheet. Available in 1350mm and 2700mm width. Refer to SELECTIONS.

2.11 THERMAKRAFT COVERTEK 215

BRANZ appraised self-supporting synthetic roof and wall underlay, grey with black logo print, composed of a water resistant vapour permeable film laminated to two layers of non-woven, spun bonded polyolefin sheet. Available in 1350mm and 2700mm width. Refer to SELECTIONS.

2.12 THERMAKRAFT RAINARMOR SELF ADHESIVE

BRANZ appraised self adhesive roof and wall underlay, composed of a three-layer water-resistant and water vapour-permeable synthetic membrane. Available in 1460mm wide and 31m long rolls.

Foil underlay & vapour control layers

2.13 THERMAKRAFT THERMABAR 344

Self-supporting, lightweight, high tensile roof & wall underlay and vapour control layer composed of reinforced aluminium foil sheet bonded to white synthetic woven fabric. Fire retardant, tested to AS 1530.2 and assigned a Flammability Index of ≤5. Light reflectance of 65 - 75%. Available in 1350mm width. Refer to SELECTIONS.

2.14 THERMAKRAFT THERMABAR 397

BRANZ appraised self-supporting synthetic foil roof & wall underlay and vapour control layer composed of a middle layer of spun bonded polypropylene material with bonded outer layers of white polypropylene film to one side and metallised polyolefin film to the other side. Fire retardant, tested to AS 1530.2 and assigned a Flammability Index of ≤5. Light reflectance of 75 - 85%. Not electrically conductive. Available in 1350mm width. Refer to SELECTIONS.

Vapour control

2.15 THERMAKRAFT VAPOUR SHIELD

Woven synthetic sarking and moisture vapour barrier, coated both sides with a vapour impermeable film. One side is coated black and the reverse side white. Available in 2130mm width. Refer to SELECTIONS.

2.16 THERMAKRAFT CAVAP ALU 1500 UV-AC

Foil reinforced, self adhesive vapour barrier. Coated with an acrylic adhesive to underside and a removable protective film. 1500mm wide and 33.4m long rolls.

Components - sealing

2.17 THERMAKRAFT WHITE GENERAL PURPOSE TAPE

60mm wide, white polypropylene general purpose tape with acrylic adhesive. Refer to SELECTIONS.

2.18 THERMAKRAFT PREMIUM JOINING TAPE

75mm wide, black self-adhering multi-layer synthetic construction tape. Refer to SELECTIONS.

2.19 THERMAKRAFT ONESEAL

BRANZ appraised black multi-fit pipe and cable penetration seal composed of adhesive coated, 1.2mm thick flexible synthetic rubber material (EPDM) with pre-notched ring markings. Refer to SELECTIONS.

2.20 THERMAKRAFT CORNER MOULDS

Orange, flexible inert polythene moulded window corner flashing. Refer to SELECTIONS.

2.21 THERMAKRAFT THERMAFLASH

BRANZ appraised self-adhering synthetic flexible flashing tape, white on the top surface. Available in 75mm, 150mm and 200mm width. Refer to SELECTIONS.

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2.22 THERMAKRAFT ALUBAND

BRANZ appraised, black, self-adhering polymeric faced bituminous flashing tape. Available in 75mm, 150mm and 200mm width. Refer to SELECTIONS.

Components - secure strapping/netting

2.23 THERMAKRAFT THERMASTRAP

19mm wide, rigid embossed polypropylene strap, colour blue. Refer to SELECTIONS.

2.24 THERMAKRAFT STUD STRAP

25mm wide, flexible woven and coated polythene strap, colour black. Refer to SELECTIONS.

2.25 THERMAKRAFT AUSNET

BRANZ appraised 1mmØ x 2000mm wide galvanized steel hexagonal wire netting to AS/NZS 4534. Available in 50mm and 75mm mesh size. Refer to SELECTIONS.

2.26 THERMAKRAFT AUSMESH

2mmØ galvanized steel safety mesh to AS/NZS 4389, 150mm x 300mm mesh size. Available in 1800mm and 2400mm width.

Fixings

2.27 FIXINGS - TO TIMBER

Little grippers, staples, clouts or screws to suit application. Refer to SELECTIONS.

2.28 FIXINGS - TO STEEL

Construction grade double sided tape, adhesive or galvanized flat head screws to suit application. 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.

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 - generally

3.4 STANDARDS AND TOLERANCES

Refer to the general section 1270 CONSTRUCTION for general requirements.

Installation - DPC

3.5 INSTALL DPC

Ensure substrate's surface is smooth, flat and free from sharp ridges/projections that may puncture membrane. Install as a single layer with minimum 50mm overlap at joints to the Installation Guide.

Installation - DPM

3.6 INSTALL DPM - CONCRETE FLOOR

Install DPM over sand blinding below concrete floors, install in a neat fashion with a smooth surface as a single layer with minimum 150mm overlap at joints to the Installation Guide.



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3.7 INSTALL DPM - SUSPENDED TIMBER FLOOR

Install DPM on ground below suspended timber floors to NZS 3604, Ground Cover:

- In a manner draining water to the exterior and preventing water accumulation on membrane
- Covering the total subfloor area
- Weighted down and held against air movement by bricks or rocks
- With minimum 75mm overlap at joints
- Butted up to surrounding foundation walls, piles and other penetrating elements

3.8 APPLY TAPE TO LAPPED DPM JOINTS

Ensure DPM is free of dust and contaminates, where required clean with a dry cloth. Apply tape to the Installation Guide centred over joint laps by firmly pressing down without stretching or pulling tape.

Installation - wall underlay

3.9 INSTALL WALL UNDERLAY

Install wall underlay to the Installation Guide horizontally and in true alignment over exterior face of wall framing including openings. Start by placing first sheet draw taut and fix at maximum 300mm centres to wall framing members. Install additional sheets in rows repeating the process for the first sheet with sheet end laps to be of at least 150mm and occurring over wall framing and overlapping higher over lower sheets by at least 150mm.

3.10 INSTALL WALL PENETRATION SEALS

Ensure wall underlay is free of dust and contaminates, where required clean with a dry cloth. Install penetration seal to the Installation Guide over pipe/conduit with a tight fit. Slide seal over pipe/conduit and place on underlay in a diamond shape. Remove backing release film and push firmly down to fix in place.

Installation - secure netting/strapping

3.11 INSTALL SECURE STRAPPING

Place straps on underlay, draw taut and fix to framing to the Installation Guide.

3.12 INSTALL WIRE NETTING

Install wire netting to the Installation Guide in the same direction as the underlay. Where required to facilitate water drainage install netting with a sag, otherwise draw taut. Tie edges of netting together with galvanized wire clips and fix in place.

3.13 INSTALL SAFETY MESH

Install safety mesh to the Installation Guide and AS/NZS 4389.

Installation - roof underlay

3.14 INSTALL ROOF UNDERLAY - HORIZONTAL

Install underlay to the Installation Guide horizontally and in true alignment over exterior face of roof framing. Place first sheet overlapping guttering (max. 20mm) or if eaves flashing is used terminate on the upper side of the flashing, draw sheet taut and fix at maximum 300mm centres to roof framing members. Install additional sheets in row repeating the process for the first sheet with sheet end laps to be of at least 150mm. Install sheets up to and over the ridge repeating the installation process for the first row and overlapping higher over lower sheets by at least 150mm.

3.15 INSTALL ROOF UNDERLAY - VERTICAL

Install underlay to the Installation Guide vertically and in true alignment over exterior face of roof framing. Place first sheet up the slope to the ridge overlapping guttering (max. 20mm) or if eaves flashing is used terminate on the upper side of the flashing, draw sheet taut and fix at maximum 300mm centres to roof framing members. Install additional sheets repeating the process for the first sheet lapping joints by at least 150mm.



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3.16 INSTALL RAINARMOR SELF ADHESIVE

Align membrane with edge of substrate, peel off the removable protective film gradually and press membrane firmly with a hand roller or plastic spreader. Apply 400mm wide strip centred on wall corners before laying sheets over. Lay upper sheets over lower sheets with minimum 150mm overlap. Penetrations and repair for small, damaged areas can be made with any Thermakraft window flashing tape or Premium Joining Tape. Larger damage can be repaired by installing a new layer over the top with a minimum of 150mm overlap on all sides. Limit UV and weather exposure to no more than 120 days.

Installation - vapour control layers

3.17 INSTALL VAPOUR CONTROL LAYER

Install vapour control layer to the Installation Guide in true alignment, overlap sheet joints by at least 150mm, draw sheets taut and fix at maximum 300mm centres to framing.

3.18 SEAL VAPOUR CONTROL LAYER

Ensure vapour layer is free of dust and contaminates, where required clean with a dry cloth. Apply tape to the Installation Guide over joint laps and over any other projections and penetrations by firmly pressing down without stretching or pulling.

3.19 INSTALL CAVAP ALU 1500 UV-AC

Foil reinforced, self-adhesive vapour barrier to be installed on the internal (warm) side of rigid substrates. Align membrane with edge of substrate, peel off the removable protective film gradually and press membrane firmly with a hand roller or plastic spreader. Seal penetrations with any Thermakraft window flashing tapes or Premium Joining Tape. Any minor damages can be repaired by installing a new layer over the top with a minimum of 150mm overlap on all sides. Limit UV and weather exposure to no more than 7 days.

Preparation of wall underlay for window/door placement

3.20 FORM OPENINGS

Form openings in wall underlay to the Installation Guide. Cut underlay diagonally from corner to corner across the opening and tightly fold underlay flaps into opening over the full depth. Secure underlay to the back face of opening framing with staples. Trim excess underlay off at internal face. Remove dust and contaminates from underlay with a dry cloth.

3.21 INSTALL CORNER MOULDS

Install corner moulds with tight fit to sill/jamb corners to the Installation Guide.

3.22 FLASHING TAPE APPLICATION - GENERALLY

Install flashing tape to the Installation Guide. Fold tape back onto exterior wall surface by at least 50mm, cover opening depth in full and finish by lining up with inside edge of opening framing. Fix tape by applying even pressure by hand or a roller leaving no air bubbles beneath the tape.

3.23 APPLY FLASHING TAPE ACROSS SILL/JAMB CORNERS

Cut 75mm wide tape to 100mm length. Apply to exterior wall surface across sill/jamb corners at 45°, overlap corners by 3mm.

3.24 APPLY FLASHING TAPE TO SILL

Use 150mm wide tape for up to 100mm deep opening framing and 200mm wide tape for deeper framing. Cut tape to sill length plus 400mm. Remove release film from tape, align back edge of tape with interior sill edge allowing for at least 200mm tape upstand at jambs, apply tape to sill and jamb. Cut tape overhang at external sill/jamb corners, fold back onto and apply to exterior wall face.

3.25 CREATE PENETRATION SELF-SEAL AT SILL

Cut 75mm wide flashing tape to sill length. Apply along entire length of sill at window/door fixing location to ensure fixing penetration self-seal.

3.26 APPLY FLASHING TAPE TO HEADER

Use 150mm wide tape for up to 100mm deep opening framing and 200mm wide tape for deeper framing. Cut tape to 400mm length. Remove release film from tape, align back edge of tape with interior opening framing edge and apply 200mm along head and 200mm down jambs. Cut tape overhang at external head/jamb corners, fold back onto and apply to exterior wall face.

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3.27 APPLY FLASHING TAPE ACROSS HEAD/JAMB CORNERS

Cut 75mm wide tape to 100mm length. Apply to exterior wall surface across head/jamb corners at 45°, overlap corners by 3mm to create a seal at corner junctions.

Completion

3.28 COMPLETION MATTERS

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

4 SELECTIONS

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

DPC

4.1 DPC - THERMAKRAFT SUPERCOURSE 500

Location:	~
Manufacturer:	Thermakraft
Brand:	Supercourse 500
Type:	Damp proof course
Width:	~

4.2 DPC - THERMAKRAFT PERIMETER

Location:	~
Manufacturer:	Thermakraft
Brand:	Perimeter
Type:	Damp proof course
Width:	~

DPM

4.3 DPM - THERMAKRAFT THERMATHENE ORANGE

Location:	~
Manufacturer:	Thermakraft
Brand:	Thermathene Orange
Type:	Damp proof membrane
Width:	4000mm
Joint tape:	~
Maximum UV exposure:	30 days

4.4 DPM - THERMAKRAFT THERMATHENE BLACK

Location:	~
Manufacturer:	Thermakraft
Brand:	Thermathene Black
Type:	Damp proof membrane
Width:	4000mm
Joint tape:	White General Purpose Tape

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Synthetic underlays - fire retardant

4.5 WALL UNDERLAY - THERMAKRAFT 220

Location:	~
Manufacturer:	Thermakraft
Brand:	Thermakraft 220
Type:	Synthetic wall underlay
Width:	~
Fixings:	~
Maximum UV exposure:	60 days

4.6 WALL UNDERLAY - THERMAKRAFT WATERGATE PLUS

Location:	~
Manufacturer:	Thermakraft
Brand:	Watergate Plus
Type:	Synthetic wall underlay
Width:	~
Fixings:	~
Maximum UV exposure:	90 days

4.7 ROOF & WALL UNDERLAY - THERMAKRAFT COVERTEK 407

Location:	~
Manufacturer:	Thermakraft
Brand:	Covertek 407
Type:	Synthetic roof and wall underlay
Width:	~
Fixings:	~
Maximum UV exposure:	Walls - 120 days Roofs - 30 days

4.8 ROOF & WALL UNDERLAY - THERMAKRAFT COVERTEK 405

Location:	~
Manufacturer:	Thermakraft
Brand:	Covertek 405
Type:	Synthetic roof and wall underlay
Width:	~
Fixings:	~
Maximum UV exposure:	Walls - 60 days Roofs - 7 days

4.9 ROOF & WALL UNDERLAY - THERMAKRAFT COVERTEK 403

Location:	~
Manufacturer:	Thermakraft
Brand:	Covertek 403
Type:	Synthetic roof and wall underlay
Width:	1350mm
Fixings:	~
Maximum UV exposure:	Walls - 42 days Roofs - 7 days



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Synthetic underlays - not fire retardant

4.10 ROOF & WALL UNDERLAY - THERMAKRAFT COVERTEK 401

Location:	~
Manufacturer:	Thermakraft
Brand:	Covertek 401
Type:	Synthetic roof and wall underlay
Width:	~
Fixings:	~
Maximum UV exposure:	Walls - 60 days Roofs - 7 days

4.11 ROOF & WALL UNDERLAY - THERMAKRAFT COVERTEK 215

Location:	~
Manufacturer:	Thermakraft
Brand:	Covertek 215
Type:	Synthetic roof underlay
Roll size:	~
Fixings:	~
Maximum UV exposure:	Walls - 60 days Roofs - 7 days

4.12 ROOF & WALL UNDERLAY - THERMAKRAFT RAINARMOR SELF ADHESIVE

Location:	~
Manufacturer:	Thermakraft
Brand:	RainArmor Self Adhesive
Type:	Synthetic roof and wall underlay
Maximum UV exposure:	120 days

Foil underlays - fire retardant

4.13 ROOF & WALL UNDERLAY - THERMAKRAFT THERMABAR 344

Location:	~
Manufacturer:	Thermakraft
Brand:	Thermabar 344
Type:	Foil roof and wall underlay
Width:	1350mm
Fixings:	~
Maximum UV exposure:	7 days

4.14 ROOF & WALL UNDERLAY - THERMAKRAFT THERMABAR 397

Location:	~
Manufacturer:	Thermakraft
Brand:	Thermabar 397
Type:	Foil roof and wall underlay
Width:	1350mm
Fixings:	~
Maximum UV exposure:	7 days



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Vapour control

4.15 VAPOUR BARRIER LAYER - THERMAKRAFT THERMABAR 344

Location:	~
Manufacturer:	Thermakraft
Brand:	Thermabar 344
Type:	Vapour barrier layer
Width:	1350mm
Joint tape:	~
Fixings:	~
Maximum UV exposure:	7 days

4.16 VAPOUR BARRIER LAYER - THERMAKRAFT THERMABAR 397

Location:	~
Manufacturer:	Thermakraft
Brand:	Thermabar 397
Type:	Vapour barrier layer
Width:	1350mm
Joint tape:	~
Fixings:	~
Maximum UV exposure:	7 days

4.17 VAPOUR BARRIER LAYER - THERMAKRAFT CAVAP ALU 1500 UV-AC

Location:	~
Manufacturer:	Thermakraft
Brand:	CaVap Alu 1500 UV-AC
Type:	Foil reinforced self adhesive vapour barrier
Maximum UV exposure:	7 days

4.18 VAPOUR BARRIER LAYER - THERMAKRAFT VAPOUR SHIELD

Location:	~
Manufacturer:	Thermakraft
Brand:	Vapour Shield
Type:	Vapour barrier layer
Width:	2130mm
Joint tape:	~
Fixings:	~

Components for sealing wall underlay penetrations

4.19 PENETRATION SEAL - THERMAKRAFT ONESEAL

Location:	~
Manufacturer:	Thermakraft
Brand:	OneSeal
Type:	Pipe and service penetration seal
Size:	~

4.20 WINDOW CORNER FLASHING - THERMAKRAFT CORNER MOULDS

Location:	~
Manufacturer:	Thermakraft
Brand:	Corner Moulds
Type:	Window corner flashing
Fixings:	~

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4.21 75MM FLASHING TAPE - THERMAKRAFT THERMAFLASH

Location:	~
Manufacturer:	Thermakraft
Brand:	Thermaflash
Type:	Flashing tape
Width:	75mm
Maximum UV exposure:	180 days

4.22 150MM FLASHING TAPE - THERMAKRAFT THERMAFLASH

Location:	~
Manufacturer:	Thermakraft
Brand:	Thermaflash
Type:	Flashing tape
Width:	150mm
Maximum UV exposure:	180 days

4.23 200MM FLASHING TAPE - THERMAKRAFT THERMAFLASH

Location:	~
Manufacturer:	Thermakraft
Brand:	Thermaflash
Type:	Flashing tape
Width:	200mm
Maximum UV exposure:	180 days

4.24 75MM FLASHING TAPE - THERMAKRAFT ALUBAND

Location:	~
Manufacturer:	Thermakraft
Brand:	Aluband
Type:	Flashing tape
Width:	75mm
Maximum UV exposure:	42 days

4.25 150MM FLASHING TAPE - THERMAKRAFT ALUBAND

Location:	~
Manufacturer:	Thermakraft
Brand:	Aluband
Type:	Flashing tape
Width:	150mm
Maximum UV exposure:	42 days

4.26 200MM FLASHING TAPE - THERMAKRAFT ALUBAND

Location:	~
Manufacturer:	Thermakraft
Brand:	Aluband
Type:	Flashing tape
Width:	200mm
Maximum UV exposure:	42 days

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Components for securing underlays

4.27 SECURE STRAPPING - THERMAKRAFT THERMASTRAP

Location:	~
Manufacturer:	Thermakraft
Brand:	Thermastrap
Type:	Secure strapping
Width:	19mm
Fixings:	~

4.28 SECURE STRAPPING - THERMAKRAFT STUD STRAP

Location:	~
Manufacturer:	Thermakraft
Brand:	Stud Strap
Type:	Secure strapping
Width:	25mm
Fixings:	~

4.29 SUPPORT NETTING - THERMAKRAFT AUSNET

Location:	~
Manufacturer:	Thermakraft
Brand:	Ausnet
Type:	Support netting
Width:	2000mm
Mesh size:	~
Fixings:	~

4.30 SAFETY MESH - THERMAKRAFT AUSMESH

Location:	~
Manufacturer:	Thermakraft
Brand:	Ausmesh
Type:	Safety mesh
Width:	~
Mesh size:	150mm x 300mm
Finish:	Galvanized
Fixings:	To AS/NZS 4389

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4221 TIMBER BOARD CLADDING

1 GENERAL

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

- weatherboards
- shiplap
- board and batten

1.1 RELATED WORK

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

Refer to 4223 PLYWOOD CLADDING for plywood used as a rigid backing.

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

1.4 MANUFACTURER/SUPPLIER DOCUMENTS

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

~

Manufacturer/supplier contact details

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

Performance

1.5 FIXINGS, WIND

Design and use the fixings appropriate for the wind zone (R) and topographical classification (T) of this site and building height; as required by NZS 3604.

1.6 PERFORMANCE

Accept responsibility for the weather-tight performance of the completed cladding system, including all penetrations.

2 PRODUCTS

Materials

2.1 UNDERLAYS

Refer to 4161 UNDERLAYS, FOIL AND DPC section

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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 WEATHERBOARDS

Profile (unless detailed otherwise) to NZS 3617, species and grading to NZS 3602, NZS 3631, minimum treatment to NZS 3602, table 2, reference 2A.1, Requirements for wood-based building components to achieve a 15-year durability performance. Weatherboards in long lengths, with all knots excluded.

2.5 BOARD AND BATTEN

In long lengths to profile detailed with species and grading to the requirements of NZS 3602, NZS 3631, but with all knots excluded. To NZS 3602, table 2, Requirements for wood-based building components to achieve a 15-year durability performance.

2.6 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.

Components

2.7 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.

2.8 SHARKS TOOTH FLASHING

PVC compressible flashing strip.

2.9 SOAKERS, ALUMINIUM/ZINC COATED STEEL

Machine folded aluminium/zinc coated steel sheet to profile of weatherboard and mitred corner joints.

2.10 SOAKERS, COPPER

Machine folded half-hard copper sheet to profile of weatherboard and mitred corner joints.

Finishes

2.11 PRIMER

Water borne acrylic or solvent borne oil-alkyd primer to suit the timber and proposed painting system.

2.12 SEMI-TRANSPARENT STAIN

Water borne acrylic stain, solvent borne semi-transparent oil stain, or solvent-borne semi-transparent oil-alkyd stain to suit the timber.

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.

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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 PRIMING AND SEALING

If not pre-finished before delivery, coat all faces and edges immediately the block stack is opened. Then fillet stack, laid flat and true, until fixed. Keep dry and undamaged. Coat to suit the paint system specified in painting sections. Allow to re-coat if exposed for more than one month before the final coating is applied.

3.6 FIX UNDERLAYS

Refer to 4161 UNDERLAYS, FOIL AND DPC section

3.7 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.

3.8 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 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).

3.9 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.

Application - fixing

3.10 FIXING, PAINT FINISH

Prime all cut ends before fixing. Drill all fixings located within 25mm of board ends. Punch all fixings.

3.11 FIXING, CLEAR FINISH

Coat all cut ends before fixing. Drill all fixings located within 25mm of board ends. Finish fixings flush.

3.12 FIXING BEVEL BACK WEATHERBOARDS

For rebated bevel back boards ensure a minimum gap of 2mm at the overlap between successive boards. Nail weatherboards to every fixing point with one nail just clear of the lap. Weatherboards should be fixed in full lengths where possible, stagger end joints across adjacent boards. Where joint required, locate over stud or cavity batten. Scarf joint away from prevailing wind at 45° or have soaker fitted. To all openings fit scribers, and if required cover boards.

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Provide boxed external corners with scribers in accordance to NZBC E2/AS1, Figure 9.4.4.4B: External corners for horizontal weatherboards or mitred external corners with either a back flashing in accordance to NZBC E2/AS1, Figure 9.4.4.4B: External corners for horizontal weatherboards or a corner soaker in accordance to NZBC E2/AS1, Figure 9.4.4.4A: Corner soakers for bevel-back 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.

3.13 FIXING RUSTICATED WEATHERBOARDS

Adjust vertical set-out to provide a minimum 2mm expansion gap at the overlap between successive boards. Nail weatherboards to every fixing point with one nail just clear of the lap. Weatherboards should be fixed in full lengths where possible, stagger end joints across adjacent boards. Where joint required, locate over stud or cavity batten. Scarf joint away from prevailing wind at 45° or have soaker fitted. To all openings fit scriber with plug to suit profile, and if required cover boards.

Provide boxed external corners with scribers or plugs in accordance to NZBC E2/AS1, Figure 9.4.4.4B: External corners for horizontal 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.

3.14 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.

3.15 FIXING BOARD AND BATTEN

Fit boards with a 5mm to 8mm gap between boards and with weather grooves to boards & battens aligned. Boards to be continuous lengths over a storey height, nail at the centre of the board width (nogs at maximum 480mm centres). Nail the batten with a single fixing through the gap between boards at every fixing point.

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.

3.16 INSTALL FLASHINGS

Install flashings, covers and soakers as detailed on the drawings and to NZBC E2/AS1

3.17 COMPLETE

Ensure the work is complete with all flashings, finishings and trim properly installed so the cladding system is completely weathertight.

Completion

3.18 REPLACE

Replace all damaged or marked elements.

3.19 LEAVE

Leave work to the standard required for following procedures.

3.20 REMOVE

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

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4 SELECTIONS

4.1 CERTIFIED SUSTAINABLE TIMBER

Product: ~
Certification type: ~
Timber species: ~
Origin: ~
Claim: ~

4.2 BUILDING WRAPS/UNDERLAYS

Refer to 4161 UNDERLAYS, FOIL AND DPC section

4.3 CAVITY BATTENS

Timber species: ~
Timber grade: ~
Treatment: H3.1

4.4 CAVITY CLOSER/VERMIN-PROOFING

Brand/type: ~
Material: ~

4.5 WEATHERBOARDS

Location: ~
Species: ~
Grade: ~
Treatment: ~
Profile: ~
Dimensions: ~mm x ~mm
Surface finish: ~
Moisture content: ~ % at fixing

4.6 BOARD AND BATTEN

Location: ~
Species: ~
Grade: ~
Treatment: ~
Surface finish: ~
Moisture content: ~ % at fixing
Board dimensions: ~mm x ~mm
Batten dimensions: ~mm x ~mm

4.7 COVER BOARDS, BOXED CORNERS AND SCRIBERS

Species: ~
Grade: ~
Treatment: ~
Moisture content: ~ % at fixing
Surface finish: ~

4.8 NAILS, SCREWS AND FASTENINGS

Cladding: ~
Type: ~
Centres: ~

4.9 FLASHINGS

Location: ~
Material: ~
BMT: ~
Finish: ~

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4.10 COVERS AND TRIMS

Location: ~
Material: ~
BMT: ~
Finish: ~

4.11 SOAKERS

Location: ~
Material: ~
BMT: ~
Finish: ~

4.12 PRIMER

Brand/type: ~

4.13 SEMI-TRANSPARENT STAIN

Brand/type: ~
Colour: ~

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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:

- Fibre cement sheet
- Plywood
- Timber board
- Jointers
- Trim

1.1 RELATED WORK

Refer to ~ for ~.

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

1.3 MANUFACTURER/SUPPLIER DOCUMENTS

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

~ ~

Warranties

1.4 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

~ years For ~

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

Refer to the general section 1237 WARRANTIES for additional requirements

Requirements

1.5 QUALIFICATIONS

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

1.6 HEALTH AND SAFETY

Comply with all manufacturer/supplier and WorkSafe New Zealand requirements for health and safety.

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1.7 NO SUBSTITUTIONS

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

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:

~

Provide this information prior to practical completion.

2 PRODUCTS

Fibre cement soffit cladding

2.1 FIBRE CEMENT SOFFIT CLADDING

Fibre cement soffit cladding, manufactured from treated cellulose fibre, Portland cement, sand and water, cured by high pressure autoclaving and manufactured to AS/NZS 2908.2. Refer to SELECTIONS.

2.2 FLUSH JOINTED FIBRE CEMENT SOFFIT CLADDING

Fibre cement soffit cladding with recessed edges for flush jointing. Manufactured from treated cellulose fibre, Portland cement, sand and water, cured by high pressure autoclaving and manufactured to AS/NZS 2908.2. Refer to SELECTIONS.

2.3 PRE-FINISHED FIBRE CEMENT SOFFIT CLADDING

Fibre cement soffit cladding, manufactured from treated cellulose fibre, Portland cement, sand and water, cured by high pressure autoclaving and manufactured to AS/NZS 2908.2. Pre-finished to exposed face. Refer to SELECTIONS

2.4 IMITATION TONGUE AND GROOVE FIBRE CEMENT SOFFIT CLADDING

Fibre cement soffit cladding with grooved face to imitate TG&V timber appearance. Manufactured from treated cellulose fibre, Portland cement, sand and water, cured by high pressure autoclaving and manufactured to AS/NZS 2908.2. Refer to SELECTIONS.

2.5 NAILS - GALVANIZED

Hot-dip galvanized nails for fibre cement sheet as required by manufacturer / supplier documents. Refer to SELECTIONS.

2.6 NAILS - STAINLESS STEEL

316 Stainless steel nails for fibre cement sheet as required by manufacturer / supplier documents. Refer to SELECTIONS.

2.7 SCREWS - STAINLESS STEEL

Stainless steel screws for fibre cement sheet as required by manufacturer / supplier documents. Refer to SELECTIONS.

2.8 PROPRIETARY FASTENERS

Proprietary nylon insert fasteners for use with pre-finished fibre cement soffit cladding. Refer to SELECTIONS.

2.9 ADHESIVE

Adhesive for fibre cement sheet, used in conjunction with mechanical fixings, as required by manufacturer / supplier documents.

Refer to SELECTIONS.

Fibre cement soffit cladding - Components

2.10 SOFFIT JOINTERS

Extruded uPVC jointer.

2.11 CAPPING MOULDS

Extruded uPVC capping mould.



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2.12 SCOTIA MOULDS
Extruded uPVC scotia mould.

Flush finished fibre cement soffit cladding - Components

2.13 CORNER ANGLE
Extruded uPVC jointer corner angle.

2.14 CONTROL JOINT
Extruded uPVC jointer control joint.

2.15 JOINT REINFORCING TAPE
Perforated paper tape as required by manufacturer / supplier documents.

2.16 JOINTING COMPOUND
Proprietary jointing compounds as required by manufacturer / supplier documents. Refer to SELECTIONS.

Fibre cement - Accessories

2.17 FLASHING TAPES
Single sided medium density closed cell PVC foam tape, with pressure sensitive acrylic adhesive on one side of tape. Tape thickness and width to manufacturer technical literature.

2.18 SEALANT
Facade sealant or similar. Refer to the sheet manufacturer technical literature for selection and use requirements.

2.19 SEALER
For jointed systems, seal all sheet edges prior to fixing.

Flush jointed fibre cement soffit cladding - Accessories

2.20 ACRYLIC SEALER
Acrylic sealer to site cut and site recessed sheet edges. Refer to SELECTIONS.

2.21 WATERPROOFING ADMIXTURE
Waterproofing admixture to control moisture suction prior to stopping, as required by manufacturer / supplier documents. Refer to SELECTIONS.

Plywood soffit cladding

2.22 PLYWOOD SOFFIT CLADDING
Rotary cut, radiata pine veneer ply sheet to AS/NZS 2269.0. Treated H3 to AS/NZS 1604.1.
Refer to SELECTIONS.

2.23 GROOVED PLYWOOD SOFFIT CLADDING
Proprietary plywood rotary cut, radiata pine veneer ply sheet to AS/NZS 2269.0. Treated H3.1 LOSP to AS/NZS 1604.1. Provided with parallel "V" grooves running the length of the sheet, to provide an imitation tongue and groove appearance. Plywood manufactured for use as an external soffit cladding.
Refer to SELECTIONS.

2.24 APPEARANCE GRADE PLYWOOD SOFFIT CLADDING
Rotary cut, radiata pine veneer ply sheet to AS/NZS 2269.0. Treated H3.1 LOSP to AS/NZS 1604.1.
Refer to SELECTIONS.

Plywood soffit cladding fastener

2.25 NAILS - GALVANIZED
Refer to the plywood cladding manufacturer requirements. Use annular grooved or twisted shank nails for soffit cladding.

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Refer to SELECTIONS.

2.26 NAILS - STAINLESS STEEL

Refer to the plywood cladding manufacturer requirements. Use annular grooved or twisted shank nails for soffit cladding.

Refer to SELECTIONS.

2.27 SCREWS - STAINLESS STEEL

Refer to the manufacturer's requirements for size and use; galvanized countersunk or stainless steel to NZS 3604, Table 4.1.

2.28 ADHESIVE

Adhesive for plywood soffit cladding, used in conjunction with mechanical fixings, as required by manufacturer / supplier documents. Refer to SELECTIONS.

Plywood soffit cladding edge treatment

2.29 PLYWOOD CUT EDGE TREATMENT

A solution of 12.5% copper naphthenate in white spirits, or mineral turpentine.

Timber board soffit cladding

2.30 TIMBER BOARD

Timber board in long lengths to profile detailed, with species and grading to the requirements of NZS 3602, table 2, Requirements for wood-based building components to achieve a 15-year durability performance. Select appearance grades to NZS 3631 requirements.

2.31 TONGUE AND GROOVE TIMBER BOARD SARKING

Tongue and groove timber board profile as detailed, in long lengths with species and grading to the requirements of NZS 3602, table 2, Requirements for wood-based building components to achieve a 15-year durability performance. Select appearance grades to NZS 3631 requirements.

2.32 SHIPLAP WEATHERBOARDS

Shiplap timber weatherboard profile as per NZS 3617 or as detailed. In long lengths with species and grading to the requirements of NZS 3602, table 2, Requirements for wood-based building components to achieve a 15-year durability performance. Select appearance grades to NZS 3631 requirements.

Timber board soffit cladding fasteners

2.33 NAILS - GALVANIZED

Refer to SELECTIONS for size and use; galvanized countersunk or stainless steel to NZS 3604, Table 4.1.

2.34 NAILS - STAINLESS STEEL

Refer to SELECTIONS for size and use; galvanized countersunk or stainless steel to NZS 3604, Table 4.1.

2.35 SCREWS - STAINLESS STEEL

Refer to SELECTIONS for size and use; galvanized countersunk or stainless steel to NZS 3604, Table 4.1.

Timber profiles

2.36 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.



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2.37 TIMBER TRIM

18 x 18 mm timber trim with 6 mm minimum chamfer to internal corner. 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.

2.38 DECORATIVE TIMBER TRIM

To profiles detailed/scheduled. 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.

2.39 DECORATIVE EAVES BRACKET

To profiles detailed/scheduled. 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.

Flashing

2.40 SOFFIT CLADDING/WALL CLADDING JUNCTION FLASHING

Flashing as detailed with minimum 50 mm return behind soffit cladding and 35 mm cover to wall cladding, complete with hook and kick-out. Refer to SELECTIONS for flashing material.

3 EXECUTION

Conditions

3.1 DELIVERY, STORAGE & HANDLING OF PRODUCTS

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

3.2 ROUTINE MATTERS

Refer to 1250 TEMPORARY WORKS & SERVICES for protection requirements.

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

3.3 PRE-INSTALLATION REQUIREMENTS

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

Moisture content:	~% maximum

3.4 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

3.5 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.

3.6 MOISTURE CONTENT TIMBER BOARD

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.

3.7 PLYWOOD CLADDING SUPPORT

Fully support all edges and joints.

3.8 EXPANSION PLYWOOD CLADDING

Provide 2-3mm gap at all edges of cladding for sheet expansion.

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3.9 PLYWOOD CUT EDGE TREATMENT

Brush on surface treatment to all edges of plywood cut after treatment.

3.10 SEAL FIBRE CEMENT SHEET EDGES

Seal site cut sheet edges prior to installation. Seal sheet edges around penetrations.

3.11 PENETRATIONS

Form small holes to accommodate penetrations through the soffit as per the method detailed in the sheet manufacturer's technical literature.

Application - fire rated soffits

3.12 FIRE RESISTANCE RATING, FIBRE CEMENT SOFFIT CLADDING

Install fibre cement soffit cladding as part of an overall fire rated wall/soffit construction, to the drawn details and the manufacturer's requirements.

Install fibre cement sheets

3.13 SHEET LAYOUT

All sheet edges must be supported by framing and/or rebates in fascia and barge boards.

3.14 INSTALL SOFFIT CLADDING - JOINTERS AND CAPPING MOULDS

Cut sheets dry using score and snap method, hand guillotine or fibre cement shears. If these methods are not feasible, use an alternative manufacturer approved method. Ensure all edges and joints are fully supported. Insert uPVC jointers and capping moulds to manufacturer's requirements. Fix sheets complete with jointers and capping moulds. Refer to manufacturer's installation manual and SELECTIONS.

3.15 INSTALL SOFFIT CLADDING - EXPRESSED JOINTS

Cut sheets dry using score and snap method or hand guillotine. Ensure all edges and joints are fully supported. Install inseal sealing strip to framing at expressed joint locations. Fix sheets complete with required gap to form expressed joint detail. Refer to manufacturer's installation manual and SELECTIONS.

3.16 INSTALL FLUSH FINISHED SOFFIT CLADDING

Cut sheets dry using score and snap method, hand guillotine or fibre cement shears. If these methods are not feasible, use an alternative manufacturer approved method. Seal site cut and site recessed sheet edges with acrylic sealer. Ensure all edges and joints are fully supported. Fit expansion/control joints as detailed and as required by fibre cement sheet manufacturer's requirements. Flush joints with proprietary Base Coat, paper reinforcing tape and proprietary top coat to required flush finish. Refer to manufacturer's installation manual and SELECTIONS.

3.17 INSTALL PRE-FINISHED FIBRE CEMENT SOFFIT CLADDING

Cut sheets dry using score and snap method, hand guillotine or fibre cement shears. If these methods are not feasible, use an alternative manufacturer approved method. Ensure all edges and joints are fully supported. Install as per the pre-finished fibre cement manufacturer's requirements with adhesive, proprietary fixings and mechanical fasteners as required.

3.18 INSTALL IMITATION TONGUE AND GROOVE FIBRE CEMENT SOFFIT CLADDING

Cut sheets dry using score and snap method, hand guillotine or fibre cement shears. If these methods are not feasible, use an alternative manufacturer approved method Ensure all edges and joints are fully supported. Butt joint short ends of cladding (cut square and form chamfer to match) and align to provide continuation of grooved profile line. Install as per the pre-finished fibre cement manufacturer's requirements and with the fixing method as nominated in SELECTIONS.

3.19 FIBRE CEMENT CLADDING CONTROL JOINT

Install control joint to fibre cement sheet manufacturer's requirements and type as nominated in SELECTION.

3.20 FIBRE CEMENT CLADDING FASTENER - SIZE AND LAYOUT

Fix sheets to framing using fixings and fixing methods as nominated in SELECTIONS. Fix to manufacturer's requirements.

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3.21 SEALANTS - FIBRE CEMENT

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

3.22 PAINTING - FIBRE CEMENT

Refer to painting section/s for protective coating system.

Install plywood sheets

3.23 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).

3.24 PLYWOOD EDGE TREATMENT

Treat cut edges of plywood with edge treatment solution before fixing.

3.25 PLYWOOD SEALING

Seal cut edges of plywood before fixing with primer or sealer to suit the surface finish being used.

3.26 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.

3.27 GROOVED PLYWOOD SOFFIT FIXINGS

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. Ensure alignment of grooves between adjacent sheets.

3.28 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.

3.29 FIXING NAILS - PLYWOOD CLEAR FINISH

Punch nails flush with the face of external trim being stained or clear finished.

Install timber board soffit cladding

3.30 FIXING SHIPLAP WEATHERBOARDS AS SOFFIT CLADDING

Adjust set-out to ensure there is a 2mm expansion gap between successive boards. Using full length boards only, clench nail tongue to every fixing point. Nail other side of board just clear of lap.

3.31 FIXING SOFFIT BOARD

Using full length boards only, nail from the centre of the board width (nogs at 480mm centres). Nail the batten with a single fixing through the gap between boards at every fixing point.

3.32 FIXING TONGUE AND GROOVE SARKING

Using full length sarking as soffit cladding, ~

3.33 SCARF JOINTS

Where possible run boards/sarking full length. If this is not possible, provide scarf joints over framed support.

3.34 FIXING, PAINT FINISH

Prime all cut ends before fixing. Drill all fixings located within 25mm of board ends. Punch all fixings.

3.35 FIXING, CLEAR FINISH

Coat all cut ends before fixing. Drill all fixings located within 25mm of board ends. Finish fixings flush.



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Install timber profiles

3.36 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).

3.37 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.

3.38 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.

3.39 DECORATIVE EAVES BRACKET

Fix securely, plumb, level 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.

3.40 NAILING, PAINT FINISH

Punch nails and patch prime external trim being painted, before stopping as specified under painting preparation.

3.41 NAILING, CLEAR FINISH

Punch nails flush with the face of external trim being stained or clear finished.

Completion

3.42 COMPLETION MATTERS

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

4 SELECTIONS

Fibre cement soffit cladding

Plywood soffit cladding

Shiplap Weatherboard soffit cladding

4.1 SHIPLAP WEATHERBOARD - SOFFIT CLADDING

Profile: ~
Species: ~
Treatment: ~
Fixing: ~
Finish: ~

Timber Board soffit cladding

4.2 TIMBER BOARD

Profile: ~
Species: ~
Treatment: ~
Fixing: ~
Finish: ~

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4.3 TONGUE AND GROOVE TIMBER BOARD

Profile: ~
Species: ~
Treatment: ~
Fixing: ~
Finish: ~

Accessories

4.4 DECORATIVE TIMBER TRIM

Profile: ~
Timber species: Radiata pine
Treatment: H3.1

4.5 SOFFIT CLADDING/WALL CLADDING JUNCTION FLASHING

Material: ~
Profile: ~
Finish: ~
Colour: ~

Finishes - materials supplied unfinished

4.6 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

Finishes - factory applied

4.7 MATERIALS SUPPLIED PRE-PRIMED

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

4.8 MATERIALS SUPPLIED PRE-FINISHED (EXCEPT FINAL COAT)

Soffit: ~
Trim: ~
Cover batten: ~

4.9 MATERIALS SUPPLIED PRE-FINISHED (COMPLETE)

Soffit: ~
Trim: ~
Cover batten: ~

Finishes - cut edges

4.10 SITE FINISHES - CUT EDGES

Soffit: ~

Finishes - applied on site

4.11 SITE FINISHES - FINAL FINISH COAT ONLY

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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4271 NATURAL STONE VENEER CLADDING

1 GENERAL

This section relates to the installation of natural stone as a mechanically anchored masonry veneer cladding.

1.1 RELATED WORK

Refer to ~ for ~

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:

kPa	Kilopascal
MPa	Megapascal

The following definitions apply specifically to this section:

Masonry	To NZS 4210, any construction in units of stone laid to a bond in, and joined together with, mortar
Pointing	To NZS 4210, finishing of previously raked joints of masonry with mortar
Veneer	To NZS 4210, a single skin of non-loadbearing masonry which is attached to and laterally supported by a structural element
Wall tie	To NZS 4210, a tie, together with its fixings or anchorages, used to transfer face loads from a veneer to a structural wall, or between skins of a cavity wall, while being capable of accommodating differential inplane horizontal and vertical deflections between the attached elements

Documents

1.3 DOCUMENTS

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

AS/NZS 2699.1	Built-in components for masonry construction - Wall ties
AS/NZS 2699.3	Built-in components for masonry construction - Lintels and shelf angles (durability requirements)
NZS 3404.1-2	Steel structures standard
NZS 4210	Masonry construction - Materials and workmanship
AS/NZS 4456	Masonry units, segmental pavers and flags - Methods of test
AS/NZS 4600	Cold-formed steel structures

1.4 MANUFACTURER/SUPPLIER DOCUMENTS

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

~

Manufacturer/supplier contact details

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

1.5 SPECIFIC DESIGN DOCUMENTS

Specific design documents relating to this part of the work:

Documents:	~
Note:	Refer to ~

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Warranties

1.6 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

~ years For ~

- 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.

1.7 WARRANTY - INSTALLER/APPLICATOR

Provide an installer/applicator warranty:

~ years For ~

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

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.8 QUALIFICATIONS GENERALLY

Refer to 1270 CONSTRUCTION for 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 SAMPLES

Refer to the general section 1270 CONSTRUCTION for details of how samples will be reviewed and how instructions to proceed will be given. Provide the following samples for review:

	Sample A	Sample B	Sample C
Sample description:	~	~	~
Sample type:	~	~	~
Number:	~	~	~
Location:	~	~	~
Supporting documentation:	~	~	~
Reviewer:	Contract administrator~	Contract administrator~	Contract administrator~
Time for review:	10 working days ~	10 working days ~	10 working days ~
Review criteria:	~	~	~

1.12 TEST MASONRY

Test masonry in accordance with NZS 4210 for the following and at frequencies required by the engineer. Keep test records and make available to the contract administrator on request.

- 28 day compressive strength of mortar
- 7 day masonry-to-mortar bond strength

1.13 KEEP RECORDS

Keep the following records and make available to the contract administrator on request:



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- Proportions of mortar used, including admixtures
- Supplier of mortar sand

1.14 INFORMATION FOR INSTALLATION

Contractor to obtain manufacturer / supplier instructions and requirements for the installation of the natural stone product. Keep and maintain on site the relevant latest version of such documents and make available to workers carrying out that part of the work.

1.15 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:
~

Provide this information prior to practical completion.

Compliance information

1.16 INFORMATION REQUIRED FOR CODE COMPLIANCE

Provide the following compliance documentation:

- Producer Statement - Construction from the applicator / installer
- Other information required by the BCA in the Building Consent Approval documents.

Quality control and assurance

1.17 INSPECTIONS

~ ~

2 PRODUCTS

Materials - cavity

2.1 CAVITY BATTENS

Refer to SELECTIONS.

2.2 BACKING BOARD

Moisture resistant rigid backing board material and associated components such as board fixings, joint sealant and joint tape. Refer to SELECTIONS.

2.3 BACKING BOARD SEALER

Liquid applied waterproofing sealer compatible with the specified backing board, formulated to prevent moisture absorption into backing board. Refer to SELECTIONS.

Materials - veneer

2.4 NATURAL STONE

Quarried stone worked to size, shape and face finish to form veneer cladding and decorative stone work, such as string courses, quoins, sill and cap stones. Salt attack resistance tested to AS/NZS 4456 to comply with NZS 4210. Refer to SELECTIONS.

2.5 MORTAR

To NZS 4210, bedding and jointing mortar composed of Portland cement, sand, admixture or hydrated lime and clean, fresh water free from excess alkali, salt, silt and organic materials. Mortar for pointing and for use with sill and cap stones to include waterproofing agents. Coloured mortar to be coloured by use of mineral oxide pigments or coloured cement. Refer to SELECTIONS.

2.6 CEMENT SLURRY

Pourable liquid cement slurry mixture for sill and cap stone laying, composed of Portland cement, admixture and clean, fresh water free from excess alkali, salt, silt and organic materials.

2.7 WALL TIES

Wall ties and associated fixings of the specified type. Durability classification, marking and structural performance to AS/NZS 2699.1. Refer to SELECTIONS.

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2.8 STEEL LINTELS

Steel lintel durability classification and marking to AS/NZS 2699.3, structural performance to NZS 3404.1-2 or AS/NZS 4600. Refer to SELECTIONS.

Finishes

2.9 IMPREGNATING SEALER

Impregnating sealer compatible with the specified natural stone product. 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 STORAGE & HANDLING OF AGGREGATES

Store and handle aggregates to prevent segregation and contamination by foreign materials and intermixing of aggregate sizes.

3.3 STORAGE & HANDLING OF CEMENT & MORTAR

Store and handle cement and mortar to protect it against deterioration and contamination. Store accessible for inspection.

3.4 STORAGE & HANDLING OF NATURAL STONE

Store natural stone to protect from weather so that stone is in an air-dry state at installation. In hot dry weather dampen stone as per the manufacturer / supplier instructions. Check stone is of required thickness, size, shape and finish, and without defects. Carry out such additional work to bring stone to the required condition.

3.5 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.

3.6 PRE-INSTALLATION REQUIREMENTS

Check work previously carried out and confirm it is of the required standard for this part of the work, including (but not limited to):

- Vertical and horizontal alignment of the concrete base
- Installation of damp proofing material to walls and concrete base
- Installation of flashings required to be installed prior to veneer cladding installation (i.e. joinery flashings)
- Installation of windows and doors

Installation/application - generally

3.7 STANDARDS AND TOLERANCES

Refer to the general section 1270 CONSTRUCTION for general requirements. Tolerances to NZS 4210, Maximum tolerances.

3.8 COLD & HOT WEATHER CONSTRUCTION

In air temperatures below 5°C and above 25°C or in drying winds, install natural stone veneer cladding to the precaution requirements of NZS 4210 for cold and hot weather construction.

3.9 BLENDING OF NATURAL STONE

Blend natural stone to achieve a consistent colour and size spread throughout the work.

3.10 CLEANING OUT

To NZS 4210, Cleaning Out. Clean out drained cavities and remove mortar from ties, mortar protruding into cells and cavities at joints, mortar droppings and other loose material.

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3.11 FACE WORK

Keep natural stone face work clean during erection and until completion of the contract works. Remove occurring stains as per the natural stone manufacturer / supplier instructions and requirements for cleaning.

3.12 PROTECTION OF UNFINISHED WORK

Protect freshly laid stone work and the top course of uncompleted walls during interruption through rain and at completion of each day's work.

3.13 PROTECTION OF CAVITY

Install temporary protection where required to protect the cavity from wet mortar entering. Only remove when mortar has cured.

Installation - cavity

3.14 INSTALLATION CAVITY BATTENS

Install cavity battens vertically, true to line and face, at required spacing. Rigidly fix in place.

3.15 INSTALLATION BACKING BOARDS

Install backing boards to cavity battens, and where specified seal and tape joints, to the manufacturer's requirements and instructions.

3.16 APPLICATION BACKING BOARD SEALER

Mask surfaces to prevent contamination, apply backing board sealer to backing board with tools and to technique and curing times instructed by the sealer manufacturer.

Installation - veneer

3.17 PREPARATION MORTAR

Mix materials for mortar to composition and proportion required by, and to the instructions of, the manufacturer and NZS 4210. Measure materials in calibrated devices, thoroughly mix to an even consistency in a mechanical batch mixer or with a hand-mixer for quantities of mortar not exceeding 0.03m³.

3.18 PREPARATION CEMENT SLURRY

Mix materials for cement slurry to composition and proportion required by, and to the instructions of, the cement manufacturer. Measure materials in calibrated devices, thoroughly mix to an even consistency.

3.19 LAYING OF VENEER STONES

Ensure stone is clean, sound and free of defects. Start at corners / wall ends and work horizontally towards the centre, lay stone to the required bond, true to line, plumb and level in 10mm thick (±3 mm tolerance) soft plastic mortar bed, up to 20mm thickness is acceptable for bottom course where required to accommodate variations in the foundation. Lay stone from sedimentary geological formation with its natural bed horizontal. Tool mortar joints to the specified type.

3.20 LAYING OF CAP AND SILL STONES

Ensure stone is clean, sound and free of defects. Apply neat cement slurry to surface where stone is to be placed. Let slurry dry slightly (until it has lost its shine but is still sticky), apply mortar bed over and place stone in mortar bed. Tool mortar joints to the required type.

3.21 INSTALLATION WALL TIES

Install wall ties as the work proceeds to the specified embedment, spacing and fixing and to the instructions of the manufacturer. Install at a 5° downward angle away from the exterior wall and contained within the veneer's mortar bed over its full contact length. When fixing through membranes pre-fill fixing holes with silicone sealant.

3.22 INSTALLATION STEEL LINTELS

Install steel lintels above openings to NZS 4210, Openings and in accordance with construction drawings and specific design documents.

3.23 INSTALLATION CONTROL JOINTS

Install and weatherproof control joints to NZS 4210, Methods of Controlling Wall Movements and in accordance with construction drawings and specific design documents.

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3.24 INSTALLATION WEEP HOLES

Install 75mm high x maximum 10mm wide weep holes at maximum 800mm centres to mortar joints at the bottom of the natural stone veneer cladding and at any other location shown on construction drawings and stated in the specific design documentation. Where 75mm height cannot be achieved reduce weep hole spacing to provide at least 1000mm² opening area per lineal meter.

3.25 INSTALLATION VENTILATION

Provide ventilation to the top of the veneer to the requirements of NZS 4210 and in accordance with construction drawings and specific design documents.

Finishes

3.26 APPLICATION IMPREGNATING SEALER

Prepare natural stone veneer cladding and apply impregnating sealer as per the requirements and instructions of the sealer manufacturer.

Completion & Commissioning

3.27 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 - cavity

4.1 CAVITY BATTENS

Location: ~
Supplier: ~
Brand: ~
Type: ~
Material: ~
Size: ~
Fixings: ~

4.2 BACKING BOARD

Location: ~
Supplier: ~
Brand: ~
Type: ~
Size: ~
Fixing: ~
Joint sealant: ~
Joint tape: ~

4.3 BACKING BOARD SEALER

Location: ~
Supplier: ~
Brand: ~
Type: ~

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Materials - veneer

4.4 NATURAL STONE

Location:	~
Supplier:	~
Type:	~
Thickness:	~
Size:	~
Face finish:	~
Compressive strength:	~MPa minimum unconfined compressive strength

4.5 MORTAR

Location:	~
Supplier:	~
Brand:	~
Type:	~
Classification:	~
Colour:	~
Compressive strength:	~MPa minimum 28 day compressive strength
Bond strength:	~kPa minimum 7 day masonry-to-mortar bond strength
Joint type:	~

4.6 WALL TIES

Location:	~
Supplier:	~
Brand:	~
Type:	~
Classification:	~
Material:	~
Spacing:	~
Embedment:	~
Fixings:	~

4.7 STEEL LINTEL

Location:	~
Supplier:	~
Type:	~
Size:	~

Finishes

4.8 IMPREGNATING SEALER

Location:	~
Supplier:	~
Brand:	~
Type:	~

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4381NJ NURAJACK DECK SUPPORT SYSTEM

1 GENERAL

This section relates to the supply and installation of Nuralite Group Limited NURAJACK height adjustable support systems for river stone roof covering on geotextile filter fabric.

It includes:

- support systems for river stone roof covering on geotextile filter fabric

Related work

1.1 RELATED SECTIONS

Refer to 4422NT Nuraply TPO Roof & Deck Membrane for roof membrane specification and details.

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 B2/AS1	Durability provisions for building elements
NZBC E2/AS1	External moisture provisions for timber-framed buildings up to 10 m in height

1.4 MANUFACTURER/SUPPLIER DOCUMENTS

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

- NURALITE ACCESSORIES NURAJACKS & NURAPADS – Technical Brochure
- NURALITE CAD details
- NURAJACK Placement Graph
- NURAJACK Quantity Calculator
- NURALITE NURAJACK – Installation Video
- Nuragrid Installation Guide

Manufacturer/supplier contact details

Company:	Nuralite Group Limited
Web:	www.nurajack.co.nz
Email:	info@nuralite.co.nz
Telephone:	09 579 2046

Warranties

1.5 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

20 years	For Nurajack deck pedestal support materials. Warranty applies only when installed over a Nuralite membrane 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 installation.

1.6 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

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standard form in the general section 1237WA WARRANTY AGREEMENT)
- Commence the warranty from the date of installation.

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.

Compliance information

1.9 INFORMATION REQUIRED FOR CODE COMPLIANCE

Provide the following compliance documentation: -
- Manufacturer's, importer's or distributors warranty
- Installer's warranty

2 PRODUCTS

River stone roof covering on geotextile filter fabric support system

2.1 DECK SUPPORT SYSTEM

NURAJACK components comprised of high-density UV resistant polypropylene injection moulding, complying with NZBC B2/AS1. Complete with all required accessories to complete installation. Refer to SELECTIONS.

Components - for Nuragrid

2.2 NURAJACK SE PEDESTAL

NURAJACK SE, a height adjustable, self-levelling decking pedestal with heads that pivot up to 4.5°. Available in a range of sizes from 28-38mm to 365-550m. Additional height options are available.

Refer to SELECTIONS for options.

2.3 NURAJACK PEDESTAL EXTENSION

NURAJACK Pedestal Extension, used to create a greater height in the Nurajack. Fits into size SE3, SE4 and SE5 Nurajack. Refer to SELECTIONS for options.

2.4 NURAJACK STAR.T

NURAJACK Star.T, a small Nurajack adjustable to height 8-15mm. Shims available (1, 2 or 3mm) if levelling required.

2.5 NURAJACK STAR.B

NURAJACK Star.B, a 5mm base installed under NURAJACK Star.T. Can be stacked up to 3 high giving a combined adjustable height of between 8mm and 30mm.

2.6 NURAGRID

500mm x 500mm x 40mm plastic grid designed to support river stone roof covering on geotextile filter fabric. Grid features dovetail joints to join units together, and receivers for the Nurajack tile head.

Accessories - for Nuragrid

2.7 NURAPAD SHIM

NURAPAD Shim, in sizes 1, 2 or 3mm high.

2.8 ADJUSTMENT KEY

Adjustment Key, used to adjust Nurajacks. Suitable for minor adjustments.

2.9 NURAJACK HEAD LOCKER

NURAJACK Head Locker, designed to clip into place and lock Nurajacks self-levelling head.

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Components - for Nuragrid on Nurajack aluminium frame system over internal gutter

2.10 NURAJACK ALUMINIUM FRAME

NURAJACK aluminium modular box section frame system.

2.11 NURAJACK JOIST HEAD

NURAJACK Timber Joist Head, located on top of screw adjustable Nurajack SE Pedestal; designed to accept Nurajack aluminium frame system.

2.12 NURAJACK SE PEDESTAL

NURAJACK SE, a height adjustable, self-levelling decking pedestal with heads that pivot up to 4.5°. Available in a range of sizes from 28-38mm to 365-550m. Additional height options available. Refer to SELECTIONS for options.

2.13 NURAJACK PEDESTAL EXTENSION

NURAJACK Pedestal Extension, used to create a greater height in the Nurajack. Fits into size SE3, SE4 and SE5 Nurajack. Refer to SELECTIONS for options.

2.14 NURAGRID

500mm x 500mm x 40mm plastic grid designed to support river stone roof covering on geotextile filter fabric. Grid features dovetail joints to join units together, and receivers for the Nurajack aluminium frame system.

Accessories - for Nuragrid on Nurajack aluminium frame system over internal gutter

2.15 NURAPAD SHIM

NURAPAD Shim, in sizes 1, 2 or 3mm high.

2.16 ADJUSTMENT KEY

Adjustment Key, used to adjust Nurajacks. Suitable for minor adjustments.

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 PRE-INSTALLATION REQUIREMENTS - GENERAL

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

3.4 PEDESTAL LAYOUT

Before commencing work confirm the proposed setting out of pedestals. Confirm maximum load of pedestal on Nuratherm PIR Insulation Board to determine whether intermediate pedestals are required. Ensure pedestal configurations will not impede critical water flows.

Conditions - over waterproof membrane substrate

3.5 PRE-INSTALLATION REQUIREMENT - OVER WATERPROOF MEMBRANES

Before commencing work obtain confirmation from contractor administrator that the installation of the waterproof membrane complies with NZBC E2/AS1. Ensure that the deck support system is not attached to or penetrates the waterproof membrane substrate below.

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Installation - general

3.6 INSTALL RIVER STONE ROOF COVERING ON GEOTEXTILE FILTER FABRIC SUPPORT SYSTEM

Install support system in accordance with Nurajack installation instructions and associated river stone roof covering on geotextile filter fabric following geotextile filter fabric manufacturer’s instructions.

3.7 PRIOR TO INSTALLATION

Sweep clean waterproof membrane and ensure it is clear of any foreign objects before commencing installation.

3.8 NURAJACK PLACEMENT GRAPH FOR RIVER STONE ROOF COVERING ON GEOTEXTILE FILTER FABRIC

Set out Nurajacks in accordance with Nurajack's requirements.

3.9 NURAJACKS - QUANTITIES

To determine the number of Nurajacks required refer to Nurajack.

Installation - with Nuragrid on Nurajack aluminium frame system over internal gutter

3.10 SET OUT

Place pedestals on the substrate; the distance apart will depend on the supporting Nurajack aluminium frame, maximum load of pedestal and substrate loading capacity.

3.11 FIX NURAJACK ALUMINIUM FRAME

Fix Nurajack aluminium frame to top of pedestals with self-drilling screws through the plastic upstand of the joist head. Adjust the heights of the pedestals so that the joists are completely level.

3.12 NURAGRID INSTALLATION ON NURAJACK ALUMINIUM FRAME

Fix Nuragrid to the Nurajack aluminium frame using screws in accordance with Nurajack's requirements.

3.13 GEOTEXTILE FILTER FABRIC

Ensure Nuragrid is flat, firm and stable. Check surface with 1.8m straight edge. Ensure Nuragrid layout enables outlets to be accessible for cleaning. Roll selected geotextile filter fabric onto Nuragrid following manufacturer’s instructions.

3.14 CLEAN OUT MANHOLES / HATCHES

Provide removable screw-fixed access panels at appropriate locations on the roof for cleaning out of sumps and other similar outlets that require servicing.

Installation - with Nuragrid

3.15 SET OUT NURAGRID

Install first four Nurajack deck pedestals, and intermediate pedestal if required, at the centre cross of set-out. Sit the first Nuragrid module in place and adjust the height of each pedestal so that it aligns with datum in both directions. Add additional Nuragrids, interlocking each with the dovetails. Ensure full grids are over outlets and other accessible areas as required.

3.16 GEOTEXTILE FILTER FABRIC

Ensure Nuragrid is flat, firm and stable. Check surface with 1.8m straight edge. Ensure Nuragrid layout enables outlets to be accessible for cleaning. Roll selected geotextile filter fabric onto Nuragrid following manufacturer’s instructions.

3.17 CLEAN OUT MANHOLES / HATCHES

Provide removable screw-fixed access panels at appropriate locations on the roof 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.



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4 SELECTIONS

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

Deck support systems - for river stone roof covering on geotextile filter fabric

4.1 NURAJACK DECK PEDESTAL SUPPORT SYSTEM FOR NURAGRID

Location:	Refer to the latest Architectural Drawings
Manufacturer:	Nuralite
Overlay type:	River stone roof covering on geotextile filter fabric
Components:	Refer to the latest Architectural Drawings
Accessories:	Refer to the latest Architectural Drawings

4.2 NURAJACK DECK SUPPORT SYSTEMS FOR NURAGRID ON NURAJACK ALUMINIUM FRAME SYSTEM OVER INTERNAL GUTTER

Location:	Refer to the latest Architectural Drawings
Manufacturer:	Nuralite
Overlay:	River stone roof covering on geotextile filter fabric
Components:	Refer to the latest Architectural Drawings
Accessories:	Refer to the latest Architectural Drawings

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4422NT NURAPLY TPO ROOF & DECK MEMBRANE

1 GENERAL

This section relates to Nuralite Group Limited Nuraply TPO Roof and Deck Membrane system installed as a single ply external waterproof covering with associated components & accessories for river stone roof covering.
It includes;

- Nuratherm insulated roof system with Nuraply TPO smooth back fully adhered over Nuratherm insulation installed over concrete, plywood, and metal tray deck substrates.
- Nuraply TPO smooth or fleece back fully adhered installed directly over concrete and plywood substrates.

1.1 RELATED WORK

Refer to 4381NJ NURAJACK DECK SUPPORT SYSTEM for pedestal support systems for river stone roof covering.

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:

TPO	Thermoplastic polyolefin

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 2122.1	Combustion characteristics of plastics - Determination of flame propagation - Surface ignition of vertically orientated specimens of cellular plastics
AS/NZS 2269.0	Plywood - Structural - Specifications
NZS 3604	Timber-framed buildings
ASTM D6878	Standard Specification for Thermoplastic Polyolefin Based Sheet Roofing

Codemark certificate CMNZ70166 version 0 - Nuraply TPO Waterproofing membrane

1.4 MANUFACTURER/SUPPLIER DOCUMENTS

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

Nuraply TPO Technical information
Nuradrain - Technical Data Sheet
Nuracoat BG - Technical Data Sheet
Nuraply TPO and Soudal Gorilla MS Sealant - Technical Note
Nuralite ELD - Method Statement
Sealing Fixing Penetrations in Nuraply TPO - Method Statement
Soudal Gorilla BlackJack sealant - Technical Data Sheet
Soudal Gorilla MS Sealant - Technical Data Sheet
Dimond LT7 Product Technical Statement
DensDeck Prime Technical Guide

Manufacturer/supplier contact details

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

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Warranties

1.5 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

20 years	For Nuraply TPO membrane
20 years	For Nuraply TPO fleece backed membrane

- 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 installation.

Refer to the general section 1237 WARRANTIES for additional requirements.

1.6 WARRANTY - INSTALLER/APPLICATOR

Provide an installer/applicator warranty:

5 years	For Nuraply TPO membrane system installation

- Provide this warranty on the Nuraply TPO installer/applicator standard form.
- Commence the warranty from the date of installation.

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.7 NO SUBSTITUTIONS

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

1.8 QUALIFICATIONS WORKERS – MANUFACTURER / SUPPLIER REQUIREMENTS

Workers to be Nuralite Group Limited Authorised Membrane Applicators. Refer to 1270 CONSTRUCTION for additional requirements relating to qualifications.

Compliance Information

1.9 INFORMATION REQUIRED FOR CODE COMPLIANCE

Provide the following compliance documentation: -

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

1.10 COMPLIANCE - CODEMARK CERTIFICATE

Nuraply TPO waterproofing membrane meets the requirements of the NZBC when used within the Conditions and Limitations of certificate CMNZ70166

Performance - general

1.11 PERFORMANCE

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

- NuraplyTPO roofing applicator
- Nuralite representative
- Contractor
- Principal
- Principal's consultant(s)



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1.12 AS APPROVED

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

Performance - wind

1.13 WIND ZONE DESIGN PARAMETERS – LOW TO HIGH

According to the wind zone parameters of NZS 3604, table 5.4 this project is rated as high or lower. Ensure that the installation is adequate for this standard or greater.

1.14 WIND ZONE DESIGN PARAMETERS – VERY HIGH OR EXTRA HIGH

According to the wind zone parameters of NZS 3604, table 5.4 this project is rated as very high or extra high. Ensure that the installation is adequate for this standard or greater.

Performance - Nuratherm Insulated roof system

1.15 DURABILITY

Nuratherm insulated roof system complies with NZBC B2/AS1 when maintained to Nuralite requirements.

1.16 ENERGY EFFICIENCY

IKO Nuratherm ALU insulation board has an aged thermal resistance (R Value) of the following:

40mm	R1.80
50mm	R2.25
60mm	R2.70
70mm	R3.15
80mm	R3.60
100mm	R4.55

based on an aged thermal conductivity of 0.022 W/mK.

1.17 FIRE SAFETY

IKO Nuratherm PIR insulation board complies with the flame propagation criteria as specified in AS 2122.1.

2 PRODUCTS

Materials - Nuraply TPO single layer system

2.1 NURAPLY TPO SMOOTH BACK MEMBRANE

Nuraply TPO, a single ply, polyester fabric reinforced TPO fully bonded roofing and waterproofing membrane, to ASTM D6878.

2.2 NURAPLY TPO FLEECE-BACK MEMBRANE

Nuraply TPO Fleece-Back Membrane, a reinforced TPO roofing and waterproofing membrane, with factory applied polyester fleece backing, to ASTM D6878. Refer to SELECTIONS.

Materials - Nuratherm insulated roof system with Nuraply TPO for river stone roof covering

2.3 INSULATION BOARD

IKO Nuratherm ALU insulation board, comprised of a core of hard polyisocyanurate foam coated on both sides with tri-ply gas-tight aluminium.

2.4 VAPOUR BARRIER

Nuraply ALU, 0.6mm thick self-adhesive modified bitumen sheet membrane with a top side of polyester reinforced aluminium foil. Used as a vapour barrier between the substrate and insulation board when required. Supplied in 1.08m wide x 25m long rolls.

2.5 NURAPLY TPO SMOOTH BACK MEMBRANE

Nuraply TPO, a single ply, polyester fabric reinforced TPO fully bonded roofing and waterproofing membrane, to ASTM D6878. Refer to SELECTIONS.

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Components

2.6 PRIMER - SOLVENT BASED

50/50 mixture of solvent and Nuraply TPO Bonding Adhesive, a solvent based rubberised contact adhesive to bond the membrane.

2.7 NURAPLY TPO MEMBRANE BONDING ADHESIVE - SOLVENT BASED

Nuraply TPO Bonding Adhesive, a solvent based rubberised contact adhesive to bond the membrane.

2.8 NURAPLY TPO SOLVENT

Nuraply TPO Solvent is used to cut back Nuraply TPO Adhesive for use as a primer and for cleaning of equipment.

Components - Nuratherm insulated roof system with Nuraply TPO for river stone roof covering

2.9 METAL TRAY DECK

Dimond LT7 metal tray, as manufactured by Dimond Roofing, comprised of G550 steel 0.55 BMT.

2.10 MECHANICAL FIXING - FASTENERS AND PLATES FOR NURATHERM PIR INSULATION PANELS

Nuratherm IKO Fix Screws and Flange system. Polypropylene telescopic sleeves for fixing insulation panels. Screws supplied in lengths to suit both the substrate and installed insulation.

2.11 MECHANICAL FIXING - FASTENERS AND PLATES FOR COVERBOARD (OPTIONAL) ON PIR INSULATION PANELS

Nuratherm IKO Fix Screws and Pressure Plate Tube Flange system. Metal washer and polypropylene telescopic sleeves for fixing cover board on insulation panels. Screws supplied in lengths to suit both the substrate and installed insulation.

2.12 PRIMER - FOR VAPOUR BARRIER

Nuraflux QD primer for substrate preparation prior to bonding Nuraply ALU vapour barrier to concrete, timber and metal deck substrates.

2.13 EXPANDING FOAM

Soudal Gorilla Nailpower fire rated expanding foam for filling gaps in insulation layer.

Accessories

2.14 NURAPLY TPO DETAIL MEMBRANE

Nuraply TPO Detail Membrane easily forms flashings around corners and penetrations. Specifically designed for use in areas that cannot be properly detailed with TPO field membrane.

2.15 NURAPLY TPO PRE-FORMED CORNERS

NuraplyTPO pre-formed non-reinforced internal and external corners and T joint patches, used for detailing internal/external and 3-way lap joints.

2.16 NURAPLY TPO SEALANT

Nuraply TPO Sealant is an approved sealant compatible with Nuraply TPO and other accessories.

2.17 NURAPLY TPO MEMBRANE CLEANER

Nuraply Membrane Cleaner is used for lap preparation and removing marks from the membrane surface.

2.18 NURAPLY TPO DRAIN

Nuraply TPO Drains are a selected range of clamp ring drains in varying size and configurations.

2.19 NURAPLY TERMINATION BARS

Nuraply Aluminium Termination Bars are used to terminate the TPO on vertical and horizontal services. Pre-drill holes at 200mm centres. Flat - 28mm wide x 3mm thick x 2.5 metres long. Folded - 45mm wide x 3mm thick x 2.4 meters long. Custom sizes available upon request.



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2.20 NURAPLY BONDING TAPE

Double-sided polymer adhesive tape used to terminate Nuraply TPO onto metal flashings and under-flash Nuraply TPO beneath Synthetic rubber membranes in vertical applications.

2.21 COVER BOARD (OPTIONAL)

6.4mm DensDeck Prime Roof Board. Gypsum fibre board used as a optional substrate on Nuratherm PIR where specific substrate characteristics are desired.

2.22 NURAPLY TPO BUTYL TAPE

Nuraply Butyl Tape is 1mm thick, single sided butyl tape with a polypropylene fleece face. Designed to bond permanently to most surfaces including TPO.

2.23 ALUMINIUM TAPE

3M Aluminium tape in 150mmm or 48mm widths.

2.24 NURACOAT BG MESH REINFORCED BANDAGE

Nuracoat BG polymer modified bitumen emulsion reinforced with fibreglass bandage.

2.25 NURADRAIN DRAINAGE AND PROTECTION LAYER

High-density polyethylene (HDPE) dimpled sheet, faced with polyester yarn geotextile.

2.26 SLIP LAYER

250µm thick heavy duty polyethylene sheet.

2.27 POLYETHYLENE TAPE

Polyethylene tape.

2.28 NURALITE GRAVEL GUARD

Perforated marine grade aluminium gravel guard. Custom sizes available upon request.

2.29 DECK SUPPORT SYSTEMS - NURAJACKS & NURAPADS

Refer to 4381NJ NURAJACK DECK SUPPORT SYSTEM for specification.

2.30 ELECTRONIC LEAK DETECTION - CONDUCTIVE TAPE

Nuralite Electronic Leak Test Tape, 50mm wide self-adhesive conductive tape.

2.31 ELECTRONIC LEAK DETECTION - EARTHING PLATE

Nuralite Electronic Leak Test Earthing Plate with earthing cable.

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.

3.2 ROUTINE MATTERS

Refer to 1250 TEMPORARY WORKS & SERVICES for protection requirements.

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

3.3 GENERALLY

Work and materials to Nuralite installation instructions and NZBC E2/AS1.

3.4 WEATHER

Lay Nuraply TPO membrane in fair weather, with ambient air temperature no less than 5°C.

3.5 INSTALLATION SEQUENCE

Install Nuraply TPO membrane systems in sections to produce a weather tight at the end of each work period. Ensure that moisture absorbent substrates and insulation panels are covered with Nuraply TPO membrane on the same day they are laid or ensure that the base is kept covered and dry until Nuraply TPO membrane is laid. Seal exposed Nuraply TPO membrane edges at the end of each work period to ensure complete system remains dry.

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Installation - preparation

3.6 PRELIMINARY WORK

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

3.7 ACCEPTANCE OF SUBSTRATE

Confirm that the substrate complies with Codemark CMNZ70166 for the relevant substrates and Nuralite documents, including sumps, outlets and projections, and ensure work is of the required standard.

Confirm the moisture content of substrates:

Concrete substrate:	Relative humidity of 75% maximum
Plywood/ timber substrate:	Moisture Content of 20% maximum

Confirm constructed falls:

Roofs and decks:	1:80 minimum
Gutters:	1:100 minimum

3.8 PLYWOOD SUBSTRATE

Ensure that sheets have been stretcher bond laid to falls, are rigid, with joints flush, edges arrised, upstands filleted, no lumps or hollows, smooth, clean, dry and free of debris. Plywood grain across the line of supports below. Constructed falls on roofs and decks to be 1 in 80 minimum and 1 in 100 for gutters.

3.9 CONCRETE SUBSTRATE

Ensure wood float concrete substrate has been allowed to cure for at least 28 days before commencing application. Prepare surface, including vacuum cleaning and patching as necessary to leave smooth, clean, dry and free of debris. Constructed falls on roofs and decks to be 1 in 80 minimum and 1 in 100 for gutters.

3.10 METAL TRAY DECK SUBSTRATE

Ensure the LT7 metal tray decking sheets are inverted and supporting structure has been installed to Dimond Roofing and Nuralite requirements and specifications. If using timber supports, ensure bitumen tape or DPC is installed between timber and metal tray. Constructed falls on roofs and decks to be 1 in 80 minimum and 1 in 100 for gutters.

3.11 RIGID AIR BARRIER (RAB)

Fibre cement or Gypsum where they are placed behind cladding only.

Application - laying on plywood, and concrete

3.12 POSITION MEMBRANE

Position Nuraply TPO membrane over acceptable substrate and fold membrane back to expose half of the underside.

3.13 APPLY ADHESIVE (ADHESIVE FIX)

Apply bonding adhesive to the exposed underside of the membrane and to the corresponding substrate. Apply using a plastic core, medium nap paint roller to Nuralite requirements.

3.14 INSTALL MEMBRANE SHEETS (ADHESIVE FIX)

Allow bonding adhesive to dry tacky and roll the coated Nuraply TPO membrane onto the coated substrate. Brush down the bonded section of Nuraply TPO membrane immediately with a soft bristle broom. Fold back the un-bonded half of the sheet and repeat procedure.

3.15 LAP JOINTS ADHERED MEMBRANE AND HOT-AIR WELD (ADHESIVE FIX)

Allow for overlapping membrane edges a minimum of 75mm to provide for a minimum 40mm hot-air weld.

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3.16 HOT-AIR WELD

Hot-air weld the adjoining Nuraply TPO membrane sheets with an automatic hot-air welding machine or using hand welding techniques.

3.17 PENETRATIONS

Form and finish up-stands, down-turns, penetrations, sumps and vents to conform with Nuralite details.

3.18 PENETRATIONS AND JUNCTIONS

Check that adjoining walls and parapets are prepared ready for the installation of the Nuraply TPO membrane.

Note: Ensure that no penetrations will occur until after the Nuraply TPO membrane has been laid.

Application - Nuratherm insulated roof system with Nuraply TPO for river stone roof covering on geotextile filter fabric.

3.19 LAY VAPOUR BARRIER

Lay Nuraply ALU self-adhesive vapour barrier into the Nuraflux QD primed substrate to Nuralite requirements, with joints being rolled and well-sealed shut.

3.20 LAY NURATHERM INSULATION

Ensure that sheets have been stretcher bond laid to falls, are rigid, with joints flush upstands filleted, no lumps or hollows, smooth, clean, dry and free of debris.

For double layered systems, use one fixing to hold the first layer of sheets and then fix down the second sheet using IKOfix thermal flanges at the prescribed amount.

Seal any gaps in the insulation with expanding foam to produce a continuous insulation blanket with no gaps. Apply a layer of Aluminium Tape to any exposed ends of insulation sheets, fixings and sheet joins to provide a surface for the membrane to adhere to. On the lip of gutters, a Gutter Lip Trim may be installed if the insulation sheet edge requires additional protection from damage.

Secure the sheets to the substrate with Nuratherm fasteners at a rate based in the Installation checklist.

3.21 APPLY ELECTRONIC LEAK DETECTION SYSTEM

Apply 50mm wide strips of Nuralite Electronic Leak Test Tape centred over every Nuratherm insulation board join. Install Nuralite Electronic Leak Test Earthing Plates to the surface of Nuratherm insulation boards at a rate of 1 per 500m2 roof area. Run and connect earthing cable through a dedicated Goose Neck cable duct in accordance with Nuralite installation details. Not suitable for cover board over Nuratherm PIR.

3.22 LAY COVER BOARD (OPTIONAL)

Lay DensDeck Prime Roof Board on Nuratherm PIR. Secure the sheets to the substrate with Nuratherm IKO Fix Screws and Pressure Plate Tube Flange system to DensDeck Prime Technical Guide and Nuralite requirements.

3.23 POSITION MEMBRANE

Position Nuraply TPO membrane over acceptable substrate and fold membrane back to expose half of the underside.

3.24 APPLY ADHESIVE (ADHESIVE FIX)

Apply bonding adhesive to the exposed underside of the membrane and to the corresponding substrate. Apply using a plastic core, medium nap paint roller to Nuralite requirements.

3.25 INSTALL MEMBRANE SHEETS (ADHESIVE FIX)

Allow bonding adhesive to dry tacky and roll the coated Nuraply TPO membrane onto the coated substrate. Brush down the bonded section of Nuraply TPO membrane immediately with a soft bristle broom. Fold back the un-bonded half of the sheet and repeat procedure.

3.26 LAP JOINTS ADHERED MEMBRANE AND HOT-AIR WELD (ADHESIVE FIX)

Allow for overlapping membrane edges a minimum of 75mm to provide for a minimum 40mm hot-air weld.



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3.27 HOT AIR WELD

Hot-air weld the adjoining Nuraply TPO membrane sheets with an automatic hot-air welding machine or using hand welding techniques.

3.28 PENETRATIONS

Form and finish upstands, downturns, penetrations, sumps and vents to conform with Nuralite required details.

3.29 PENETRATIONS AND JUNCTIONS

Check that adjoining walls and parapets are prepared ready for the installation of the Nuraply TPO membrane. Note: Ensure that no penetrations will occur until after the Nuraply TPO membrane has been laid.

Installation - Drainage layer for river stone roof covering

3.30 LAY SLIP LAYER

Lay heavy duty polyethylene sheet over Nuraply TPO membrane. Laps edges minimum 100mm. Tape joints with polypropylene tape. Turn sheet up along upstands to depth of river stone covering. Tape joints with polyethylene tape.

3.31 LAY NURADRAIN

Lay drainage mat with dimpled side up. Overlap ends.

Installation - Nurajack support systems for river stone roof covering on geotextile filter fabric

3.32 NURAJACK & NURAPAD INSTALLATION

Refer to 4381NJ NURAJACK DECK SUPPORT SYSTEM for details.

Testing

3.33 TEST - FLOOD - COLD ROOFS

Flood test gutters and where practical other low pitch and horizontal areas with a minimum 50mm depth of water for 24 hours. Make good any lack of water tightness when the surface is completely dry. Repeat water test process after making any necessary repairs.

3.34 TEST - ELECTRONIC LEAK DETECTION - WARM ROOFS

Carry out leak detection testing on warm roofs using Nuralite Electronic Leak Detection system upon completion of membrane installation and prior to any covering. Make good any lack of water tightness when the surface is completely dry. Depending on conditions, repeat a total or localised test process after making repairs.

Finishing

3.35 FOOT TRAFFIC

Keep foot traffic to a minimum after laying the Nuraply TPO membrane. Lay protection at all traffic concentration points.

3.36 ACCESS BOARDS

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

3.37 ACCEPTANCE

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

3.38 SUBSEQUENT WORK

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

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Completion

3.39 COMPLETION MATTERS

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

4 SELECTIONS

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

Nuraply TPO Smooth Back Membrane

4.1 NURAPLY TPO MEMBRANE - FULL ADHESIVE FIX

Location:	Refer to the latest Architectural Drawings
Substrate:	Plywood
Supplier:	Nuralite
Membrane:	Nuraply TPO
Thickness:	1.5mm
Colour:	Grey
Finish:	Smooth
Adhesive:	Nuraply TPO Membrane Bonding Adhesive

Nuraply TPO Fleece Back Membrane

4.2 NURAPLY TPO FLEECE-BACK MEMBRANE - FULL ADHESIVE FIX

Location:	Refer to the latest Architectural Drawings
Substrate:	Concrete
Supplier:	Nuralite
Membrane:	Nuraply TPO Fleece-Back Membrane
Thickness:	1.5mm
Colour:	Grey
Finish:	Smooth
Adhesive:	Nuraply TPO Membrane Bonding Adhesive

Nuratherm insulated roof system with Nuraply TPO Smooth Back Membrane

4.3 NURATHERM INSULATED ROOF SYSTEM ON TIMBER SUBSTRATES WITH NURAPLY TPO SMOOTH BACK MEMBRANE - ADHESIVE FIX

Location:	Refer to the latest Architectural Drawings
Supplier:	Nuralite
Substrate:	Plywood
Substrate adhesion:	Nuraflux QD
Vapour barrier:	Nuraply ALU
Insulation layer:	IKO Nuratherm ALU insulation board
Thickness:	Refer to the latest Architectural Drawings
R-value:	Refer to the latest Architectural Drawings
Fixings:	IKO Fix fasteners - fixing pattern to suit wind loading (for fixing insulation board to substrate)
Membrane:	Nuraply TPO Smooth Back Membrane
Thickness:	1.5mm
Colour:	Grey
Finish:	Smooth
Adhesive:	Nuraply TPO Membrane Bonding Adhesive

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4.4 NURATHERM INSULATED ROOF SYSTEM ON METAL TRAY DECK WITH NURAPLY TPO SMOOTH BACK MEMBRANE - ADHESIVE FIX

Location:	Refer to the latest Architectural Drawings
Supplier:	Nuralite
Substrate:	Inverted Dimond LT7 metal tray deck 0.55 BMT
Substrate adhesion:	Nuraflux QD
Vapour barrier:	Nuraply ALU
Insulation layer:	IKO Nuratherm ALU insulation board
Thickness:	100mm
R-value:	R4.55
Fixings:	IKO Fix fasteners - fixing pattern to suit wind loading (for fixing insulation board to substrate)
Membrane:	Nuraply TPO Smooth Back Membrane
Thickness:	1.5mm
Colour:	Grey
Finish:	Smooth
Adhesive:	Nuraply TPO Membrane Bonding Adhesive

4.5 NURATHERM INSULATED ROOF SYSTEM ON CONCRETE WITH NURAPLY TPO SMOOTH BACK MEMBRANE - ADHESIVE FIX

Location:	Refer to the latest Architectural Drawings
Supplier:	Nuralite
Substrate:	Concrete
Substrate adhesion:	Nuraflux QD
Vapour barrier:	Nuraply ALU
Insulation layer:	IKO Nuratherm ALU insulation board
Thickness:	100mm
R-value:	R4.55
Fixings:	IKO Fix fasteners - fixing pattern to suit wind loading (for fixing insulation board to substrate)
Membrane:	Nuraply TPO Smooth Back Membrane
Thickness:	1.5mm
Colour:	Grey
Finish:	Smooth
Adhesive:	Nuraply TPO Membrane Bonding Adhesive

Materials - detail membrane

4.6 NURAPLY TPO DETAIL MEMBRANE

Location:	Refer to the latest Architectural Drawings
Supplier:	Nuralite
Description:	Nuraply TPO Detail membrane
Size:	1.5mm thick x 1524m long x 610mm wide
Colour:	Grey

Accessories

4.7 NURAJACK & NURAPAD DECK SUPPORT SYSTEM

Refer to 4381NJ NURAJACK DECK SUPPORT SYSTEM for details.

4.8 NURAPLY TPO MATERIAL ACCESSORIES

Location:	Refer to the latest Architectural Drawings
Supplier:	Nuralite
Type:	Refer to the latest Architectural Drawings

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4481LD INTERNATIONAL LEAK DETECTION SYSTEM

1 GENERAL

This section relates to the International Leak Detection (ILD®) EFVM® leak detection system. It comprises of;

- The installation of the International Leak Detection (ILD®) EFVM® system to facilitate leak detection in waterproof membranes.
- The pin point leak detection testing of membrane covered roofs and structures using Electronic Field Vector Mapping.

1.1 RELATED WORK

Refer to 4400 MEMBRANE ROOFING

1.2 ABBREVIATIONS

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

The following abbreviations apply specifically to this section:

ILD®	International Leak Detection
EFVM®	Electric Field Vector Mapping
ILD® Vector Grid	316 Stainless Steel Mesh 50mm x 50mm x 0.6mm
ILD® Conductive Ribbon	12.5mm Nylon and Stainless Steel Ribbon

Documents

1.3 DOCUMENTS

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

ASTM 7877-14	Standard Guide for Electronic Methods for Detecting and Locating Leaks in Waterproof Membranes

1.4 MANUFACTURER/SUPPLIER DOCUMENTS

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

International leak detection brochure ~

Manufacturer/supplier contact details

Company:	International Leak Detection
Web:	www.ild.co.nz
Email:	info@ildnz.co.nz
Telephone:	09 352 9614

Requirements

1.5 QUALIFICATIONS

ILD® trained technicians to carry out the EFVM® installation and the EFVM® Integrity test. If requested provide evidence of qualification / experience prior to commencing work.

1.6 DOCUMENTS - TESTING

ILD® will provide a full written report, CAD drawings and picture documentation detailing the results of the test, and the location of any breaches.

Compliance information

1.7 INFORMATION REQUIRED FOR CODE COMPLIANCE

Provide the following compliance documentation: -

- Manufacturer's, importer's or distributors warranty
- Installer's / applicator's warranty

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- Other information required by the BCA in the Building Consent Approval documents.

2 PRODUCTS

EFVM® System

2.1 EFVM® VECTOR PLATE

Stainless steel Vector Plate adhered to the conductive substrate connected to a weatherproof termination point in the membrane with a heatproof cable.

Note: (not required for membrane directly adhered to concrete)

2.2 ILD® VECTOR GRID

Vector Mapping Grid (VMG™), (also known as ILD® Vector grid), 316 Stainless Steel Mesh 50mm x 50mm x 0.6mm, to create a conductive substrate on plywood structures and warm roofs (insulation over concrete). E.g. Balconies, Roofs, Gutters, Canopies.

2.3 ILD® CONDUCTIVE RIBBON

12.5mm Nylon and Stainless Steel Ribbon to create a continuous conductive substrate below the waterproof membrane. Used for testing insulated membrane roofs.

3 EXECUTION

Conditions

3.1 DELIVERY, STORAGE AND HANDLING

Take delivery of materials and goods and store on site and protect from damage.

Protect finished surfaces, edges and corners from damage.
Move/handle goods in accordance with manufacturer's requirements.

3.2 PRE-INSTALLATION REQUIREMENTS

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

Installation

3.3 STANDARDS AND TOLERANCES

Refer to the general section 1270 CONSTRUCTION for general requirements.

3.4 LOW VOLTAGE METHODS (EFVM®)

When testing using a low voltage electrical potential, a thin controlled covering of water on the surface forms the conductive path horizontally across the membrane to any membrane breach. At a breach location, an electrical path to the substrate is formed through the water connecting to the substrate below. A sensitive receiver detects the leakage current and alerts the operator to the exact location of this connection.

Membrane directly adhered to Concrete	Compatible with EFVM® as concrete is already a conductive substrate.
Membrane to Plywood	ILD Vector Grid mechanically fixed to the horizontal surfaces of the plywood creating a conductive substrate below the membrane.
Membrane to Foil Faced Insulation Warm roof	ILD Conductive Ribbon taped in line with ILD guidance to create electrical continuity by connecting all the foil faces of the PIR.
Membrane to Non-Foil Faced Insulation	(100% & 50% options) 100% ILD Vector Grid Taped to the insulation directly below the membrane. 50% is to Tape ILD Conductive Ribbon at 600mm centres to create a conductive field below the membrane.

Installation of Vector Grid (by membrane installer)

3.5 INSTALL VECTOR GRID

Membrane installer to place Vector Grid directly onto substrate. Grid to cover the total horizontal area that is to receive membrane. Install in accordance with the EFVM® leak detection system to ASTM 7877-14.

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Terminate the grid 50mm from all membrane termination points, penetrations outlets and projections.

Different horizontal areas e.g. roof areas and gutters can be electrically joined with strips of Vector Grid, 2 x squares wide (100mm) by required length to connect two zones.
Each separate area must have its own connection plates. If areas are greater than 1000m2 then extra connection plates must be fitted.

Where Vector grid sheets overlap, they must overlap by a minimum of 1 x square wide (50mm) of the grid, both at the edges and ends.
Fix grid with 8mm staples. Ensure that there are no sharp wire protrusions let exposed.

3.6 INSTALL CONTINUITY RIBBON

Fix continuity ribbon in place with foil tape along each row of foil faced PIR insulation boards.

Once all the insulation boards are connected electrically in rows, install a minimum of 2 additional strips of continuity ribbon perpendicular to the electrically connected rows, creating a fully connected substrate of insulation foil.

Testing Generally

3.7 TIMING OF TESTING

- Workmanship test – Completed immediately after the installation of the membrane to verify watertightness of workmanship.

- Final Test – Test at the very last opportunity i.e. at the end of the project prior to handover to client or just before final coverings are to be installed over the membrane surface i.e. Decking, Pavers, Landscaping, overburden.

3.8 MEMBRANE TESTING

Carry out leak detection testing to ASTM 7877-14 upon completion of the installation of the waterproofing membrane, in accordance with the EFVM® leak detection system.

3.9 GREEN ROOF TESTING

Carry out leak detection testing to ASTM 7877-14 upon completion of the installation of the waterproofing membrane, and before any overburden is placed, in accordance with the EFVM® leak detection system.

Before any overburden is placed, install a permanent test wire around the perimeter of the membrane and any drains or conductive penetrations to aid future EFVM® testing. Testing through overburden is aided by a semi permeable drainage layer.

3.10 TESTING OTHER STRUCTURES

Carry out leak detection testing to ASTM 7877-14 upon completion of the installation of the waterproofing membrane, in accordance with the EFVM® leak detection system.

Testing Procedure - all roofs and structures

3.11 CONNECT

Securely clamp the ILD EFVM® Generator to connection plate onto the edge of the roof slab at a location planned by the ILD® technician.

Connect the prefabricated cable to the connection plate, and lead to a location planned by ILD® technician.

3.12 WETTING

Thoroughly dampen the membrane prior to testing.

3.13 INTEGRITY TEST

Perform the integrity test of the waterproofing membrane using EFVM® procedure upon completion of roof membrane installation.

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Completion

3.14 ROUTINE CLEANING

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

3.15 PROTECTION

Provide the following temporary protection of the finished work:

~

Commissioning

3.16 RE-TESTING AFTER REPAIRS

Retest breached locations using EFVM® procedure to ASTM 7877-14 after repairs have been carried out.

4 SELECTIONS

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

ILD® EFVM® System (by membrane installer)

4.1 ILD® EFVM® VECTOR PLATES

Type/Brand:	EFVM® ILD Vector Plates
Location:	~

4.2 ILD® EFVM® GRID

Type/Brand:	EFVM® ILD Vector Grid 316 Stainless Steel Mesh 50mm x 50mm x 0.6mm
Location:	~
Grid position:	refer to Testing

4.3 ILD® EFVM® ILD® CONDUCTIVE RIBBON

Type/Brand:	EFVM® ILD Conductive Ribbon
Size:	12.5mm Nylon and Stainless Steel Ribbon
Location:	Install to the top of the roof cover board, laid against the fall of the roof at 600crs max spacing.

Testing - by ILD

4.4 TEST - CONDUCTIVE SUBSTRATE

Location:	~
Test type:	EFVM®
Roof construction:	Concrete
Membrane age & condition:	~
Special features:	~

4.5 TEST - NON-CONDUCTIVE SUBSTRATE

Location:	~
Test type:	EFVM®
Roof construction:	~
Membrane age & condition:	~
Grid position:	~
Special features:	~



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4.6 TEST - GREEN ROOF

Location:	~
Test type:	~
Roof construction:	~
Membrane age & condition:	~
Grid position:	~
Special features:	~

4.7 TEST - OTHER STRUCTURES

Location:	~
Test type:	~
Structure:	~
Membrane age & condition:	~
Grid position:	~
Special features:	~

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4521AC APL COMMERCIAL ALUMINIUM WINDOWS & DOORS

1 GENERAL

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

- APL Aluminium windows and doors
- APL Minima Sliding Door System
- APL Shopfront system
- APL Flushglaze
- APL Structural Glaze
- APL Roof Windows and Overhead glazing
- APL Ventient trickle ventilators
- Hardware and furniture
- Flashings and sealants

1.1 RELATED WORK

Refer to appropriate AGP glazing sections for glass types.

1.2 ABBREVIATIONS AND TERMS

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

Documents

1.3 DOCUMENTS

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

NZBC E2/AS1	External moisture 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
AS/NZS 1170.2:2011	Structural design actions - Wind actions
NZS 1170.5	Structural design actions - Earthquake actions - New Zealand
AS/NZS 1580.108.1	Methods of test for paints and related materials - Determination of dry film thickness on metallic substrates - Non destructive methods
AS/NZS 1734	Aluminium and aluminium alloys - Flat sheet, coiled sheet and plate
AS/NZS 1866	Aluminium and aluminium alloys - Extruded rod, bar, solid and hollow shapes
NZS 3604	Timber-framed buildings
NZS 4211	Specification for performance of windows
NZS 4223.3	Glazing in buildings - Human impact safety requirements
NZS 4303	Ventilation for acceptable indoor air quality
AS/NZS 4680	Hot-dip galvanized (zinc) coatings on fabricated ferrous articles
BS EN 673	Glass in building - Determination of thermal transmittance (U-value) - Calculation method
AAMA 2603	Voluntary specification, performance requirements, and test procedures for pigmented organic coatings on aluminium extrusions and panels (with coil coating appendix)

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AAMA 2604	Voluntary specification, performance requirements and test procedures for high performance organic coatings on aluminium extrusions and panels
AAMA 2604.05	Performance requirements and test procedures for high performance organic coatings on aluminium extrusions and panels
AAMA 2605	Voluntary specification, performance requirements and test procedures for superior performing organic coatings on aluminium extrusions and panels
BS 3900	Methods of tests for paints, Part C5: Determination of film thickness
ISO 10077-1	Thermal performance of windows, doors and shutters - Calculation of thermal transmittance - General
ISO 10077-2	Thermal performance of windows, doors and shutters - Calculation of thermal transmittance - Numerical method for frames
ISO 12631	Thermal performance of curtain walling - Calculation of thermal transmittance
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
PQAS	Powder Coating Quality Assurance System
SFA 3503-03	Anodic Oxide coatings on wrought aluminium for external architectural application (2005)

US Federal Specification:

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

CodeMark™ CMNZ10033 ver2	APL Metro Series ThermalHEART® with Centrafix™ Windows and Doors.

1.4 MANUFACTURER / SUPPLIER DOCUMENTS

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

Altherm Specifier's Guide
First Specifier's Guide
Vantage Specifier's Guide
APL Specifier Guide to Fluoroset FP - Selling, Fabricating, Handling, Care and Maintenance
APL Window Energy Efficiency Rating System (WEERS) Report Series
APL Metro Series ThermalHEART® with Centrafix™ System Guide V1, April 2023
APL Testing of APL new window and installation to EM9 test method
BRANZ Appraisal 1188 [2023] - APL Metro Series ThermalHEART® with Centrafix™ Windows and Doors
BRANZ Appraisal 1259 [2024] - APL ThermalHEART+® Window and Door Systems

Manufacturer/supplier contact details

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

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Warranties

1.5 WARRANTY - MANUFACTURER / SUPPLIER

Provide a material manufacturer/supplier warranty:

5 years:	For fabrication
2 years:	For hardware
12 years:	For AGP glass

- 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 in 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

1.7 SAMPLES

Refer to the general section 1270 CONSTRUCTION for details of how samples will be reviewed and how instructions to proceed will be given. Provide the following samples for review

	Sample A		
Sample description:	Powdercoating and Flashings		
Sample type:	Portable samples for review		
Number:	TBC		
Location:	TBC		
Reviewer:	Architect & Contractor		
Time for review:	TBC by Architect		
Review criteria:	Appearance, Colour, Constructability		

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.

Provide shop drawings to show the general arrangement including, but not be limited to:
Fully dimensioned elevations of all elements
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

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- 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 ~.

- ~ 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 PROTOTYPES

Allow to fabricate the following prototypes from shop drawings and test:

Prototype description:	1m high prototype of each of the four different pivot door jamb-to-head connections, and jamb to sill connections. - Pivot door to four-track Minima - Pivot door to three-track Minima - Pivot door to fixed Minima window (Pro-shop) - Pivot door to fixed CTH44 commercial suite sidelights to main entry.
Location:	TBC
Review criteria:	Appearance, Colour, Constructability, and Construction Methodology
Reviewer:	Architect & Contractor
Time for review:	TBC by Architect

1.10 NO SUBSTITUTIONS

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

1.11 QUALIFICATIONS

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

Compliance Information

1.12 INFORMATION REQUIRED FOR CODE COMPLIANCE

Provide the following compliance documentation:

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

1.13 COMPLIANCE

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

1.14 CERTIFICATION

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

Performance

1.15 PERFORMANCE - WINDOWS AND DOORS

To NZS 4211, including:

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

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Refer to SELECTIONS.

1.16 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.

1.17 THERMAL PERFORMANCE - WINDOWS & DOORS

Thermal performance of windows & doors to NZBC H1/AS1 or NZBC H1/AS2 & NZBC H1/VM1 or NZBC H1/VM2. The construction R-value of windows & doors determined by NZBC H1/VM1 or NZBC 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.

1.18 PASSIVE VENTILATION

To NZBC G4/AS1, paragraph 2.2.2.5, and NZS 4303.

Performance - Wind

1.19 DESIGN PARAMETERS - NON SPECIFIC DESIGN

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

Refer to SELECTIONS for wind zone.

1.20 DESIGN PARAMETERS - SPECIFIC DESIGN

Design the installation to the wind pressure parameters of AS/NZS 1170.2. Refer to SELECTIONS for ULS and SLS

Finishes

1.21 CERTIFY COATINGS - POWDER COATING

Certify on request, compliance with this specification and support with control and sampling records. Test for film thickness to BS 3900, part C5, method No. 4, using method (b) or to AS/NZ 1580.108.1 for certifying thickness and method (a) where any dispute arises as to the thickness provided.

The coating should be applied by an applicator who can certify that the coating has been applied in accordance with the specification.

2 PRODUCTS

2.1 WINDOWS

Refer to SELECTIONS for type and finish.

2.2 DOORS

Refer to SELECTIONS for type and finish.

Materials

2.3 ALUMINIUM EXTRUSIONS

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

2.4 ALUMINIUM SHEET AND STRIP

Complying with AS/NZS 1734 of suitable thickness. Rolled for anodising or powder coating.

Alloy designation: 5251 - H16 or 5005 - H16

2.5 STAINLESS STEEL SHEET AND STRIP

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

2.6 GLASS

Refer to the glazing section for glass types and installation.

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Reveals

2.7 REVEALS - TIMBER PAINTED

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

2.8 REVEALS - ALUMINIUM

Aluminium reveals fitted to frame via thermal break.

2.9 REVEALS - PVC

Prefinished thermoplastic PVC reveals grooved for wall linings.

Accessories

2.10 SEISMIC SUB-FRAMES

Where required units to have seismic sub-frames. Refer to NZS 1170.5. Refer to SELECTIONS for requirements

2.11 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.

Components for installation - direct fix systems

2.12 SILL PAN FLASHING

To NZBC E2/AS1, paragraphs 9.1.10.3 - 9.1.10.6. 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 aluminium frame out over the external face of the cladding.

2.13 SUPPORT ANGLE

WGANZ aluminium support angle for use below the sill pan for deeper claddings to transfer the weight of the window back to the frame. Size to suit cladding thickness.

Components for installation - cavity systems

2.14 STANDARD CAVITY CLOSER

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

2.15 SUPPORT BAR

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

Components

2.16 GLAZING GASKETS

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

2.17 HARDWARE AND FURNITURE

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

2.18 SAFETY STAYS

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

2.19 FIXING BRACKETS

Designed by manufacturer to specific design.



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Sealants

2.20 STRUCTURAL SEALANT

Silicone chemically curing sealant specifically formulated and tested or approved equivalent with not less than a ± 40% movement factor complying with US Federal Specification TT-S-001543A.

2.21 WEATHERING/INSTALLATION SEALANT

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

Accessories

2.22 TRICKLE VENTILATORS

Refer to SELECTIONS.

Finishes

2.23 DURATEC POWDER COATED ALUMINIUM

High-performance polyester powder coating in accordance with WGANZ PQAS and AAMA 2604.

2.24 FLUOROSET POWDER COATED ALUMINIUM

Very high-performance PVF2 fluoropolymer powder coating in accordance with WGANZ PQAS and AAMA 2605.

3 EXECUTION

Conditions - generally

3.1 DELIVERY, STORAGE & HANDLING OF PRODUCTS

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

3.2 ROUTINE MATTERS

Refer to 1250 TEMPORARY WORKS & SERVICES for protection requirements.

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

3.3 PRE-INSTALLATION REQUIREMENTS

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

3.4 PROTECTIVE COVERINGS

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

3.5 ADDITIONAL PROTECTION

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

Assembly

3.6 FABRICATION

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

3.7 TIMBER REVEALS

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

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3.8 HARDWARE GENERALLY

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

3.9 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.

3.10 PASSIVE VENTILATION

Factory fit all required and scheduled passive ventilation systems to NZBC G4/AS1, paragraph 2.2.2.5, NZS 4303 and manufacturer's requirements.

Installation - windows and doors

3.11 SUPPLY OF FIXINGS

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

3.12 EXPOSED FIXINGS AND FASTENINGS

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

3.13 PROTECTED FIXINGS AND FASTENINGS

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

3.14 CORROSION PROTECTION

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

3.15 CONFIRM PREPARATION OF EXTERIOR WALL OPENINGS

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

Required preparatory work includes the following:

- wall 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.

3.16 STANDARDS AND TOLERANCES

Refer to the general section 1270 CONSTRUCTION for general requirements.

3.17 INSTALLATION

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

3.18 INSTALLATION FIXING

To NZBC E2/AS1, paragraph 9.1.9.10. Fix windows/doors through reveal to frame with a pair of 75 x 3.15mm minimum galvanised jolt head nails or a pair of 8 gauge x 65mm minimum stainless steel screws. Fix at a maximum of 450 centres along all reveals and a maximum of 150mm from reveal ends. Ensure fixings do not penetrate metal flashings.

Install packers between reveals and framing at fixing points, except at the head.

3.19 INSTALLATION DIRECT FIX

Install to window manufacturers details and drawings including sill pans to window and door units.



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3.20 INSTALLATION CAVITY CONSTRUCTION

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

For thresholds with support bars fixed through membranes, pre-fill support bar screw holes with silicone sealant to NZBC E2/AS1, Figure 8.5.6.1D: Junctions with walls for membrane.

3.21 INSTALL FLASHINGS

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

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

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

3.22 COMPLETE AIR SEAL

To NZBC E2/AS1, 9.1.5 Air seals. Form an air-tight seal by means of proprietary expanding foam or sealants used with PEF backing rods, applied between the window / door reveal and structural framing to a depth of 10 - 20mm, to provide a continuous air tight seal to the perimeter of the window or door.

3.23 FIX HARDWARE

Fix all sash and door hardware and furniture as scheduled.

Application - jointing and sealing

3.24 SEAL FRAMES ON SITE

Seal frames to each other and to adjoining structure and finishes, to the requirements of 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.

3.25 PREPARE JOINTS

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

3.26 BACK UP

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

3.27 SEALANT FINISH

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

3.28 PROTECTIVE COVERINGS

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

Anodised finishes should be protected from cement products and requires immediate clean-up of cement splashes. Only use tapes that have passed WGANZ testing on powder coated products. Remove protection on completion.

3.29 IN-SITU TOUCH-UP TO POWDER COATED ALUMINIUM

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

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3.30 SAFETY

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

3.31 MANIFESTATIONS

To NZS 4223.3, 2.2 Manifestation (making glass visible).

Completion & Commissioning

3.32 COMPLETION MATTERS

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

4 SELECTIONS

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

4.1 NOMINATED FABRICATOR

The nominated fabricators for this section of work are;

Brand:	Altherm
Company:	Design Windows Central Otago
Contact:	John Hancock
Email:	central@designwindows.co.nz
Telephone:	03 445 0305

4.2 SUPPLY AND INSTALLATION

Supply and installation of the specified APL aluminium joinery system.

Supply:	By fabricator
Installation:	By Fabricator

Performance

4.3 AIR INFILTRATION

For NZS 4211, table 3 Air infiltration.

Non-air conditioned zones:	Refer to services engineer's drawings
Air conditioned zones:	Refer to services engineer's drawings

4.4 APL SEISMIC SUB-FRAME

The following units to have seismic sub-frames.

Windows No:	Seismic movement to be provided for
EJ01A EJ01B EJ02 EJ02A EJ02B EJ05A Refer to shop drawings for confirmation	40mm 40mm 40mm 40mm 40mm 40mm Refer to shop drawings for confirmation

Performance - Wind

4.5 DESIGN PARAMETERS - NON SPECIFIC DESIGN

Building wind zone VH (refer to NZS 3604, table 5.1)

4.6 DESIGN PARAMETERS - SPECIFIC DESIGN

The design wind pressures are to AS/NZS 1170.2.



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SLS	+/- 1.23kPa, Refer to Structural Engineer's drawings
ULS	+/- 1.65kPa, Refer to Structural Engineer's drawings

Finishes - Powder Coating

4.7 DURATEC - POWDER COATING FINISH

Type:	Polyester organic powder coating
System integrity:	Minimum 25 years film integrity, up to 20 years colour integrity
Colour:	TBC by architect
Finish:	TBC by architect

4.8 FLUOROSET - POWDER COATING FINISH

Type:	PVF2 fluoropolymer powder coating
System integrity:	Minimum 35 years film integrity, up to 30 years colour integrity
Colour:	TBC by architect
Finish:	TBC by architect

Glazing

4.9 GLASS

Type/thickness:	Refer to 4611AG AGP GLAZING COMMERCIAL for type and thickness.

Hardware

4.10 DOOR HARDWARE

Locks & handles:	TBC by architect, refer to shop drawings

4.11 HARDWARE FINISH

Finish:	Powder coat
Colour:	Black

4.12 MANIFESTATIONS

Location:	Supplied and fitted by others in accordance with NZS 4223.3
Type/details:	Supplied and fitted by others in accordance with NZS 4223.3

Flashings and Sealant

4.13 FLASHINGS

Material/type:	Custom folded aluminium
Pattern:	Formed to suit details provided

4.14 WEATHERING SEALANT

Type:	1-part polyurethane moisture curing, elastic joint sealant
Colour:	TBC by architect

Window and door system - APL Architectural Series THERMALHEART+®

4.15 APL ARCHITECTURAL SERIES THERMALHEART+ FIXED WINDOW

Type:	APL Architectural Series THERMALHEART+®
Window No.:	As per window and door schedule included on drawings
Reveal/plasterboard adaptor:	As per Architectural drawings/ details

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4.16 APL ARCHITECTURAL SERIES THERMALHEART+ PASSIVE VENTILATION

Brand:	APL Ventient SCW-SH
Window No.:	As per window and door schedule included on drawings
Door No.:	As per window and door schedule included on drawings
Frame size:	Refer to shop drawings
Reveal/plasterboard adaptor:	As per Architectural drawings/ details

4.17 APL ARCHITECTURAL SERIES THERMALHEART+ ACOUSTIC PASSIVE VENTILATION

Brand:	APL Ventient with acoustic sound boxes
Window No.:	As per window and door schedule included on drawings
Door No.:	As per window and door schedule included on drawings
Frame size:	Refer to shop drawings
Reveal/plasterboard adaptor:	As per Architectural drawings/ details

Minima Sliding Door System

4.18 APL MINIMA SLIDING DOOR

Type:	Minima Sliding Door System
Door No.:	As per window and door schedule included on drawings

40mm Commercial Window Series

4.19 APL 40MM COMMERCIAL WINDOW SERIES

Brand:	APL 40mm Commercial Window Series
Type:	Refer to shop drawings
Window No.:	As per window and door schedule included on drawings
Glazing system:	Double glazing

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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

Refer to ~ for ~

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.

Quality control and assurance

1.12 INSPECTIONS

~ ~

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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.

Components

2.2 FIXINGS

6mm x 80mm 304 stainless steel star washer construction screws.

2.3 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 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.

3.9 REMOVE PROTECTIVE FILM

Remove any protective films immediately after installation.

Completion & Commissioning

3.10 COMPLETION MATTERS

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

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4 SELECTIONS

For further details on selections go to www.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:
SL01 - 06 & SL09 - 10	R0.57
SL11 - 15	R0.60

Adlux roof windows

4.2 ADLUX HARMONY ROOF WINDOW - FIXED

Roof window No:	SL01 - 06 & SL09 - 10
Type/brand:	Adlux Harmony Fixed
Model:	HF23/44DG - custom
Size:	4370mm wide x 2325mm high
Kerb external dimensions:	4320mm x 2275mm
Kerb pitch:	5º
Frame finish:	Powder coated
Frame colour:	Colour to be confirmed
IGU type:	COMF-E Optimum Low-E & Argon 10/24/17.52mm
Glass structural laminate:	Yes
Glass finish/colour:	Clear
Glass edge band:	Not Required

4.3 ADLUX HARMONY ROOF WINDOW - FIXED

Roof window No:	SL11 - 15
Type/brand:	Adlux Harmony Fixed
Model:	HF9/55DG - custom
Size:	5450mm wide x 900mm high
Kerb external dimensions:	5400mm x 850mm
Kerb pitch:	5º
Frame finish:	Powder coated
Frame colour:	Colour to be confirmed
IGU type:	COMF-E Optimum Low-E & Argon 10/24/17.52mm
Glass structural laminate:	Yes
Glass finish/colour:	Clear
Glass edge band:	Not Required

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4611AG AGP GLAZING COMMERCIAL

1 GENERAL

This section relates to the supply and fixing of AGP® glass products for use with APL Window Solutions external and internal joinery in commercial type buildings.

It includes:

- Window and door glazing
- Curtain wall systems
- Canopies

This AGP section is to be read in conjunction with APL Window Solutions branded sections.

1.1 RELATED WORK

Refer to 4521AC APL COMMERCIAL ALUMINIUM WINDOWS & DOORS for aluminium joinery

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
PA	Polyamide
PE	Polyethylene
PP	Polypropylene
PVB	Polyvinyl butyral
SLS	Serviceability limit state
ULS	Ultimate limit state
uPVC	Unplasticised polyvinyl chloride

Documents

1.3 DOCUMENTS

Energy efficiency for buildings greater than 300m²Refer 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 B2/AS1	Durability provisions for building elements
NZBC F2/AS1	Hazardous building materials
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 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 4667	Quality requirements for cut and processed glass
BPS	Building Product Specifications

1.4 MANUFACTURER/SUPPLIER DOCUMENTS

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

- Product notes and manufacturing limitations

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- Care and maintenance of your AGP glass
- Condensation guide
- AGP Glass handling, storage & transportation guide
- Guide to visual quality of commercial glass and insulating glass units (IGUs)
- Insulating glass unit (IGU) warranty

Manufacturer/supplier contact details

Company:	Architectural Glass Products Ltd
Trading as:	AGP
Web:	www.agpl.co.nz
Email:	technical@agpl.co.nz
Telephone:	07 849 8880

Warranties

1.5 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

12 years	For IGU
12 years	For float glass
12 years	For toughened glass
12 years	For laminated glass

- 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 supply.

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 SAMPLES

Refer to the general section 1270 CONSTRUCTION for details of how samples will be reviewed and how instructions to proceed will be given. Provide the following samples for review:

	Sample A
Sample description:	AGP Solux Ultra® + Low-Iron
Sample type:	Portable sample for review
Number:	2 control samples
Location:	Off site
Supporting documentation:	Performance datasheet
Reviewer:	Architect and design team
Time for review:	10 days after receipt
Review criteria:	Appearance, colour rendering, clarity, colour, reflection, transmission

1.9 INFORMATION FOR OPERATION AND MAINTENANCE

Refer to the general section 1239 OPERATION & MAINTENANCE for provision of the following general operation and maintenance information as electronic PDF format documents:

- Care and maintenance of your AGP glass
- Condensation guide

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Provide this information prior to practical completion.

Compliance information

1.10 INFORMATION REQUIRED FOR CODE COMPLIANCE

Provide the following compliance documentation: -

- Applicator approval certificate from the manufacturer / importer / distributor
- Manufacturer / supplier warranty
- Installer / applicator warranty
- Producer Statement - Construction from the applicator / installer
- Other information required by the BCA in the Building Consent Approval documents.

Performance

1.11 THERMAL STRESS ANALYSIS

For non-heat treated glass, obtain a thermal stress analysis for tinted, reflective and other solar control vision glass including IGU's for review before placing final order.

1.12 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.

Performance - Wind (design by contractor)

1.13 DESIGN PARAMETERS WIND - DESIGN BY CONTRACTOR

Design the installation to the manufacturer requirements and as appropriate for the project wind design parameters. Refer to SELECTIONS.

2 PRODUCTS

Materials, windows and doors

2.1 CLEAR FLOAT GLASS

Clear ordinary transparent float glass for general window/door glazing application. Thickness to NZS 4223.1, NZS 4223.Supp1, NZS 4223.3 and NZS 4223.4.

2.2 LAMINATED GLASS

Grade A safety glass to AS/NZS 2208 with PVB interlayer.

2.3 TOUGHENED GLASS

Grade A safety glass to NZBC F2/AS1 and AS/NZS 2208.
Heat soaked toughened glass to NZS 4223.1, Appendix E for critical areas.
Refer to SELECTIONS.

2.4 REFLECTIVE AND COATED FLOAT GLASS

Coated float glass incorporating both solar and thermal insulation properties, or coated float glass with thermal insulation properties only.

2.5 INSULATING GLASS UNITS (IGU'S)

To the performance requirements of NZS 4223.2.
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 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

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Components, aluminium and uPVC glazing

2.6 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 manufacturer's requirements.

2.7 SETTING BLOCKS

APL Window and Door Systems setting blocks consisting of PE, PP or PA material selected to suit the frame and panel 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. Interface between external glazing and other elements to be wind and watertight on completion.

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 PRE-INSTALLATION REQUIREMENTS

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

3.5 GLASS CONDITION

All glass to have undamaged edges and surfaces in accordance with AS/NZS 4667.

3.6 GLASS THICKNESS

Whether stated in a glazing schedule or not, confirm glass thicknesses to NZS 4223.1, NZS 4223.3, NZS 4223.4. 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.

3.7 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

3.8 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.

3.9 SAFETY GLAZING MATERIAL

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

3.10 CONTAINMENT

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

Assembly

3.11 WORKING OF GLASS

All working of glass as required in NZS 4223.1.

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3.12 EDGE WORK

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

Installation/application

3.13 STANDARDS AND TOLERANCES

Refer to the general section 1270 CONSTRUCTION for general requirements.
Refer to AS/NZS 4667 and NZS 4223.1 for glass and glazing.

3.14 INSTALL SAFETY GLASS

To NZS 4223.3.

3.15 INSTALLING INSULATING GLASS UNITS

Refer to the APL branded window manufacturer's requirements, and before glazing, ensure that the materials forming the opening are strong enough to accept the weight, the rebates are the correct size and prepared to receive the units to the manufacturer's requirements. Fit setting and location blocks and bead glaze units using a compatible sealant.

3.16 INSTALLING REFLECTIVE AND COATED GLASS

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

Application aluminium

3.17 INSTALL GLASS TO ALUMINIUM 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, Partly Framed Glass Assemblies.

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.

3.19 MANIFESTATIONS

To NZS 4223.3, 2.2 Manifestation (making glass visible).

Completion & Commissioning

3.20 COMPLETION MATTERS

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

3.21 COMPLETION - TESTS & CERTIFICATION

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

4 SELECTIONS

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

Performance - wind

4.1 WIND ZONE - NON-SPECIFIC DESIGN

Refer to general section 1220 PROJECT for design wind pressures.

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Glass by type

4.2 AGP LOW-IRON FLOAT GLASS

Location:	All IGUs
Brand:	AGP
Type:	Low-Iron float glass
Thickness:	4mm minimum, actual thickness as required by NZS 4223.1, NZS 4223.3 and NZS 4223.4

4.3 AGP TOUGHENED GLASS

Location:	Where safety glass is required by NZS 4223.3
Brand:	AGP
Type:	Toughened safety glass
Thickness:	4mm minimum, actual thickness as required by NZS 4223.1, NZS 4223.3 and NZS 4223.4

4.4 AGP SOLUX ULTRA® - HIGH-PERFORMANCE LOW E THERMAL AND SOLAR CONTROL IGU

Location:	All IGUs
Brand/type:	AGP SOLUX ULTRA®
Outer glass type:	Low-E glass
Coated surface:	#2
Outer glass thickness:	4mm minimum, actual thickness as required by NZS 4223.1, NZS 4223.3 and NZS 4223.4
Spacer width:	15mm nominal and ideal, 12mm minimum, 20mm maximum
Spacer type:	ATS-Architectural Thermal Spacer®
Space gas:	Argon
Inner glass type:	Low-Iron float glass
Inner glass thickness:	4mm minimum, actual thickness as required by NZS 4223.1, NZS 4223.3 and NZS 4223.4

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4711AG AUTEX GREENSTUF® THERMAL INSULATION

1 GENERAL

This section relates to Autex Industries Limited GreenStuf® polyester fibre insulation installed, laid, hung or fitted as thermal insulation.

1.1 RELATED WORK

Refer to ~ for ~

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:

BIB	Building Insulation Blanket
GSM	Grams per square metre

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 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 3000	Electrical installations (Known as the Australian/New Zealand Wiring Rules)
NZS 4246	Energy efficiency - Installing bulk thermal insulation in residential buildings
AS/NZS 4534	Zinc and zinc/aluminium-alloy coatings on steel wire
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
AS/NZS ISO 9001	Quality management systems - requirements
ISO 9705	Fire Tests: Full scale room test for surface products

1.4 MANUFACTURER/SUPPLIER DOCUMENTS

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

Data Sheet	GreenStuf® Thermal Wall Insulation
Data Sheet	GreenStuf® Thermal Ceiling Insulation
Data Sheet	GreenStuf® Thermal Underfloor
Data Sheet	GreenStuf® Building Insulation Blanket (BIB)
Data Sheet	GreenStuf® Masonry Wall Blanket
Data Sheet	GreenStuf® Car Park and Acoustic Soffit Liner (ASL)
Installation Instructions	GreenStuf® Thermal Ceiling and Wall Insulation
Installation Instructions	GreenStuf® Car Park and Acoustic Soffit Liner (ASL)
Installation Instructions	GreenStuf® Thermal Underfloor

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Installation Instructions	GreenStuf® Masonry Wall Blanket

GreenStuf® BPIR
GreenStuf® Material Safety Data Sheet
GreenStuf® Insulation Residential Guide
GreenStuf® Certificate of Warranty
BRANZ Appraisal 380 (2021) - GreenStuf® Insulation - Amended 4 August 2025
BRANZ Appraisal 734 (2021) - GreenStuf® Underfloor Insulation - Amended 19 August 2024
BRANZ Fire Assessment Report FAR 4045 - Assessment Report on Autex GreenStuf® with Variations to Tested Product
Buy NZ Made Campaign Ltd - Certificate of Licence No. 705337

Manufacturer/supplier contact details

Company:	Autex Industries Limited
Web:	www.greenstuf.co.nz
Email:	enquiries@greenstuf.co.nz
Telephone:	0800 428 839

Warranties

1.5 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

50 years	For polyester thermal insulation material

- 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.

1.6 WARRANTY - INSTALLER/APPLICATOR

Provide an installer/applicator warranty:

1 year	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 GENERAL

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.

Compliance Information

1.9 COMPLIANCE - BRANZ APPRAISAL 380

Autex GreenStuf® Insulation has been appraised as meeting provisions of the NZBC when used within the Conditions and Limitations of its BRANZ Appraisal 380.

1.10 COMPLIANCE - BRANZ APPRAISAL 734

Autex GreenStuf® Underfloor Insulation has been appraised as meeting provisions of the NZBC when used within the Conditions and Limitations of its BRANZ Appraisal 734.

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Performance

1.11 FIRE GROUP NUMBERS

The Group Number Classification to NZBC C/AS2, Table 4.12.1.1: Maximum permitted Group Number for internal surface finishes, has been determined in accordance with BPS, 8.5.1 Group Numbers, following testing and data reduction to ISO 9705.

Product	Group number
GreenStuf®, all variations up to 4,800GSM Refer to BRANZ Fire Assessment Report FAR 4045	1-S

2 PRODUCTS

Materials

2.1 GREENSTUF® THERMAL INSULATION

100% polyester fibres thermally bonded in pad, roll and blanket forms to AS/NZS 4859.1. Manufactured in NZ under AS/NZS ISO 9001 and ISO 14001 quality and environmental management systems. Compliant with AS/NZS 60695.11.5, 30s needle flame test. Refer to SELECTIONS.

Components

2.2 WIRE NETTING

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

2.3 PLASTIC STRAPPING TAPES

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

2.4 STAPLES

Stainless steel gauge and length to suit application and to 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.

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 the location and framing are free from moisture, cavities are not interconnected and required wire netting, underlays and vapour barriers are in place.

Check all wall and roof underlays are dry, clean, bright, undamaged and free of debris.

Check foils are dry, clean, bright, undamaged and free of debris.

Check vapour barriers form a homogeneous sheet.

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Waste Management - Takeback Programme

3.4 TAKEBACK PROGRAMME - GREENSTUF® RECYCLING

Clean working area prior to commencing installation of GreenStuf® insulation. Place clean GreenStuf® insulation off-cuts and clean GreenStuf® bale bags in separate large clean GreenStuf® bale bags. Store full bags separate from general construction waste.

Return full bags of GreenStuf® insulation off-cuts and bale bags for recycling to:

- 22 - 24 Miami Parade, Onehunga, Auckland 1061
- Report to office upstairs on arrival
- Contact number: 021 820 247

Installation/application

3.5 STANDARDS AND TOLERANCES

Refer to the general section 1270 CONSTRUCTION for general requirements.

3.6 LAY WIRE NETTING - UNDER JOISTS / PURLINS

Lay at right angles across the rafters/roof joists (under purlins). Pull tight and fix.

3.7 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 to prevent insulation bulge into vented cavity when fit where stud spaces are greater than 450mm.

3.8 CUTTING INSULATION TO SIZE

Tear insulation by hand or cut with an insulation saw/knife, sharp scissors, or with sharp wide-blade knife after compressing the insulation under a timber off-cut. Cut slightly oversized for snug friction fit.

3.9 INSTALL INSULATION - GENERAL

Lay, install, fit and fix insulation without gaps, tucks, folds and over compaction to NZBC H1/AS1 or AS2 and insulation manufacturer's requirements. For all housing and buildings up to 300m², install in accordance to NZS 4246 sections 5 Walls, 6 Ceilings & Roofs, 7 Underfloor - Suspended Framed Floors and 10 Concrete Slab-on-Ground Insulation, for residential light timber or steel framed buildings. Allow insulation to re-loft/relax prior to installation. Maintain full insulation thickness throughout installation. Do not cover vents and cut around metal flues to the safety requirement of the fireplace manufacturer. Lift up electrical wires, lighting transformers/controllers and lay the insulation underneath.

3.10 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.

3.11 FIT THERMAL INSULATION

Friction fit GreenStuf® insulation between framing member (i.e. wall studs, rafters/trusses or midfloor joists) to completely fill the whole of the cavities. Tear or cut to smaller pieces for smaller spaces and around penetrations. Fix in place with plastic strapping tape to hold the insulation until the wall and/or ceiling linings are in place.

Refer to GreenStuf® Thermal Ceiling and Wall installation instructions.

Completion

3.12 COMPLETION MATTERS

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

4 SELECTIONS

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

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4.1 GREENSTUF® THERMAL WALL INSULATION

Location:	Timber-framed walls - refer drawings
Supplier:	Autex Industries Ltd
Brand:	GreenStuf® Thermal Insulation
Material:	Polyester Fibre
R-Value:	3.4
Thickness:	140mm
Product weight:	2,550gsm
Density:	18.2kg/m2
Format:	roll

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4711OI OUTRIGHT ENERTHERM PIR INSULATION

1 GENERAL

This section relates to the supply and installation of **Outright Continuous Insulation** IKO Enertherm PIR continuous thermal insulation for pitched warm roofs, exterior wall applications, behind external wall linings and basement areas.
It includes:

- IKO Enertherm PIR Insulation Boards
- and associated componentry necessary to complete the installation.

1.1 RELATED WORK

Refer to ~ for ~

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 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 (Known as the Australian/New Zealand Wiring Rules)
NZS 4246	Energy efficiency - Installing bulk thermal insulation in residential building
AS/NZS 4859.1	Thermal insulation materials for buildings - General criteria and technical provisions

1.3 MANUFACTURER/SUPPLIER DOCUMENTS

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

IKO Enertherm Product Literature on Outright Continuous Insulation website

Manufacturer/supplier contact details

Company:	**Outright Continuous Insulation**
Web:	www.outright.co.nz
Email:	info@outright.co.nz
Telephone:	09 579 2046

Warranties

1.4 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

15 years	For IKO Enertherm

- 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

1.5 QUALIFICATIONS GENERAL

Refer to 1270 CONSTRUCTION for requirements relating to qualifications.

1.6 NO SUBSTITUTIONS

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

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Performance

1.7 SURFACE FIRE PROPERTIES FOR LININGS

Group Number to NZBC C/AS2, Table 4.12.1.1: Maximum permitted Group Number for internal surface finishes. Refer to SELECTIONS.

2 PRODUCTS

Materials

2.1 IKO ENERTHERM ALU - INSULATION BOARD FOR WALLS & ROOFS

IKO Enertherm ALU Board, a high performance, fibre-free rigid PIR insulation, faced on both sides with a low emissivity composite foil bonded to the insulation during manufacture. Designed to provide continuous thermal insulation to floors, pitched roofs, concrete, concrete block, timber and steel framed walls, and engineered timber (CLT) structures.

Supplied in a straight edge board, 2270mm x 1200mm or 2400mm x 1200mm and available in a range of thicknesses and R values. Refer to SELECTIONS for options.

Components

2.2 FASTENERS - GENERALLY

Fasteners to suit the particular application in accordance with Outright installation instructions.

2.3 TAPE

IKO Foil Tape, aluminium foil tape, minimum of 48mm and 96mm wide.

2.4 EXPANDING FOAM

IKO Expanding foam, compatible with IKO Enertherm ALU boards.

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 - generally

3.3 INSTALL INSULATION - GENERAL

Lay, install, fit and fix insulation without gaps, tucks, folds and over compaction to NZBC H1/AS1 or AS2 and insulation manufacturer's requirements. For all housing and buildings up to 300m 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. Do not cover vents. Lift up electrical wires, lighting transformers/controllers and lay the insulation underneath.

3.4 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.

3.5 PIPES AND PLUMBING

Cut holes in the IKO Enertherm board with a sharp knife and notch around obstacles such as pipes and plumbing.

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3.6 ELECTRICAL CABLES

Fit IKO Enertherm Board behind or in front of electrical wiring and plumbing. Ensure there are no gaps or undesirable compression at edges.

Use extreme caution when working around electrical cables.

3.7 CHECK FOILS

Ensure foils are dry, clean, bright, undamaged and free of debris before being covered.

3.8 CHECK WALL AND ROOF UNDERLAYS

Ensure these are dry, clean, undamaged and free of debris before being covered.

3.9 CHECK VAPOUR BARRIERS

Ensure these form one homogeneous sheet vapour barrier and remain as such throughout the ensuing construction process.

3.10 INSULATION BOARD - CUTTING

Cut IKO Enertherm Board by using a fine-toothed saw or by scoring with a sharp knife, snapping the board over a straight edge and then cutting the facing on the other side. Ensure joints are close-butted to maintain continuity of insulation.

Installation - IKO Enertherm ALU board, with weatherboard cladding, fibre cement sheet cladding, metal profile cladding or similar lightweight cladding styles

3.11 INSTALL INSULATION - STEEL & TIMBER FRAMED WALL OR STRUCTURE, EXTERNAL SIDE OF FRAME

Install IKO Enertherm ALU Board to steel, timber framed or engineered timber (CLT) walls to Outright installation instructions and as follows:

- After wall underlay or RAB board has been installed, fix IKO Enertherm ALU Board to external face of frame or engineered timber (CLT) with vertical or horizontal joints to coincide with structure where appropriate
- Slot boards together to provide a continuous insulation layer and air barrier.
- Install a maximum of three IKO Fix fixing per sheet to hold boards in place temporarily.
- Use expanding foam to full all gaps between the boards, or between the boards and the structure so a complete air barrier is created.

3.12 INSTALL INSULATION - CONCRETE OR CONCRETE BLOCK WALL, EXTERNAL SIDE

Install IKO Enertherm ALU Board to concrete or concrete block walls to Outright installation instructions and as follows:

- Fix IKO Enertherm ALU Board to external face of wall
- Slot boards together to provide a continuous insulation layer and air barrier.
- Install a maximum of three IKO Fix fixing per sheet to hold boards in place temporarily.
- Use expanding foam to full all gaps between the boards, or between the boards and the structure so a complete air barrier is created.

3.13 APPLY TAPE TO INSULATION BOARD

Tape all board joints with a minimum 48mm wide foil tape.

- Remove dust, dirt or oil and clean surface of board with a dry cloth before applying tape.
- Remove liner on tape 500mm at a time and press adhesive firmly on to the insulation. Do not stretch tape.
- Ensure tape is applied over the centre of the join so that there is adequate area on both sides of the joint.
- Wipe tape firmly from the centre out (like wallpaper) with a plastic squeegee. The more pressure applied, the greater the bond surface.
- Cut and fit tape with a knife and scissors. Repeat wiping instructions as above.

3.14 INSTALL CLADDING AND CLADDING BATTENS

Install cladding as follows:

- Install cladding on H3.1 structural timber battens or metal batten system fixed vertically or horizontally to the structure beyond through the insulation board.
- Fix external cladding to secondary support battens to the appropriate cladding section(s) specification.



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Installation - IKO Enertherm ALU board, with brick veneer or stone cladding

3.15 INSTALL INSULATION BOARD - BRICK / STONE VENEER WALL TO STEEL & TIMBER FRAMED WALL, EXTERNAL SIDE OF FRAME

Install IKO Enertherm ALU Board to brick or stone veneer wall to Outright installation instructions and as follows:

- After wall underlay or RAB board has been installed, fix IKO Enertherm ALU Board to external face of steel or timber frame or engineered (CLT) structure with vertical or horizontal joints to coincide with studs, where appropriate.
- Slot boards together to provide a continuous insulation layer and air barrier.
- Install a maximum of three IKO Fix fixing per sheet to hold boards in place temporarily.
- Use expanding foam to full all gaps between the boards, or between the boards and the structure so a complete air barrier is created.

3.16 INSTALL INSULATION - BRICK / STONE VENEER TO CONCRETE OR CONCRETE BLOCK WALL, EXTERNAL SIDE

Install IKO Enertherm ALU Board to concrete or concrete block walls with brick / stone veneer to Outright installation instructions and as follows:

- Fix IKO Enertherm ALU Board to external face of wall
- Slot boards together to provide a continuous insulation layer and air barrier.
- Install a maximum of three IKO Fix fixing per sheet to hold boards in place temporarily.
- Use expanding foam to full all gaps between the boards, or between the boards and the structure so a complete air barrier is created.

3.17 APPLY TAPE TO INSULATION BOARD

Tape all board joints with a minimum 96mm wide foil tape.

- Remove dust, dirt or oil and clean surface of board with a dry cloth before applying tape.
- Remove liner on tape 500mm at a time and press adhesive firmly on to the insulation. Do not stretch tape.
- Ensure tape is applied over the centre of the join so that there is adequate area on both sides of the joint.
- Wipe tape firmly from the centre out (like wallpaper) with a plastic squeegee. The more pressure applied, the greater the bond surface.
- Cut and fit tape with a knife and scissors. Repeat wiping instructions as above.

3.18 INSTALL CLADDING - BRICK / STONE VENEER WALL

Install brick veneer as follows:

- Screw fix brick / stone veneer ties, through the insulation board, to wall framing to support external wall.
- Construct brick / stone veneer wall to the appropriate masonry / stone veneer section(s) specification.

Installation - IKO Enertherm ALU board, warm pitched roofs

3.19 INSTALL INSULATION BOARD – WARM PITCHED ROOF, EXTERNAL SIDE OF ROOF STRUCTURE

Install IKO Enertherm ALU Board to warm pitched roof to Outright installation instructions and as follows:

- Rafter spacing to be maximum of 600mm centres.
- After roof metal underlay or plywood diaphragm has been installed, fix IKO Enertherm ALU Board to external face of rafter or engineered timber (CLT) structure with vertical joints to coincide with studs, where appropriate.
- Slot boards together to provide a continuous insulation layer and air barrier.
- Install a maximum of three IKO Fix fixing per sheet to hold boards in place temporarily.
- Use expanding foam to full all gaps between the boards, or between the boards and the structure so a complete air barrier is created.
- Ensure straight edge board is selected.

3.20 APPLY TAPE TO INSULATION BOARD

Tape all board joints with a minimum 96mm wide foil tape.

- Remove dust, dirt or oil and clean surface of board with a dry cloth before applying tape.

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- Remove liner on tape 500mm at a time and press adhesive firmly on to the insulation. Do not stretch tape.
- Ensure tape is applied over the centre of the join so that there is adequate area on both sides of the joint.
- Wipe tape firmly from the centre out (like wallpaper) with a plastic squeegee. The more pressure applied, the greater the bond surface.
- Cut and fit tape with a knife and scissors. Repeat wiping instructions as above.

3.21 INSTALL ROOFING AND ROOFING BATTENS/PURLINS

Install roof material as follows:

- Screw fix roofing battens/purlins through the insulation board, to the rafters to support roofing material.
- Construct roof material to the appropriate metal roof section(s) specification or metal roof manufacturers code of practice, as appropriate.

Completion

3.22 COMPLETION MATTERS

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

4 SELECTIONS

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

Materials

4.1 OUTRIGHT CONTINUOUS INSULATION - IKO ENERTHERM ALU, STRAIGHT EDGE BOARD

Location:	Refer to drawings and details
Manufacturer:	IKO Enertherm
Supplier:	Outright Continuous Insulation
Brand/type:	IKO Enertherm ALU Board
Board size:	~
Construction type:	~
Thickness:	~
R value:	~

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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.

1.1 RELATED WORK

Refer to ~ for ~.

Documents

1.2 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)

1.3 MANUFACTURER'S DOCUMENTS

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

~

Copies of the above literature are available from ~

Web:	~
Email:	~
Telephone:	~
Facsimile:	~

Warranties

1.4 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.

1.5 WARRANTY - INSTALLER/APPLICATOR

Provide an installer/applicator warranty:

5 years	For installation

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

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.6 SUBMIT

Before commencing work submit the manufacturer's specifications for the specified sealant system, including the following:

- trade name

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- 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
- clean up solvents required
- primers required
- method of preparing surface
- method of application.

1.7 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.

1.8 SAMPLES

Refer to the general section 1270 CONSTRUCTION for details of how samples will be reviewed and how instructions to proceed will be given. Provide the following samples for review:

	Sample A	Sample B	Sample C
Sample description:	~	~	~
Sample type:	~	~	~
Number:	~	~	~
Location:	~	~	~
Supporting documentation:	~	~	~
Reviewer:	Contract administrator ~	Contract administrator ~	Contract administrator ~
Time for review:	10 working days ~	10 working days ~	10 working days ~
Review criteria:	~	~	~

1.9 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.

1.10 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.

1.11 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

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2 PRODUCTS

Materials

Accessories

2.1 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.

2.2 MASKING TAPE

Pressure sensitive, self adhesive crimped paper tape. Do not use masking-grease materials.

2.3 SURFACE PRIMER

As required by the sealant manufacturer for each surface substrate and particular applications. Primers to suit the various project conditions.

2.4 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.

2.5 BOND BREAKER TAPE

Pressure sensitive self adhesive polyethylene breaker tape. Masking tape or PVC insulation tape is not permitted.

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.



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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.

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.



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3.19 REMOVE

Remove masking tape, used packaging and waste products from the site.

4 SELECTIONS

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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.

1.1 RELATED WORK

Refer to ~ for ~.

Documents

1.2 DOCUMENTS

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

NZBC B2/AS1	Durability 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

1.3 QUALIFICATIONS

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

1.4 VERIFY DIMENSIONS

Verify dimensions against site measurements prior to fabrication.

Standards of performance

1.5 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.

1.6 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.

1.7 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.

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.

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.

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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 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

3.11 PROTECT

Protect new work from damage.

3.12 REPLACE

Replace all damaged or marked elements.

3.13 LEAVE

Leave work to the standard required for following procedures.

3.14 REMOVE

Remove debris, unused materials and elements from the site.

4 SELECTIONS

4.1 FLASHINGS

Type	Material and finish/colour - All flashings to the architect's approval.
General flashings:	Refer to drawings and details. All flashings to the architect's approval.
Window/doors:	
- Head:	~
- Sill:	~
Beam caps:	~
Cladding:	
- External corner:	~
- Internal corner:	~
Balustrade capping:	~
Garage door:	~
Meter box:	~
Chimney flue:	~
Soffit:	~
Wall/roof junctions:	~
Barge:	~
Apron:	~
Parapet capping:	~
Saddle:	~
Change of pitch:	~
Gutter apron:	~
Curved:	~
Roof penetrations:	~

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4911 STEEL METALWORK

1 GENERAL

This section relates to the fabrication and installation of steel items, including:

- support frames
- fabricated brackets
- stairs
- ladders
- balustrades
- screens
- shutters
- sheet steel items

1.1 RELATED WORK

Refer to ~ for ~

Documents

1.2 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.

1.3 MANUFACTURER DOCUMENTS

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

~

Copies of the above literature are available from
Company: ~

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Web: ~
Email: ~
Telephone: ~

Requirements

1.4 SAMPLES

Refer to the general section 1270 CONSTRUCTION for details of how samples will be reviewed and how instructions to proceed will be given. Provide the following samples for review:

	Sample A	Sample B	Sample C
Sample description:	~	~	~
Sample type:	~	~	~
Number:	~	~	~
Location:	~	~	~
Supporting documentation:	~	~	~
Reviewer:	Contract administrator ~	Contract administrator ~	Contract administrator ~
Time for review:	10 working days ~	10 working days ~	10 working days ~
Review criteria:	~	~	~

1.5 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.

1.6 HOT WORK - FIRE SAFETY

Refer to section 1270 CONSTRUCTION

1.7 SHOP DRAWINGS

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 GALVANIZED PIPE

Medium gauge galvanized steel pipe to NZS/BS 1387 with plain ends, or screwed and socketed joints as detailed, complete with galvanized and bolted couplings.

2.4 STEEL TUBES AND TUBULARS

To NZS/BS 1387.

2.5 STEEL FLAT

Hot-rolled sheet and/or strip to AS/NZS 1594.

2.6 UNPAINTED HOT-DIP ZINC-COATED STEEL

Hot-dip zinc-coated steel coil to AS 1397.

Zinc coating class: ZM 275

2.7 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

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2.8 HOT-DIP ALUMINIUM AND ZINC ALLOY COATED STEEL, UNPAINTED

Hot-dip aluminium and zinc alloy coated steel coil to AS 1397.

Coating class: AZ 150

2.9 PRE-FINISHED HOT-DIP ALUMINIUM AND ZINC ALLOY COATED STEEL

Hot-dip aluminium and zinc alloy coated steel coil to AS 1397, pre-treated, primed, top-finished and back-coated.

Coating class: AZ 150

Components

2.10 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.

2.11 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.

2.12 BOLTS

Similar composition and mechanical properties to the parent metal, selecting type and size to suit the work and its location.

2.13 RIVETS

Solid domed with similar composition and mechanical properties to the parent metal. Flat head mild steel to be galvanized.

2.14 TUBULAR RIVETS

Domed/countersunk head steel with composition and mechanical properties to suit the parent metal.

2.15 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.

2.16 CLIPS

Form clips to detail of the same metal as the metal sheet to be fixed/secured.

2.17 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

2.18 PRIMER

Alkyd oil zinc chromate priming paint.

2.19 EXTERNAL ORGANIC COATINGS

Polyester exterior grade coatings to BS 6497.

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 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.

3.13 RIVETED JOINTS

Draw riveted joints tightly together, with rivets closed to completely fill holes.

3.14 MECHANICAL JOINTS

Ensure mechanical joints are tight with no visible gaps.

3.15 MECHANICAL JOINTS, ELEMENTS

Bed in mastic all mechanical joints of elements which will be located externally, including all mating surfaces, cleats and other fixings.

3.16 MECHANICAL JOINTS, CLEATS

Unless specified otherwise connect cleats to frames with countersunk screws where they will be visible after the component has been fixed and where raised heads would interfere with any moving part.

Assembly - Welding

3.17 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.

3.18 ACCURACY

Ensure accurate fit using clamps and jigs where practical. Use tack welds for temporary attachment where jigging is not practical.

3.19 TACK WELDING

Use only for temporary attachment unless otherwise specified.

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3.20 WELDS

Make joints with parent and weld metal fully fused throughout with no inclusions, holes, porosity or cracks.

3.21 SPATTER

Prevent weld spatter falling on surfaces of materials which will be self finished and/or visible in completed work.

3.22 RESIDUES

Ensure complete removal of flux residues and slag.

3.23 BUTT WELDS

Finish butt welds which will be visible in completed work smooth and flush with adjacent surfaces.

3.24 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.

3.25 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.

3.26 WELDING THERMAL METAL SPRAY COATED STEEL

Where possible, welding to be carried out prior to thermal metal spraying. Where welding to be carried out after thermal spraying, the weld zone to be masked and not coated with thermal metal spray for approximately 100mm from the weld zone to AS/NZS 2312.3. Carry out standard weld.

Refer to 6782 METAL SPRAY CORROSION PROTECTION.

Application

3.27 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.

3.28 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

3.29 FABRICATE

Fabricate and assemble in a workshop wherever practicable.

3.30 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.

3.31 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.

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3.32 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).

3.33 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.

3.34 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.

3.35 JOINING HOT-DIP ZINC-COATED STEEL

Use self-secured seams, pop rivets, sealant strip, soldering and spot welding or a combination as best suits the form and location of the work.

3.36 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.

3.37 JOINING ALUMINIUM AND ZINC ALLOY COATED STEEL

Use self-secured seams, pop rivets, sealant strip, or a combination as best suits the form and location of the work.

3.38 JOINING PRE-FINISHED ALUMINIUM AND ZINC ALLOY COATED STEEL

Neutral cure silicone and rivets as best suits the form and location of the work and the supplier's stated requirements.

3.39 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.

3.40 LOADING

Ensure elements are fully supported unless designed to be self-supporting.

Finishing

3.41 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.

3.42 GALVANIZING

After fabrication clean surface and hot-dip galvanize to AS/NZS 4680 and AS/NZS 4792.

3.43 THERMAL METAL SPRAY

Refer to 6782 METAL SPRAY CORROSION PROTECTION for thermal metal spray.

3.44 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.

3.45 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.

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3.46 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.

3.47 APPLY COATINGS

Prepare surfaces and apply the coating system strictly in accordance with the coating manufacturer's technical information.

3.48 REPAIR 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.

3.49 REPAIR DAMAGED THERMAL SPRAY

Refer to 6782 METAL SPRAY CORROSION PROTECTION for repair to thermal metal spray.

Completion

3.50 COMPLETION MATTERS

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

4 SELECTIONS

Fabricated steel items

4.1 STEEL METALWORK BALUSTRADING

~

4.2 STEEL METALWORK HANDRAILS

~

4.3 STEEL METALWORK FABRICATED ELEMENTS

~

4.4 STEEL METALWORK SCREENS

~

4.5 STEEL METALWORK HARDWARE

~

Sheet steel items

4.6 UNPAINTED HOT-DIP ZINC-COATED STEEL

BMT: ~mm

4.7 PRE-FINISHED HOT-DIP ZINC-COATED STEEL

BMT: ~mm
Coating grade: ~
Colour: ~

4.8 HOT-DIP ALUMINIUM AND ZINC ALLOY COATED STEEL, UNPAINTED

BMT: ~mm

4.9 PRE-FINISHED HOT-DIP ALUMINIUM AND ZINC ALLOY COATED STEEL

BMT: ~mm
Coating grade: ~
Colour: ~

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Coatings

4.10 PRIMER

Brand/type: ~

4.11 EXTERNAL ORGANIC COATINGS

Location: ~
Brand: ~
Colour: ~
Gloss level: ~ %
Thickness: ~ microns

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7430 DRAINAGE

1 GENERAL

This section relates to the supply and laying of gravity foul water (sewage), stormwater and groundwater drainage.

1.1 DOCUMENTS

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

NZBC B1/AS1	Structure
NZBC E1/AS1	Surface water
NZBC E1/AS2	Surface water
NZBC E1/VM1	Surface water
NZBC G1/AS1	Personal hygiene
NZBC G13/AS1	Foul water - sanitary plumbing
NZBC G13/AS2	Foul water - drainage
NZBC G13/AS3	Foul water - sanitary plumbing and drainage
AS/NZS 1254	PVC-U pipes and fittings for Stormwater and Surface Water applications
AS/NZS 1260	PVC-U pipes and fittings for drain, waste and vent applications
AS/NZS 2032	Installation of PVC pipe systems
AS/NZS 2033	Installation of polyethylene pipe systems
AS 2439.1	Perforated Plastics Drainage and Effluent Pipes and Fittings - Perforated drainage pipe and associated fittings
AS/NZS 2566.1	Buried Flexible Pipelines - Structural Design
AS/NZS 2566.2	Buried Flexible Pipelines - Installation
AS/NZS 3500.3	Plumbing and drainage - Stormwater drainage
NZS 3104	Specification for concrete production
NZS 3111	Method of test for water and aggregate for concrete
AS/NZS 3500.2	Plumbing and drainage - sanitary plumbing and drainage
NZS 3604	Timber-framed buildings
NZS 4229	Concrete masonry buildings not requiring specific engineering design
NZS 4402 (set)	Method of testing soils for civil engineering purposes
AS/NZS 4671	Steel reinforcing materials
AS/NZS 5065	Polyethylene and polypropylene pipes and fittings for drainage and sewerage applications
NZCMM	NZ Concrete Masonry Manual section 6.1 Masonry Retaining Walls
NZTA F2	Specification for pipe subsoil drain construction

Plumbers, Gasfitters and Drainlayers Act 2006

1.2 MANUFACTURER'S DOCUMENTS

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

~

Copies of the above literature are available from ~

Web:	~
Email:	~
Telephone:	~
Facsimile:	~

1.3 AS BUILT DOCUMENTS

Supply a 1:100 scale as-built drawing of drains and fittings to the territorial authority and to the owner on completion.

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1.4 QUALIFICATIONS

Drainlayers to be experienced, competent and familiar with the materials and techniques specified. Carry out all work under the direct supervision of a certifying drainlayer under the Plumbers, Gasfitters and Drainlayers Act 2006.

2 PRODUCTS

2.1 CONCRETE

17.5 MPa prescribed mix to NZS 3104.

2.2 REINFORCEMENT

Plain round and/or deformed steel bars, Grade 300 to AS/NZS 4671.

Components

2.3 PVC-U PIPES

PVC-U pipes bends, junctions, fittings and joints to AS/NZS 1254 and AS/NZS 1260.

Underground PVC-U pipe to be classified as follows:

Classification:	Use:
SN4 - SN6	Domestic & light load areas
SN8 - SN10	Commercial & Industrial medium load areas
SN16	Public roads & high load areas

2.4 POLYETHYLENE PIPES

Polyethylene pipes and fittings to AS/NZS 5065.

2.5 PERFORATED PIPE - SUBSOIL DRAINAGE

Perforated corrugated coil high density polyethylene subsoil drainage pipe to AS 2439.1 with polypropylene filter sock over, for groundwater drainage.

2.6 GULLY TRAPS - NZBC G13/AS2

To NZBC G13/AS2: 3.3 Gully traps, complete with grating.

2.7 GULLY TRAPS - AS/NZS 3500.2

Gully traps complete with grating to AS/NZS 3500.2, 4.6 Gullies, as modified by NZBC G13/AS3.

2.8 INSPECTION COVERS

Cast iron frame with screw-down cover.

Foul water

2.9 TRENCH BACKFILLING MATERIAL, FOUL WATER - NZBC G13/AS2

Bedding and backfilling material to NZBC G13/AS2, 2.0 Materials, for methods shown in NZBC G13/AS2, figure 7, Bedding and backfilling.

2.10 TRENCH BACKFILLING MATERIAL, FOUL WATER - AS/NZS 3500.2

Bedding and backfilling material to AS/NZS 3500.2, 5.4, Bedding of drains, and for concrete, if required, AS/NZS 3500.2, 5.3 Concrete Support.

Subsoil

2.11 DRAINAGE MATERIAL - SUBSOIL DRAINAGE

Free draining crushed stone, 7 mm to 20 mm in size.

Concrete masonry retaining walls

2.12 DRAINAGE MATERIAL - SIMPLE STANDALONE CONCRETE MASONRY RETAINING WALLS

Free draining imported hardfill to the NZTA F2 specification.

Filter material comprised of clean, durable stone having a crushing resistance of not less than 100 kN when tested in accordance with NZS 3111, or a mixture of such material with clean hard sand. The filter material when tested in accordance with NZS 4402, shall comply with the following gradings:

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TEST SIEVE APERTURE	PERCENTAGE PASSING
26.5mm	100
13.2mm	85-100
9.5mm	80-95
4.75mm	65-85
2.36mm	50-70
1.18mm	35-55
600µm	18-40
300µm	3-25
150µm	8 maximum
75µm	0

Accessories

2.13 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.

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3 EXECUTION

3.1 EXCAVATE

Excavate for drains to a firm even base with correct gradients set in straight runs.
Trenches running parallel, below and close to foundations of buildings to NZS 3604 or NZS 4229 to be separated to:

- NZBC E1/AS1, 3.9.7, Proximity of Trench to Building, for stormwater and subsoil drains.
- AS/NZS 3500.3, 6.2.8, Installation near and under buildings, as modified by NZBC E1/AS2.
- NZBC G13/AS2, 5.6, Proximity of Trench to Building, for foul water drains.

3.2 MANUFACTURER'S REQUIREMENTS

All drainage installations to the pipe and fitting manufacturer's requirements.

3.3 FOUL WATER DRAINAGE GENERALLY - NZBC G13/AS2

Carry out foul water drainage work to NZBC G13/AS2 and NZBC G1/AS1 and complete all tests to NZBC G13/AS1, 7.1 Test Methods.
Lay uPVC pipe systems to relevant sections of AS/NZS 2032. Lay polyethylene pipes and fittings to relevant sections of AS/NZS 2033.

3.4 FOUL WATER DRAINAGE GENERALLY - AS/NZS 3500.2

Carry out this work to AS/NZS 3500.2 and complete all tests to AS/NZS 3500.2, section 15 Testing of Sanitary Plumbing and Sanitary Drainage Installations.
Lay uPVC pipe systems to relevant sections of AS/NZS 2032. Lay polyethylene pipes and fittings to relevant sections of AS/NZS 2033.

3.5 LAY FOUL WATER DRAINS

Lay drains in straight runs to correct gradients, to discharge into the network utility operator's sewer. Set inspection fittings on a concrete base.

3.6 CONSTRUCT GULLY TRAPS - NZBC G13/AS2

Set in a minimum 75mm thick concrete with top surround 25mm above paving and 75mm above other surfaces, to NZBC G13/AS2, 3.3 Gully traps.

3.7 INSTALL FOUL WATER INSPECTION CHAMBERS - NZBC G13/AS2

Construct as detailed on a poured concrete footing to NZBC G13/AS2, 5.7 Access points. Provide all necessary haunching to channels. Fit a cast iron cover and frame.

3.8 INSTALL FOUL WATER INSPECTION CHAMBERS - AS/NZS 3500.2

Construct as detailed on a poured concrete footing to AS/NZS 3500.2, 4.7 Inspection openings and 4.8 Inspection chambers, as modified by NZBC G13/AS3. Provide all necessary haunching to channels. Fit a cast iron cover and frame.

3.9 SOAKHOLES OR TRENCHES

Dispose of stormwater on site as shown on the drawings, by soakage, to suit local geology and soil structure; all as directed by the territorial authority.

3.10 TESTING - FOUL WATER

Confirm timing before carrying out any tests. Supply potable water and apparatus needed.
Test to NZBC G13/AS1, 7.1 Test Methods or AS/NZS 3500.2, section 15 Testing of Sanitary Plumbing and Sanitary Drainage Installations, as required. Carry out and record a visual inspection that each joint showed no evidence of leaks.

Backfilling and encasement - Foul water and surface water

3.11 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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3.12 TRENCH BACKFILLING GENERALLY - FOUL WATER

Granular bedding and selected fill shall be placed in layers no greater than 100 mm loose thickness and compacted. Base bedding (beneath the pipe) shall be placed and compacted before pipes are laid. Up to 300mm above the pipe, compaction shall be by tamping by hand tool over the entire surface of each layer to produce a compact layer without obvious voids, without disturbing or distorting the drain. Run marker tape along line of the pipe on top of the bedding.

Up to 300mm above the pipe, compaction shall be by tamping by hand using a rod with a pad foot (having an area of 75 ± 25 mm by 75 ± 25 mm) over the entire surface of each layer to produce a compact layer without obvious voids, without disturbing the drains.

More than 300 mm above the pipe, compaction shall be by at least four passes of a mechanical tamping foot compactor (whacker type) with a minimum weight of 75 kg. For plastic based pipes, ensure care taken to avoid impact loading of the pipe.

3.13 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.

PVC-U pipe to AS/NZS 2032 and polyethylene pipes to AS/NZS 2033.

3.14 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.

PVC-U pipe to AS/NZS 2032 and polyethylene pipes to AS/NZS 2033.

Subsoil ground water drainage

3.15 FILTER FABRIC TO DRAINAGE MATERIAL - SUBSOIL DRAINAGE

Where details require drainage material to be encapsulated in filter fabric to prevent fines from blocking the aggregate. Place fabric and carefully hold in place by pinning and/or by controlled use of aggregate as ballast. After drain installation and required backfilling, complete encapsulation with fabric. Ensure filter fabric is correctly placed, sufficiently overlapped and pinned and/or secured.

3.16 LAY PERFORATED PIPING - SUBSOIL DRAINAGE

Lay perforated groundwater drainage piping with filter sock, firmly on a bed of drainage material screeded to the required gradient. Lay in straight runs to discharge into surface water drainage system. The pipe must not excessively elongate during installation. Carry drainage material up and over the pipes without disturbing them. Extend the high end of all lines up to the surface in capped, solid pipe to provide for flushing out.

3.17 LAY PERFORATED PIPING TO BASEMENT WALLS - SUBSOIL DRAINAGE

Ensure any required waterproofing and protection sheets are in place before starting work.

Lay perforated groundwater drainage piping with filter sock, firmly on a bed of drainage material screeded to the required gradient. The pipe must not excessively elongate during installation. Lay in straight runs to 1:150 gradients with invert of the highest horizontal point 50 mm minimum below floor slab level, discharging into surface water drainage system. Carry drainage material up and over the pipes without disturbing them. Fill with drainage material to full height of wall. Carry the high end of all lines up to the surface in capped, solid pipe to provide for flushing out.

3.18 LAY PERFORATED PIPING TO RETAINING WALLS - SUBSOIL DRAINAGE

Lay perforated groundwater drainage piping with filter sock, firmly on a bed of drainage metal comprising of filter material to the NZTA F2 specification. Pipe bedding not less than 75mm deep. Backfill not less than 300mm deep. The pipe must not excessively elongate during installation. Lay in straight runs to correct gradients , discharging into surface water drainage system. Carry drainage material up and over the pipes without disturbing them. Place granular fill in layers not exceeding 150 mm thick loose depth, to full height of wall, with an allowance for the thickness of the surface finish. Compact to provide support of not less than that of the adjacent material. Where geocomposite drain is used, the backfill shall follow the manufacturer's recommendations. Carry the high end of all lines up to the surface in capped, solid pipe to provide for flushing out.

3.19 CLEAN OUT SUBSOIL DRAIN INSTALLATION

Clean and flush out the whole subsoil drain installation and remove silt and debris before handing over.

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4 SELECTIONS

4.1 REFER - HYDRAULIC / GEOTECHNICAL / CIVIL/ STUCTURAL ENGINEERS DOCUMENTATION

Subsoil drainage material, perforated piping, filter fabric, extent and location all to be confirmed in consultation with hydraulic / geotechnical / civil/ structural engineers documentation.

4.2 CERAMIC PIPES

Type/size: ~

4.3 PVC-U PIPES

Brand/type: ~

4.4 POLYETHYLENE PIPES

Brand/type: ~

4.5 PERFORATED DRAINAGE PIPING - SUBSOIL DRAINAGE

Pipe brand/type: ~
Diameter: DN 160mm
Sock brand/type: ~

4.6 DRAINAGE MATERIAL - SUBSOIL DRAINAGE

Location: ~
Type: ~

4.7 FILTER FABRIC

Brand: ~
Type: ~



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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

1.3 MANUFACTURER'S DOCUMENTS

Documents referred to in this and the above sections are:

~

Copies of the above literature are available from ~

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

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.

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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
1.18mm	35-55
600µm	18-40
300µm	3-25
150µm	8 maximum
75µm	0

2.5 TRENCH BACKFILLING MATERIAL

Free draining crushed stone, 7mm to 20mm in size.

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

Lay perforated groundwater drainage piping with filter sock, firmly on a bed of drainage material screeded to the required gradient. Lay in straight runs to discharge into surface water drainage system. The pipe must not excessively elongate during installation. Carry drainage material up and over the pipes without disturbing them. Extend the high end of all lines up to the surface in capped, solid pipe to provide for flushing out.

3.7 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.

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3.8 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.

3.9 BACKFILLING

Complete backfilling with drainage material.

3.10 CLEAN OUT PIPING INSTALLATION

Clean and flush out the whole piping installation and remove silt and debris before handing over.

4 SELECTIONS

4.1 REFER - HYDRAULIC / GEOTECHNICAL / CIVIL/ STUCTURAL ENGINEERS DOCUMENTATION

Subsoil drainage material, perforated piping, filter fabric, extent and location all to be confirmed in consultation with hydraulic / geotechnical / civil/ structural engineers documentation.

4.2 PERFORATED DRAINAGE PIPING

Pipe brand/type: ~
Diameter: DN 160mm
Sock brand/type: ~

4.3 DRAINAGE MATERIAL

Location: ~
Type: ~

4.4 TRENCH BACKFILLING MATERIAL

Location: ~
Type: ~

4.5 FILTER FABRIC

Brand: ~
Type: ~

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7451A ACO SURFACE DRAINAGE SYSTEMS

1 GENERAL

This section relates to **ACO Exterior Surface Drainage Systems** including PointDrains (surface water sumps), linear drainage, grates and accessories for:

- Residential applications
- Light to medium duty commercial applications
- Heavy duty commercial and industrial applications
- Restricted depth applications
- Discrete drainage applications

1.1 RELATED WORK

Refer to 7431 DRAINAGE COMMON REQUIREMENTS for general matters

Refer to 7441 GROUNDWATER DRAINAGE for sub-soil 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 E2/AS1	External moisture provisions for timber-framed buildings up to 10 m in height
AS 1428.2	Design for Access and Mobility - Enhanced and additional requirements - Buildings and facilities
NZS 3104	Specification for concrete production
AS 3996	Access covers and grates
AS/NZS 3500.3	Plumbing and drainage - Stormwater drainage
DIN V 19580	Drainage channels for vehicular and pedestrian areas - Weathering resistance, mass per unit area and third party control
DIN EN 1433	Drainage channels for vehicular and pedestrian areas - Classification, design and testing requirements, marking and evaluation of conformity

Plumbers, Gasfitters and Drainlayers Act 2006

1.3 MANUFACTURER'S DOCUMENTS

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

ACO Limited – Catalogue and Technical Handbook
ACO Limited – Installation Drawings
ACO Limited – SPEC INFO

Copies of the above literature are available from:

Company:	ACO Limited
Web:	www.aconz.co.nz
Email:	info@aconz.co.nz
Telephone:	0800 448 080

Warranties

1.4 WARRANTY

Provide warranty for:

6 months	For defects arising from faulty materials or workmanship

- 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.

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Requirements

1.5 QUALIFICATIONS WORKERS – LICENSED UNDER STATUTE

Workers and supervisors to be appropriately qualified to applicable legislative requirements. 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.

Refer to 1270 CONSTRUCTION for additional requirements relating to qualifications.

1.6 NO SUBSTITUTIONS

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

1.7 ACO LIMITED SPECIFIC DESIGN DOCUMENTS

Refer to SELECTIONS for project specific design documentation by ACO Limited.

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.

Performance

1.9 TECHNICAL APPLICATION

Refer to ACO Limited for technical support for drainage hydraulics, grate performance hydraulics, ponding analysis, run layout and scheduling.

1.10 COMPLIANCE WITH NZ BUILDING CODE

All work to comply with:

- NZBC E1/AS1: Surface Water, 3.0 Drainage System Materials and Construction
- AS/NZS 3500.3 as modified by NZBC E1/AS2
- NZBC E2/AS1, 7.4 Level thresholds, and paragraph 7.4.2.2.

2 PRODUCTS

Materials - Linear Drainage

2.1 ACO KLASSIKDRAIN K100, K200, K300

ACO KlassikDrain, polyester resin polymer concrete V-profile interlocking channel system, 100mm (K100), 200mm (K200), 300mm (K300) channel widths with a built in slope of 0.5% and cast in galvanized and stainless steel edge rails. Polyethylene, galvanized steel and iron grate options with DrainLok System. Refer to SELECTIONS.

Components

2.2 GRATES

Manufacturer and testing of grates to AS 3996, DIN V 19580 and DIN EN 1433. Grates are manufactured from ductile iron, mild steel, stainless steel, aluminium and plastic/composites. Grates to AS 1428.2 where required for mobility access and to AS 3996 for a bicycle tyre penetration resistant grate. Refer to SELECTIONS for grate type and AS 3996 load classification.

Accessories

2.3 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.
Sand:	Hard, durable, angular particles.

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2.4 CONCRETE

Concrete with a minimum compressive strength of 25 MPa to NZS 3104. Refer to the standard installation drawings for minimum dimensional requirements for the concrete surround.

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. Clean and flush out the whole installation and remove all silt and debris on completion and immediately prior to practical completion.

3.3 TEMPORARY INSTALLATION

ACO Exterior Surface Drainage Systems cannot be trafficked until fully installed. During site work and after the trench run is laid, route site traffic away from the trench. If temporary crossings are required lay base course of minimum 1 metre wide either side of the trench for protection.

Installation

3.4 INSTALLATION - GENERAL - NZBC E1/AS1

All work to comply with NZBC E1/AS1: Surface Water, 3.0 Drainage System Materials and Construction, and ACO Limited requirements.

3.5 INSTALLATION - GENERAL - AS/NZS 3500.3 & NZBC E1/AS2

All work to comply with AS/NZS 3500.3 as modified by NZBC E1/AS2, and ACO Limited requirements.

3.6 INSTALLATION - SPECIFIC

Refer to SELECTIONS for ACO Limited project specific design documentation.

3.7 STANDARDS AND TOLERANCES

Refer to the general section 1270 CONSTRUCTION for general requirements.

3.8 EXCAVATION - LINEAR DRAINAGE SYSTEM

Excavate to accommodate linear drainage system, accessories, bedding and surround materials. Excavate about the centre line of proposed trench run. Excavate the trench base to follow fall of linear drainage system. Ensure loose material is removed from trench before product installation.

3.9 BEDDING

Place to ACO Limited requirements, using material to avoid differential settlement and to obtain longitudinal support of the channel and to support pits.

3.10 SETTING OUT

Use string line, boning rod or laser equipment methods. Use surveying and levelling equipment to accurately set out design invert and grate levels.

3.11 FORM PIPE ENTRIES

Mark out location and pre-drill a pilot hole, drill holes with a holesaw to ACO limited requirements.

3.12 INSTALL LINEAR DRAINAGE SYSTEM

Install linear drainage system to ACO Limited requirements.

3.13 JOINT SEALING

Where channels are installed in suspended slabs, seal all channel joints and pipe connection joints with a proprietary sealant. Sealant must be resistant to the same chemicals and be flexible to allow for movement.

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Application - connections

3.14 CONNECT TO SURFACE WATER DRAIN - NZBC E1/AS1

Drainage contractor to connect ACO Exterior Surface Drainage Systems to stormwater drains to NZBC E1/AS1: Surface water requirements and satisfaction of the network utility operator.

3.15 CONNECT TO SURFACE WATER DRAIN - AS/NZS 3500.3 & NZBC E1/AS2

Drainage contractor to connect ACO Exterior Surface Drainage Systems to stormwater drains to AS/NZS 3500.3 as modified by NZBC E1/AS2 requirements and satisfaction of the network utility operator.

Completion & Commissioning

3.16 COMPLETION MATTERS

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

4 SELECTIONS

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

4.1 ACO LIMITED SPECIFIC DESIGN

Document:	~
Submitted:	~
Available:	~

Materials

Commercial - ACO Linear Drainage - Load Class A to C (Slope Channels)

4.2 ACO KLASSIKDRAIN K100 WITH BRICKSLOT STAINLESS GRATE HEELSAFE®

Location:	Cart Drive Through
Manufacturer:	**ACO DRAIN**
Model:	ACO KlassikDrain K100
Channel Dimension:	1000x130x [120-320]mm (LxWxH)
Slope:	Neutral
Body Material:	Polymer Concrete
Grate:	ACO Brickslot Stainless **Heelsafe®** 141758
Grate Material:	Stainless steel
Grate Model:	Brickslot
Load Class:	D

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7451AE ALLPROOF EXTERIOR SURFACE DRAINAGE SOLUTIONS

1 GENERAL

This section relates to **Allproof Industries** exterior surface drainage systems.
It comprises of a range of heavy duty commercial and domestic exterior drainage systems including connection to the network utility operator's system.
It includes:

- Allproof Polymer Concrete 100mm clear opening linear channel drainage system with a range of grates
- Allproof Polymer Concrete 200mm clear opening linear channel drainage system with a range of grates
- Allproof Polymer Concrete Slot linear channel drainage system
- Allproof Recycled Plastic Domestic channel drainage system with a range of domestic grade grates
- Allproof Recycled Plastic Commercial Channel 200mm Clear Opening
- Allproof Recycled Plastic Commercial Channel 300mm Clear Opening
- Allproof Recycled Plastic Drainage Pits
- Allproof Recycled Plastic Domestic Drain
- Allproof Polymer Concrete Pits
- Allproof Storm Series commercial point drain
- Allproof Car Park Drains
- Allproof Podium Drains

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
Plumbers, Gasfitters and Drainlayers Act 2006

1.3 MANUFACTURER/SUPPLIER DOCUMENTS

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

Allproof Industries Exterior Surface Drainage Solutions Brochure
Allproof Industries Exterior Surface Drainage Solutions Technical Details
Allproof Industries Exterior Surface Drainage Solutions Installation Details

Manufacturer/supplier contact details

Company:	**Allproof Industries**
Web:	www.allproof.co.nz
Email:	info@allproof.co.nz
Telephone:	09 481 8020

Warranties

1.4 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

5 - 25 years	For Allproof Industries Exterior Surface Drainage System components. For warranty conditions and details refer to Allproof Industries

.

- Provide this warranty on Allproof Industries Ltd standard form.
- Commence the warranty from the date of purchase.

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Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.5 QUALIFICATIONS

Drainlayers / contractors 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.

1.6 SITE CONFIRMATION

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 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.

1.8 NO SUBSTITUTIONS

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

1.9 SAMPLES

Refer to the general section 1270 CONSTRUCTION for details of how samples will be reviewed and how instructions to proceed will be given. Provide the following samples for review:

	Sample A	Sample B	Sample C
Sample description:	~	~	~
Sample type:	~	~	~
Number:	~	~	~
Location:	~	~	~
Supporting documentation:	~	~	~
Reviewer:	Contract administrator ~	Contract administrator ~	Contract administrator ~
Time for review:	10 working days ~	10 working days ~	10 working days ~
Review criteria:	~	~	~

Performance

1.10 TECHNICAL APPLICATION

Refer to Allproof Industries for technical support on grate performance and engage a hydraulics engineer for hydraulic performance, run layout and scheduling, ponding analysis and information on the chemical resistance of the trench and grate materials.

Performance - Slip resistance

1.11 SLIP RESISTANCE - PREVIOUSLY TESTED SURFACE

The following grates have previously been tested for slip resistance, and complies with NZBC D1/AS1 requirements.

S/S Wedge Wire, Glass Filled Polypropylene (GFP) & 200HCI Heelproof Cast Iron grate.

Compliance information

1.12 COMPLIANCE WITH NZ BUILDING CODE

All work to comply with NZBC E1/AS1: Surface water, 3.0 Drainage system materials and construction.



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Quality control and assurance

1.13 INSPECTIONS

~

2 PRODUCTS

Components - Allproof PC linear channel drainage systems

2.1 ALLPROOF POLYMER CONCRETE LINEAR CHANNEL DRAINAGE SYSTEM - 200MM CLEAR OPENING, HEAVY DUTY

200mm Clear Opening Polymer Concrete channel drainage system comprised of the following:

- A PC channel 225mm deep, end caps and an inline sump
- 5 types of grates - Wedge Wire (316 Stainless Steel), Heelproof Cast Iron, Cast Iron, Laser Perforated Stainless Steel (304 stainless steel) and Ladder (stainless steel). Available in a range of standard lengths 500mm or 1000mm
- Finishes dependent on grate selection; available finishes - stainless steel or cast iron
- Supplied with lockdown bars and bolts. Bolt head will differ depending grate used. Bars twist into place locating into pre-formed slots.
- Loading rated from load class A to E.

Refer to SELECTIONS for options.

Components - Allproof drainage pits and drains

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 GROUND CONDITIONS

Specific ground conditions or contaminated ground may require an increase in the concrete surround dimensions or the addition of reinforcement.

3.4 TEMPORARY INSTALLATION

Allproof Industries exterior surface drainage channels are not trafficable until fully installed. During site work and after the trench run is laid, route site traffic away from the trench. If temporary crossings are required lay base course of minimum 1 metre wide either side of the trench for protection and install temporary protective cover or timber infill for support.

Installation

3.5 GENERAL

All work to comply with NZBC E1/AS1: Surface water, 3.0 Drainage system materials and construction and Allproof Industries Installation Details.

Installation - Allproof PC linear channel drainage systems

3.6 INSTALL ALLPROOF POLYMER CONCRETE LINEAR CHANNEL DRAINAGE SYSTEM - 200MM CLEAR OPENING

Install Polymer Concrete Linear Channel Drainage System in accordance with Allproof Industries Exterior Surface Drainage Installation Details, and as follows:

- Install sump first
- Connect and seal outlet plumbing
- Working away from the outlet, haunch channel into position in trench with site concrete prior

to pouring primary concrete to reduce movement. Ensure correct lines using a string line or similar.
- Support channel from the weight of the setting concrete by having either the original grates or appropriate bracing in place
- Protect grates from chemical and concrete contamination during installation by wrapping in plastic or tape
- Ensure concrete is poured evenly to avoid shifting the channels during installation
- Secure grates with lock down bars and bolts. Bolt head will differ depending on grate used. Twist bars into place by locating them into pre-formed slots provided

Cutting PC channel and grate:
- Use mitre cuts to form corners, junctions and irregular lengths; for heavy loads use a tee joint
- Cut channels with a masonry or diamond saw
- Cut pipe holes using an appropriately sized hole saw
- Seal joints with a flexible sealant
- Wear appropriate PPE

Installation - Allproof drainage pits and drains

3.7 INSTALL ALLPROOF PLASTIC DOMESTIC DRAIN

Install Plastic Domestic Drain in accordance with Allproof industries Exterior Surface Drainage Install Details.

3.8 INSTALL ALLPROOF POLYMER CONCRETE DRAINAGE PIT - HEAVY DUTY

Install heavy duty Polymer Concrete Drainage Pit in accordance with Allproof Industries Exterior Surface Drainage Installation Details.

3.9 INSTALL ALLPROOF COMMERCIAL POINT DRAIN - STORM SERIES

Install Storm Series Commercial point drain in accordance with Allproof Industries Exterior Surface Drainage Installation Details.

3.10 INSTALL ALLPROOF CAR PARK DRAIN

Install Car Park Drain in accordance with Allproof Industries Exterior Surface Drainage Installation Details.

3.11 INSTALL ALLPROOF PODIUM DRAIN

Install Podium Drain in accordance with Allproof Industries Exterior Surface Drainage Installation Details.

Installation - connection

3.12 CONNECT TO SURFACE WATER DRAIN

Connect Allproof exterior surface drainage system to stormwater drain to the requirements and satisfaction of the network utility operator.

3.13 CLEAN

Clean and flush out the whole installation and remove all silt and debris before handing over.

Completion

3.14 COMPLETION MATTERS

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

3.15 REPLACE

Replace damaged or marked elements.

3.16 LEAVE

Leave the whole of this work discharging completely and freely into the storm water system and free of all debris. Leave work to the standard required by following procedures.

3.17 REMOVE

Remove debris, unused materials and elements from the site.

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4 SELECTIONS

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

Components - Allproof PC linear channel drainage systems

4.1 ALLPROOF POLYMER CONCRETE LINEAR CHANNEL DRAINAGE SYSTEM - 200MM CLEAR OPENING, HEAVY DUTY

Location:	Cart Ramp
Manufacturer:	Allproof Industries
Channel type/size:	200mm clear opening x 225mm deep polymer concrete channel
Grate type:	Ladder
Grate length:	1000mm
Grate finish:	Stainless Steel
Product code:	PC200/225SSLAD
Load rating:	D

4.2 ALLPROOF POLYMER CONCRETE LINEAR CHANNEL DRAINAGE SYSTEM - 200MM CLEAR OPENING INLINE SUMP, HEAVY DUTY

Location:	Cart Ramp
Manufacturer:	Allproof Industries
Channel type/size:	200mm clear opening x 225mm deep polymer concrete Sump
Grate type:	Ladder
Grate length:	500mm
Grate finish:	Stainless Steel
Product code:	PC200SUMPSSLAD
Load rating:	D

Components - Allproof drainage pits and drains

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7938PB MONKEYTOE FALL PROTECTION SYSTEMS

1 GENERAL

This section relates to the supply and installation of Monkeytoe Group Ltd. permanent safety access systems required for routine maintenance and servicing activities on buildings.
It includes:

- Fall arrest anchor points

1.1 RELATED WORK

Refer to ~ for ~

Documents

1.2 DOCUMENTS

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

AS/NZS 1891.2	Industrial fall-arrest systems and devices - Horizontal lifeline and rail systems
AS/NZS 1891.4	Industrial fall-arrest systems and devices - Selection, use and maintenance
WorkSafe	Guidelines for the provision of facilities and general safety in the construction industry
WorkSafe	Best practice guidelines for working at height in NZ – Good Practice Guidelines
WorkSafe	Working on roofs - Good Practice Guidelines

1.3 MANUFACTURER/SUPPLIER DOCUMENTS

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

Product data sheets and installation instructions.

Manufacturer/supplier contact details

Company:	Monkeytoe Group Ltd.
Web:	www.monkeytoe.co.nz
Email:	spec@monkeytoegroup.com
Telephone:	0800 658 637

1.4 SPECIFIC DESIGN DOCUMENTS

Specific design documents relating to this part of the work:

Document:	~
Refer to:	~

Warranties

1.5 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

10 years	For corrosion, fixing and associated flashing

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

Refer to the general section 1237 WARRANTIES for additional requirements.

1.6 WARRANTY - INSTALLER/APPLICATOR

Provide an installer/applicator warranty:

5 years	For workmanship - subject to annual re-certification by an accredited re-certification technician.

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- 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 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 accredited Monkeytoe Group Ltd. installers. 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.

1.9 NO SUBSTITUTIONS

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

1.10 WORKING AT HEIGHT

Carry out a hazard assessment for all work at height. It is essential that the hazards are identified before the work starts and that the necessary equipment, appropriate precautions and systems of work are provided and implemented.

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 including, but not limited to:

- Location and type of safety access system.
- Details how the products are attached to the structure, including fixings to the structure and flashings.

Submit shop drawings for review to ~.

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

1.12 OPERATION AND MAINTENANCE MANUALS

Refer to the general section 1239 OPERATION & MAINTENANCE for the requirements for submission and review of operation and maintenance manuals.

Provide the following operation and maintenance manual(s):
Monkeytoe Group Ltd. Operational & Maintenance Manual

Include the following in the operation and maintenance manual(s):

- Inspection and testing programme to comply with AS/NZS 1891.4, Section 9 Inspection maintenance and storage
- Manufacturer maintenance instructions

1.13 MAINTENANCE CONTRACT PROPOSAL

Provide a priced proposed maintenance contract for the annual re-certification by an accredited re-certification technician to meet warranty requirements.

Compliance information

1.14 INFORMATION REQUIRED FOR CODE COMPLIANCE

Provide the following compliance documentation: -

- Manufacturer's, importer's or distributor's warranty
- Installer's / applicator's warranty

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- Producer Statement PS1 - Design for the systems including fixings
- Producer Statement PS3 - Construction from the applicator / installer
- Producer Statement PS4 - Construction Review from an acceptable suitably qualified person

2 PRODUCTS

Materials

2.1 ANCHOR POINT

Anchor device consisting of a component or assembly of components which incorporates a personnel attachment. Refer to SELECTIONS.

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.

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.

Installation/application

3.3 INSTALLATION

Install to Monkeytoe Group Ltd. design and manufacturer requirements. Ensure all fixings are made to parts of the permanent structure capable of resisting the required loadings. Seal penetrations to maintain weather tightness.

3.4 MOVING PARTS

When assembled, all moving parts must move freely and without binding.

3.5 HARNESSES AND ACCESSORIES

Provide harnesses and accessories listed in SELECTIONS.

Completion & Commissioning

3.6 COMPLETION MATTERS

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

3.7 COMMISSIONING - TESTS & CERTIFICATION

Refer to the general section 1270 CONSTRUCTION for general test and certification requirements for commissioning. Inspect and test the installation to AS/NZS 1891.2 and AS/NZS 1891.4. On completion provide an installer's 'Producer Statement PS3 - Construction' and a 'Producer Statement PS4 - Construction Review' from a suitably qualified person. Tag all systems for use.

4 SELECTIONS

Materials

For further details on selections go to www.monkeytoe.co.nz
Substitutions are not permitted to any of the specified systems, components and associated products listed in this section.

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4.1 MONKEYTOE - FALL ARREST ANCHOR POINT

Location:	Roof - amongst ballast
Manufacturer:	Kattsafe
Supplier/Installer:	Monkeytoe Group Ltd.
Type:	Kattsafe AP135 Rapid Top Mount Anchor
Description:	Top mounted anchor point fixed to either Kattsafe warm roof mounting plate, or Plinth Build up depending on location.
Application:	Fall Arrest
Finish	Powder coat - Colour TBC -

4.2 MONKEYTOE - FALL ARREST ANCHOR POINT

Location:	Roof- along Gridline M
Manufacturer:	Kattsafe
Supplier/Installer:	Monkeytoe Group Ltd.
Type:	Kattsafe AP125 Anchor or similar
Description:	Fall arrest anchor fixed into concrete at edge of roof
Application:	Fall Arrest
Finish	Powder coat - Colour TBC

4.3 MONKEYTOE - FALL ARREST ANCHOR POINT

Location:	Roof- fixed to skylight and flue pop up structure
Manufacturer:	Kattsafe
Supplier/Installer:	Monkeytoe Group Ltd.
Type:	Kattsafe AP118 or similar
Description:	Fall arrest anchor bolted to steel structure
Application:	Fall Arrest
Finish	Powder coat - Colour TBC

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Hogan Gully Clubhouse

Hogan Gully Stage 02 - Project Specification

420 McDonnell Road, Arrowtown, Queenstown, New Zealand
Project Ref: 17008
Date: 18 September 2026

BC2

SPECIFICATION CONTRACT DOCUMENTATIONTo be referenced in association with the specification of the work to be done and materials to be used in carrying out the works shown on the accompanying drawings

Spec Version ID: 378546-455467
Document authenticity may be verified at masterspec.co.nz/verify/378546-455467
Prepared using Masterspec software

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Contract Appendix Documents Index

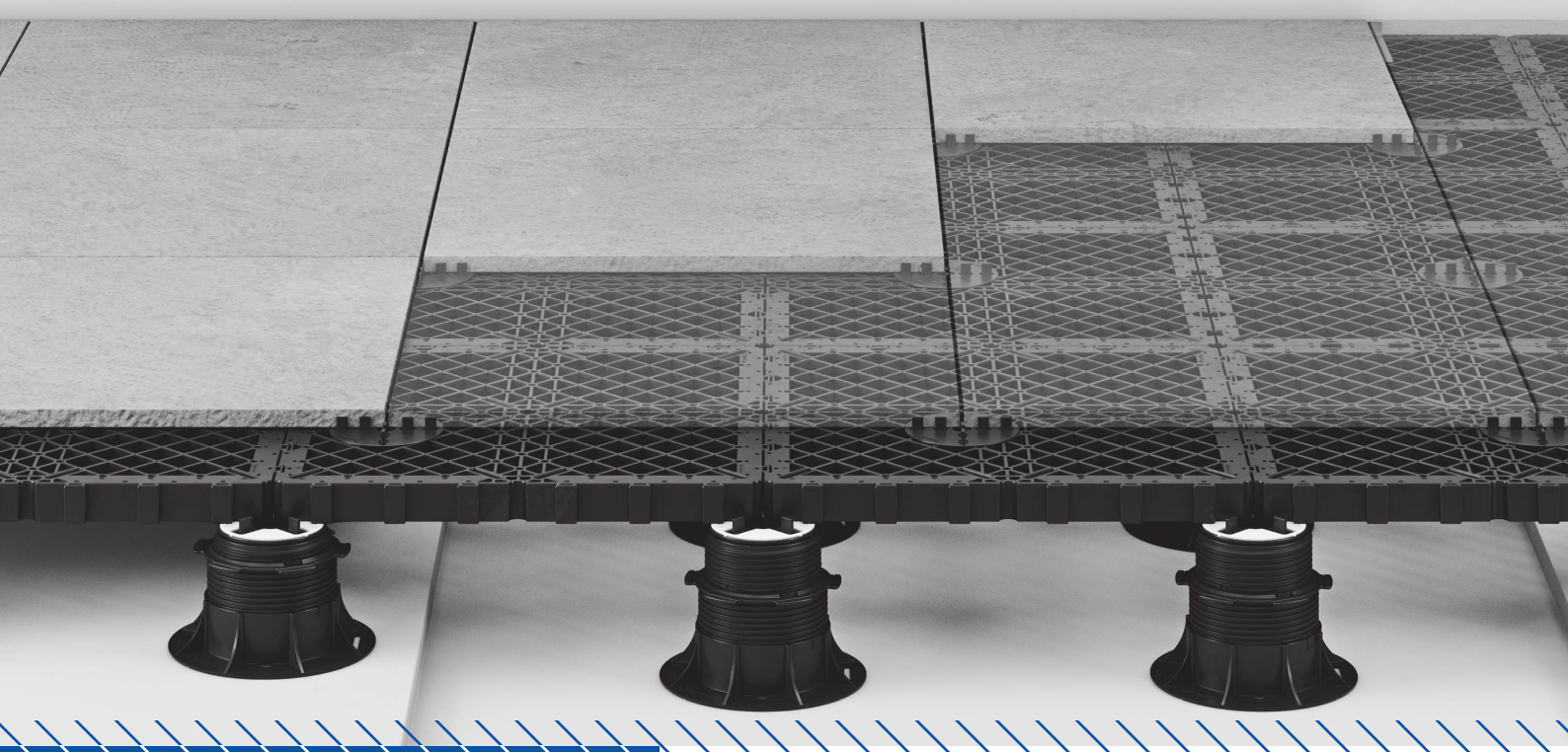
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June 2025

NURAGRID

DESIGN VERSATILITY FOR FLOATED DECKS



The Nuragrid offers a revolutionary approach to raised floated decking - providing unparalleled safety, design versatility, durability and ease of installation. This innovative system is perfect for large podium areas, public spaces, rooftop bars and even stylish backyards. It allows for the seamless integration of various flooring materials - such as pavers of different sizes and artificial turf - without sacrificing aesthetic appeal or waterproofing integrity.



www.nurajack.co.nz
0800 687 252

NURAJACK
DECKING MADE EASY

KEY BENEFITS OF THE NURAGRID:

Design Versatility:
The Nuragrid grants complete freedom in flooring selection. Effortlessly combine different flooring materials like pavers of various sizes and even artificial turf to create truly personalised and dynamic outdoor spaces.

Dry Installation:
The Nuragrid typically is a dry installation process, ensuring raised and removable access to membranes and a clean and environmentally-friendly installation.

Adhesive Installation:
To ensure a firm and resilient surface, an adhesive system is available. The adhesive option may allow for windproof, vandal-proof or non-structural paver applications (testing recommended).

Level Surface:
Due to the self-levelling heads of the Nurajacks, the system guarantees a perfectly level surface while still protecting membranes from point-loading.

Excellent Drainage:
Like all Nurajack systems, it features drainage below the trafficable surface, ensuring a completely level surface and eliminating potential trip hazards.

Compatibility:
Compatible with a wide range of subfloors, including waterproof membrane systems, it is ideal for both residential and commercial applications.

Low-Maintenance:
Once installed, the Nuragrid requires minimal to no maintenance.

Sustainability:
All components of the Nurajack systems are made from a high percentage of post-consumer recycled materials and are recyclable, aligning with sustainable building practices. Nurajack is part of Nuralite Waterproofing group of companies and has a target of zero carbon emissions.

Wide Range of Accessories:
With a variety of accessories available, including vertical closures and perimeter spacers, the system can be installed in a wide variety of scenarios - from backyard patios to rooftop bars and podiums.





WHY CHOOSE NURAJACK NURAGRID?

Safety:
The Nuragrid provides enhanced safety, especially in raised flooring applications where a broken paver could cause significant damage or disruption, such as in public spaces or emergency egress.

Flexibility:
The Nuragrid offers unparalleled flexibility in paver design, selection and installation. Turf is easily installed to create dynamic outdoor spaces.

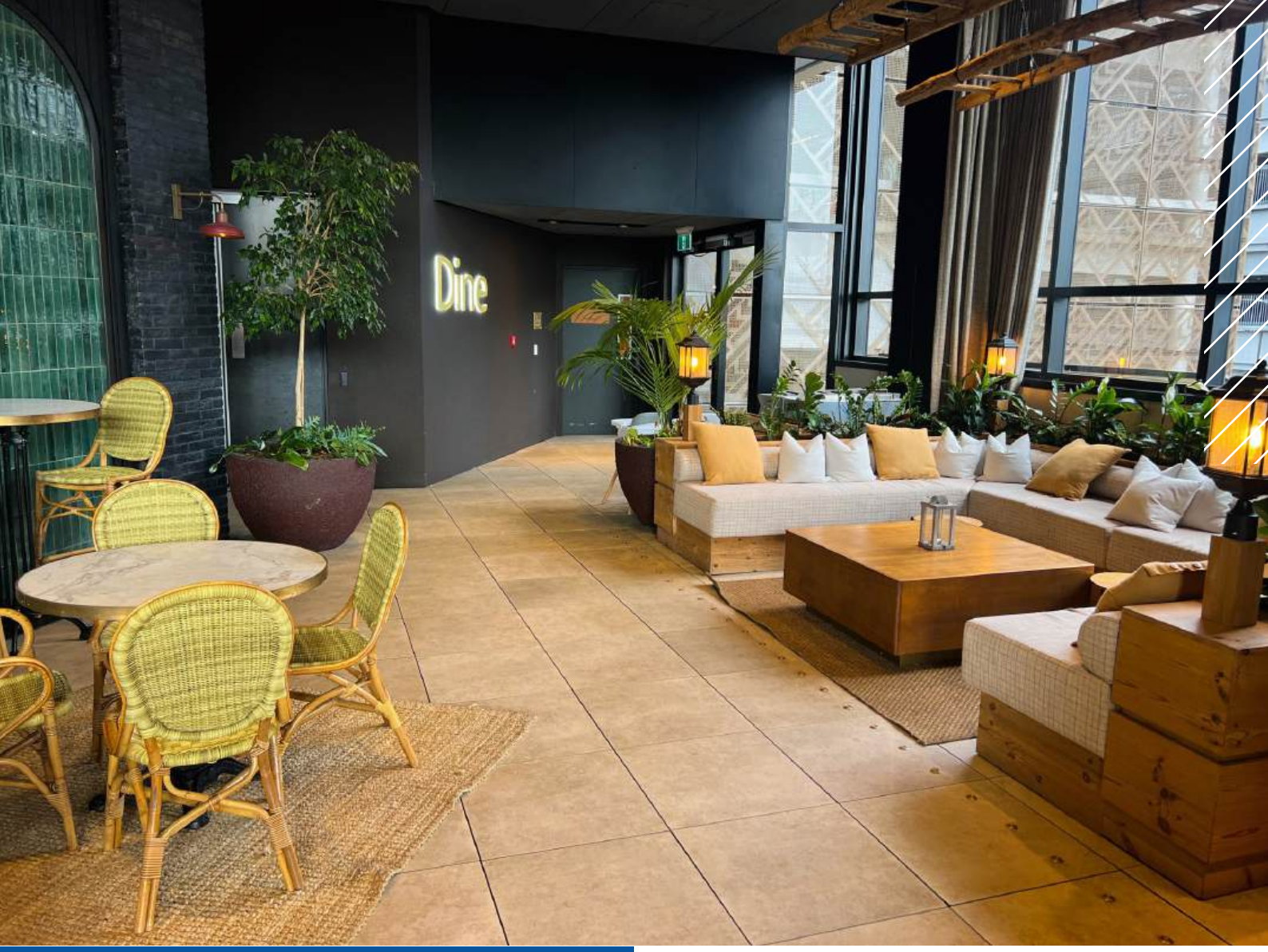
Stability:
The finished flooring is exceptionally stable, providing a secure and durable surface.

Resilience:
The Nuragrid is designed to withstand heavy loads and maintain its structural integrity over time.

Sustainability:
By using recyclable components and avoiding harmful chemicals, the Nuragrid promotes environmental responsibility.

Ease of Installation:
The system is quick and easy to install, saving time and labour costs.





INSTALLATION PROCESS:

The Nuragrid installation is a straightforward process that can be completed in four simple steps:

1. Place Nurajacks: Position the Nurajacks on the desired surface and adjust them to the required height.
2. Install Nuragrid Panels: Connect the Nuragrid panels together using dovetail joints, ensuring a stable and level surface.
3. Adjust and Level: Use the Nurajack Adjustment Key to fine-tune the levelling of the Nuragrid panels.
4. Lay Flooring: Install your chosen flooring materials.

See the installation video here:
www.nurajack.co.nz/nuragrid





The Nuragrid system is a versatile and innovative solution for raised flooring projects. Its combination of durability and ease of installation makes it an ideal choice for both residential and commercial applications.

NURALITE
FLAT ROOFS | BUILT RIGHT

NURALITE WATERPROOFING LTD
60D Leon Leicester Ave, Mt Wellington, Auckland, New Zealand
09 579 2046 or 0800 687 252
info@nurajack.co.nz
www.nurajack.co.nz

NURAJACK
DECKING MADE EASY



NURAGRID™

INSTALLATION GUIDE

: 0800 687 252
: www.nurajack.co.nz

CONTENT

NURAGRID INSTALLATION GUIDE FOR
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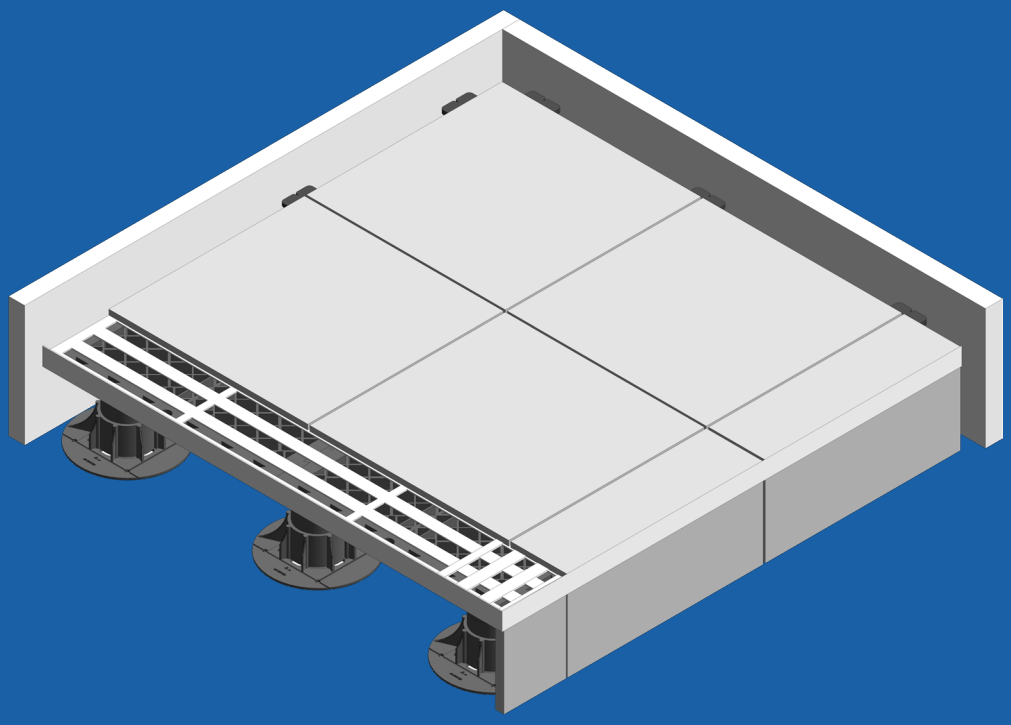
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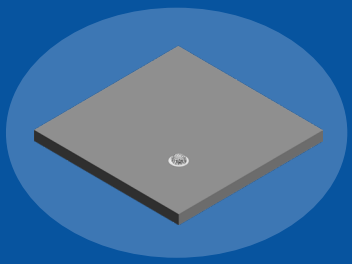
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NURAJACK
DECKING MADE EASY

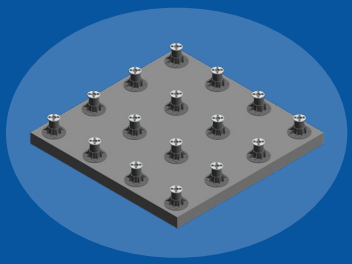
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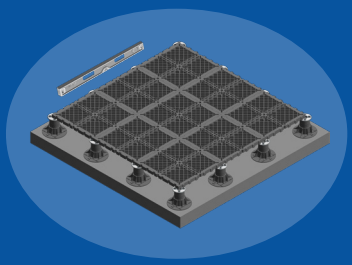
NURAGRID INSTALLATION GUIDE FOR
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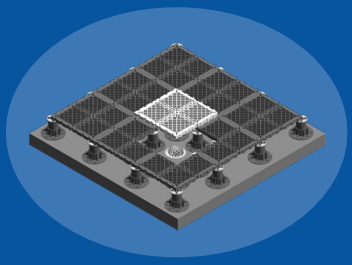
1. Sweep substrate clear of debris.



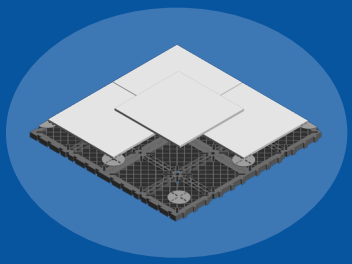
2. Install Nurajacks and Nuragrid as per Installation video here (www.youtube.com/@Nurajack). No centre pedestal required.



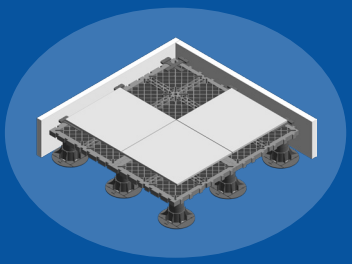
3. Ensure Nuragrid is flat, firm and stable. Check surface with 1.8m straight edge. Install additional Nurajacks as required.



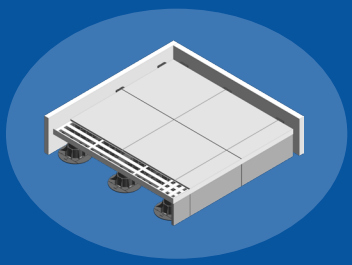
4. Ensure Nuragrid layout enables outlets to be accessible for cleaning. Interrupt layout if necessary. Detail drawings available here (www.nurajack.co.nz/nuragrid).



5. Install tiles/pavers with the Nuragrid Tile Spacer. Add additional Shims depending on tile size and format for tile support.



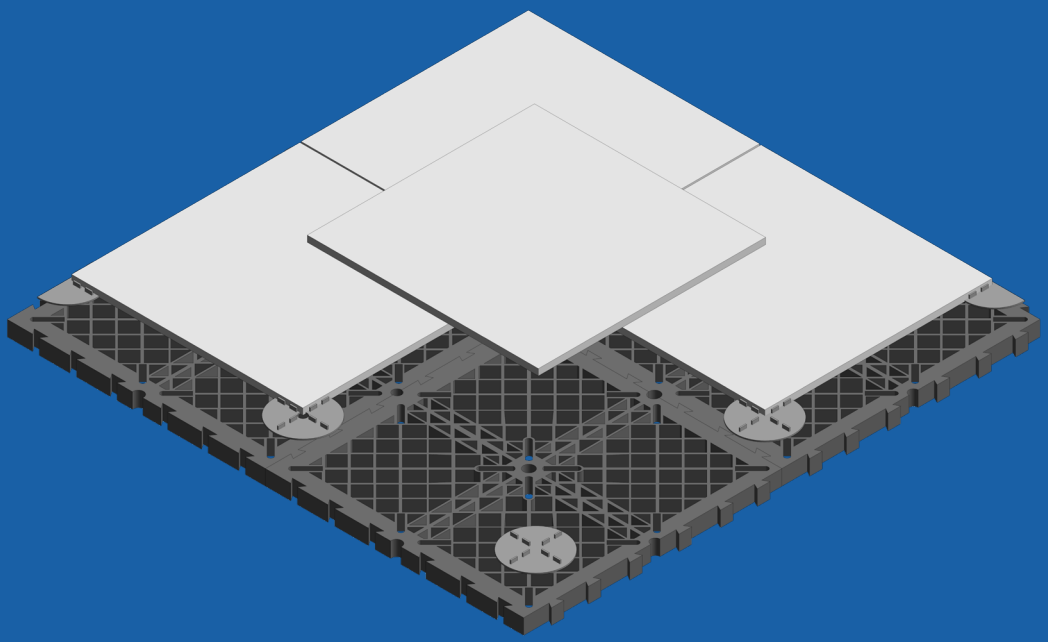
6. Install Nurajack Tile Cladding Clips around the perimeter to space off vertical surfaces.



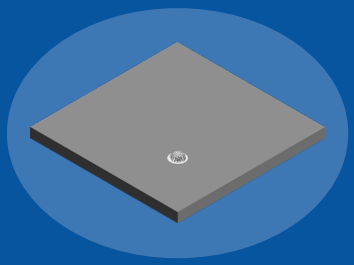
7. For areas with no containment, consider spot fixing the pavers to the Nuragrid. See page 5 for Spot-fixed Structural Tile and Pavers.

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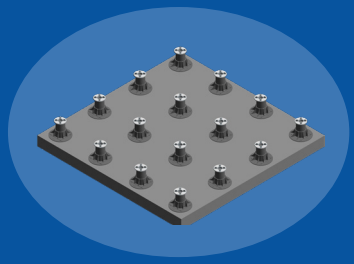
NURAGRID INSTALLATION GUIDE FOR SPOT-FIXED STRUCTURAL TILE & PAVERS



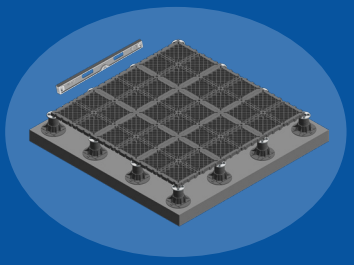
NURAGRID INSTALLATION GUIDE FOR
SPOT-FIXED STRUCTURAL TILE & PAVERS



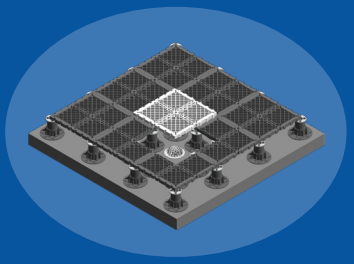
1. Sweep substrate clear of debris.



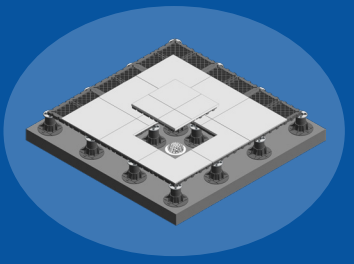
2. Install Nurajacks and Nuragrid as per Installation video here (www.youtube.com/@Nurajack).
   No centre pedestal required.



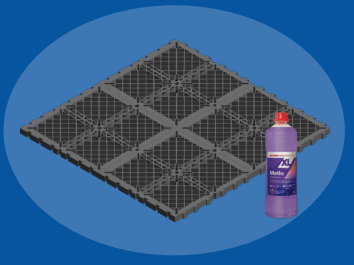
3. Ensure Nuragrid is flat, firm and stable.
   Check surface with 1.8m straight edge.
   Install additional Nurajacks as required.



4. Ensure Nuragrid layout enables outlets to be accessible for cleaning. Interrupt layout if necessary. Detail drawings available here (www.nurajack.co.nz/nuragrid).

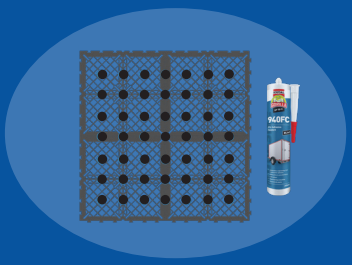


5. String line or laser tile/paver layout on Nuragrid.
   Avoid using chalk lines.
   Build inspection hatch to suit outlets.

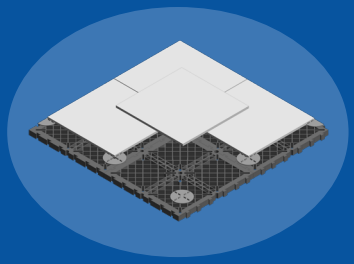


6. Clean Nuragrid surface with meths ensuring surface is dry and dust-free.

NURAGRID INSTALLATION GUIDE FOR
SPOT-FIXED STRUCTURAL TILE & PAVERS



7. **Apply spot-fix style of Soudal 940FC PU adhesive to area for each tile, targeting holes and slots in the grid pattern. Approximately 1 x 600ml sausage of adhesive is required for every 2m².**

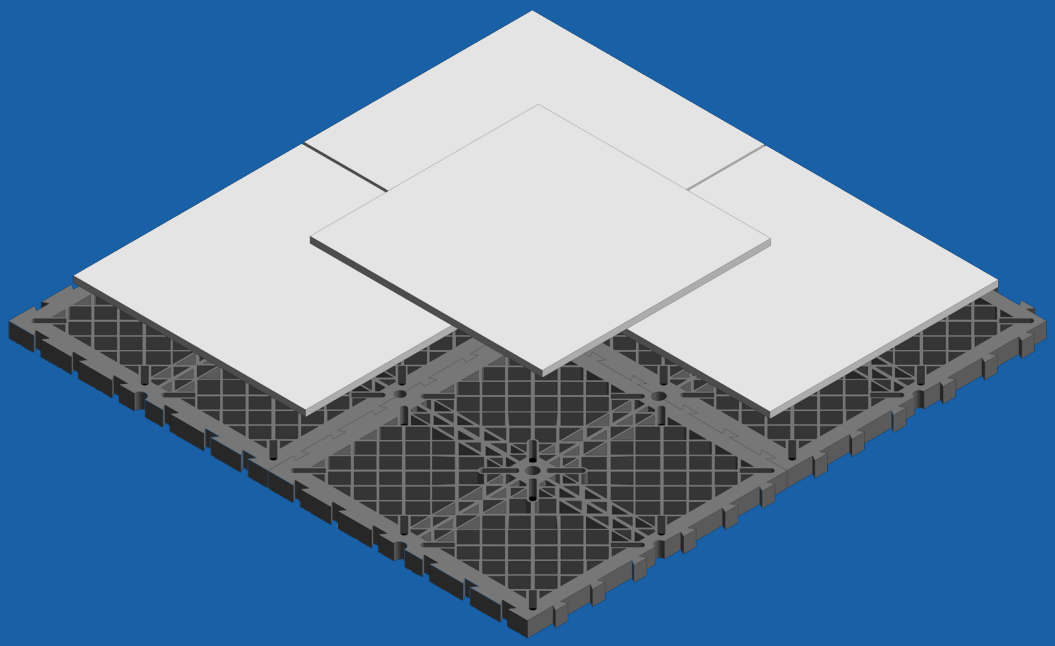


8. **Install tile using Nuragrid Tile Spacer and press firm using Shims and levelling clips as required. Allow to cure for 7 working days at 22 degrees Celsius. Avoid foot traffic until full cure time elapses.**

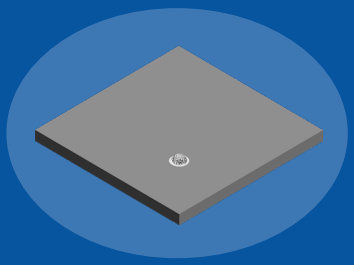
NOTE: It is strongly recommended that tiles or pavers are tested for suitability with the Nuragrid system, including adhesive compatibility. Nuralite Group Ltd. accepts no liability for the performance of adhesives used in conjuction with Nuragrid.

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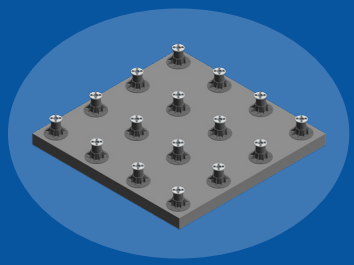
NURAGRID INSTALLATION GUIDE FOR NON-STRUCTURAL ADHERED TILE & PAVERS



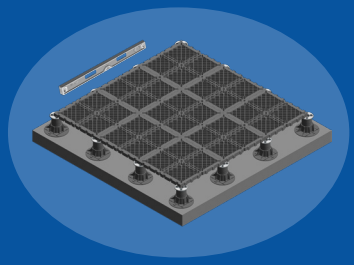
NURAGRID INSTALLATION GUIDE FOR
NON-STRUCTURAL ADHERED TILE & PAVERS



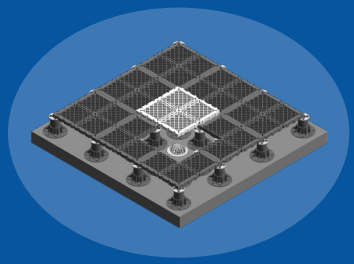
1. Sweep substrate clear of debris.



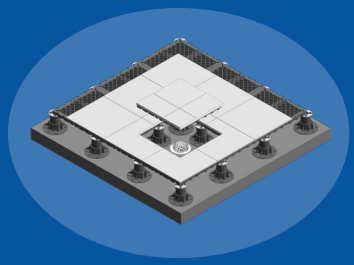
2. Install Nurajacks and Nuragrid as per Installation video here (www.youtube.com/@Nurajack).



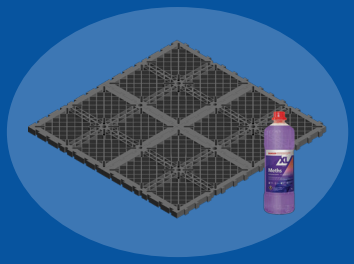
3. Ensure Nuragrid is flat, firm and stable.
   Check surface with 1.8m straight edge.
   Installing additional Nurajacks is recommended.



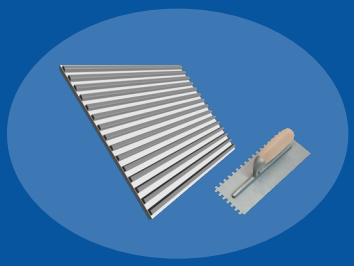
4. Ensure Nuragrid layout enables outlets to be accessible for cleaning. Interrupt layout if necessary. Detail drawings available here (www.nurajack.co.nz/nuragrid).



5. Use a straight edge or laser to design tile/paver layout on Nuragrid. Avoid using chalk lines.
   Build inspection hatch to suit outlet.

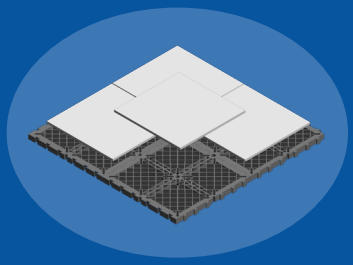


6. Clean Nuragrid surface with meths ensuring surface is dry and dust-free.



7. **Using 15mm notch trowel, apply selected stone and tile adhesive to tile/paver following glue manufacturer's instructions. Ensure full coverage of adhesive to the back of the tile/paver.**

   Install tiles by firmly pressing onto the Nuragrid using shims or levelling clips as necessary. Adhesive must protrude into the underside of the Nuragrid.

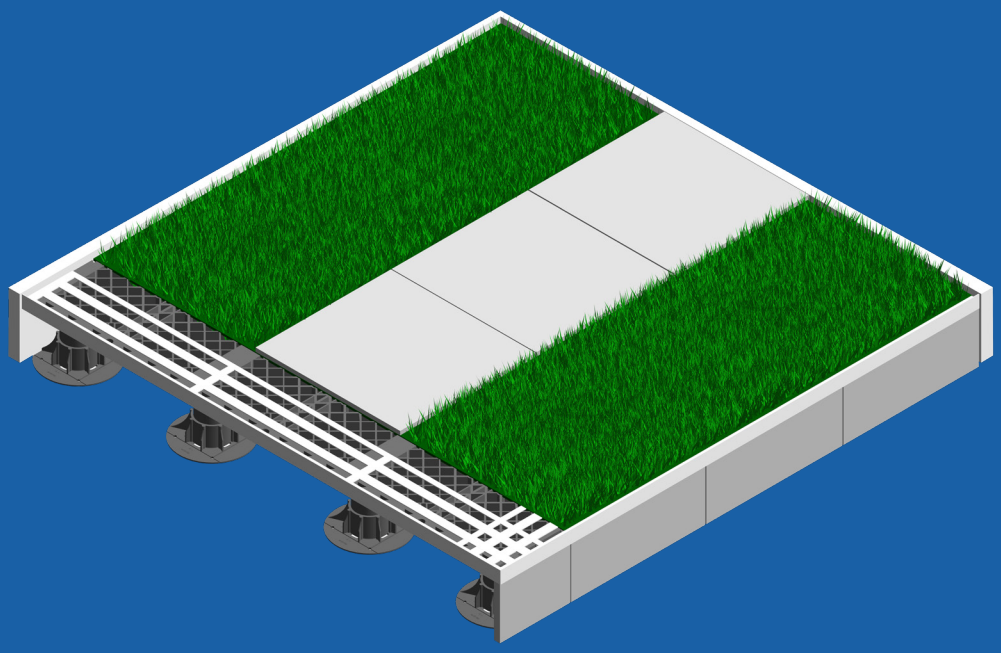


8. **Allow to cure as per glue manufacturers recommendations. Avoid foot traffic until full cure time elapses.**

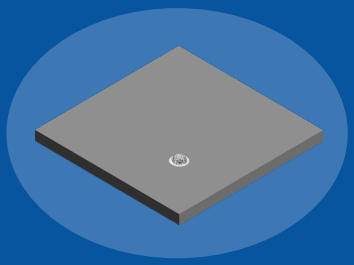
NOTE: It is strongly recommended that tiles or pavers are tested for suitability with the Nuragrid system, including adhesive compatibility. Nuralite Group Ltd. accepts no liability for the performance of adhesives used in conjuction with Nuragrid.

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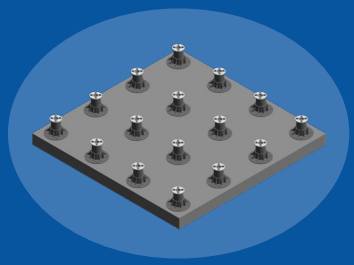
NURAGRID INSTALLATION GUIDE FOR SYNTHETIC TURF



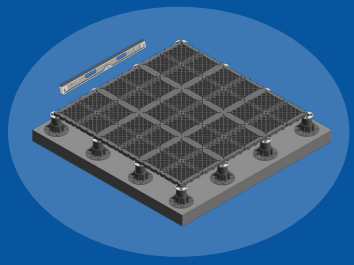
NURAGRID INSTALLATION GUIDE FOR SYNTHETIC TURF



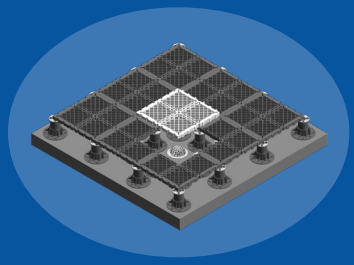
1. Sweep substrate clear of debris.



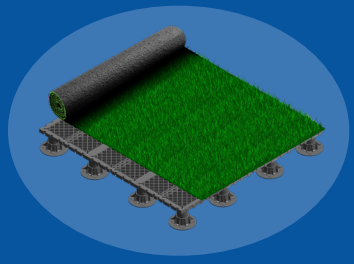
2. Install Nurajacks and Nuragrid as per Installation video here (www.youtube.com/@Nurajack).
   No centre pedestal required.



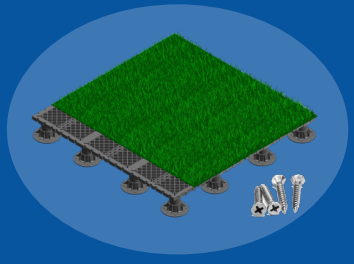
3. Ensure Nuragrid is flat, firm and stable.
   Check surface with 1.8m straight edge.
   Install additional Nurajacks as required.



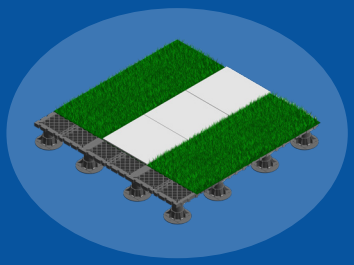
4. Ensure Nuragrid layout enables outlets to be accessible for cleaning. Interrupt layout if necessary. Detail drawings available here (www.nurajack.co.nz/nuragrid).



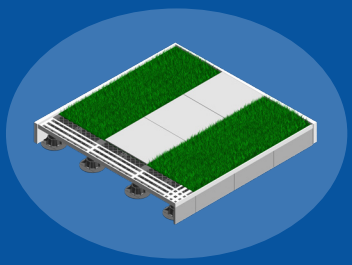
5. Roll selected turf onto Nuragrid following manufacturer's instructions.



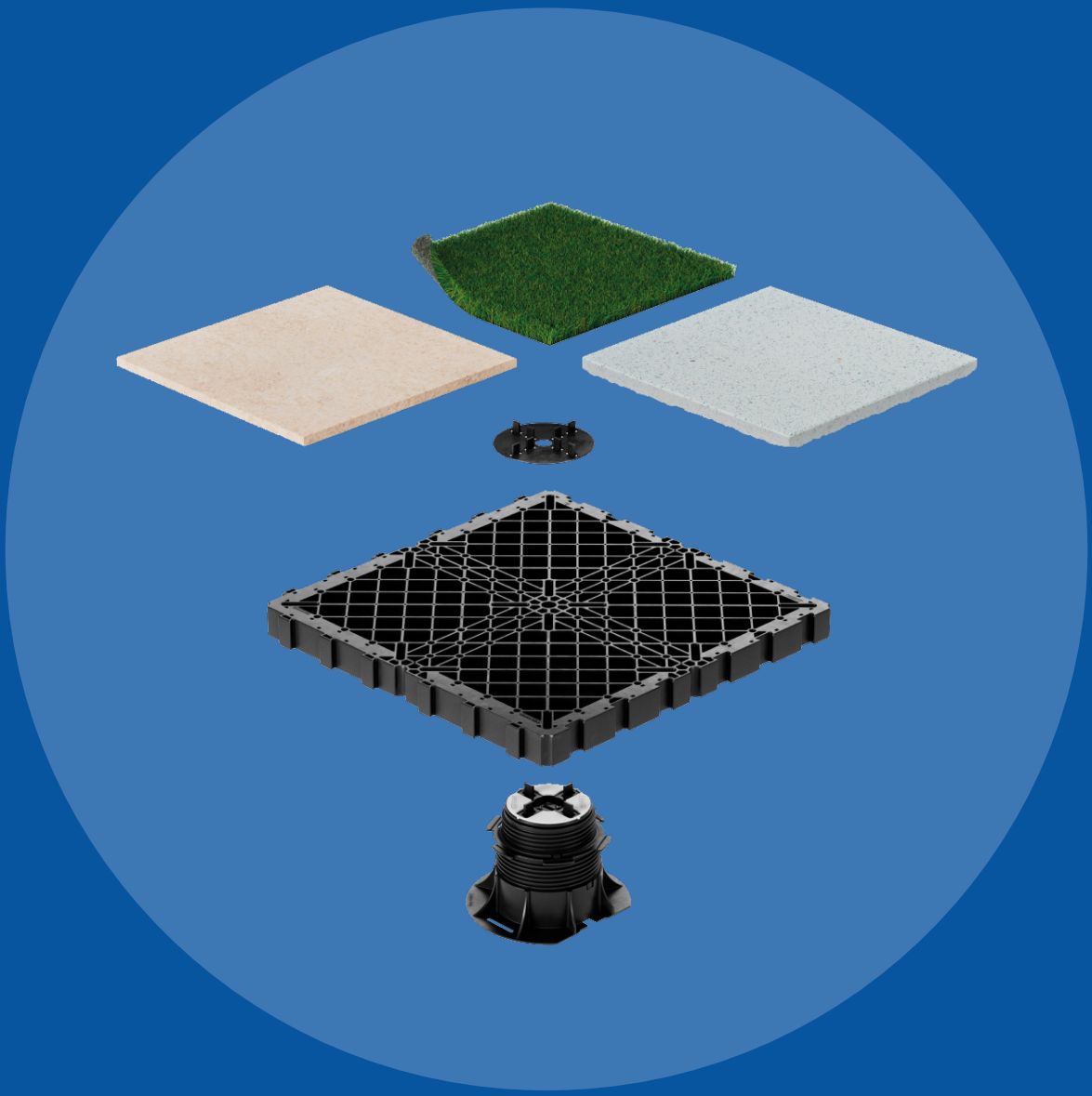
6. Consider screwing perimeter of turf at recommended intervals with 10G x 30mm stainless steel wood screws. If required, weight off turf with sand as per manufacturerer's instructions, taking care not to allow sand onto tiled/paved areas. Precautions should be taken to minimise sand tracking to drainage outlets.



7. If installing tiles/pavers, see page 3 for Tiles and Pavers.



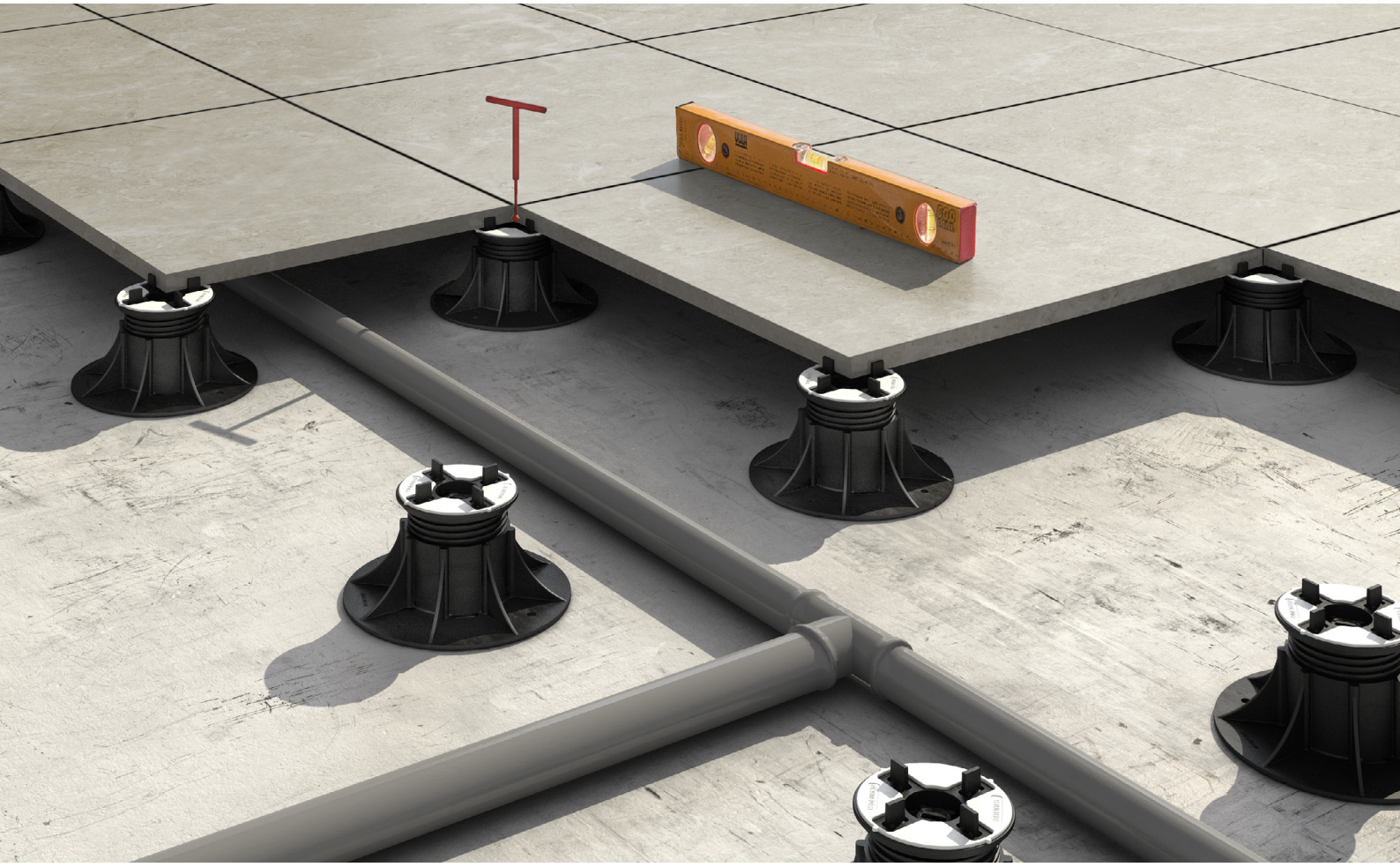
8. For areas with no containment, install Nurajack Tile Edge Trim with 10G x 30mm stainless steel wood screws to perimeter. Install vertical tile as necessary.



: 0800 687 252
: www.nurajack.co.nz

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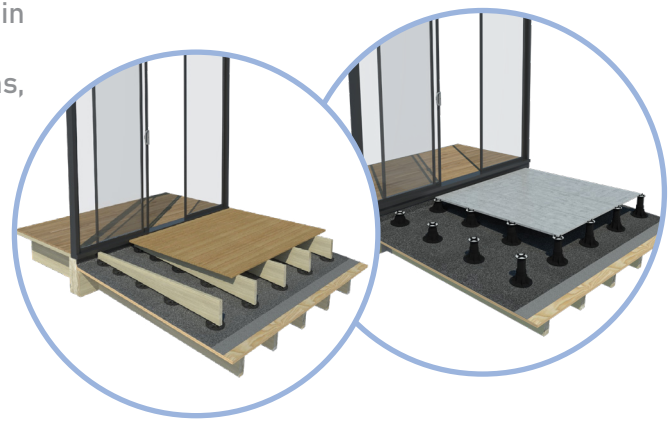
BUILDING PRODUCT INFORMATION SHEET

NURAJACK

Nurajacks are an adjustable, self-levelling pedestal support system for tile, paving or timber decking over exterior membrane waterproofing and other stable, non-eroding surfaces.

THE SYSTEM CONSISTS OF:

- Nurajack adjustable pedestal with self-levelling head in multiple sizes from 28mm to 550mm
- Nurajack Star.T and Nurapad offer low profile solutions, starting from 8mm in height
- Accessories include (but not limited to):
  - Tile Cladding Spacers and/or Clips
  - Adjustment Key
  - Shims (1mm, 2mm or 3mm)
  - Nurajack Nuragrid
  - Nurajack Tile Spacers
  - Tile Trim and/or Edge Trim
  - Acoustic Separation Pad



PLACE OF MANUFACTURER:
Italy

LEGAL AND TRADING NAME OF THE MANUFACTURER(S):
Eterno Ivica srl

LEGAL AND TRADING NAME OF THE IMPORTER:
Nuralite Group Ltd

ADDRESS FOR SERVICE:
60D Leon Leicester Ave, Mt Wellington, New Zealand 1060

WEBSITE:
www.nurajack.co.nz

EMAIL ADDRESS:
info@nurajack.co.nz

PHONE NUMBER:
0800 687 254

NZBN 9429052938009

RELEVANT BUILDING CODE CLAUSES:
NZBC E2/AS1.

STATEMENT ON HOW THE BUILDING PRODUCT IS EXPECTED TO CONTRIBUTE TO COMPLIANCE:
E2/AS1: Nurajacks act as a proprietary chair support of tile or timber decks over membranes.

LIMITATIONS ON THE USE OF THE BUILDING PRODUCT:

- The floated deck must be constrained from lateral movement.
- Not suitable for a trafficable deck surface higher than 1000mm off the substrate.

NURAJACK
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DESIGN REQUIREMENTS THAT WOULD SUPPORT THE USE OF THE BUILDING PRODUCT:

- Nurajacks can be installed over concrete, ply, CLT or Enertherm insulated substrates with a membrane.
- Nurajacks are compatible with all sheet membranes (eg. Butyl, TPO, Bitumen etc.) and are installed without penetration of the membrane.
- Nurajacks can also be installed over concrete or other stable, non-eroding surfaces to facilitate level threshold doorways.
- Nurajacks are suitable for new or existing commercial and residential buildings.
- Download full drawings and specifications from www.nurajack.co.nz

INSTALLATION REQUIREMENTS:

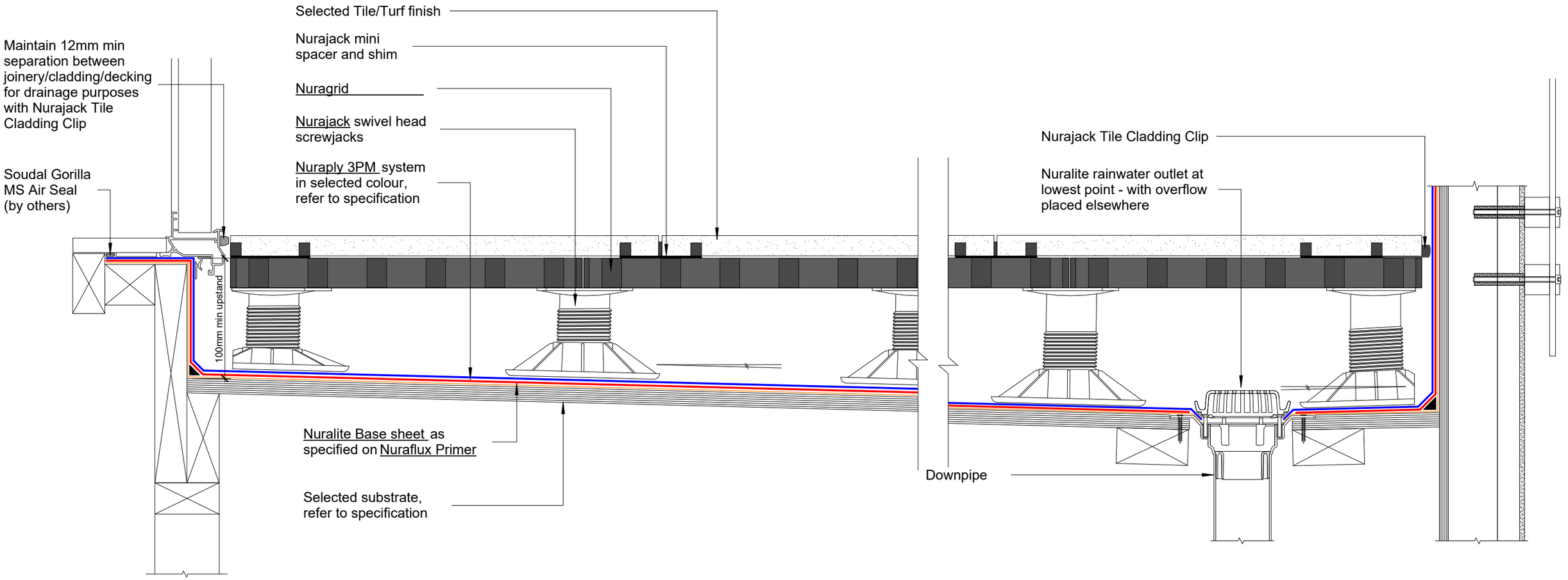
- Full installation instructions and videos can be found on the website - www.nurajack.co.nz
- The substrate should be clean and free of debris.
- Set out the Nurajacks as per the tile or timber decking span requirements.
- Adjust the Nurajacks to the desired height.
- Install the decking surface, ensuring a 12mm space is maintained around the perimeter as per E2/AS1.

MAINTENANCE REQUIREMENTS:
Periodic checking for loose Nurajacks especially if the substrate has moved.

IS THE BUILDING PRODUCT/BUILDING PRODUCT LINE SUBJECT TO WARNING OR BAN UNDER SECTION 26?:
No, there is no warning or ban under Section 267

DATE:
24.04.2026

This drawing is indicative only and not for construction. This detail depicts Nurajack products and components for correct use.
All other elements are typical only - refer to the designer. Always refer to original colour details when printing

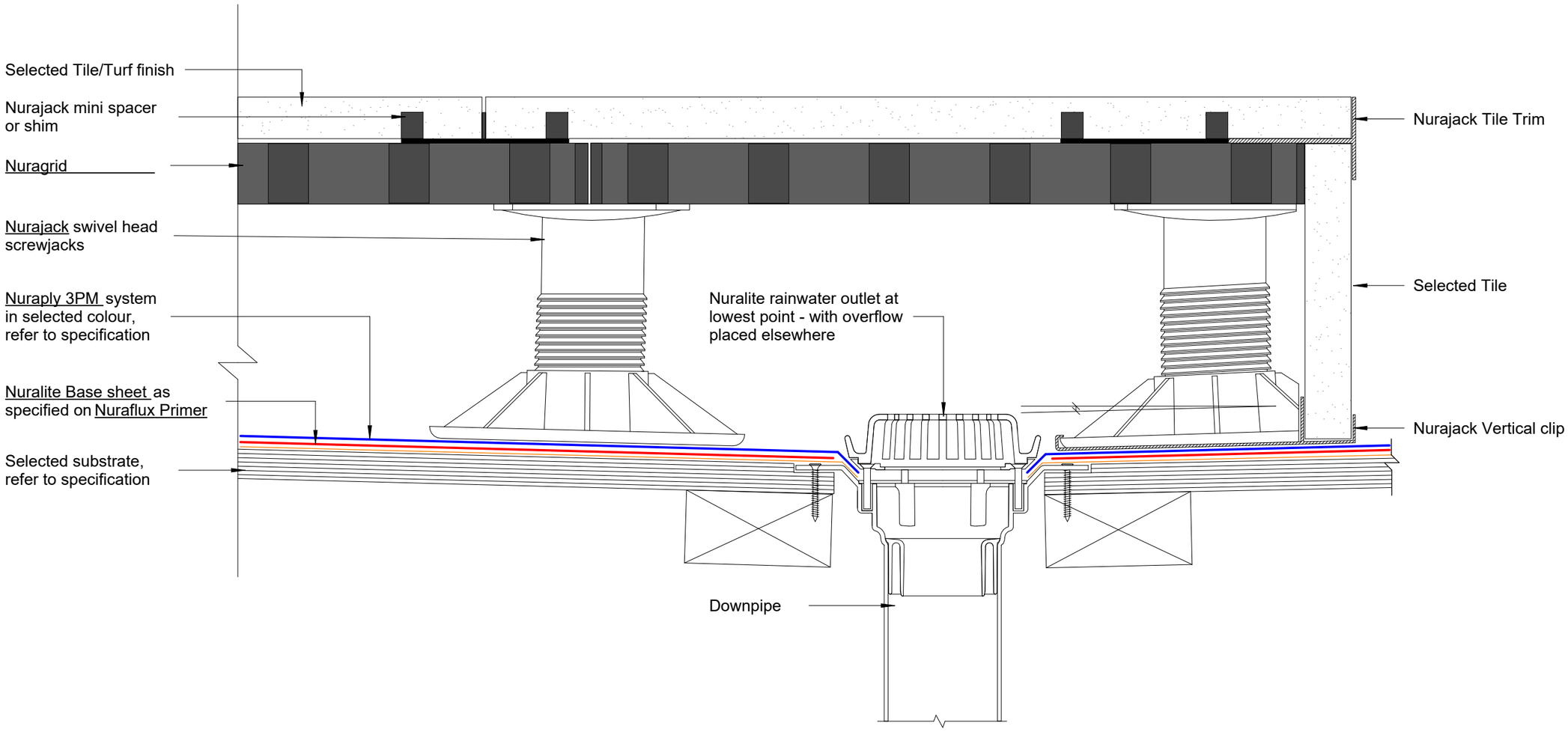


NURAJACK
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DETAIL: **NURAJACK NURAGRID**

SCALE: **NTS** DATE: **DEC 2024** PREVIOUS DWG no:**-** REVISION: **1** DWG no: **NJ.B1**

This drawing is indicative only and not for construction. This detail depicts Nurajack products and components for correct use.
All other elements are typical only - refer to the designer. Always refer to original colour details when printing

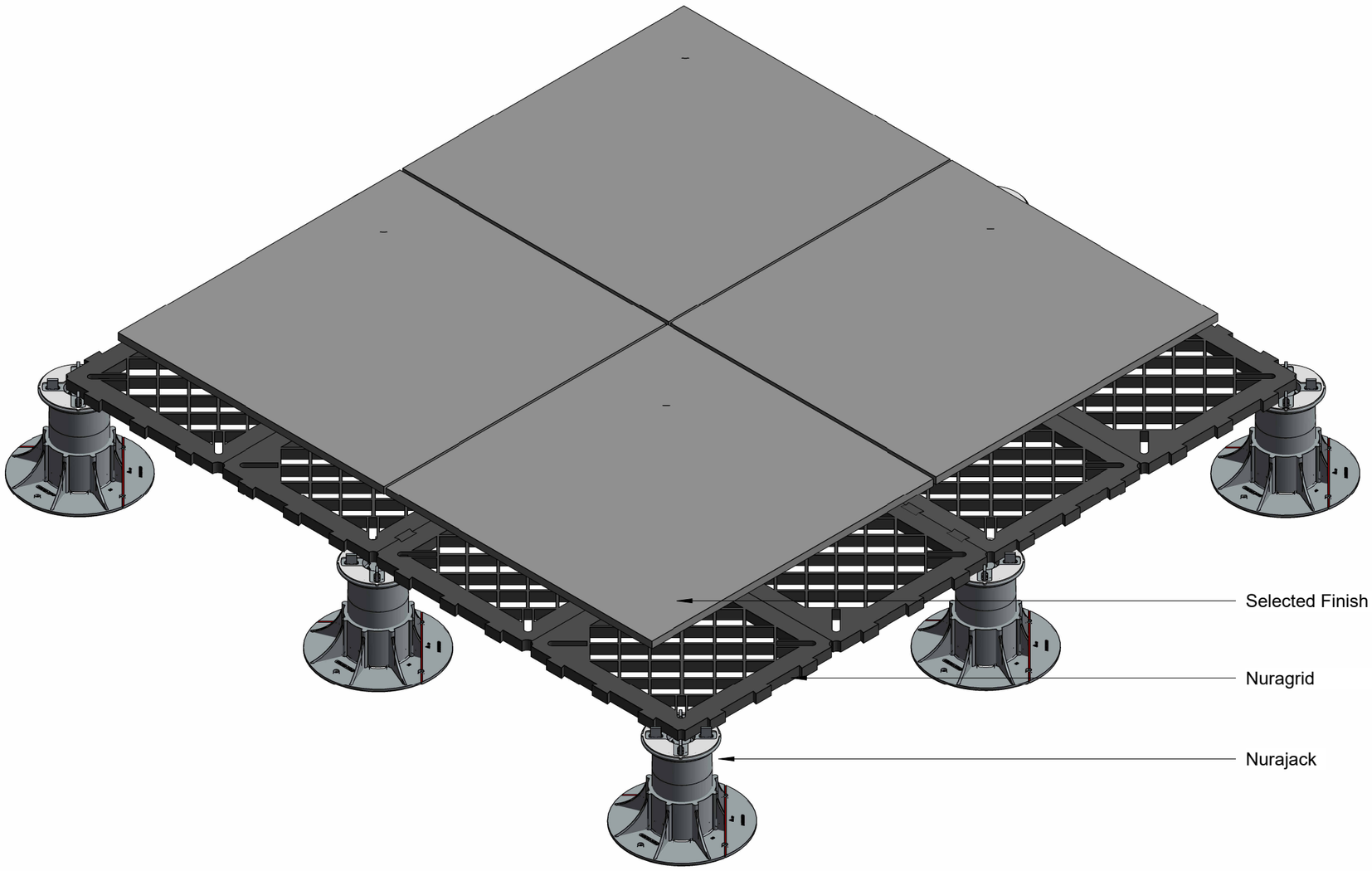


NURAJACK
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DETAIL: **NURAJACK NURAGRID - TILE TRIM EDGE**

SCALE: **NTS** DATE: **DEC 2024** PREVIOUS DWG no:**-** REVISION: **1** DWG no: **NJ.B1**

This drawing is indicative only and not for construction. This detail depicts Nurajack products and components for correct use.
All other elements are typical only - refer to the designer. Always refer to original colour details when printing



NURAJACK
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DETAIL: **NURAJACK NURAGRID - ISO**

SCALE: **NTS** DATE: **DEC 2024** PREVIOUS DWG no: **-** REVISION: **1** DWG no: **NJ.B3**

Hogan Gully - Golf Estate Clubhouse

Project Specification

Hogans Gully Road, Arrowtown, Queenstown, New Zealand

Project Ref: 17008

Date: 08 July 2026

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

Spec Version ID: 375335-452650
Document authenticity may be verified at masterspec.co.nz/verify/375335-452650
Prepared using Masterspec software

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6745R	RESENE PROTECTIVE COATINGS - STEELWORK	12

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6742R RESENE FIREPROOFING COATINGS - STEELWORK

1 GENERAL

This section relates to the preparation and painting of **Resene Paints Ltd / Altex Coatings Ltd** intumescent and fireproofing coating systems providing fire rating protection for steelwork.
It includes:

- exterior and interior structural and miscellaneous steelwork items

1.1 RELATED WORK

Refer to 3411 STRUCTURAL STEELWORK for fabrication of 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:

AMPP	Association for Materials Protection and Performance
CIP	Coating Inspector Programme
DFT	Dry Film Thickness
FPANZ	Fire Protection Association of New Zealand
FR	Fire Rated
FRR	Fire Resistance Rating
HDG	Hot Dip Galvanizing
MPNZA	Master Painters New Zealand Association Inc

Documents

1.3 DOCUMENTS

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

NZS/BS 476.21	Fire tests on buildings and structures - Method for determination of the fire resistance of load bearing elements of construction
AS 1530.4:2005	Methods for fire tests on building materials, components and structures - Fire resistance test of elements of construction
AS 1627.1	Metal finishing - Preparation and pretreatment of surfaces - Removal of oil, grease, and related contamination
AS 1627.4	Metal finishing - Preparation and pretreatment of surfaces - Method selection guide - Abrasive blast cleaning
AS/NZS 2312.1	Guide to the protection of structural steel against atmospheric corrosion by the use of protective coatings - Part 1: Paint coatings
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 3750	Paints for steel structures
AS/NZS 3750.13	Paints for steel structures - Epoxy primer (2-pack)
AS 3894.3	Site testing of protective coatings. Method 3: Determination of dry film thickness
AS/NZS ISO 9001	Quality management systems - Requirements
FPANZ	Code of Practice for the Specification and Application of Intumescent Coatings for the Fire Protection of Structural Steel.
WorkSafe	Guidelines for the provision of facilities and general safety in the construction industry
MPNZA	Health and Safety Program

Health and Safety at Work Act 2015

1.4 MANUFACTURER / SUPPLIER DOCUMENTS

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

Resene / Altex Coatings / Carboline® Product Data Sheets
Resene / Altex Coatings / Carboline® Safety Data Sheets

Manufacturer/supplier contact details

Company:	**Resene Paints Ltd**
Web:	www.resene.co.nz
Email:	advice@resene.co.nz
Telephone:	0800 737 363 / 04 577 0500

Requirements

1.5 QUALIFICATIONS WORKERS – MANUFACTURER / SUPPLIER REQUIREMENTS

For intumescent coatings, applicators to meet the requirements of FPANZ Code of Practice for the Specification and Application of Intumescent Coatings for the Fire Protection of Structural Steel. If one or more of the FPANZ Code of Practice conditions are not met, an accredited third-party coatings inspector should be engaged to oversee application.

Trained and approved applicators are required for applying Altex Nullifire SC902.

Refer to 1270 CONSTRUCTION for additional requirements relating to qualifications.

1.6 NO SUBSTITUTIONS

Substitutions are not permitted to any of the specified Resene Paints or Altex Coatings Systems, components and associated products listed in this section without the express written approval from Altex Coatings Technical Services.

1.7 SAMPLES

Refer to the general section 1270 CONSTRUCTION for details of how samples will be reviewed and how instructions to proceed will be given. Provide the following samples for review:

	Sample A	Sample B	Sample C
Sample description:	~	~	~
Sample type:	~	~	~
Number:	~	~	~
Location:	~	~	~
Supporting documentation:	~	~	~
Reviewer:	Contract administrator ~	Contract administrator ~	Contract administrator ~
Time for review:	10 working days ~	10 working days ~	10 working days ~
Review criteria:	~	~	~

1.8 SUPPLY VERIFICATION PRODUCER STATEMENT

Contact Altex Coatings Ltd before the shop or on-site application of fireproofing where a manufacturers product supply verification statement is required.

Compliance information

1.9 INFORMATION REQUIRED FOR CODE COMPLIANCE

Provide the following compliance documentation:

- Applicator’s approval certificate from the distributor
- Manufacturer / supplier warranty
- Applicator warranty
- Applicator Quality Assurance Records - applicators QA Procedures and Inspection Test Plan (ITP) & records
- Producer Statement - Construction (PS3) from the applicator including supplier Intumescent Paint manufacturer’s - Fire Loading Schedule with the required Dry Film Thicknesses and floor plans identifying location of intumescent coatings.
- Producer Statement - Construction Review (PS4) from consultant engaged by client.
- Third Party Inspection certification

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- Other information required by the BCA in the Building Consent Approval documents including maintenance, fire rest reports, remedial specification

Performance

1.10 QUALITY ASSURANCE

Maintain quality assurance programs to AS/NZS ISO 9001 for surface preparation, environment conditions and coating application, as necessary to ensure that work is performed in accordance with this specification and the qualifying requirements of the contract documents.

1.11 NON-CONFORMANCE TO SPECIFICATIONS

Any reduced passive fire protection system performance which may result from the steel preparation and / or selection of specified coatings not being followed in accordance with the specification is outside the control of Resene Paints Ltd**.**

1.12 GENERAL INSPECTIONS - HOLD POINTS

Notify of Hold Point work/item, do not to proceed further with work/item until advised to continue.

Notify:	Contract administrator
Notification:	2 working days prior to work/item being carried out.

Inspection of the work is to take place at each of the stages as scheduled. Refer to SELECTIONS. Confirm a written program to facilitate these inspections, including notification when each stage of the work is ready for inspection.

1.13 INDEPENDENT THIRD PARTY INSPECTIONS

If qualification requirements are not met, engage a third-party independent accredited inspector to verify that the work has been carried out in accordance with the required standards and provide certification of compliance. Confirm a written programme to facilitate these inspections by an Independent Inspector, including notification when each stage of the work is ready for inspection.

All coatings inspections are to be carried out by a minimum AMPP CIP level 1 Certified Coating Inspector (or equivalent such as CBIP Protective Coating Inspector) who has experience with intumescent coatings.

1.14 MANUFACTURER'S INSPECTIONS

Permit the paint manufacturer to inspect the work in progress and to take samples of their products from site as requested. This is not deemed independent inspection but supplier site assistance to help with advice and guidance only.

1.15 TESTING - DRY FILM THICKNESS

Test for dry film thickness of all intumescent paint system individual coatings and overall system thickness in accordance to AS 3894.3 and in accordance with FPANZ Code of Practice for the Specification and Application of Intumescent Coatings for the Fire Protection of Structural Steel.

1.16 HEALTH AND SAFETY

Refer to the requirements of the Health and Safety at Work Act 2015 and WorkSafe: Guidelines for the provision of facilities and general safety in the construction industry. If the elimination or isolation of potential hazards is not possible then minimize hazards in this work on site by using the proper equipment and techniques as set out in the MPNZA Health and Safety Program. Supply protective clothing and equipment. Inform employees and others on site of the hazards and put in place procedures for dealing with emergencies.

1.17 SAFETY DATA SHEETS

Obtain from Resene Paints Ltd & Altex Coatings Ltd the safety data sheet for each paint product used and comply with the required safety procedures. Keep sheets in application shop and on site.

Conditions

1.18 CONDITIONS - MATERIALS

Use only Resene Paints Ltd & Altex Coatings Ltd products which are guaranteed for consistency and performance under AS/NZS ISO 9001 and when prepared, mixed and applied as directed in the Resene Engineered Coatings Systems & Altex Coatings Ltd Coatings Manual or refer to www.resene.co.nz, www.altexcoatings.co.nz.

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2 PRODUCTS

Fireproofing coatings

2.1 THIN FILM INTUMESCENT COATING

Nullifire® SC601, solvent based single component, fast drying intumescent coatings, tested to BS 476.21. Applied by airless spray, it provides fire protection of interior steel against structural failure for up to 60 minutes. Refer to SELECTIONS. **ONSITE APPLICATION RECOMMENDED FOR THIS SYSTEM**

Primers

2.2 ALL PURPOSE EPOXY

Carboguard® 635, a two-component epoxy coating suitable for use as a corrosion resistant primer or as an epoxy intermediate coat. May be applied onto mild steel and hot-dip galvanized steel (HDG), for interior and exterior use. Refer to SELECTIONS.

Sealers

2.3 INTUMESCENT SEALER COAT

Pro-Seal® Intumescent Seal Coat, a single pack solvent-based coating used as a seal coat over Nullifire® SC601 Intumescent base coat to provide protection from weather, rain and moisture as well as seal the intumescent prior to applying polyurethane finish coats. Also used to promote the cure of Nullifire® SC601 to achieve a Shore D50 level of hardness before finish coating. Refer to SELECTIONS

Isocyanate Free

2.4 ISOCYANATE FREE ACRYLIC EPOXY GLOSS / SEMI-GLOSS FINISH - SOLVENT BASED

Imperite IF 503 & Imperite IF 502 (Semi-Gloss) epoxy reactive acrylic finish for interior and exterior suitably primed structural steel. Available in a range of colours and gloss levels. Refer to SELECTIONS.

Coating systems

2.5 COATING SYSTEMS

Refer to SELECTIONS for type.

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 paint containers in accordance with selected product Technical Data Sheets and any Health and Safety at Work (Hazardous Substances) regulations.

For off-site coated steelwork, implement protective measures and care during transport, storage, and erection of steelwork. If off-site steelwork is to be stored for pro-longed periods and exposed to the weather, stack, and cover to eliminate ponding of water and periodically wash down to remove surface contamination.

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-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.



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3.4 ENVIRONMENTAL CONDITIONS FOR PAINTING - MONITORING

Carry out off-site and on-site preparation and coating application in accordance with conditions as per Technical Data Sheet for specified Resene / Altex products. Do not carry out preparation or painting when the ambient relative humidity exceeds 85%, or when the steel surface temperature is within 3°C of the dew point.

For intumescent coating systems, monitor and record environmental conditions before and after application and at maximum 4 hourly intervals as part of the project Q&A documentation. The minimum conditions monitored are:

- Air temperature
- Steel temperature
- Dew point
- Relative humidity

3.5 COATING APPLICATION

Apply coatings strictly in accordance with the manufacturer's stated requirements. Ensure that the manufacturer's latest product data sheets are available for reference during preparation and painting.

3.6 COMPATIBILITY / CONDITIONS OF EXPOSURE

Ensure that materials used, and systems applied are approved by the manufacturer for the surface and conditions of exposure, and that materials used within each painting system are compatible with each other and are from the same manufacturer.

3.7 SEQUENCE OF OPERATIONS

Complete surface preparation before commencing painting. Apply paint in the specified sequence using the specified paint. Allow full drying time between coats to the manufacturer's stated requirements. Do not expose primers, undercoats and intermediate coats beyond a few days before applying the next coat.

3.8 DRYING & OVER-COATING TIME

Ensure that surfaces being painted are clean, dry and that ambient conditions are such that condensation does not occur before the paint reaches surface-dry condition.

Before handling or applying the next coat of paint, give each coat the required drying time required by the manufacturer.
Where high film builds of intumescent are required, apply in thinner multiple coats. Ensure that surfaces being painted are clean, dry and that ambient conditions are such that condensation does not occur before the paint reaches surface-dry condition.

3.9 INSTALLATION OF SUNDRY ATTACHMENTS

Ensure clips, hangars, supports, sleeves, precast concrete panel connections and other attachments specified under other work sections are placed and fixed before the application of the coating.

3.10 PROTECT ADJOINING SURFACES

Protect adjoining surfaces and areas to prevent contamination from overspray or fallout of materials.

Application

3.11 STANDARDS AND TOLERANCES

Refer to the general section 1270 CONSTRUCTION for general requirements.

Application - surface preparation

3.12 UNPAINTED SURFACES

Do not paint:

- Faying face of high strength friction grip (HSFG) bolted joints
- Areas for site welding keeping 75mm clear all round

3.13 SURFACE PREPARATION

Remove all slag.
Ensure that all cut edges are ground to a smooth 2mm radius.



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The following applies:

For welds exposed to view:	Remove weld splatter and grind to a neat, clean finish
For intumescent fireproofing coating:	Remove rust and mill scale by abrasive blasting to SSPC SP10 (AS1627.4 Class 2½)

Pre-clean steelwork to SSPC SP1 (AS 1627.1), then carry out abrasive blasting or power tool preparation after completion of the fabrication. Apply required coating to the coating manufacturer's requirements. Apply primer coat within 4 hours of preparation. Work off site wherever possible. Surfaces that are in contact or near contact are to receive specified coating before assembly.

3.14 CONDITIONS FOR PREPARING STEELWORK BEING PAINTING

Prepare steelwork in conditions approved for the application of coatings. Carry out off site preparation and coating applications under cover, in a controlled environment and with adequate lighting.

3.15 POWER TOOL DISC CLEANING

Remove oil and grease by the use of solvents. Scrape and power disc prepare to Class St3 standard in accordance with AS 1627.2 (SSPC SP3) and avoid producing a polished surface. Check that no burrs or sharp arrises remain which may prevent full coating thickness to be attained.

3.16 ABRASIVE BLASTING

Remove oil and grease by the use of solvents. Abrasive blast clean to Class 2½ finish to AS 1627.4 (SSPC SP10) and achieve a blast profile between 38 - 75 microns. Clean to bright metal but avoid producing a polished surface. Select a suitable blast media 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.

3.17 PREPARING ZINC PRIMED SURFACES

Zinc primers must be free from zinc salts, remove if present. Remove grease, oil and other solvent-soluble contaminants by solvent wiping with Altex D30 Degreaser/Dewaxer. Allow to dry and proceed with the next operation immediately.

All zinc primed surfaces are to be lightly abraded to achieve a surface key. Areas of smooth or glossy surfaces are to be abraded to a matte finish.

Application - general

3.18 EACH COAT

Each coat of paint and completed paint system to have the following qualities and properties:

- Uniform finish, colour, texture, sheen and hiding power
- Correct number of coats applied and DFT achieved
- Free of defects such as pin holing, alligatoring, blistering, staining, overspray, peeling, runs, sags and wrinkling.

3.19 PRIMING -GENERALLY

Apply specified Altex or Resene primer to prepared steelwork in accordance with the primer manufacturer's Technical Data Sheet and to the required DFT for the specified Intumescent Coating System, refer to SELECTIONS for details. Test and record DFT as part of the project Q&A documentation.

The maximum average thickness of primer (measured according to ASFP TGD 11 guidelines) for an item to be coated with intumescent should not exceed a dry film thickness (DFT) of 150 microns. Any single spot reading shall not exceed 250 microns and any 3-point average reading should not exceed 200 microns DFT.

If shop primed, allow for patch priming on site after erection

3.20 PATCH PRIMING

Clean and prepare areas of damaged priming and areas left clear for site jointing to a standard comparable with the shop cleaning specified. Degrease to remove chemical fume deposits resulting from welding as well other contamination. Apply priming coat/s to same standard as shop primers, ensuring thorough coating of bolts, nuts and connection areas. Re-prime if the primer fails, or more than the specified primer re-coat time has lapsed before the final coating system is applied.

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3.21 PRIOR TO INTUMESCENT COATING APPLICATION

Confirm surface preparation is in accordance with Altex Technical Data Sheet for specified intumescent coating. Ensure surface is clean and dry, ready for intumescent coating. Lightly abrade primer coat to provide a key.

If system includes primer, ensure primer condition is suitable and confirm primer is within re-coat time. Ensure primer DFT summary documentation has been provided however the on-site applicator should carry out their own readings to confirm DFT of primer. Proceeding with the application of intumescent coating implicitly accepts the condition and DFT of primer.

Ensure each steel section is adequately identified and required intumescent coating type and thickness confirmed.

3.22 APPLICATION OF INTUMESCENT COAT - GENERALLY

Apply selected Altex intumescent coat/s to coating manufacturer's requirements and the required DFT specified for each fire rated structural steel member. If the on-site application of intermediate and/or finish coats is via brush/roller multiple coats may be required to achieve the nominated dry film thickness.

3.23 SITE REPAIR METALLIC / MIOX FINISHES

Spray application (conventional or HVLP) on site is recommended for repair and touch up of MIOX or Metallic finishes.

3.24 BOLTED / WELDED CONNECTIONS AND GALVANIZED BOLTS

For shop applied intumescent coatings, allow to mask off areas within 100mm of steel requiring to be site welded prior to shop application. After site welding has occurred allow to clean and prepare area, apply primer and intumescent coating on-site in accordance with manufacturer's requirements.

For fire rated bolted connections allow to apply Intumescent coating at the same DFT of adjacent beam/column, plus finish coat if required.

For galvanized bolts allow to degrease, abrade, and apply an approved primer coat prior to the intumescent coating of galvanized bolts.
Contact Altex Coatings Ltd for FR Galvanized Bolt painting specification.

3.25 INTUMESCENT COAT - DRY FILM THICKNESS

Apply intumescent coating to the required DFT specified for each fire rated structural steel member. Note the DFT's are item specific and are to be obtained from the Fire Loading Schedule issued by Altex Coatings Ltd. If DFT for fire rated sections are not detailed within, contact Altex Coatings Ltd for details. Refer to SELECTIONS for details.

3.26 INTUMESCENT COAT - DRY FILM THICKNESS DEFICIENCY REPAIR

Where DFT testing has confirmed that intumescent coating DFT is less than acceptable criteria, further application of coating is required. Ensure that the application is within the re-coat time of intumescent coating. Ensure surface is clean, dry and free from contamination, then apply intumescent coating to manufacturers requirements.

Where DFT testing has confirmed that intumescent coating DFT is more than manufacturer's acceptable criteria, contact manufacturer for corrective procedures.

3.27 APPLICATION OF TOPCOAT - GENERALLY

For systems with decorative and/or protective (non-intumescent) topcoat, lightly abrade intumescent coat to provide a key. Apply topcoat / coats by spray, brush or roller in accordance with the relevant product Altex Technical Data Sheet and manufacturer's requirements. Refer to SELECTIONS for dry film thickness.

3.28 APPLICATION OF TOPCOAT - ARCHITECTURAL FINISH

For systems with decorative and/or protective (non-intumescent) topcoat, if a high-quality aesthetic finish is required, a thorough sand of the Intumescent coating is recommended prior to applying the topcoat. When sanding intumescent coatings always ensure adequate film build is maintained to provide the required DFT.



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3.29 WEATHER PROTECTION & SEAL COATING OF INTUMESCENT COATED STEEL SECTIONS

Unsealed Nullifire SC601 will not withstand prolonged rain/water contact, even under optimum curing conditions during construction. Where exposure to weather, rain and/or water contact may occur, temporary protection must be supplied. Application of Altex Pro-Seal intumescent sealer coat will provide weather protection during construction once the required dry film thicknesses are achieved (refer to Altex Coatings).
Also apply Altex Pro-Seal intumescent sealer to Nullifire SC601 in the following situations:

- when shop applying the intumescent or to mitigate the risk with water, rain or weather contact while in laydown areas or during on-site construction.
- when steel sections are adjacent to glazing which will be in direct sun contact
- to promote the hard cure of Nullifire SC601
- to permit the application of a wide range of architectural finishes.

3.30 PROTECTION OF COATED STEEL SECTIONS

Ensure that unsealed Nullifire SC601, unsealed Nullifire® SC902, Nullifire® SC802, and Southwest Type 5 GP coated steel sections are not exposed to any water, rain, or moisture contact both during application as well as during the design life (refer to Altex Coatings).

Completion

3.31 COMPLETION MATTERS

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

3.32 COMPLETION - TESTS & CERTIFICATION

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

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4 SELECTIONS

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

Structural Steel Member Schedule

4.1 STRUCTURAL STEEL MEMBER SCHEDULE

Refer to ~ for structural steelwork schedule for Intumescent Coatings.

Inspections

4.2 GENERAL INSPECTIONS - HOLD POINT

Hold Point Schedule:

Location/Coating System:	Hold Point Inspection	Requirement
~	~	~
~	~	~

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New interior dry visible steel, 30 – 60 FRR, solventborne intumescent + finish

4.3 RESENE / ALTEX NULLIFIRE® SC601 INTUMESCENT SYSTEM, METALLIC GLOSS SYSTEM, 30-60 FRR

Location:	Interior Exposed
Environmental Classification:	C1 – C3
Steel FRR:	30 Mins
Supplier:	Resene Paints Ltd / Altex Coatings Ltd
System:	Epoxy Primer / Intumescent coating / intumescent sealer / acrylic epoxy finish
Preparation:	Abrasive blast to AS 1627.4 Class 2½ (SSPC SP10)
1st coat:	Altex CarboGuard 635 @ 75 microns DFT
2nd coat:	Altex Nullifire® SC601 Series Intumescent @ ~ microns DFT in accordance with Steel Members Hp/A value as detailed in the Nullifire loading schedule. This product should be applied onsite to eliminate transport damages.
3rd coat:	Altex Pro-Seal Intumescent Seal Coat @ 50 microns DFT
4th coat:	Resene Imperite IF503 RA81 @ 50 microns DFT
5th coat:	Resene Imperite IF503 RA81 @ 50 microns DFT
6th coat: (optional)	Resene Uracryl 404 clear Low sheen @ 30 microns DFT
5th coat colour:	Electro Dark Bronze
Finish:	Architectural.
NOTE:	Client's preference is to do all the work off-site. Extra care should be taken when doing this system offsite by proper wrapping and handling when on and offloading the steel.

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6745R RESENE PROTECTIVE COATINGS - STEELWORK

1 GENERAL

This section relates to the preparation and application of Resene Paints Ltd coating systems to steelwork.

1.1 RELATED WORK

Refer to 3411 STRUCTURAL STEELWORK for fabrication of 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:

ACOP	Approved Code of Practice
DFT	Dry film thickness
SIPDS	Surface Information & Preparation Data Sheets
SSPC	Society for Protective Coatings

Documents

1.3 DOCUMENTS

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

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 ISO 9001	Quality management systems - requirements
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
AS 1627.7	Metal finishing - Preparation and pretreatment of surfaces, Hand tool cleaning of metal surfaces
AS 3894.3	Site testing of protective coatings - Method 3 Determination of fry film thickness

WorkSafe ACOP: Management and Removal of Asbestos

1.4 MANUFACTURER/SUPPLIER DOCUMENTS

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

Resene Surface Information & Preparation Data Sheets (SIPDS)
Resene Engineered Coating Systems Manual
Resene Product Technical Data Sheets
Resene Safety Data Sheets
Resene Putting Your Safety First brochure
Maintenance Guide for Resene Paint Finishes

Manufacturer/supplier contact details

Company:	Resene Paints Ltd.
Web:	www.resene.co.nz
Email:	advice@resene.co.nz
Telephone:	0800 RESENE (0800 737 363)

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Warranties

1.5 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

~ years For ~

- 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.

1.6 WARRANTY - INSTALLER/APPLICATOR

Provide an installer/applicator warranty:

3 years: For execution

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

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.7 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 following general operation and maintenance information as electronic PDF format documents:
Maintenance Guide for Resene Paint Finishes

Provide this information prior to practical completion.

1.10 QUALITY CONTROL SYSTEM - AS/NZS ISO 9001

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.

1.11 INSPECTIONS

Type:
Requirement:
Location:
Notify: Contract administrator
~
Notification: 2 working days prior to work/item being carried out

2 PRODUCTS

Materials

2.1 RESENE COATING SYSTEMS

Refer to SELECTIONS.

2.2 RESENE PRIMER

Refer to SELECTIONS.

2.3 THINNERS/ADDITIVES

Thinners and additives as required by Resene Paints Ltd for particular applications.

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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-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 CONDITIONS FOR PAINTING

Surfaces to be painted are dry and ambient conditions are such that condensation will not occur before the paint reaches surface-dry condition:

Ambient relative humidity	Maximum 85%
Air temperature	Between 10°C and 25°C
Substrate temperature	3°C above Dew Point

Application

3.5 STANDARDS AND TOLERANCES

Refer to the general section 1270 CONSTRUCTION for general requirements.

3.6 APPLICATION GENERALLY

Prepare and apply coatings in accordance with Resene Engineered Coatings Systems Manual, SIPDS, and Product Technical Data Sheets.

3.7 COMPATIBILITY

Use only Resene Paints Ltd products as required for the particular surface and conditions of exposure, and that materials used within each painting system are compatible with each other.

3.8 SEQUENCE OF OPERATIONS

Complete surface preparation before commencing painting. Apply paint in the specified sequence using the specified paint. Allow full drying time between coats to the manufacturer's stated requirements. Do not expose primers, undercoats and intermediate coats beyond a few days before applying the next coat. Surfaces being painted to be dry and ambient conditions met to prevent condensation from occurring before the paint reaches surface-dry condition.

3.9 DRYING TIME

Before applying the next coat of paint, give each coat the required drying time.

Surface preparation

3.10 LEAD-BASED PAINT

Handle lead-based in accordance with Resene Putting Your Safety First brochure.

3.11 ASBESTOS

Handle asbestos in accordance with WorkSafe ACOP: Management and Removal of Asbestos.

3.12 UNPAINTED SURFACES

Do not paint:

- Faying face of high strength friction grip (HSFG) bolted joints
- Areas for site welding keeping 75mm clear all round
- Surfaces for embedding in concrete. Where steel is only partly encased, extend priming 100mm maximum into the concrete encasement area.

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3.13 BRUSHING AND POWER TOOL CLEANING

Remove oil and grease to AS 1627.1. Water blast to remove salt deposits. Scrape and power wire brush to a minimum class 2 finish to AS 1627.2. Grind sharp edges to a 2mm radius. Clean to bright metal, without producing a polished surface. Check that no burrs or sharp arrises remain which may prevent full coating thickness being attained.

3.14 ABRASIVE BLASTING

Remove oil and grease to AS 1627.1. Water blast to remove salt deposits. Abrasive blast clean to a class 2½ finish to AS 1627.4. Select grit type and equipment so 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.

3.15 PREPARING HOT DIP GALVANIZED SURFACES

Remove grease, oil to AS 1627.1. Water blast to remove salt deposits. Allow to dry and proceed with the next operation immediately. Carefully whip blast (sweep blast) the surface to provide a slightly roughened surface profile using clean new non-metallic blasting media. Do not to remove more than 10 microns of zinc from galvanized surface. Remove white corrosion completely before painting.

3.16 PREPARING "IN-LINE" GALVANIZED, ZINC AND ALUMINIUM/ZINC COATINGS

Remove grease, oil and other solvent-soluble contaminants to AS 1627.1. Water blast to remove salt deposits. Remove white corrosion by wet and dry sanding or high pressure water blasting before painting. Allow to dry and proceed with the next operation immediately.

3.17 SHOP PRIMING

Degrease to AS 1627.1. Water blast to remove salt deposits. Allow to dry and remove all loose corrosion products by wire brushing, power tool cleaning, or abrasive blast cleaning. Dust off and apply a coat of primer within 4 hours of completing surface preparation in accordance with appropriate SIPDS standard and specified dry film thickness.

3.18 PATCH PRIMING

Clean areas of damaged priming and areas left clear for site jointing to a standard comparable with the shop cleaning specified. Wash off chemical deposits from welding fumes. Apply priming coats to same standard as shop primers, ensuring thorough coating of bolts, nuts and connection areas. Re-prime if the primer fails, or more than 4 weeks elapse before the final coating system is applied. Overlap patch primer 20mm over sound existing coating.

Coating/Painting

3.19 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 correct number of coats and specified dry film thickness of each coat is achieved
- Free of defects, including pin-holing, alligatoring, blistering, staining, overspray, peeling, runs, sages and wrinkling

3.20 PAINT FILM THICKNESS

The film thickness and dry film thicknesses noted in SELECTIONS are the minimum to be achieved. Do not exceed thickness by more than 20%. Achieve the specified film thickness for each coat before applying the subsequent coat. Measure the dry film thickness to AS/NZS 3894.3 (SSPC-PA2).

Completion

3.21 COMPLETION MATTERS

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

3.22 COMPLETION - TESTS & CERTIFICATION

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

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4 SELECTIONS

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

Mild steel primer only systems

4.1 INTERIOR CONCEALED MILD STEEL - IZS1 INORGANIC ZINC SILICATE - C1 - DRY (ON THE WARM SIDE OF THE DEW POINT) INACCESSIBLE AND ACCESSIBLE FOR MAINTENANCE

Location:	Internal Concealed Structural Steel - Dry (on the warm side of the dew point) C1 - Inaccessible for Maintenance
System:	Resene equivalent to AS/NZS 2312.1 IZS1 Inorganic zinc
Durability:	Time to First Major Maintenance C1 - Very Low 25+ years in accordance with AS/NZS 2312.1:2014 and SNZ TS 3404:2018
Description:	Mild steel, Inorganic Zinc Silicate

Offsite Preparation and Priming

Surface prep:	Wash and degrease where necessary in accordance with AS 1627.1 to remove all soluble contamination, Dry Abrasive Blast in accordance with AS 1627.4 (Sa 2½) or SSPC-SP10 'Near White Metal' to remove all existing coatings, corrosion and corrosion bi-products and achieve a uniform jagged blast profile of between 35µm (minimum) and up to 50µm. Clean to remove all dust, grit and debris, all surfaces to be painted shall Clean and Dry.
Primer coat:	Resene Zincilate 11 RA21 @ 75 microns DFT

Onsite repair of welded or damaged areas

Surface Prep:	Wash and degrease where necessary then to any welded or damaged steel areas, spot power tool clean the area to a white metal finish as per SSPC-SP11 Standard. Must achieve a minimum of a 25 microns profile. All sound coating to be painted or spot primed is to be evenly sanded/scuffed with P120-P180 grit sandpaper, ensure all paint edges are feathered to provide adequate adhesion prior to priming. Ensure all sanding dust and contaminants are removed.
Spot Prime:	Spot prime all bare or damaged areas with Resene Armourzinc 120 RA22 @ 75 microns DFT, Overlap existing sound coating by 15-25mm, this may need to be applied in 2 coats by brush or roller.

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4.2 INTERIOR CONCEALED MILD STEEL – INHIBITIVE 2 PACK EPOXY PRIMER - C1 - DRY (ON THE WARM SIDE OF THE DEW POINT)

Location:	Internal Concealed Structural Steelwork - Dry (on the warm side of the dew point) C1 - Inaccessible for Maintenance
System:	Inhibitive epoxy
Durability:	Expected time to First Major Maintenance C1 - Very Low 15-25+ Years
Description:	Mild steel, Inhibititive Epoxy Primer

Offsite Preparation and Priming

Surface prep:	Wash and degrease where necessary in accordance with AS 1627.1 to remove all soluble contamination, Dry Abrasive Blast in accordance with AS 1627.4 (Sa 2½) or SSPC-SP10 'Near White Metal' to remove all existing coatings, corrosion and corrosion bi-products and achieve a uniform jagged blast profile of between 35µm (minimum) and up to 50µm. Clean to remove all dust, grit and debris, all surfaces to be painted shall Clean and Dry.
Primer coat:	Resene Armourcote 220 RA34 @ 75 microns DFT

Onsite repair of welded or damaged areas

Surface Prep:	Wash and degrease where necessary then to any welded or damaged steel areas, spot power tool clean the area to a white metal finish as per SSPC-SP11 Standard. Must achieve a minimum of a 25 microns profile. All sound coating to be painted or spot primed is to be evenly sanded/scuffed with P120-P180 grit sandpaper, ensure all paint edges are feathered to provide adequate adhesion prior to priming. Ensure all sanding dust and contaminants are removed.
Spot Prime:	Spot prime all bare or damaged areas with Resene Armourcote 221 RA36 @ 75 microns DFT, Overlap existing sound coating by 15-25mm, this may need to be applied in 2 coats by brush or roller.

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4.3 RESENE INTERIOR VISIBLE NEW MILD STEEL, SOLID COLOUR - PUR2 - C1 - DRY (ON THE WARM SIDE OF THE DEW POINT

Location:	Internal Visible Structural Steelwork - Dry (on the warm side of the dew point) C1 - Inaccessible and Accessible for Maintenance
System:	Resene equivalent to AS/NZS 2312.1 PUR2
Durability:	Time to First Major Maintenance C1 - Very Low 25+ Years in accordance with AS/NZS 2312.1:2014 and SNZ TS 3404:2018
Description:	Mild steel, Inhibititive Epoxy Primer, Metallic Gloss System

Offsite Preparation and Priming

Surface prep:	Wash and degrease where necessary in accordance with AS 1627.1 to remove all soluble contamination, Dry Abrasive Blast in accordance with AS 1627.4 (Sa 2½) or SSPC-SP10 'Near White Metal' to remove all existing coatings, corrosion and corrosion bi-products and achieve a uniform jagged blast profile of between 35µm (minimum) and up to 50µm. Clean to remove all dust, grit and debris, all surfaces to be painted shall Clean and Dry.
1st coat:	Resene Armourcote 220 RA34 @ 75 microns DFT

Onsite repair of welded or damaged areas

Surface Prep:	Wash and degrease where necessary then to any welded or damaged steel areas, spot power tool clean the area to a white metal finish as per SSPC-SP11 Standard. Must achieve a minimum of a 25 microns profile. All sound coating to be painted or spot primed is to be evenly sanded/scuffed with P120-P180 grit sandpaper, ensure all paint edges are feathered to provide adequate adhesion prior to priming. Ensure all sanding dust and contaminants are removed.
Spot Prime:	Spot prime all bare or damaged areas with Resene Armourcote 221 RA36 @ 75 microns DFT, Overlap existing sound coating by 15-25mm, this may need to be applied in 2 coats by brush or roller.
2nd coat:	Resene Imperite IF503 RA81 @ 50 microns DFT
3rd coat:	Resene Imperite IF503 RA81 @ 50 microns DFT
4th coat: (Optional)	Resene Uracryl 404 clear Low sheen @ 30 microns DFT
4th coat colour:	Electro Dark Bronze
Finish:	Architectural

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4.4 NEW INTERIOR CONCEALED MILD STEEL PRIMER – C3 - DAMP (ON THE COLD SIDE OF THE DEW POINT OR IN SUBFLOOR SPACES) C3 - INACCESSIBLE AND ACCESSIBLE FOR MAINTENANCE

Location:	Internal Concealed Structural Steelwork - Damp (On the cold side of the dew point or in subfloor spaces) C3 - Inaccessible and Accessible for Maintenance
System:	Resene equivalent to AS/NZS 2312.1 IZS4 - Inorganic Zinc Silicate
Durability:	Time to First Major Maintenance C3 - Medium 40+ Years in accordance with AS/NZS 2312.1:2014 and SNZ TS 3404:2018
Description:	Mild steel, Inorganic Zinc Silicate

Offsite Preparation and Priming

Surface prep:	Wash and degrease where necessary in accordance with AS 1627.1 to remove all soluble contamination, Dry Abrasive Blast in accordance with AS 1627.4 (Sa 2½) or SSPC-SP10 'Near White Metal' to remove all existing coatings, corrosion and corrosion bi-products and achieve a uniform jagged blast profile of between 35µm (minimum) and up to 50µm. Clean to remove all dust, grit and debris, all surfaces to be painted shall Clean and Dry.
1st coat:	Resene Zincilate 11 RA21 @ 125 microns DFT

Onsite repair of welded or damaged areas

Surface Prep:	Wash and degrease where necessary then to any welded or damaged steel areas, spot power tool clean the area to a white metal finish as per SSPC-SP11 Standard. Must achieve a minimum of a 25 microns profile. All sound coating to be painted or spot primed is to be evenly sanded/scuffed with P120-P180 grit sandpaper, ensure all paint edges are feathered to provide adequate adhesion prior to priming. Ensure all sanding dust and contaminants are removed.
Spot Prime:	Spot prime all bare or damaged areas with Resene Armourzinc 120 RA22 @ 125 microns DFT, Overlap existing sound coating by 15-25mm, this will need to be applied in 2 coats by brush or roller.

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4.5 RESENE INTERIOR VISIBLE HOT-DIP GALVANIZED STEEL - 5D - C3 - DAMP (ON THE COLD SIDE OF THE DEW POINT OR IN SUBFLOOR SPACES) C3 - INACCESSIBLE FOR MAINTENANCE

Location:	Internal Visible Structural Steelwork - Damp (On the cold side of the dew point or in subfloor spaces) C3 - Inaccessible for Maintenance
System:	RESENE EXTERIOR NEW HOT-DIP GALVANIZED MILD STEEL, METALLIC GLOSS FINISH - 5D
Durability:	Time to First Major Maintenance C3 - Medium 40+ Years in accordance with SNZ TS 3404:2018
Description:	Hot dipped galvanized (HDG600), Epoxy Primer, High Build Epoxy, Acrylic epoxy finish

Offsite Preparation and Priming

Surface prep:	Wash and Degrease in accordance with AS1627.1 or SSPC-SP1, sweep abrasive blast to SSPC-SP16 using a non-metallic abrasive, achieving a profile of 19-25 microns, taking care not to remove more than 10 microns of galvanized zinc coating.
1st coat:	Resene Armourcote 220 RA34 @ 75 microns DFT
2nd coat:	Resene Armourcote 510 RA40 @ 225 microns DFT
3rd coat:	Resene Imperite IF503 RA81 @ 50 microns DFT
4th coat:	Resene Imperite IF503 RA81 @ 50 microns DFT
5th coat: (Optional)	Resene Uracryl 404 clear Low sheen @ 30 microns DFT
4th coat colour:	Electro Dark Bronze
Finish:	Architectural

Onsite repair of welded or damaged areas and application of Topcoat

Surface Prep:	Wash and degrease where necessary then to any welded or damaged steel areas, spot power tool clean the area to a white metal finish as per SSPC-SP11 Standard. Must achieve a minimum of a 25 microns profile. All sound coating to be painted or spot primed is to be evenly sanded/scuffed with P120-P180 grit sandpaper, ensure all paint edges are feathered to provide adequate adhesion prior to priming. Ensure all sanding dust and contaminants are removed.
Spot Prime:	Spot prime all bare or damaged areas with Resene Armourzinc 120 RA22 @ 100 microns DFT, Overlap existing sound coating by 15-25mm, this will need to be applied in 2 coats by brush or roller.
Spot coat:	Spot prime all repaired areas with Resene Armourcote 221 RA36 @ 75 microns DFT, Overlap existing sound coating by 15-25mm, this may need to be applied in 2 coats by brush or roller.
Spot coat:	Spot prime all repaired areas with Resene Armourcote 510 RA40 @ 225 microns DFT, Overlap existing sound coating by 15-25mm, this will need to be applied in multiple coats by brush or roller.
Spot coat:	Spot coat all primed areas with Resene Imperite IF504 RA81 (Gloss) RA59 @ 50 microns DFT, Overlap existing sound coating by 15-25mm.
4th coat:	Resene Imperite IF503 RA81 @ 50 microns DFT - Full coat to ensure an even finish
5th coat: (Optional)	Resene Uracryl 404 clear Low sheen @ 30 microns DFT
4th coat colour:	Electro Dark Bronze
Finish:	Architectural

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4.6 RESENE INTERIOR VISIBLE THERMAL ZINC SPRAY COATINGS 100 MICRONS - C3 - DAMP (ON THE COLD SIDE OF THE DEW POINT OR IN SUBFLOOR SPACES) - INACCESSIBLE FOR MAINTENANCE

Location:	Internal Visible Structural Steelwork - Damp (on the cold side of the dew point or in subfloor spaces) C3 - Inaccessible for Maintenance
System:	Comparable to **TSZ 100S** in accordance with AS/NZS 2312:2002
Durability:	Time to First Major Maintenance C3 - Medium 40+ Years in accordance with SNZ TS 3404:2018
Description:	Mild steel, Thermal Zinc Spray, Epoxy Sealer, Epoxy Primer, Acrylic epoxy finish
Offsite Preparation and Priming	
Surface prep:	Resene SIPDS No4 and Spec Sheet 4:3/1, A blast profile of **50-75 microns.**
Thermal Zinc:	Thermal Sprayed Zinc **100 microns** (By Others) in accordance with NACE No. 12/AWS C2.23M/SSPC CS-23-2016
Sealer coat:	Resene Armourcote 220 RA34 (thinned 30-50% with Resene Thinner #12) @ ≥10 microns DFT
Note:	Lightly sand the arc spray zinc to remove any spikes and excessive surface roughness that may protrude through the subsequent paint system. Ensure that excessive coating thickness is not removed. Thoroughly vacuum the surface to remove all sanding dust.
1st coat:	Resene Armourcote 220 RA34 @ 100 microns DFT
Onsite repair of welded or damaged areas and application of Topcoat	
Surface Prep:	Wash and degrease where necessary then to any welded or damaged steel areas, spot power tool clean the area to a white metal finish as per SSPC-SP11 Standard. Must achieve a minimum of a 25 microns profile. All sound coating to be painted or spot primed is to be evenly sanded/scuffed with P120-P180 grit sandpaper, ensure all paint edges are feathered to provide adequate adhesion prior to priming. Ensure all sanding dust and contaminants are removed.
Spot Prime:	Spot prime all bare or damaged areas with Resene Armourzinc 120 RA22 @ 100 microns DFT, Overlap existing sound coating by 15-25mm, this will need to be applied in 2 coats by brush or roller.
Spot coat:	Spot prime all repaired areas with Resene Armourcote 221 RA36 @ 100 microns DFT, Overlap existing sound coating by 15-25mm, this will need to be applied in 2 coats by brush or roller.
3rd coat:	Resene Imperite IF503 RA81 @ 50 microns DFT
4th coat:	Resene Imperite IF503 RA81 @ 50 microns DFT
4th coat: (Optional)	Resene Uracryl 404 clear Low sheen @ 30 microns DFT
4th coat colour:	Electro Dark Bronze
Finish:	Architectural

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4.7 RESENE NEW INTERIOR CONCEALED AND VISIBLE MILD STEEL - PUR5 - DAMP (ON THE COLD SIDE OF THE DEW POINT OR IN SUBFLOOR SPACES) C3 - ACCESSIBLE FOR MAINTENANCE

Location:	Internal Concealed and Visible Structural Steelwork - Damp (on the cold side of the dew point or in subfloor spaces) C3 - Accessible for Maintenance
System:	Resene equivalent to AS/NZS 2312.1 PUR5
Durability:	Time to First Major Maintenance C3 - Medium 25+ Years in accordance with AS/NZS 2312.1:2014 and SNZ TS 3404:2018
Description:	Mild steel, Epoxy Zinc Primer, High Build Epoxy Intermediate, Acrylic epoxy finish

Offsite Preparation and Painting

Surface prep:	Wash and degrease where necessary in accordance with AS 1627.1 to remove all soluble contamination, Dry Abrasive Blast in accordance with AS 1627.4 (Sa 2½) or SSPC-SP10 'Near White Metal' to remove all existing coatings, corrosion and corrosion bi-products and achieve a uniform jagged blast profile of between 35µm (minimum) and up to 50µm. Clean to remove all dust, grit and debris, all surfaces to be painted shall Clean and Dry.
1st coat:	Resene Armourzinc 120 RA22 @ 75microns DFT
2nd coat:	Resene Armourcote 515 HS RA404A @ 200 microns DFT, or Resene Armourcote 510 RA40 @ 200 microns DFT
3rd coat:	Resene Imperite IF503 RA81 @ 50 microns DFT
4th coat: (Optional)	Resene Uracryl 404 clear Low sheen @ 30 microns DFT
3rd coat colour:	Electro Dark Bronze
Finish:	Architectural

Onsite repair of welded or damaged areas and application of Topcoat

Surface Prep:	Wash and degrease where necessary then to any welded or damaged steel areas, spot power tool clean the area to a white metal finish as per SSPC-SP11 Standard. Must achieve a minimum of a 25 microns profile. All sound coating to be painted or spot primed is to be evenly sanded/scuffed with P120-P180 grit sandpaper, ensure all paint edges are feathered to provide adequate adhesion prior to priming. Ensure all sanding dust and contaminants are removed.
Spot Prime:	Spot prime all bare or damaged areas with Resene Armourzinc 120 RA22 @ 75 microns DFT, Overlap existing sound coating by 15-25mm, this may need to be applied in 2 coats by brush or roller.
Spot coat:	Resene Armourcote 515 HS RA404A @ 200 microns DFT, or Resene Armourcote 510 RA40 @ 200 microns DFT, Overlap existing sound coating by 15-25mm, this will need to be applied in multiple coats by brush or roller.
Spot coat:	Spot coat all primed areas with Resene Imperite IF503 RA81 @ 50 microns DFT, Overlap existing sound coating by 15-25mm.
4th coat:	Resene Imperite IF503 RA81 @ 50 microns DFT
5th coat: (Optional)	Resene Uracryl 404 clear Low sheen @ 30 microns DFT
4th coat colour:	Electro Dark Bronze
Finish:	Architectural

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Exterior new mild steel, ferrous metals

4.8 RESENE EXTERNAL NEW METAL SPRAY COATINGS, 100 MICRONS ZINC METAL SPRAY - EXPOSED (WASHED BY RAIN) C3 - INACCESSIBLE AND ACCESSIBLE FOR MAINTENANCE

Location:	External Concealed and Visible Structural Steelwork - Exposed (Washed by Rain) C3 - Inaccessible and Accessible for Maintenance
System:	Comparable to **TSZ 100S** in accordance with AS/NZS 2312:2002
Durability:	Time to First Major Maintenance C3 - Medium 40 years in accordance with AS/NZS 2312:2002 and SNZ TS 3404:2018
Description:	Mild steel, Thermal Zinc Spray, Epoxy Sealer, Epoxy Primer, Acrylic epoxy finish
Offsite Preparation and Painting	
Surface prep:	Resene SIPDS No4 and Spec Sheet 4:3/1, A blast profile of **50-75 microns**.
Thermal Zinc:	Thermal Sprayed Zinc **100 microns** (By Others) in accordance with NACE No. 12/AWS C2.23M/SSPC CS-23-2016
Sealer coat:	Resene Armourcote 220 RA34 (thinned 30-50% with Resene Thinner #12) @ ≥10 microns DFT
Note:	Lightly sand the arc spray zinc to remove any spikes and excessive surface roughness that may protrude through the subsequent paint system. Ensure that excessive coating thickness is not removed. Thoroughly vacuum the surface to remove all sanding dust.
1st coat:	Resene Armourcote 220 RA34 @ 100 microns DFT
Onsite repair of welded or damaged areas and application to Topcoat	
Surface Prep:	Wash and degrease where necessary then to any welded or damaged steel areas, spot power tool clean the area to a white metal finish as per SSPC-SP11 Standard. Must achieve a minimum of a 25 microns profile. All sound coating to be painted or spot primed is to be evenly sanded/scuffed with P120-P180 grit sandpaper, ensure all paint edges are feathered to provide adequate adhesion prior to priming. Ensure all sanding dust and contaminants are removed.
Spot Prime:	Spot prime all bare or damaged areas with Resene Armourzinc 120 RA22 @ 100 microns DFT, Overlap existing sound coating by 15-25mm, this will need to be applied in 2 coats by brush or roller.
Spot coat:	Spot prime all repaired areas with Resene Armourcote 221 RA36 @ 100 microns DFT, Overlap existing sound coating by 15-25mm, this will need to be applied in 2 coats by brush or roller.
2nd coat:	Resene Imperite IF503 RA81 @ 50 microns DFT
3rd coat:	Resene Imperite IF503 RA81 @ 50 microns DFT
4th coat: (Optional)	Resene Uracryl 404 clear Low sheen @ 30 microns DFT
3rd coat colour:	Electro Dark Bronze
Finish:	Architectural

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4.9 RESENE EXTERIOR NEW HOT-DIP GALVANIZED MILD STEEL, METALLIC COLOUR - 5D - EXPOSED (WASHED BY RAIN) INACCESSIBLE FOR MAINTENANCE

Location:	Exterior Exposed (Washed by Rain) C3 - Medium - Inaccessible for maintenance Visible
System:	Resene equivalent to AS/NZS 2312.2 System 5D
Durability:	Time to First Major Maintenance C3 - Medium 40 years in accordance with AS/NZS 2312.2:2014 and SNZ TS 3404:2018
Description:	Hot dipped galvanized (HDG600), Epoxy Primer, High Build Epoxy, Acrylic epoxy finish

Offsite Preparation and Painting

Surface prep:	Wash and Degrease in accordance with AS1627.1 or SSPC-SP1, sweep abrasive blast to SSPC-SP16 using a non-metallic abrasive, achieving a profile of 19-25 microns, taking care not to remove more than 10 microns of galvanized zinc coating.
1st coat:	Resene Armourcote 220 RA34 @ 75 microns DFT
2nd coat:	Resene Armourcote 510 RA40 @ 225 microns DFT
3rd coat:	Resene Imperite IF503 RA81 @ 50 microns DFT
4th coat:	Resene Imperite IF503 RA81 @ 50 microns DFT
5th coat: (Optional)	Resene Uracryl 404 clear Low sheen @ 30 microns DFT
4th coat colour:	Electro Dark Bronze
Finish:	Architectural

Onsite repair of welded or damaged areas and application to Topcoat

Surface Prep:	Wash and degrease where necessary then to any welded or damaged steel areas, spot power tool clean the area to a white metal finish as per SSPC-SP11 Standard. Must achieve a minimum of a 25 microns profile. All sound coating to be painted or spot primed is to be evenly sanded/scuffed with P120-P180 grit sandpaper, ensure all paint edges are feathered to provide adequate adhesion prior to priming. Ensure all sanding dust and contaminants are removed.
Spot Prime:	Spot prime all bare or damaged areas with Resene Armourzinc 120 RA22 @ 100 microns DFT, Overlap existing sound coating by 15-25mm, this will need to be applied in 2 coats by brush or roller.
Spot coat:	Spot prime all repaired areas with Resene Armourcote 221 RA36 @ 75 microns DFT, Overlap existing sound coating by 15-25mm, this will need to be applied in 2 coats by brush or roller.
Spot coat:	Spot prime all repaired areas with Resene Armourcote 510 RA40 @ 225 microns DFT, Overlap existing sound coating by 15-25mm, this will need to be applied in multiple coats by brush or roller.
Spot coat:	Spot coat all primed areas with Resene Imperite IF503 RA81 @ 50 microns DFT , Overlap existing sound coating by 15-25mm.
4th coat:	Resene Imperite IF503 RA81 @ 50 microns DFT
5th coat: (Optional)	Resene Uracryl 404 clear Low sheen @ 30 microns DFT
4th coat colour:	Electro Dark Bronze
Finish:	Architectural

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4.10 RESENE EXTERIOR NEW MILD STEEL, PUR5 - EXPOSED (WASHED BY RAIN) VISIBLE ACCESSIBLE FOR MAINTENANCE

Location:	Exterior Exposed (Washed by Rain) C3 - Medium - Accessible for maintenance Visible
System:	Resene equivalent to AS/NZS 2312.1 PUR5
Durability:	Time to First Major Maintenance C3 - Medium 25+ years in accordance with AS/NZS 2312.2:2014 and SNZ TS 3404:2018
Description:	Mild Steel, Epoxy Zinc Primer, High Build Epoxy, Acrylic epoxy finish

Offsite Preparation and Painting

Surface prep:	Wash and degrease where necessary in accordance with AS 1627.1 to remove all soluble contamination, Dry Abrasive Blast in accordance with AS 1627.4 (Sa 2½) or SSPC-SP10 'Near White Metal' to remove all existing coatings, corrosion and corrosion bi-products and achieve a uniform jagged blast profile of between 35µm (minimum) and up to 50µm. Clean to remove all dust, grit and debris, all surfaces to be painted shall Clean and Dry.
1st coat:	Resene Armourzinc 120 RA22 @ 75microns DFT
2nd coat:	Resene Armourcote 515 HS RA404A @ 200 microns DFT
3rd coat:	Resene Imperite IF503 RA81 @ 50 microns DFT
4th coat: (Optional)	Resene Uracryl 404 clear Low sheen @ 30 microns DFT
3rd coat colour:	Electro Dark Bronze
Finish:	Architectural

Onsite repair of welded or damaged areas and application of Topcoat

Surface Prep:	Wash and degrease where necessary then to any welded or damaged steel areas, spot power tool clean the area to a white metal finish as per SSPC-SP11 Standard. Must achieve a minimum of a 25 microns profile. All sound coating to be painted or spot primed is to be evenly sanded/scuffed with P120-P180 grit sandpaper, ensure all paint edges are feathered to provide adequate adhesion prior to priming. Ensure all sanding dust and contaminants are removed.
Spot Prime:	Spot prime all bare or damaged areas with Resene Armourzinc 120 RA22 @ 75 microns DFT, Overlap existing sound coating by 15-25mm, this may need to be applied in 2 coats by brush or roller.
Spot coat:	Resene Armourcote 515 HS RA404A @ 200 microns DFT, Overlap existing sound coating by 15-25mm, this will need to be applied in multiple coats by brush or roller.
Spot coat:	Spot coat all primed areas with Resene Imperite IF503 RA81 @ 50 microns DFT, Overlap existing sound coating by 15-25mm.
4th coat:	Resene Imperite IF503 RA81 @ 50 microns DFT
5th coat: (Optional)	Resene Uracryl 404 clear Low sheen @ 30 microns DFT
4th coat colour:	Electro Dark Bronze
Finish:	Architectural

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4.11 RESENE EXTERIOR CONCEALED NEW HOT-DIP GALVANIZED MILD STEEL, SOLID COLOUR - 5I - SHELTERED (UNWASHED BY RAIN) INACCESSIBLE FOR MAINTENANCE

Location:	Exterior Concealed Sheltered (Unwashed by Rain) C4 - High - Inaccessible for maintenance Visible
System:	Resene equivalent to AS/NZS 2312.2 System 5I
Durability:	Time to First Major Maintenance C4 - High 40+ years in accordance with AS/NZS 2312.2:2014 and SNZ TS 3404:2018
Description:	Hot dipped galvanized (HDG600), Epoxy Primer, High Build Epoxy MIOX, High Build Epoxy MIOX

Offsite Preparation and Painting

Surface prep:	Wash and Degrease in accordance with AS1627.1 or SSPC-SP1, sweep abrasive blast to SSPC-SP16 using a non-metallic abrasive, achieving a profile of 19-25 microns, taking care not to remove more than 10 microns of galvanized zinc coating.
1st coat:	Resene Armourcote 220 RA34 @ 75 microns DFT
2nd coat:	Resene Armourcote 515 HS MIOX RA404A @ 150 microns DFT
3rd coat:	Resene Armourcote 515 HS MIOX RA404A @ 175 microns DFT
3rd coat colour:	Dark Grey micaceous iron oxide
3rd coat finish:	Flat MIOX

Onsite repair of welded or damaged areas and application to Topcoat

Surface Prep:	Wash and degrease where necessary then to any welded or damaged steel areas, spot power tool clean the area to a white metal finish as per SSPC-SP11 Standard. Must achieve a minimum of a 25 microns profile. All sound coating to be painted or spot primed is to be evenly sanded/scuffed with P120-P180 grit sandpaper, ensure all paint edges are feathered to provide adequate adhesion prior to priming. Ensure all sanding dust and contaminants are removed.
Spot Prime:	Spot prime all bare or damaged areas with Resene Armourzinc 120 RA22 @ 100 microns DFT, Overlap existing sound coating by 15-25mm, this will need to be applied in 2 coats by brush or roller.
Spot coat:	Spot prime all repaired areas with Resene Armourcote 221 RA36 @ 75 microns DFT, Overlap existing sound coating by 15-25mm, this will need to be applied in 2 coats by brush or roller.
Spot coat:	Spot prime all repaired areas with Resene Armourcote 515 HS MIOX RA404A @ 150 microns DFT, Overlap existing sound coating by 15-25mm, this will need to be applied in multiple coats by brush or roller.
Spot coat:	Spot coat all primed areas with Resene Armourcote 515 HS MIOX RA404A @ 175 microns DFT, Overlap existing sound coating by 15-25mm.
4th coat colour:	Dark Grey micaceous iron oxide
4th coat finish:	Flat MIOX

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4.12 RESENE EXTERIOR CONCEALED AND VISIBLE THERMAL ZINC SPRAY COATINGS 150 MICRONS - C4 - INACCESSIBLE AND ACCESSIBLE FOR MAINTENANCE

Location:	External Sheltered (Unwashed by rain) Concealed and Visible C4 - High - Inaccessible and Accessible for Maintenance
System:	Comparable to **TSZ 150S** in accordance with AS/NZS 2312:2002
Durability:	Time to First Major Maintenance C4 - High 40+ years in accordance with AS/NZS 2312:2002 and SNZ TS 3404:2018
Description:	Mild steel, Thermal Zinc Spray, Epoxy Sealer, Epoxy Primer, Acrylic epoxy finish

Offsite Preparation and Painting

Surface prep:	Resene SIPDS No4 and Spec Sheet 4:3/1, A blast profile of **50-75 microns.**
Thermal Zinc:	Thermal Sprayed Zinc **150 microns** (By Others) in accordance with NACE No. 12/AWS C2.23M/SSPC CS-23-2016
Sealer coat:	Resene Armourcote 220 RA34 (thinned 30-50% with Resene Thinner #12) @ ≥10 microns DFT
Note:	Lightly sand the arc spray zinc to remove any spikes and excessive surface roughness that may protrude through the subsequent paint system. Ensure that excessive coating thickness is not removed. Thoroughly vacuum the surface to remove all sanding dust.
1st coat:	Resene Armourcote 220 RA34 @ 100 microns DFT

Onsite repair of welded or damaged areas and application to Topcoat

Surface Prep:	Wash and degrease where necessary then to any welded or damaged steel areas, spot power tool clean the area to a white metal finish as per SSPC-SP11 Standard. Must achieve a minimum of a 25 microns profile. All sound coating to be painted or spot primed is to be evenly sanded/scuffed with P120-P180 grit sandpaper, ensure all paint edges are feathered to provide adequate adhesion prior to priming. Ensure all sanding dust and contaminants are removed.
Spot Prime:	Spot prime all bare or damaged areas with Resene Armourzinc 120 RA22 @ 100 microns DFT, Overlap existing sound coating by 15-25mm, this will need to be applied in 2 coats by brush or roller.
Spot coat:	Spot prime all repaired areas with Resene Armourcote 221 RA36 @ 100 microns DFT, Overlap existing sound coating by 15-25mm, this will need to be applied in 2 coats by brush or roller.
2nd coat:	Resene Imperite IF503 RA81 @ 50 microns DFT
3rd coat:	Resene Imperite IF503 RA81 @ 50 microns DFT
4th coat: (Optional)	Resene Uracryl 404 clear Low sheen @ 30 microns DFT
3rd coat colour:	Electro Dark Bronze
Finish:	Architectural

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4.13 RESENE EXTERIOR VISIBLE NEW HOT-DIP GALVANIZED MILD STEEL, METALLIC COLOUR - 5D - SHELTERED (UNWASHED BY RAIN) INACCESSIBLE FOR MAINTENANCE

Location:	External Sheltered (Unwashed by rain) Visible C4 - High - Inaccessible for Maintenance
System:	Resene equivalent to AS/NZS 2312.2 System 5D
Durability:	Time to First Major Maintenance C4 - High 40+ years in accordance with AS/NZS 2312.2:2014 and SNZ TS 3404:2018
Description:	Hot dipped galvanized (HDG600), Epoxy Primer, High Build Epoxy, Acrylic epoxy finish

Offsite Preparation and Painting

Surface prep:	Wash and Degrease in accordance with AS1627.1 or SSPC-SP1, sweep abrasive blast to SSPC-SP16 using a non-metallic abrasive, achieving a profile of 19-25 microns, taking care not to remove more than 10 microns of galvanized zinc coating.
1st coat:	Resene Armourcote 220 RA34 @ 75 microns DFT
2nd coat:	Resene Armourcote 510 RA40 @ 225 microns DFT
3rd coat:	Resene Imperite IF503 RA81 @ 50 microns DFT
4th coat:(Optional)	Resene Uracryl 404 clear Low sheen @ 30 microns DFT
3rd coat colour:	Electro Dark Bronze
Finish:	Architectural

Onsite repair of welded or damaged areas and application to Topcoat

Surface Prep:	Wash and degrease where necessary then to any welded or damaged steel areas, spot power tool clean the area to a white metal finish as per SSPC-SP11 Standard. Must achieve a minimum of a 25 microns profile. All sound coating to be painted or spot primed is to be evenly sanded/scuffed with P120-P180 grit sandpaper, ensure all paint edges are feathered to provide adequate adhesion prior to priming. Ensure all sanding dust and contaminants are removed.
Spot Prime:	Spot prime all bare or damaged areas with Resene Armourzinc 120 RA22 @ 100 microns DFT, Overlap existing sound coating by 15-25mm, this will need to be applied in 2 coats by brush or roller.
Spot coat:	Spot prime all repaired areas with Resene Armourcote 221 RA36 @ 75 microns DFT, Overlap existing sound coating by 15-25mm, this will need to be applied in 2 coats by brush or roller.
Spot coat:	Spot prime all repaired areas with Resene Armourcote 510 RA40 @ 225 microns DFT, Overlap existing sound coating by 15-25mm, this will need to be applied in multiple coats by brush or roller.
Spot coat:	Spot coat all primed areas with Resene Imperite IF503 RA81 @ 50 microns DFT, Overlap existing sound coating by 15-25mm.
4th coat:	Resene Imperite IF503 RA81 @ 50 microns DFT
5th coat: (Optional)	Resene Uracryl 404 clear Low sheen @ 30 microns DFT
4th coat colour:	Electro Dark Bronze
Finish:	Architectural

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4.14 RESENE EXTERIOR NEW METAL SPRAY COATINGS, 300 MICRONS ZINC/ALUMINIUM (85/15) METAL SPRAY, SOLID COLOUR - C5 - HIGH VISIBLE AND CONCEALED INACCESSIBLE FOR MAINTENANCE

Location:	External Wet (Damp for extended periods) Concealed and Visible C5 - Very High - Inaccessible for Maintenance
System:	Comparable to **TSZA 300S** in accordance with AS/NZS 2312:2002
Durability:	Time to First Major Maintenance C4 - High 40+ years in accordance with AS/NZS 2312:2002 and SNZ TS 3404:2018
Description:	Mild steel, Thermal **Zinc/Aluminium (85/15)** Spray, Epoxy Sealer, Epoxy Primer, Acrylic epoxy finish

Offsite Preparation and Painting

Surface prep:	Resene SIPDS No4 and Spec Sheet 4:3/1, A blast profile of **62.5-87.5 microns**.
Thermal Zinc:	Thermal Sprayed Zinc/Aluminium (85/15) **300 microns** (By Others) in accordance with NACE No. 12/AWS C2.23M/SSPC CS- 23-2016
Sealer coat:	Resene Armourcote 220 RA34 (thinned 30-50% with Resene Thinner #12) @ ≥10 microns DFT
Note:	Lightly sand the arc spray zinc to remove any spikes and excessive surface roughness that may protrude through the subsequent paint system. Ensure that excessive coating thickness is not removed. Thoroughly vacuum the surface to remove all sanding dust.
1st coat:	Resene Armourcote 220 RA34 @ 100 microns DFT

Onsite repair of welded or damaged areas and application to Topcoat

Surface Prep:	Wash and degrease where necessary then to any welded or damaged steel areas, spot power tool clean the area to a white metal finish as per SSPC-SP11 Standard. Must achieve a minimum of a 25 microns profile. All sound coating to be painted or spot primed is to be evenly sanded/scuffed with P120-P180 grit sandpaper, ensure all paint edges are feathered to provide adequate adhesion prior to priming. Ensure all sanding dust and contaminants are removed.
Spot Prime:	Spot prime all bare or damaged areas with Resene Armourzinc 120 RA22 @ 300 microns DFT, Overlap existing sound coating by 15-25mm, this will need to be applied in multiple coats by brush or roller.
Spot coat:	Spot prime all repaired areas with Resene Armourcote 221 RA36 @ 100 microns DFT, Overlap existing sound coating by 15-25mm, this will need to be applied in 2 coats by brush or roller.
2nd coat:	Resene Imperite IF503 RA81 @ 50 microns DFT
3rd coat:	Resene Imperite IF503 RA81 @ 50 microns DFT
4th coat: (Optional)	Resene Uracryl 404 clear Low sheen @ 30 microns DFT
3rd coat colour:	Electro Dark Bronze
Finish:	Architectural

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4.15 RESENE EXTERIOR NEW METAL SPRAY COATINGS, 200 MICRONS ZINC/ALUMINIUM (85/15) METAL SPRAY, SOLID COLOUR - C5 - HIGH VISIBLE AND CONCEALED ACCESSIBLE FOR MAINTENANCE

Location:	External Wet (Damp for extended periods) Concealed and Visible C5 - Very High - Accessible for Maintenance
System:	Comparable to **TSZA 200S** in accordance with AS/NZS 2312:2002
Durability:	Time to First Major Maintenance C4 - High 25+ years in accordance with AS/NZS 2312:2002 and SNZ TS 3404:2018
Description:	Mild steel, Thermal **Zinc/Aluminium (85/15)** Spray, Epoxy Sealer, Epoxy Primer, Acrylic epoxy finish

Offsite Preparation and Painting

Surface prep:	Resene SIPDS No4 and Spec Sheet 4:3/1, A blast profile of **50-75 microns**.
Thermal Zinc:	Thermal Sprayed Zinc/Aluminium (85/15) **200 microns** (By Others) in accordance with NACE No. 12/AWS C2.23M/SSPC CS- 23-2016
Sealer coat:	Resene Armourcote 220 RA34 (thinned 30-50% with Resene Thinner #12) @ ≥10 microns DFT
Note:	Lightly sand the arc spray zinc to remove any spikes and excessive surface roughness that may protrude through the subsequent paint system. Ensure that excessive coating thickness is not removed. Thoroughly vacuum the surface to remove all sanding dust.
1st coat:	Resene Armourcote 220 RA34 @ 100 microns DFT

Onsite repair of welded or damaged areas and application to Topcoat

Surface Prep:	Wash and degrease where necessary then to any welded or damaged steel areas, spot power tool clean the area to a white metal finish as per SSPC-SP11 Standard. Must achieve a minimum of a 25 microns profile. All sound coating to be painted or spot primed is to be evenly sanded/scuffed with P120-P180 grit sandpaper, ensure all paint edges are feathered to provide adequate adhesion prior to priming. Ensure all sanding dust and contaminants are removed.
Spot Prime:	Spot prime all bare or damaged areas with Resene Armourzinc 120 RA22 @ 200 microns DFT, Overlap existing sound coating by 15-25mm, this will need to be applied in multiple coats by brush or roller.
Spot coat:	Spot prime all repaired areas with Resene Armourcote 221 RA36 @ 100 microns DFT, Overlap existing sound coating by 15-25mm, this will need to be applied in 2 coats by brush or roller.
2nd coat:	Resene Imperite IF503 RA81 @ 50 microns DFT
3rd coat:	Resene Imperite IF503 RA81 @ 50 microns DFT
4th coat: (Optional)	Resene Uracryl 404 clear Low sheen @ 30 microns DFT
3rd coat colour:	Electro Dark Bronze
Finish:	Architectural

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