

Rockpool Pelican Waters

150 Bed Residential Aged Care Facility

Architectural Specification

Client: Rockpool Aged Care

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0131 PRELIMINARIES

1 GENERAL**1.1 GENERAL****General conditions**

Contract: Amended AS4000

Interpretation

General: The words principal and contract administrator have the same meaning, respectively, as owner and architect, unless the context requires otherwise.

Cross reference: The clause **GENERAL, INTERPRETATION**, in *0171 General requirements*, also applies.

1.2 THE SITE**Site restrictions**

Site limitations: Comply with the following restrictions on the use of the site: As required in the Development Approval documents.

Protection of persons and property

Temporary works: Provide and maintain required hoardings, barricades, guards, fencing, shoring, temporary roadways, footpaths, signs, lighting and traffic management.

Accessways, services: Do not obstruct or damage roadways and footpaths, drains and watercourses and other existing services in use on or adjacent to the site. Determine the location of such services.

Property: Do not interfere with or damage trees and property which are to remain on or adjacent to the site, including adjoining property encroaching onto the site.

Rectification

Accessways and services: Rectify immediately any obstruction or damage to roadways and footpaths, drains and watercourses and other existing services in use on or adjacent to the site. Provide temporary services whilst repairs are carried out.

Property: Rectify immediately any interference or damage to trees and property which are to remain on or adjacent to the site, including adjoining property encroaching onto the site.

Existing services

Service to be continued: Repair, divert or relocate service, as documented.

Trenches: If the existing service crosses the line of a required trench or will lose support when the trench is excavated, provide permanent support for the existing service.

Redundant services: Remove redundant parts and make safe.

Interruptions to services: Minimise the number and duration of interruptions.

Proposals: Submit proposals for action to be taken to existing services before starting this work.

- Purpose of submission: For review.

Adjoining property

Notice: At least 10 working days before commencing work, submit to owners of adjoining property written notice of intention to commence work and an outline description of the type and extent of work.

Revealed encroachments: If the works reveal unknown encroachments of adjoining property on to the site or of existing site structures on to adjoining property, immediately seek instructions.

Records: For adjoining property and all existing roadways, kerbing and channelling, footpaths and services access points bounding the site:

- Inspect the property before commencement of work.
- Make detailed records of conditions existing within the property, especially structural defects and other damage or defacement.
- Arrange for at least 2 copies of each record, including drawings, written descriptions, and photographs, endorsed by the owner and occupant of the property, or their representatives, as evidence of conditions existing before commencement of work.

Endorsed copies: Submit one endorsed copy of each record. Keep the other endorsed copy on site.

- Purpose of submission: Information only.

1.3 CONSTRUCTION PLANT

Parking

If Contractor determines off-site parking is required, then all necessary authority approvals are to be obtained by Contractor and such use becomes responsibility of Contractor.

Protective clothing

Protective clothing: Make available protective clothing for the use of visitors, as follows:

- Safety helmets: To AS/NZS 1801, Type 1.
- Certification provider: Submit product certification from an organisation accredited by the Joint Accreditation System of Australia and New Zealand (JAS-ANZ).

Project signboards

General: Provide project-specific signboards and as follows:

- Locate where directed.
- Maintain in good condition for duration of the work.
- Obtain permission for removal.
- Remove on completion.

Project signboard description

Size: Approx. 3000mm long x 2000mm high

Text, graphics: name of the project including Rockpool Insignia, Owner, Contractor, Architect, Town Planner, Quantity Surveyor, Interior Designer. Other consultants under the Contractor's banner may be included as determined by the Contractor.

1.4 BUILDING THE WORKS

Surveys

The Contractor will have a qualified Surveyor set out the lines and levels of the buildings as shown on the drawings. The responsibility for the correctness of this set out rests with the Contractor and he will make good at his own expense all errors caused by his negligence or workmanship.

The Contractor will notify the architect of any discrepancies and will obtain a decision before proceeding.

Survey marks

Definition: A survey peg, bench mark, reference mark, signal, alignment, level mark or any other mark used or intended to be used for the purpose of setting out, checking or measuring the work.

Care of survey marks: Preserve and maintain the principal's survey marks in their true positions.

Rectification: If survey marks are disturbed or obliterated, immediately rectify.

Safety

Accidents: Promptly notify the architect of the occurrence of the following:

- Accidents involving death or personal injury.
- Accidents involving loss of time.
- Incidents with accident potential such as equipment failure, slides and cave-ins.

Accident reports: Submit reports of accidents.

- Purpose of submission: Information only.

Contractor's representative

General: Must be accessible, and fluent in English and technical terminology.

Subcontracting

General: Submit a complete list of proposed subcontractors and suppliers.

Program of work

Construction program: Show the following:

- Sequence of work.
- Critical paths of activities related to the work.
- Allowance for holidays.
- Activity inter-relationships.

- External dependencies including provision of access, document approvals and work by others.
- Periods within which various stages or parts of the work are to be executed.

Time scale: Working days.

Updated program: Identify changes since the previous issue, and show the estimated percentage of completion for each item of work.

- Frequency: Prior to each site meeting

Program chart: Display in the contractor's site office an up-to-date bar chart and network diagram based on the construction program.

Site meetings

General: Hold and attend site meetings throughout the contract and arrange attendance of appropriate subcontractors, the architect, and appropriate consultants.

Frequency: Monthly

Minutes: Make a record of site meetings. Within 5 working days after each meeting, distribute a copy of the minutes to each party.

- Purpose of submission: Review.

Contacts: At the first site meeting, submit names and telephone numbers of responsible persons who may be contacted after hours during the course of the contract.

- Purpose of submission: Information only.

Items supplied by owner

General: Materials and other items supplied free of charge to the contractor for installation in the execution of the works. Unload and take delivery, inspect for defects and take care of the items. If defects are found, advise. Return unused items to the owner.

Items supplied by owner schedule

Refer:

- Schedule 2 – General FFE
- UFD documents

1.5 COMPLETION OF THE WORKS

Final cleaning

General: Before the date for practical completion, clean throughout, including interior and exterior surfaces exposed to view. Vacuum carpeted and soft surfaces. Clean debris from the site, roofs, gutters, downpipes and drainage systems. Remove waste and surplus materials.

Samples: Remove non-incorporated samples, prototypes and sample panels.

Reinstatement

General: Before the date for practical completion, clean and repair damage caused by installation or use of temporary work and restore existing facilities used during construction to original condition.

Adjoining property

Evaluation: At practical completion inspect adjoining property and all existing roadways, kerbing and channelling, footpaths and services access points bounding the site, recording any damage that has occurred since the pre-commencement inspection.

Removal of plant

General: Within 10 working days after practical completion, remove temporary works and construction plant no longer required. Remove the balance before the end of the defects liability period.

1.6 PAYMENT FOR THE WORKS

Anticipated progress claims schedule

General: At commencement of the works, submit a schedule of anticipated progress claims for the contract period. Submit a revised schedule with each progress claim.

- Purpose of submission: Information only.

Progress claims

Break-down: With each progress claim, submit a statement of amounts claimed in respect of each worksection or trade heading designated in the specification.

- Purpose of submission: Review.

Method of measurement

General: In conformance with the principles of the Australian Standard Method of Measurement of Building Works (Australian and New Zealand standard method of measurement of building works (ANZSMM)).

1.7 MISCELLANEOUS

Contractor and owner to observe confidentiality

Publicity: Do not issue information concerning the project for publication in the media without prior written approval of the owner. Refer to the owner, enquiries from the media concerning the project.

Compliance with the law

Requirements of authorities: The owner, before entering into the contract, has given the notices, paid the fees, and obtained the permits, approvals and other authorisations required.

0171B GENERAL REQUIREMENTS

1 GENERAL**1.1 PERFORMANCE****Corrosion resistance**

General: Atmospheric corrosivity category as defined in AS 4312:

- Exterior atmospheric corrosivity category: C4
- Interior atmospheric corrosivity category: C2

Galvanizing

Severe conditions: Galvanize mild steel components (including fasteners) to AS/NZS 1214 or AS/NZS 4680 as appropriate, if:

- Exposed to weather.
- Embedded in masonry.
- Exposed to or in air spaces behind the external leaf of masonry walls.
- In contact with chemically treated timber, other than copper chrome arsenate (CCA).

Noise levels

General: Install systems to operate within the noise level limits, as documented for the contract design and documented equipment performance.

Structure

General: If required, provide structures, installations and components as follows:

- Fixed accessways: To AS 1657.
- Structural design actions: To the AS/NZS 1170 series.

1.2 PRECEDENCE**General**

Order of precedence:

- The requirements of other worksections of the specification override conflicting requirements of this worksection.
- The requirements of worksections override conflicting requirements of their referenced documents. The requirements of the referenced documents are minimum requirements.

1.3 CROSS REFERENCES**General**

Requirement: Conform to the following worksection(s):

Common requirements

Requirement: Conform to the following worksections:

- *0181 Adhesives, sealants and fasteners.*
- *0182 Fire-stopping.*
- *0183 Metals and prefinishes.*
- *0184 Termite management.*
- *0185 Timber products, finishes and treatment.*

Cross referencing styles

General: Within the text, titles are cross referenced using the following styles:

- Worksection titles are indicated by *Italicised* text.
- Subsection titles are indicated by **BOLD** text.
- Clause titles are indicated by **BOLD** text.
- Subclause titles are indicated by **Bold** text.

1.4 REFERENCED DOCUMENTS

General

Contractual relationships: Responsibilities and duties of the principal, contractor and contract administrator are not altered by requirements in the documents referenced in this specification.

Current editions: Use referenced documents which are the editions, with amendments, current 3 months before the closing date for tenders, except where other editions or amendments are required by statutory authorities.

European standards: Any national European Standard (e.g. BS EN or DIN EN) may be used in place of the equivalent referenced European Standard (EN).

1.5 INTERPRETATION

Documentation conventions

Imperative mood and streamlined language: The words shall or shall be are implied where a colon is used following a keyword or within a sentence or sentence fragment.

Subject of sentences and phrases: Specification requirements are to be performed by the contractor, unless stated otherwise.

Abbreviations

General: For the purposes of this specification the following abbreviations apply:

- AS: Australian Standard.
- BCA: National Construction Code Series Volume One: Building Code of Australia Class 2 to 9 Buildings and Volume Two: Building Code of Australia Class 1 and Class 10 Buildings.
- EN: European Norm (European Standard).
- GRP: Glass Reinforced Plastic.
- IP: Ingress protection.
- NATA: National Association of Testing Authorities.
- NCC: National Construction Code.
- NZS: New Zealand Standard.
- PCA: National Construction Code Series Volume 3: Plumbing Code of Australia.
- PVC: Polyvinyl Chloride.
- PVC-U: Unplasticised Polyvinyl Chloride. Also known as UPVC.
- SDS: Safety data sheets.
- VOC: Volatile Organic Compound.
- WHS: Work Health and Safety.

Definitions

General: For the purposes of this specification, the following definitions apply:

- Access for maintenance: Includes access for maintenance, inspection, measurement, operation, adjustment, repair, replacement and other maintenance related tasks.
- Accessible, readily: Readily accessible, easily accessible, easy access and similar terms mean capable of being reached quickly and without climbing over or removing obstructions, using a movable ladder, and in any case not more than 2.0 m above the ground, floor or platform.
- Accredited Testing Laboratory:
 - . An organisation accredited by the National Association of Testing Authorities (NATA) to undertake the relevant tests; or
 - . An organisation outside Australia accredited to undertake the relevant tests by an authority recognised by NATA through a mutual recognition agreement; or
 - . An organisation recognised as being an Accredited Testing Laboratory under legislation at the time the test was undertaken.
 - . An organisation accredited for compliance with ISO/IEC 17025 to undertake the relevant tests.
- Attendance: Attendance, provide attendance and similar expressions mean give assistance for examination and testing.
- Contract administrator: Has the same meaning as architect or superintendent and is the person appointed by the owner or principal under the contract.

- Contractor: Has the same meaning as builder and is the person or organisation bound to carry out and complete the work under the contract.
- Default: Specified value, product or installation method which is to be provided unless otherwise documented.
- Design life: The period of time for which it is assumed, in the design, that an asset will be able to perform its intended purpose with only anticipated maintenance but no major repair or replacement being necessary.
- Design parameters: Information used as the basis for design. It includes design requirements, performance criteria, performance parameters and similar terms.
- Documented: Documented, as documented and similar terms mean contained in the contract documents.
- Economic life: The period of time from the acquisition of an asset to the time when the asset, while still physically capable of fulfilling its function and with only anticipated maintenance, ceases to be the lowest cost alternative for satisfying that function.
- Electricity distributor: Any person or organisation that provides electricity from an electricity distribution system to one or more electrical installations. Includes distributor, supply authority, network operator, local network service provider, electricity retailer or electricity entity, as may be appropriate in the relevant jurisdiction.
- Errors and omissions: For the design prepared by the contractor, errors and omissions have the same meaning as defects.
- Fire hazard properties: Terminology to BCA A5.5.
- Geotechnical site investigation: The process of evaluating the geotechnical characteristics of the site in the context of existing or proposed construction.
- Give notice: Give notice, submit, advise, inform and similar expressions mean give notice (submit, advise, inform) in writing to the contract administrator.
- High level interface: Systems transfer information in a digital format using an open system interface.
- Hot-dip galvanized: Zinc coated to AS/NZS 4680 after fabrication with coating thickness and mass to AS/NZS 4680 Table 1.
- Ingress protection: IP, IP code, IP rating and similar expression have the same meaning as IP Code in AS 60529.
- Joints:
 - . Construction joint: A joint with continuous reinforcement provided to suit construction sequence.
 - . Contraction joint: An opening control joint with a bond breaking coating separating the joint surfaces to allow independent and controlled contraction of different parts or components, induced by shrinkage, temperature changes or other causes. It may include unbound dowels to assist vertical deflection control.
 - . Control joint: An unreinforced joint between or within discrete elements of construction which allows for relative movement of the elements.
 - . Expansion joint: A closing control joint with the joint surfaces separated by a compressible filler to allow axial movement due to thermal expansion or contraction with changes in temperature or creep. It may include unbound dowels to assist vertical deflection control.
 - . Sealant joint: A joint filled with a flexible synthetic compound which adheres to surfaces within the joint to prevent the passage of dust, moisture and gases.
 - . Structural control joint: A control joint (contraction, expansion and isolation) in structural elements when used with applied material and finishes.
 - . Substrate joint: A joint in the substrate which includes construction joints and joints between different materials.
 - . Weakened plane joint: A contraction joint created by forming a groove, extending at least one quarter the depth of the section, either by using a grooving tool, by sawing, or by inserting a premoulded strip.
- Local authority (local council): A body established for the purposes of local government by or under a law applying in a state or territory.
- Low level interface: Systems transfer information via terminals and voltage free contacts.

- Manufacturer's recommendations: Recommendations, instructions, requirements, specifications (and similar expressions) provided in written or other form by the manufacturer and/or supplier relating to the suitability, use, installation, storage and/or handling of a product.
- Metallic-coated: Steel coated with zinc or aluminium-zinc alloy as follows:
 - . Metallic-coated steel sheet: To AS 1397. Metal thicknesses specified are base metal thicknesses.
 - . Ferrous open sections zinc coated by an in-line process: To AS/NZS 4791.
 - . Ferrous hollow sections zinc coated by a continuous or specialised process: To AS/NZS 4792.
- Network Utility Operator: The entity undertaking the piped distribution of drinking water or natural gas for supply or is the operator of a sewerage system or external stormwater drainage system.
- Obtain: Obtain, seek and similar expressions mean obtain (seek) in writing from the contract administrator.
- Pipe: Includes pipe and tube.
- Practical completion or defects free completion: The requirements for these stages of completion are defined in the relevant building contract for the project.
- Principal: Principal has the same meaning as owner, client and proprietor and is the party to whom the contractor is legally bound to construct the works.
- Professional engineer: As defined by the NCC, and if required by statutory authority a registered engineer (RPEQ).
- Proprietary: Identifiable by naming the manufacturer, supplier, installer, trade name, brand name, catalogue or reference number.
- Prototype: A full size mock-up of components, systems or elements to demonstrate or test construction methods, junctions and finishes, and to define the level of quality.
- Provide: Provide and similar expressions mean supply and install and include development of the design beyond that documented.
- Record drawings: Record drawings has the same meaning as as-installed drawings, as-built drawings and work-as-executed drawings.
- Referenced documents: Standards and other documents whose requirements are included in this specification by reference.
- Required: Required by the contract documents, the local or statutory authorities.
- If required: A conditional specification term for work which may be shown in the documents or is a legislative requirement.
- Sample: A physical example that illustrates workmanship, materials or equipment, and establishes standards by which the work will be judged. It includes samples and sample panels.
- Statutory authority: A public sector entity created by legislation, that is, a specific law of the Commonwealth, State or Territory.
- Subcontractor: A person or organisation, other than the principal, having a contract with the contractor for the provision of part of the works.
- Supply: Supply, furnish and similar expressions mean supply only.
- Tests – completion: Tests carried out on completed installations or systems and fully resolved before the date for practical completion, to demonstrate that the installation or system, including components, controls and equipment, operates correctly, safely and efficiently, and meets performance and other requirements. The superintendent may direct that completion tests be carried out after the date for practical completion.
- Tests – pre-completion: Tests carried out before completion tests, including:
 - . Production: Tests carried out on a purchased item, before delivery to the site.
 - . Progressive: Tests carried out during installation to demonstrate performance in conformance with this specification.
 - . Site: Tests carried out on site.
 - . Type: Tests carried out on an item identical with a production item, before delivery to the site.
- Tolerance: The permitted difference between the upper limit and the lower limit of dimension, value or quantity.
- Utility service provider: Includes organisations providing power, water, sewerage, gas and telecommunications services.

- Verification: Provision of evidence or proof that a performance requirement has been met or a default exists.

1.6 CONTRACT DOCUMENTS

Services diagrammatic layouts

General: Layouts of service lines, plant and equipment shown on the drawings are diagrammatic only, except where figured dimensions are provided or calculable.

Before commencing work:

- Obtain measurements and other necessary information.
- Coordinate the design and installation in conjunction with all trades.

Levels

General: Spot levels take precedence over contour lines and ground profile lines.

Drawings and manuals for existing services

Warranty: No warranty is given as to the completeness or accuracy of drawings and/or manuals of existing services.

1.7 SUBMISSIONS

Requirement

General: Submit the following:

- Authority approvals: Notes of meetings with authorities whose requirements apply to the work and evidence that notices, fees and permits have been sought and paid, that authority connections are complete and that statutory approvals by the authorities whose requirements apply to the work have been received.
- Building penetrations: Details of the methods to maintain the required structural, fire and other properties to **EXECUTION, BUILDING PENETRATIONS**.
- Certification: Certification of conformance to documented requirements, including certification that the plant and equipment submitted meets all requirements of the contract documents and that each installation is operating correctly.
- Design documentation: Design data and certification of proposed work, if required and as documented.
- Electronic facility and asset management information: For the whole of the work to **EXECUTION, ELECTRONIC FACILITY AND ASSET MANAGEMENT**.
- Execution details: Execution programs, schedules and details of proposed methods and equipment. For building services include the following:
 - . Embedded services: Proposed method for embedding services in concrete walls or floors or chasing into concrete or masonry walls.
 - . Fixing of services: Typical details of locations, types and methods of fixing services to the building structure.
 - . Inaccessible services: If services will be enclosed and not accessible after completion, submit proposals for location of service runs and fittings.
- Fire performance: Evidence of conformity to requirement for combustibility, fire hazard properties and fire-resistance of building elements.
- Marking and labelling: Samples and schedules of proposed marking and labels to **EXECUTION, MARKING AND LABELLING**.
- Operation and maintenance manuals: For the whole of the work to **EXECUTION, OPERATION AND MAINTENANCE MANUALS**.
- Products: Products and materials data, including manufacturer's technical specifications and drawings, product data sheets, type tests results, evidence of conformity to documented requirements, product certification, performance and rating tables, service connection requirements and installation and maintenance recommendations.
- Prototypes: Prototypes of components, systems or elements.
- Records: As-built documents, photographs, system diagrams, schedules and logbooks to **EXECUTION, RECORD DRAWINGS**.
- Samples: Representative of proposed products and materials and including proposals to incorporate samples into the works, if any to **EXECUTION, SAMPLES**.

- Shop drawings: To **EXECUTION, SHOP DRAWINGS**.
- Substitutions: To **PRODUCTS, GENERAL, Substitutions**.
- Tests:
 - . Inspection and testing plan consistent with the construction program including details of test stages and procedures.
 - . Test reports for testing performed under the contract.
- Warranties: To **EXECUTION, WARRANTIES**.

Contractor review: Before submissions, review each submission item, and check for coordination with other work of the contract and conformance to contract documents.

Submit to: Contract administrator

Submission times

Default timing: Make submissions at least 5 working days before ordering products or starting installation of the respective portion of the works.

Proposed products schedules: If major products are not specified as proprietary items, submit a schedule of those proposed for use within 3 weeks of site possession.

Identification

Requirement: Identify the project, contractor, subcontractor or supplier, manufacturer, applicable product, model number and options, as appropriate and include relevant contract document references.

Non-conformance: Identify proposals that do not conform with project requirements, and characteristics which may be detrimental to successful performance of the completed work.

Errors

Requirement: If a submission contains errors, make a new or amended submission as appropriate, indicating changes made since the previous submission.

Electronic submissions

Electronic copies file format: pdf

CAD file format: dwg or rvt as appropriate

1.8 INSPECTION

Notice

Concealment: If notice of inspection is required for parts of the works that are to be concealed, give notice when the inspection can be made before concealment.

Tests: Give notice of the time and place of documented tests.

Minimum notice: 3 days.

Light levels

Lighting levels for inspection: To AS/NZS 1680.2.4.

Attendance

General: Provide attendance for documented inspections and tests.

2 DESIGN

2.1 DESIGN DEVELOPMENT

General

Requirement: Complete the design of the work, including development of the design beyond that documented.

Conflict with the documents: If it is believed that a conflict exists between statutory requirements and the documents, notify the contract administrator immediately and provide a recommendation to resolve the conflict.

3 PRODUCTS

3.1 MATERIALS AND COMPONENTS

Manufacturers' or suppliers' recommendations

General: Provide and select, if no selection is given, transport, deliver, store, handle, protect, finish, adjust and prepare for use the manufactured items to the manufacturers' or suppliers' recommendations.

Proprietary items/systems/assemblies: Assemble, install or fix to substrate to the manufacturers' or suppliers' recommendations.

Project modifications: Advise of activities that supplement, or are contrary to the manufacturers' or suppliers' recommendations.

Product identification

Sealed containers: If materials or products are supplied by the manufacturer in closed or sealed containers or packages, bring the materials or products to point of use in the original containers or packages.

Other products: Marked to show the following, as applicable:

- Manufacturer's identification.
- Product brand name.
- Product type.
- Quantity.
- Product reference code and batch number.
- Date of manufacture.

Consistency

General: For each material or product use the same source or manufacturer and provide consistent type, size, quality and appearance.

Prohibited materials

General: Do not provide the following:

- Materials, exceeding the limits of those listed, in the Safe Work Australia *Hazardous Chemical Information System* (HCIS) Workplace exposure standards.

Insulation blowing agents:

- Materials that use chlorofluorocarbon (CFC) or hydrochlorofluorocarbon (HCFC) in the manufacturing process.
- A blowing agent with a global warming potential (GWP) ≥ 700 .

Substitutions

Identified proprietary items: Identification of a proprietary item does not necessarily imply exclusive preference for the identified item, but indicates the necessary properties of the item.

Alternatives: If alternatives to the documented products, methods or systems are proposed, submit sufficient information to permit evaluation of the proposed alternatives, including the following:

- Evidence that the performance is at least equal to that specified.
- Evidence of conformity to a cited standard.
- Samples.
- Essential technical information, in English.
- Reasons for the proposed substitutions.
- Statement of the extent of revisions to the contract documents.
- Statement of the extent of revisions to the construction program.
- Statement of cost implications including costs outside the contract.
- Statement of consequent alterations to other parts of the works.

Availability: If the documented products or systems are unavailable within the time constraints of the construction program, submit evidence.

Criteria: If the substitution is for any reason other than unavailability, submit evidence that the substitution:

- Is of net enhanced value to the principal.

- Is consistent with the contract documents and is as effective as the identified item, detail or method.

Costs: Pay the cost of submissions and of evaluations and tests of proposed alternatives, whether subsequently adopted or not. The costs will be calculated at the current charge-out rates of the relevant consultant(s).

4 EXECUTION

4.1 PROTOTYPE RESIDENT ROOM

General

Prototype resident room to be constructed to allow Principal's feedback and provide standard of finish required for resident rooms throughout project. Prototype room to be constructed as early as practicable and completed no later than 28 weeks after contractor commences construction on site. Room to be located to provide safe and convenient access.

4.2 SAMPLES

General

Incorporation of samples: Only incorporate samples in the works which have been endorsed for inclusion. Do not incorporate other samples.

Retention of samples: Keep endorsed samples in good condition on site, until the date of practical completion.

Unincorporated samples: Remove on completion.

4.3 SHOP DRAWINGS

General

Documentation: Include dimensioned drawings showing details of the fabrication and installation of structural elements, building components, services and equipment, including relationship to building structure and other services, cable type and size, and marking details.

Diagrammatic layouts: Coordinate work shown diagrammatically in the contract documents, and prepare dimensioned set-out drawings.

Services coordination: Coordinate with other building and service elements. Show adjusted positions on the shop drawings.

Space requirements: Check space and access for maintenance requirements of equipment and services indicated diagrammatically in the contract documents.

Building work drawings for building services: On dimensioned drawings show the following:

- Access doors and panels.
- Conduits to be cast in slabs.
- Holding down bolts and other anchorage and/or fixings required complete with loads to be imposed on the structure during installation and operation.
- Openings, penetrations and block-outs.
- Sleeves.
- Plinths, kerbs and bases.
- Required external openings.

Record drawings: Amend all documented shop drawings to include changes made during the progress of the work and up to the end of the defects liability period.

4.4 OFF-SITE DISPOSAL

Removal of material

General: Dispose of building waste material off site to the requirements of the relevant authorities.

4.5 WALL CHASING

Holes and chases

General: If holes and chases are required in masonry walls, make sure structural integrity of the wall is maintained. Do not chase walls with a fire-resistance level or an acoustic rating.

Parallel chases or recesses on opposite faces of a wall: Not closer than 600 mm to each other.

Chasing blockwork: Only chase core-filled hollow blocks or solid blocks which are not documented as structural.

Concrete blockwork chasing table

Block thickness (mm)	Maximum depth of chase (mm)
190	35
140	25
90	20

4.6 FIXING

General

Suitability: If equipment is not suitable for fixing to non-structural building elements, fix directly to structure and trim around penetrations in non-structural elements.

Fasteners

General: Use proprietary fasteners capable of transmitting the loads imposed, and sufficient for the rigidity of the assembly.

4.7 SERVICES CONNECTIONS

Connections

General: Connect to utility service provider services or service points. Excavate to locate and expose connection points. Reinstall the surfaces and facilities that have been disturbed.

Utility service provider requirements

General: If the utility service provider elects to perform or supply part of the works, make the necessary arrangements. Install equipment supplied, but not installed, by the utility service provider.

4.8 SERVICES INSTALLATION

General

Fixing: If non-structural building elements are not suitable for fixing services to, fix directly to structure and trim around penetrations in non-structural elements.

Installation: Install equipment and services as follows:

- Plumb and securely fixed.
- Allow for movement in both structure and services.
- Arrange services running together, parallel to each other and adjacent building elements.

Concealment: Conceal all cables, ducts, trays and pipes except where installed in plant spaces, ceiling spaces and riser cupboards or documented to be exposed. If alternative routes are available, do not locate on external walls.

Lifting: Provide heavy items of equipment with permanent fixtures for lifting to the manufacturer's recommendations.

Suspended ground floors: Keep all parts of services suspended under ground floors at least 150 mm clear of the ground surface. Make sure services do not impede access.

Dissimilar metals

Joining: Join dissimilar metals with fittings of electrolytically compatible material.

Temporary capping

Pipe ends: During construction, protect open ends of pipe with metal or plastic covers or caps.

Piping

General: Install piping in straight lines at uniform grades without sags. Arrange to prevent air locks. Provide sufficient unions, flanges and isolating valves to allow removal of piping and fittings for maintenance or replacement of plant.

Spacing: Provide at least 25 mm clear between pipes and between pipes and building elements, additional to insulation.

Changes of direction: Provide as follows:

- If practicable, long radius elbows or bends and sets, and swept branch connections.
- If pipes are led up or along walls and then through to fixtures, provide elbows or short radius bends.
- Do not provide mitred fittings.

Vibration: Arrange and support piping to prevent vibration whilst permitting necessary movement. Minimise the number of joints.

Embedded pipes: Do not embed pipes that operate under pressure in concrete or surfacing material.

Valve groupings: If possible, locate valves in groups.

Pressure testing precautions: Isolate items not rated for the test pressure. Restrain pipes and equipment to prevent movement during pressure testing.

Support and structure

Requirement: Provide incidental supports and structures to suit the services.

Pipe support systems

General: Provide proprietary support systems of metallic-coated steel construction.

Vertical pipes: Provide anchors and guides to maintain long pipes in position, and supports designed for the mass of the pipe and its contents.

Saddles: Provide saddle supports only on DN 25 or smaller pipes.

Dissimilar metals: If pipe and support materials are dissimilar, provide industrial grade electrically non-conductive material securely bonded to the pipe to separate them. Provide fasteners of electrolytically compatible material.

Uninsulated pipes: Clamp piping supports directly to pipes.

Insulated pipes:

- Spacers: Provide spacers at least as thick as the insulation between piping supports and pipes. Extend either side of the support by at least 20 mm.
- Spacer material: Rigid insulation material of sufficient strength to support the piping and suitable for the temperature application.

Support spacing: As follows:

- Cold and heated water pipes: To AS/NZS 3500.1 Table 5.6.4. Provide additional brackets, clips or hangers to prevent pipe movement caused by water pressure effects.
- Sanitary plumbing: To AS/NZS 3500.2 Table 10.2.1.
- Fuel gas: To AS/NZS 5601.1 Table 5.5.
- Other pipes: To AS/NZS 3500.1 Table 5.6.4.

Hanger size table

Nominal pipe size (DN)	Minimum hanger diameter for single hangers (mm)
50 maximum	10
65 to 90	12
100 to 125	16
150 to 200	20

Differential movement

General: If the geotechnical site investigation report predicts differential movements between buildings and the ground in which pipes or conduits are buried, provide control joints in the pipes or conduits, as follows:

- Arrangement: Arrange pipes and conduits to minimise the number of control joints.
- Magnitude: Accommodate the predicted movements.

4.9 BUILDING PENETRATIONS

Penetrations

Requirement: Maintain the required structural integrity, fire performance, waterproofing performance and other properties when penetrating or fixing to the following:

- Structural building elements including external walls, fire walls, fire doors and access panels, other tested and rated assemblies or elements, floor slabs and beams.
- Membrane elements including damp-proof courses, waterproofing membranes and roof coverings. If penetrating membranes, provide a waterproof seal between the membrane and the penetrating component.

Sealing

Fire-resisting building elements: Seal penetrations with a system conforming to AS 4072.1.

Non fire-resisting building elements: Seal penetrations around conduits and sleeves. Seal around cables within sleeves. If the building element is acoustically rated, maintain the rating.

Sleeves

General: If piping, cables or conduits penetrate building elements, provide metal or PVC-U sleeves formed from pipe sections as follows:

- Movement: Arrange to permit normal pipe or conduit movement.
- Diameter (for non fire-resisting building elements): Sufficient to provide a ring shaped space around the pipe or pipe insulation of at least 12 mm.
- Ferrous surfaces: Prime paint.
- Sealing: Seal between pipes or conduits and sleeves to prevent the entry of vermin.
- Terminations:
 - . Cover plates fitted: Flush with the finished building surface.
 - . Fire-resisting and acoustic rated building elements: 50 mm beyond finished building surface.
 - . Floors draining to floor wastes: 50 mm above finished floor.
 - . Other locations: 5 mm beyond finished building surface.
 - . Termite management: To AS 3660.1.
- Thickness:
 - . Metal: 1 mm or greater.
 - . PVC-U: 3 mm or greater.

4.10 CONCRETE PLINTHS**Construction**

General: Provide concrete plinths as documented and under all equipment located on concrete floor slabs as follows (note that structural engineer's drawings take precedence over this clause):

- Surround: Galvanized steel, at least 75 mm high and 1.6 mm thick. Fix to the floor with masonry anchors. Fill with concrete.
- Height: 75 mm or greater, as documented.
- Reinforcement: Single layer of F62 fabric.
- Concrete: Grade N20.
- Finish: Steel float, flush with top edge of the surround.

4.11 PLANT AND EQUIPMENT**General**

Location: Locate so failure of plant and equipment (including leaks) does not create a hazard for the building occupants and causes a minimum or no damage to the building, its finishes and contents including water sensitive equipment or finishes.

Safe tray and an overflow pipe: Provide to each tank, hot water heater and storage vessel.

4.12 ACCESS FOR MAINTENANCE**General**

Requirement: Provide access for maintenance of plant and equipment.

Standards: Conform to the relevant requirements of AS 1657, AS 1892.1, AS 2865 and AS/NZS 3666.1.

Work Health and Safety: Conform to the requirements of the applicable Work Health and Safety regulations.

Refrigerated or cooling plant: If the space accessed is a refrigerated or cooling chamber inside a duct, air handling plant or similar and of sufficient size for a person to enter, provide the following to BCA G1.2:

- An access door.
- Internal lighting with external indicator lamp.
- An alarm.

Protection from injury: Protect personnel from injury caused by contact with objects including those that are sharp, hot or protrude at low level.

Plant room flooring surfaces: R10 Slip resistance classification to AS 4586.

Trip hazards: Do not run small services including drains and conduits across floors where they may be a trip hazard.

Manufacturer's standard equipment: If necessary, modify manufacturer's standard equipment to provide the plant access documented.

Clearances

Minimum clearances for access: Conform to the following:

- Vertical clearance: ≥ 2100 mm, vertically above horizontal floors, ground and platforms.
- Horizontal clearance: Preferably ≥ 750 mm clear, but in no case less than 600 mm between equipment or between equipment and building features including walls.
- If tools are required to operate, adjust or remove equipment, provide sufficient space so the tools can be used in their normal manner and without requiring the user to employ undue or awkward force.
- Hinged or removable components: To the manufacturer's recommendations.
- Within plant items: Conform to the preceding requirements, and not less than the clearances recommended in BS 8313.

Elevated services other than in occupied areas

Access classifications:

- Access class A: Readily accessible. Provide clear and immediate access to and around plant items. If plant or equipment is located more than 2.0 m above the ground, floor or platform, provide a platform with handrails accessible by a stair, all to AS 1657.
- Access class B: If the plant item requiring access is located more than 2.0 m above the ground, floor or platform, provide a platform with handrails accessible by a non-vertical ladder, all to AS 1657.
- Access class C: Locate plant so temporary means of access conforming to Work Health and Safety regulations can be provided.

Temporary means of access: Make sure there is adequate provision in place which is safe and effective.

Areas in which access is restricted to authorised maintenance personnel: Provide access as follows:

- Instruments, gauges and indicators (including warning and indicating lights) requiring inspection at any frequency: Readily accessible.
- Access required monthly or more frequently: Access class A.
- Access required between monthly and six monthly: Access class A or B.
- Access required less frequently than six monthly: Access class A, B or C.

Other areas: Provide access as follows:

- Locate to minimise inconvenience and disruption to building occupants or damage to the building structure or finishes.
- In suspended ceilings, locate items of equipment that require inspection and/or maintenance above tiled parts. If not possible, provide access panels where located above set plaster or other inaccessible ceilings. Arrange services and plant locations to reduce the number of access panels. Coordinate with other trades to use common access panels where feasible.
- Do not locate equipment requiring access above partitions.
- Instruments, gauges and other items requiring inspection at any frequency: Readily accessible.
- Labelling: If equipment is concealed in ceilings, provide marking to **MARKING AND LABELLING, Equipment concealed in ceilings.**

Facilities for equipment removal and replacement

Requirement: Provide facilities to permit removal from the building and replacement of plant and equipment, including space large enough to accommodate it and any required lifting and/or transportation equipment. Arrange plant so large and/or heavy items can be moved with the minimum changes of direction.

Removal of components: Allow sufficient space for removal and replacement of equipment components including air filters, tubes of shell and tube heat exchangers, removable heat exchanger

bundles, coils and fan shafts. Provide access panels or doors large enough to permit the safe removal and replacement of components within air handling units.

Facilities for access

Equipment behind hinged doors: Provide doors opening at least 150°.

Equipment behind removable panels: Provide panels with quick release fasteners or captive metal thread screws.

Removable panels: Provide handles to permit easy and safe removal and replacement.

Insulated plant and services: If insulation must be removed to access plant and services for maintenance, arrange it to allow for removal and replacement without damage.

Piping

Requirement: Conform to the following:

- Provide access and clearance at fittings which require maintenance, inspection or servicing, including control valves and joints intended to permit pipe removal.
- Arrange piping so it does not interfere with the removal or servicing of associated equipment or valves or block access or ventilation openings.
- Preferably run piping, conduits, cable trays and ducts at high level and drop vertically to equipment.

Electrical equipment and controls

Electrical equipment: Provide clearances and access space to AS/NZS 3000.

Switchboards and electrical control equipment: Locate near the main entrance to plant space and with switchboards visible from the plant being operated.

Control panels: Locate near and visible from the plant being controlled.

4.13 VIBRATION SUPPRESSION

General

Requirement: Minimise the transmission of vibration from rotating or reciprocating equipment to other building elements.

Standard

Machinery noise and vibration: Vibration severity in Zone A to ISO 20816-1 and ISO 10816-3.

Speeds

General: If no maximum speed is prescribed, do not exceed 1500 r/min for direct driven equipment.

Connections

General: Provide flexible connections to rotating machinery and assemblies containing rotating machinery. Isolate pipes by incorporating sufficient flexibility into the pipework or by use of proprietary flexible pipe connections installed to prevent placing stress on pipes due to end reaction.

Inertia bases

General: If necessary to achieve the required level of vibration isolation, provide inertia bases having appropriate mass and to the following:

- Construction: Steel or steel-framed reinforced concrete with reinforcing bars welded between base sections. Position foundation bolts for equipment before pouring concrete.
- Supports: Support on vibration isolation mountings using height saving support brackets.

Vibration isolation mountings

General: Except for external equipment that is not connected to the structure of any building, support rotating or reciprocating equipment on mountings as follows:

- For static deflections < 15 mm: Single or double deflection neoprene in-shear mountings incorporating steel top and base plates and a tapped hole for bolting to equipment.
- For static deflections ≥ 15 mm: Spring mountings.

Selection: Provide mountings selected to achieve 95% isolation efficiency at the normal operating speeds of the equipment.

Installation: Set and adjust vibration isolation mounting supports to give clearance for free movement of the supports.

Spring mountings: Provide freestanding laterally stable springs as follows:

- Clearances: ≥ 12 mm between springs and other members such as bolts and housing.
- High frequency isolation: 5 mm neoprene acoustic isolation pads between baseplate and support.

- Levelling: Provide bolts and lock nuts.
- Minimum travel to solid: $\geq 150\%$ of the designated minimum static deflection.
- Ratio of mean coil diameter to compressed length at the designated minimum static deflection: $\geq 0.8:1$.
- Snubbing: Snub the springs to prevent bounce at start-up.
- Vertical resilient limit stops: To prevent spring extension when unloaded, to serve as blocking during erection and which remain out of contact during normal operation.

4.14 SEISMIC RESTRAINT OF NON-STRUCTURAL COMPONENTS

General

Earthquake design category: Refer to structural engineer's documentation.

Seismic restraint to AS 1170.4: Refer to structural engineer's documentation.

4.15 FINISHES TO BUILDING SERVICES

General

Requirement: If exposed to view (including in plant rooms), paint building services and equipment.

Surfaces painted or finished off-site: Conform to *0183 Metals and prefinishes*.

Exceptions: Do not paint chromium or nickel plating, anodised aluminium, GRP, stainless steel, non-metallic flexible materials and normally lubricated machined surfaces. Surfaces with finishes applied off-site need not be re-painted on-site provided the corrosion resistance of the finish is not less than that of the respective finish documented.

Standard: Conform to the recommendations of AS/NZS 2311 Sections 3, 6 and 7 or AS 2312.1 Sections 6, 7 and 8, as applicable.

Inaccessible surfaces: If surfaces are inaccessible after installation, complete finish before installation.

Painting systems

New unpainted interior surfaces: To AS/NZS 2311 Table 5.1.

New unpainted exterior surfaces: To AS/NZS 2311 Table 5.2.

Paint application

Coats: Apply the first coat immediately after substrate preparation and before contamination of the substrate can occur. Make sure each coat of paint or clear finish is uniform in colour, gloss, thickness and texture and free of runs, sags, blisters or other discontinuities.

Combinations: Do not combine paints from different manufacturers in a paint system.

Protection: Remove fixtures before starting to paint and refix in position undamaged when painting is complete.

Underground metal piping

Requirement: Provide corrosion protection for the following:

- Underground ferrous piping.
- Underground non-ferrous metal piping in corrosive environments.

Corrosion protection: Select from the following:

- Cathodic protection: Sacrificial anodes or impressed current. Incorporate a facility for periodic testing. Conform to the recommendations of AS 2832.1.
- Continuous wrapping using proprietary petroleum taping material.
- Impermeable flexible plastic coating.
- Sealed polyethylene sleeve.

Aggressive soils: If metallic piping or components are installed in chemically aggressive soil, provide additional protection as follows:

- Material: Continuous polyethylene sleeve to ASTM D1248 with a minimum thickness of 0.25 mm.
- Installation: Wrap or sleeve pipes and components. Tape joints between sections of polyethylene and between polyethylene and piping.

Low VOC emitting paints

Paint types: To the recommendations of AS/NZS 2311 Table 4.2.

Repairs to finishes

Requirement: Repair damaged finishes to restore their corrosion protection, appearance and service life.

4.16 MARKING AND LABELLING**General**

Requirement: Mark and label services and equipment for identification purposes as follows:

- Locations exposed to weather: Provide durable materials.
- Pipes, conduits and ducts: To AS 1345 throughout its length, including in concealed spaces.
- Cables: Label to indicate the origin and destination of the cable.

Consistency: Label and mark equipment using a consistent scheme across all services elements of the project.

Label samples and schedules

Requirement: For each item or type of item, prepare a schedule of marking and labelling, including the following:

- A description of the item or type of item for identification.
- The proposed text for marking or labelling.
- The proposed location of the marking and labelling.

Submission timing: Before marking or labelling.

Electrical accessories

Circuit identification: Label isolating switches and outlets to identify circuit origin.

Operable devices

Requirement: Mark to identify the following:

- Controls.
- Indicators, gauges, meters.
- Isolating switches.

Wall mounted equipment in occupied areas

Location: Provide labels on wall mounted items in occupied areas including the following:

- Services control switches.
- Temperature and humidity sensors.

Points lists

Automatic control points: Provide plasticised, fade-free points lists for each automatic control panel and include terminal numbers, point addresses, short and long descriptors in the lists. Store in a pocket on the door of the panel.

Pressure vessels

General: Mount manufacturer's certificates in glazed frames on a wall next to the vessel.

Valves and pumps

General: Label to associate pumps with their starters and valves. Screw fix labels to body or attach label to valve handwheels with a key ring.

Underground services

Survey: Accurately record the routes of underground cables and pipes before backfilling. Include on the record drawings.

Records: Provide digital photographic records of underground cable and pipe routes before backfilling. Include in operation and maintenance manual.

Location marking: Accurately mark the location of underground cables and pipes with route markers consisting of a marker plate set flush in a concrete base, engraved to show the direction of the line and the name of the service.

Markers: Place markers at ground level at each joint, route junction, change of direction, termination and building entry point and in straight runs at intervals of not more than 100 m.

Marker bases: 200 mm diameter x 200 mm deep, minimum concrete.

Direction marking: Show the direction of the cable and pipe run by means of direction arrows on the marker plate. Indicate distance to the next marker.

Plates: Brass, aluminium or stainless steel with black filled engraved lettering, minimum size 75 x 75 x 1 mm thick.

Plate fixing: Waterproof adhesive and 4 brass or stainless steel countersunk screws.

Marker height: Set the marker plate flush with paved surfaces, and 25 mm above other surfaces.

Marker tape: Where electric bricks or covers are not provided over underground wiring, provide a 150 mm wide yellow or orange marker tape bearing the words WARNING – electric cable buried below, laid in the trench 150 mm below ground level.

Plastic pipe: Provide a detectable marker tape with trace wire to identify the route of buried piping. Terminate with 1000 mm coil in a readily accessible location. Tag to match the record drawings.

Labels and notices

Materials: Select from the following:

- Cast metal.
- For indoor applications only, engraved two-colour laminated plastic.
- Proprietary pre-printed self-adhesive flexible plastic labels with machine printed black lettering.
- Stainless steel or brass minimum 1 mm thick with black filled engraved lettering.

Emergency functions: To AS 1319.

Colours: Generally to AS 1345 as appropriate, otherwise black lettering on white background except as follows:

- Danger, warning labels: White lettering on red background.
- Main switch and caution labels: Red lettering on white background.

Edges: If labels exceed 1.5 mm thickness, radius or bevel the edges.

Labelling text and marking: To correspond to terminology and identifying number of the respective item as shown on the record drawings and documents and in operating and maintenance manuals.

Lettering heights:

- Danger, warning and caution notices: Minimum 10 mm for main heading, minimum 5 mm for remainder.
- Equipment labels within cabinets: Minimum 5 mm.
- Equipment nameplates: Minimum 40 mm.
- Identifying labels on outside of cabinets: Minimum 5 mm.
- Isolating switches: Minimum 5 mm.
- Switchboards, main assembly designation: Minimum 25 mm.
- Switchboards, outgoing functional units: Minimum 10 mm.
- Switchboards, sub assembly designations: Minimum 15 mm.
- Valves: Minimum 20 mm.
- Self-adhesive flexible plastic labels:
 - . Labels less than 2000 mm above floor: 5 mm.
 - . Labels minimum 2000 mm above floor: 10 mm.
 - . Other locations: Minimum 5 mm.

Label locations: Locate labels so they are easily seen and are either attached to, below or next to the item being marked.

Fixing: Fix labels securely using screws, rivets, proprietary self-adhesive labels or double-sided adhesive tape and as follows:

- If labels are mounted in extruded aluminium sections, use rivets or countersunk screws to fix the extrusions.
- Use aluminium or monel rivets for aluminium labels.

Vapour barriers: Do not penetrate vapour barriers.

4.17 RECORD DRAWINGS

General

Record drawings to be integrated into **ELECTRONIC FACILITY AND ASSET MANAGEMENT** system.

Requirement: Prepare record drawings showing the following:

- Installed locations of building elements, services, plant and equipment.
- Off-the-grid dimensions and depth if applicable.
- Any provisions for the future.

Recording, format and submission

Requirement: Record changes made during the progress of the works on a set of drawings kept on site for that specific purpose.

Format: To be integrated into **ELECTRONIC FACILITY AND ASSET MANAGEMENT** system.

Endorsement: Sign and date all record drawings.

Accuracy: If errors in, or omissions from, the record drawings are found, amend the drawings and re-issue in the format noted above.

Date for submission: Not later than 2 weeks after the date for practical completion.

Services record drawings

General: To **General** and **Recording, format and submission** and the following:

- Extensions and/or changes to existing: If a drawing shows extensions and/or alterations to existing installations, include sufficient of the existing installation to make the drawing comprehensible without reference to drawings of the original installation.
- Detention: If on-site detention tanks or pondage are provided, include the volume required on the drawing and the permitted flow rate to the connected system.
- Domestic cold water or fire mains: Show the pressure available at the initial connection point and the pressure available at the most disadvantaged location on each major section of the works.
- Stormwater: If storm water pipes are shown, include the pipe size and pipe grade together with the maximum acceptable flow and the actual design flow.

Diagrams: Provide diagrammatic drawings of each system including the following:

- Controls.
- Piping including all valves and valve identification tags.
- Principal items of equipment.
- Single line wiring diagrams.
- Acoustic and thermal insulation.
- Access provisions and space allowances.
- Fasteners.
- Fixtures.
- Switchgear and control gear assembly circuit schedules including electrical service characteristics, controls and communications.
- Charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

Subsurface services: Record information on underground or submerged services to the documented quality level, conforming to AS 5488.

Subsurface services recording quality level: QL-B

4.18 OPERATION AND MAINTENANCE MANUALS

General

Operation and maintenance manuals to be integrated into **ELECTRONIC FACILITY AND ASSET MANAGEMENT** system.

Authors and compilers: Personnel experienced in the maintenance and operation of equipment and systems installed, and with editorial ability.

Referenced documents: If referenced documents or worksections require submissions of manuals, include corresponding material in the operation and maintenance manuals.

Subdivision: By installation or system, depending on project size.

Contents of manual

Table of contents: Include a table of contents in each volume. Title to match cover.

Table of amendments: Include a table of amendments.

Directory: Include names, addresses, email addresses and telephone and facsimile numbers of principal consultant, subconsultants, contractor, subcontractors and names of responsible parties.

Record drawings: Include complete set of record drawings, full size.

Drawings and technical data: Include as necessary for the efficient operation and maintenance of the installation.

Installation description: Include a general description of the installation.

Systems descriptions and performance: Include a technical description of the systems installed including design concepts embodied, the interrelation with other systems and the building and mode of operation, presented in a clear and concise format readily understandable by the principal's staff. Identify function, normal operating characteristics, safety features and limiting conditions.

Baseline data: To AS 1851, AS 1668.1, AS 1682.2 and AS 1670.1.

Commissioning results: Include for use as baseline data for system and equipment maintenance performance.

Fire systems and equipment: Include documentation to AS 1851, including the schedule of essential functionality and performance requirements.

Digital photographic records: Include records to **MARKING AND LABELLING, Underground services.**

Equipment descriptions:

- Name, address, email address and telephone and facsimile numbers of the manufacturer and supplier of items of equipment installed, together with catalogue list numbers.
- Schedules (system by system) of equipment, stating locations, duties, performance figures and dates of manufacture. Provide a unique code number cross-referenced to the record and diagrammatic drawings and schedules, including spare parts schedule, for each item of equipment installed. Equipment schedules in tabular form including the equipment designation used on the drawings, manufacturer's name and contact details, equipment name plate data, function of item, associated system and capacity data.
- Manufacturers' technical literature for equipment installed, assembled specifically for the project, excluding irrelevant matter. Mark each product data sheet to clearly identify specific products and component parts used in the installation, and data applicable to the installation.
- Supplements to product data to illustrate relations of component parts. Include typed text as necessary.

Certificates:

- Certificates from authorities.
- Product certification.
- Test certificates for each service installation and all equipment.
- Test reports.
- Test, balancing and commissioning reports.
- Control system testing and commissioning results.
- Warranties.

Trends: 7 day record of all trends at commissioning.

Operation procedures:

- Manufacturers' technical literature as appropriate.
- Safe starting up, running-in, operating and shutting down procedures for systems installed. Include logical step-by-step sequence of instructions for each procedure.
- Control sequences and flow diagrams for systems installed.
- Legend for colour-codes services.
- Schedules of fixed and variable equipment settings established during commissioning and maintenance.
- A list of special safety devices and their set points.
- Procedures for seasonal changeovers.
- Warnings to operators.
- Recommendations for efficient plant operation.

- If the installation includes cooling towers, a water efficiency management plan.

Maintenance procedures:

- Detailed recommendations for periodic maintenance and procedures, including schedule of maintenance work with frequency and manufacturers' recommended tests.
- Manufacturer's technical literature as appropriate. Register with manufacturer as necessary. Retain copies delivered with equipment.
- Safe trouble-shooting, disassembly, repair and reassembly, cleaning, alignment and adjustment, balancing and checking procedures. Provide logical step-by-step sequence of instructions for each procedure.
- Schedule of spares, recommended to be held on site, for those items subject to wear or deterioration and that may involve the principal in extended deliveries when replacements are required. Include complete nomenclature and model numbers, and local sources of supply.
- Schedule of normal consumable items, local sources of supply, and expected replacement intervals up to a running time of 40 000 hours. Include lubrication schedules for equipment.
- Schedules for recording recommissioning data to identify changes in the system over time.
- Instructions for use of tools and testing equipment.
- Troubleshooting procedures.
- Emergency procedures, including telephone numbers for emergency services, and procedures for fault finding.
- Safety data sheets (SDS).
- Instructions and schedules conforming to AS 1851, AS/NZS 3666.2, AS/NZS 3666.3 and AS/NZS 3666.4.

Maintenance records:

- Prototype service records conforming to AS 1851 prepared to include project specific details.
- Prototype periodic maintenance records and report to AS/NZS 3666.2, AS/NZS 3666.3 and AS/NZS 3666.4 as appropriate, prepared to include project specific details.

Emergency information: For each type of emergency, including fire, flood, gas leak, water leak, power failure, water failure, system or sub system failure, chemical release or spill, include the following:

- Emergency instructions.
- Emergency procedures including:
 - . Instructions for stopping or isolating.
 - . Shutdown procedures and sequences.
 - . Instructions for actions outside the property.
 - . Special operating instructions relevant to the emergency.
 - . Contact details relevant to the emergency.

Emergency information manual

Form of emergency information: Provide one of the following:

- An index and coloured tabs identifying emergency information for each type of emergency within the Operation and maintenance manual.
- A separate Emergency manual containing copies of emergency information from the main Operation and maintenance manual.

Format – electronic copies

Quantity and format: To be integrated into **ELECTRONIC FACILITY AND ASSET MANAGEMENT** system.

Printing: Except for drawings required in the **RECORD DRAWINGS** clause provide material that can be legibly printed on A4 size paper.

Date for submission

Draft submission: The earlier of the following:

- 4 weeks before the date for practical completion.
- Commencement of training on services equipment.

Final submission: Within 2 weeks after practical completion.

4.19 ELECTRONIC FACILITY AND ASSET MANAGEMENT

General

Coordinate with Web FM to provide Operation and Maintenance Manual system. Contractor is responsible for all costs in setting up the system, and for payment of fees for the first year.

4.20 CLEANING

Final cleaning

General: Before the date for practical completion, clean throughout, including all exterior and interior surfaces except those totally and permanently concealed from view.

Labels: Remove all labels not required for maintenance.

4.21 WARRANTIES

General

Requirement: If a warranty is documented, name the principal as warrantee. Register with manufacturers as necessary. Retain copies delivered with components and equipment.

Warranty period: Start warranty periods at acceptance of installation.

Approval of installer: If installation is not by manufacturer, and product warranty is conditional on the manufacturer's approval of the installer, submit the manufacturer's written approval of the installing firm.

4.22 PERIODIC MAINTENANCE OF SERVICES

General

Requirement: During the maintenance period, carry out periodic inspections and maintenance work as recommended by manufacturers of supplied equipment, and promptly rectify faults.

Emergencies: Attend emergency calls promptly.

Annual maintenance: Carry out recommended annual maintenance procedures before the end of the maintenance period.

Maintenance period: As documented by services engineers but no less than the defects liability period.

Maintenance program

General: Submit details of maintenance procedures and program, relating to installed plant and equipment, 6 weeks before the date for practical completion. Indicate dates of service visits. State contact telephone numbers of service operators and describe arrangements for emergency calls.

Maintenance records

General: Record in binders provided with the Operation and maintenance manuals.

Referenced documents: If referenced documents or technical worksections require that log books or records be submitted, include this material in the maintenance records.

Certificates: Include test and approval certificates.

Service visits: Record comments on the functioning of the systems, work carried out, items requiring corrective action, adjustments made and name of service operator. On completion of the visit, obtain the signature of the principal's designated representative on the record of the work undertaken.

Site control

General: Report to the principal's designated representative on arriving at and before leaving the site.

4.23 POST-CONSTRUCTION MANDATORY INSPECTIONS AND MAINTENANCE

General

Requirement: For the duration of the defects liability period, provide inspections and maintenance of safety measures required by the following:

- AS 1851.
- Other statutory requirements applicable to the work.

Records: Provide mandatory records.

Certification: Certify that mandatory inspections and maintenance have been carried out and that the respective items conform to statutory requirements.

Annual inspection: Perform an annual inspection and maintenance immediately before the end of the defects liability period.

0181 ADHESIVES, SEALANTS AND FASTENERS

1 GENERAL**1.1 RESPONSIBILITIES****General**

Requirement: Provide adhesives, sealants and fasteners, as documented.

Performance

Requirements: Conform to the following:

- Fitness for purpose: Suitable for particular use, capable of transmitting imposed loads, sufficient to maintain the rigidity of the assembly, or integrity of the joint.
- Finished surface: That will not cause discolouration.
- Compatibility: Compatible with the products to which they are applied.
- Sealant replacement: Capable of safe removal without compromising the application of the replacement sealant for future refurbishment.
- Movement: If an adhered or sealed joint is subject to movement, select a system certified to accommodate the projected movement under the conditions of service.

1.2 PRECEDENCE**General**

Order of precedence:

- The requirements of other worksections of the specification override conflicting requirements of this worksection.
- The requirements of worksections override conflicting requirements of their referenced documents. The requirements of the referenced documents are minimum requirements.

1.3 CROSS REFERENCES**General**

Requirement: Conform to the following:

- 0171 General requirements.

1.4 SUBMISSIONS**Products and materials**

Adhesives and sealants: Submit product data sheets.

Samples

Visible joint sealants: Submit colour samples.

Tests

Compatibility testing: Submit adhesion and compatibility testing data demonstrating that adhesive, sealant or fastener is compatible with materials to be fixed and is suitable for the project conditions.

Warranties

Manufacturer's warranty: Submit the manufacturer's published product warranties.

2 PRODUCTS**2.1 ADHESIVES****Standards**

Gypsum plaster adhesive: To AS 2753.

High strength adhesive tape

General description: A foam of cross linked polyethylene or closed cell acrylic coated both sides with a high performance acrylic adhesive system, encased in release liners of paper or polyester.

Product classification: Select tape to suit substrate as follows:

- Firm high strength foam tapes: For high energy surfaces including most bare metals such as stainless steel and aluminium.
- Conformable high strength foam: For the following:
 - . Medium energy surfaces including many plastics and paints, and bare metals.
 - . Lower energy surfaces including many plastics, most paints and powder coatings, and bare metals.

Thickness: Select the tape to make sure a mismatch between surfaces does not exceed half the tape thickness under the applied lamination pressure.

2.2 SEALANTS

Standards

General: To ISO 11600.

External masonry joints

General: Provide sealant and bond breaking materials which are non-staining to masonry. Do not use bituminous materials with absorbent masonry units.

Bond breaking backing:

- Bond breaking materials: Non-adhesive to sealant, or faced with a non-adhering material.
- Foamed materials: Closed-cell or impregnated, not water-absorbing.

Lightweight building element joints

Joints subject to rapid changes of movement: Provide sealants that accommodate the movement of the contact materials.

Floor control joints

General: Provide trafficable sealants.

Bond breaking backing:

- Bond breaking materials: Non-adhesive to sealant, or faced with a non-adhering material.
- Foamed materials: Closed-cell or impregnated, not water-absorbing.

2.3 FASTENERS

General

Masonry anchors: Proprietary expansion or bonded type anchors conforming to **SELECTIONS, ANCHORS**.

Plain washers: To AS 1237.1.

- Provide washers to the heads and nuts of bolts, and the nuts of coach bolts.

Plugs: Proprietary purpose-made plastic.

Stainless steel fasteners: To ASTM A240/A240M.

Steel nails: To AS 2334.

- Length: At least 2.5 times the thickness of the member being secured, and at least 4 times the thickness if the member is plywood or building board less than 10 mm thick.

Unified hexagon bolts, screws and nuts: To AS/NZS 2465.

Fasteners in CCA treated timber: Epoxy coated or stainless steel.

Bolts

Coach bolts: To AS/NZS 1390.

Hexagon bolts Grades A and B: To AS 1110.1.

Hexagon bolts Grade C: To AS 1111.1.

Corrosion resistance

Atmospheric corrosivity category: To 0171 *General requirements*.

Steel products: Conform to the **Corrosion resistance table** or provide proprietary products with metallic and/or organic coatings of equivalent corrosion-resistance.

Corrosion resistance table

Atmospheric corrosivity category to AS 4312	Threaded fasteners and anchors		Powder actuated fasteners
	Material	Minimum local	Material

Atmospheric corrosivity category to	Threaded fasteners and anchors		Powder actuated fasteners
		metallic coating thickness (µm)	
C1 and C2	Electroplated zinc or Hot-dip galvanized	30	Stainless steel Type 316
C3	Hot-dip galvanized	50	Stainless steel Type 316
C4	Stainless steel Type 316	-	Stainless steel Type 316
Note: For categories C5, CX and T to the AS/NZS 2312 series, seek specialist advice.			

Finishes

Electroplating:

- Metric thread: To AS 1897.
- Imperial thread: To AS 4397.

Galvanizing:

- Threaded fasteners: To AS/NZS 1214.
- Other fasteners: To AS/NZS 4680.

Mild steel fasteners: Galvanize if:

- Embedded in masonry.
- In external timbers.
- Exposed to or in air spaces behind the external leaf of masonry walls.
- In contact with chemically treated timber other than CCA treated timber.

Epoxy coated: CCA treated timber.

Nuts

Hexagon chamfered thin nuts Grades A and B: To AS 1112.4.

Hexagon nuts Grade C: To AS 1112.3.

Hexagon nuts Style 1 Grades A and B: To AS 1112.1.

Hexagon nuts Style 2 Grades A and B: To AS 1112.2.

Screws

Coach screws: To AS/NZS 1393.

Hexagon screws Grades A and B: To AS 1110.2.

Hexagon screws Grade C: To AS 1111.2.

Hexagon socket screws: To AS 1420.

Self-drilling screws: To AS 3566.1.

Self-tapping screws:

- Crossed recessed countersunk (flat – common head style): To AS/NZS 4407.
- Crossed recessed pan: To AS/NZS 4406.
- Crossed recessed raised countersunk (oval): To AS/NZS 4408.
- Hexagon: To AS/NZS 4402.
- Hexagon flange: To AS/NZS 4410.
- Hexagon washer: To AS/NZS 4409.
- Slotted countersunk (flat – common head style): To AS/NZS 4404.
- Slotted pan: To AS/NZS 4403.
- Slotted raised countersunk (oval – common head style): To AS/NZS 4405.

Blind rivets

Description: Expanding end type with snap mandrel.

Type: Closed end for external application, open end for internal application.

End material:

- Aluminium base alloy for metallic-coated or prepainted steel.
- Stainless steel for stainless steel sheet.
- Copper for copper sheet.

Size:

- For sheet metal to sheet metal: 3 mm.
- For sheet metal to supports, brackets and rolled steel angles: 4.8 mm.

3 EXECUTION

3.1 ADHESIVES

General

Requirement: Install to the manufacturer's recommendations.

Preparation

Substrates: Conform to the following:

- Remove any deposit or finish which may impair adhesion.
- If framed or discontinuous, provide support members in full lengths without splicing.
- If solid or continuous, remove excessive projections.
- If previously painted, remove cracked or flaking paint and lightly sand the surface.

Contact adhesive

Precautions: Do not use contact adhesive if:

- A substrate is polystyrene foam.
- A PVC substrate may allow plasticiser migration.
- The adhesive solvent can discolour the finished surface.
- Dispersal of the adhesive solvent is impaired.

Two-way method: Immediately after application, press firmly to transfer adhesive and then pull both surfaces apart. Allow to tack off and then reposition and press firmly together. Tap areas in contact with a hammer and padded block.

One-way method: Immediately after application, bring substrates together and maintain maximum surface contact for 24 hours by clamps, nails or screws as appropriate. If highly stressed, employ permanent mechanical fasteners.

High strength adhesive tape

Preparation:

- Non-porous surfaces: Clean with surface cleaning solvents such as isopropyl alcohol/water, wash down and allow to dry.
- Porous surfaces: Prime the surface with a contact adhesive compatible with the tape adhesive system.

Application to copper, brass, plasticised vinyl and hydrophilic surfaces such as glass and ceramics in a high humidity environment: Conform to manufacturer's recommendations.

Applied lamination pressure: Make sure the tape experiences 100 kPa.

Application temperature: Generally above 10 °C and to the manufacturer's recommendations.

Completion: Do not apply loads to the assembly for 72 hours at 21 °C.

3.2 JOINT SEALING

General

Requirement: Install to the manufacturer's recommendations.

Joint preparation

Cleaning: Cut flush joint surface protrusions and rectify if required. Mechanically clean joint surfaces free of any deposit or finish which may impair adhesion of the sealant. Immediately before sealant application, remove loose particles from the joint, using oil-free compressed air.

Bond breaking: Install bond breaking backing material.

Taping: Protect the surface on each side of the joint using 50 mm wide masking tape or equivalent means. On completion of sealant application, remove the tape and remove any stains or marks from adjacent surfaces.

Primer: Apply the recommended primer to the surfaces in contact with sealant materials.

Sealant joint proportions

General weatherproofing joints (width:depth):

- 1:1 for joint widths less than 12 mm.
- 2:1 for joint widths greater than 12 mm.

Sealant application

General: Apply the sealant to dry joint surfaces using a pneumatic applicator gun. Make sure the sealant completely fills the joint to the required depth, provides good contact with the full depth of the sides of the joint and traps no air in the joint. Do not apply the sealant outside the recommended working time for the material or the primer.

Weather conditions

Two pack polyurethanes: Do not apply the sealant if ambient conditions are outside the following:

- Temperature: Less than 5°C or greater than 40°C.
- Humidity: To the manufacturer's recommendations.

Joint finish

General: Force the sealant into the joint and finish with a smooth, slightly concave surface using a tool designed for the purpose.

Excess sealant: Remove from adjoining surfaces using cleaning material nominated by the sealant manufacturer.

Protection

General: Protect the joint from inclement weather during the setting or curing period of the material.

Rectification

General: Cut out and remove damaged portion of joint sealant and reinstall so repaired area is indistinguishable from undamaged portion.

3.3 FASTENERS

General

Requirement: Install to the manufacturer's recommendations.

Fastening to wood and steel

Timber substrates: To AS 1720.1 Section 4.

Self-drilling screws: To AS 3566.1 for timber and steel substrates.

Masonry anchors

Installation: To the manufacturer's recommendations.

4 SELECTIONS

4.1 ADHESIVES

Application schedule

Application	Product	Relevant worksections
Colourback glass faced wall panels or splashbacks	1 part polyurethane sealant / adhesive with permanent elasticity	0551 Joinery
Drywall lining/wall panels	High strength contact adhesive	0511 Lining, 0520 Partitions – combined
Joinery doors	PVA or 1 part polyurethane	0453 Doors and access panels
Mirrors	1 part polyurethane sealant / adhesive with permanent elasticity	
Stainless steel faced wall panels	1 part polyurethane sealant /	0551 Joinery

Application	Product	Relevant worksections
or splashbacks	adhesive with permanent elasticity	
Timber joinery fitments	PVA or 1 part polyurethane	0551 Joinery
Trim, mouldings, skirtings and architraves	High strength contact adhesive	0511 Lining

4.2 SEALING, POINTING AND BEDDING

Application schedule

Application	Product	Relevant worksections
Metal flashings and rainwater goods	Silicone neutral cure	0421 Roofing – combined
Metal flashings and sealing non-porous substrates	1 part elastomeric polyurethane	0431 Cladding – combined
Window and external doors	1 part elastomeric polyurethane	0451 Windows and glazed doors, 0453 Doors and access panels
Hydraulic services	Silicone neutral cure formulated to prevent microbiological growth for kitchen and sanitary ware applications	0811 Sanitary fixtures, 0812 Tapware, 0813 Water heaters, 0815 Drinking water dispensers

Adhesives, sealants and fasteners combined function schedule

Application	Product	Relevant worksections
Control joints, tile adhesives and wet area sealants	2 part elastomeric polyurethane	0631 Ceramic tiling
Wet area sealants and lightweight detail items	Silicone neutral cure formulated to prevent microbiological growth for kitchen and sanitary ware applications	0551 Joinery, 0811 Sanitary fixtures

4.3 SEALING STRUCTURALLY DESIGNED CONTROL JOINTS

Application schedule

Application	Sealant type	Bond breaking	Sealant colour	Relevant worksection
Masonry control joints	2 part elastomeric polyurethane	As recommended by sealant manufacturer	To match surrounding wall colour as closely as possible	0331 Brick and block construction
Trafficable masonry control joints	2 part elastomeric polyurethane	As recommended by sealant manufacturer	Grey	

0182 FIRE-STOPPING

1 GENERAL**1.1 RESPONSIBILITIES****General**

Requirement: Provide fire-stopping, as documented.

1.2 CROSS REFERENCES**General**

Requirement: Conform to the following:

- 0171 General requirements.

1.3 PRECEDENCE**General**

Order of precedence:

- The requirements of other worksections of the specification override conflicting requirements of this worksection.
- The requirements of worksections override conflicting requirements of their referenced documents. The requirements of the referenced documents are minimum requirements.

1.4 STANDARDS**General**

Service penetration fire-stopping systems: To BCA C3.15.

Control/construction joint fire-stopping systems: To AS 4072.1.

1.5 INTERPRETATION**Definitions**

General: For the purposes of this worksection the definitions given in AS 4072.1 apply.

1.6 SUBMISSIONS**Certification**

General: Submit evidence of conformity with the recommendations of AS 4072.1 Appendix B.

Certification: Submit a completed certification list and schedule for installed fire-stopped penetrations and control/construction joints.

- List form: To AS 4072.1 Figure B1.
- Schedule form: To AS 4072.1 Figure B2.

Execution details

General: Give notice, if substrates or penetrants or both are not suitable for fire-stopping.

Operation and maintenance manuals

General: For fire-stopping systems which are intended to be modified in service, submit a user manual.

Products and materials

General: Submit the following:

- Evidence that systems conform to documented requirements.
- Copies of relevant manufacturers' instructions.
- Product data sheets (PDS).

Type tests: Submit type test reports as evidence of conformance for each combination of fire-stopping system, application, type of service, substrate, penetration orientation and drawings of tested details.

Include for the following:

- Service penetration fire-stopping systems: Fire-resistance tested to AS 1530.4.
- Fire-stop mortars: Resistance to explosive spalling to AS 1774.36.

- Control joint fire-stopping systems: Fire-resistance tested to AS 1530.4.

Subcontractors

General: Submit names and contact details of proposed suppliers and installers.

Warranties

Proprietary fire-stopping products and systems: Submit the manufacturer's published product warranties.

1.7 INSPECTION**Notice**

Authority inspections: Give notice to building certifier so that inspection may be made after fire stopping is completed before being concealed.

2 PRODUCTS**2.1 MATERIALS****Storage and handling**

General: Deliver, unload and store products and accessories in unbroken manufacturer's packaging in a dry, well-ventilated and secure storage area, unaffected by weather.

Shelf life: Use materials that have not exceeded their shelf life.

Tolerances

Control joint movement to AS 4072.1 clauses 2.3 and 4.7 and Appendix C.

Toxicity

Toxic materials: Free of asbestos and lead and free of, nor requiring the use of, toxic solvents.

Toxicity in fire: Non-toxic.

Product certification

Conformance: Address the following:

- Statutory and performance requirements.
- Adequacy of application/installation.

Appointment: In the joint names of the contractor and the principal.

2.2 FIRE-STOPPING PRODUCTS**Fire-stop mortars**

Type: Re-enterable cement-based compound, mixed with water. Non-shrinking, moisture resistant. Insoluble in water, after setting.

Formulated compound of incombustible fibres

Material: Formulated compound mixed with mineral fibres, non-shrinking, moisture resistant. Insoluble in water after setting.

Fibre stuffing

Material: Mineral fibre stuffing insulation, dry and free of other contaminants.

Standard: AS/NZS 4859.1 Section 7.

Intumescent fire pillows

Material: Self-contained self-locking intumescent fire pillows for medium to large openings, where no additional support is required.

Fire-stop composite sheets

Material: Composite system comprised of a number of components, including a fire-resistive elastomeric sheet, bonded on either side with layers of sheet steel and/or steel-wire mesh covered with aluminium foil.

Fire-stop sealants

Material: Elastomeric sealant. Soft, permanently flexible, non-sag, non-shrinking, moisture resistant. Capable of providing a smoke-tight, gas-tight and waterproof seal when properly installed. Insoluble in water after setting.

Fire-stop foams

Material: Single component compound of reactive foam ingredients, non-shrinking, moisture resistant. Insoluble in water after setting.

Fire-stop putty

Material: Single component, mouldable, permanently flexible, non-shrinking, moisture resistant, intumescent compound which conforms to the following:

- Expands on exposure to surface heat gain to form a high-volume thermally insulating char that closes gaps and voids.
- Resists the turbulence of a severe fire.
- Can be placed by hand to form an immediate fire seal.
- Insoluble in water after setting.

2.3 COMPONENTS**Fire-stop collars**

Material: Mechanical device with incombustible intumescent fillers covered with sheet steel jacket. Airtight and watertight.

Fire-stop pillows

Material: Formed self-contained compressible flexible mineral fibre in cloth bags, rated to permit frequent changes in service.

Multi-service cable transit box

Material: Mechanical device consisting of a sheet steel sleeve containing heat reactive intumescent polymer, including intumescent seals and smoke rated brushes. The insulation rating can be increased by the incorporation of other fire-stopping products.

Control joint insert – elastomeric foam strip

Material: Elastomeric foam strip laminated with a graphite based intumescent compound on both sides, which is a water resistant seal that expands when exposed to heat.

Accessories

Permanent dam material: Non-combustible.

Installation accessories: Provide clips, collars, fasteners, temporary stops and dams, and other devices required to position, support and contain fire-stopping and accessories.

3 EXECUTION**3.1 PREPARATION****Substrates**

Cleaning: Clean substrates of dirt, dust, grease, oil, loose material, and other matter which may affect the bond of fire-stopping products.

Primer: Dry substrates for primers and sealants.

Restraint: Install backing and/or damming materials to arrest liquid material leakage. Remove temporary dams after material has cured.

3.2 INSTALLATION**General**

Extent: Fire-stop and smoke-stop interruptions to fire-resistance rated assemblies, materials and components, including penetrations through fire-resisting elements, breaks within fire-resisting elements (e.g. expansion joints), and junctions between fire-resisting elements.

Sequence: Fire-stop after services have been installed through penetrations and properly spaced and supported, after sleeving where appropriate, and after removal of temporary lines, but before restricting access to the penetrations, including before dry lining.

Ventilation: Supply ventilation for non-aqueous solvent-cured materials.

Density: Apply fire-stopping material to a uniform density.

Fire-stopping exposed to view: Finish surfaces to a uniform and level condition.

Cable separation: Maintain cable separation.

Protection: Protect adjacent surfaces from damage arising through installation of fire-stopping. Protect completed fire-stopping from damage arising from other work.

Loose or damaged fire-stopping material: Remove and replace.

Penetrations by pipes and ducts: Allow for thermal movement of the pipes and ducts.

Preventing displacement: Reinforce or support fire-stopping materials with non-combustible materials when:

- The unsupported span of the fire-stopping materials is greater than 100 mm.
- The fire-stopping materials are non-rigid (unless shown to be satisfactory by test).

Penetrations: Provide structural support around the opening.

Labelling

Requirement: To the recommendations of AS 4072.1 Appendix B.

Additional marking: Include the following text in addition to the above: CAUTION – FIRE BARRIER MUST REMAIN SEALED.

Location: Attach labels to cables, conduits, pipes and ducts on both sides of and close to, the control joint or penetration. On large items, provide multiple labels.

3.3 FIRE-STOPPING SYSTEMS

Control joint insert – elastomeric foam strip

Site conditions: Make sure that the application area is free from dust, oil, solvents or any other foreign substances.

Installation: To manufacturer's recommendations

Fire-stop mortars

Ambient conditions: Do not install below 5°C.

Formulated compound of incombustible fibres

Installation: To manufacturer's recommendations

Fibre stuffing

Installation: Compress to 40% of its uncompressed volume.

Fire-stop composite sheets

Installation: To manufacturer's recommendations

Fire-stop sealants

Ambient conditions: Do not store above 32°C. Do not install outside the temperature range recommended by the sealant manufacturer. Do not install when humidity exceeds that recommended by the sealant manufacturer for safe installation.

Fire-stop foams

Ambient conditions: Do not store above 32°C. Do not install below 15°C or above 32°C. Do not apply when temperature of substrate and air is below 15°C. Maintain this minimum temperature before, during and for 3 days after installation.

Installation: Test substrates for adhesion and prime if necessary. Place in layers for homogenous density, filling cavities and spaces. Place sealant to completely seal junctions with adjacent dissimilar materials.

Fire-stop putty

Ambient conditions: Do not install below 5°C. Do not allow the material to freeze.

Installation: To manufacturer's recommendations

Fire-stop collars

Installation: To manufacturer's recommendations

Fire-stop pillows

Ambient conditions: Do not install in conditions outside the manufacturer's recommendations.

Multi-service cable transit box

Installation: To manufacturer's recommendations

3.4 COMPLETION

Cleaning

Requirement: Clean the finished surfaces and remove spilled and excess fire-stopping materials without damaging other work.

0183B METALS AND PREFINISHES

1 GENERAL**1.1 RESPONSIBILITIES****General**

Requirements: Provide metal and prefinishes, as documented.

Performance

Requirement: Provide metals in sections of strength and stiffness suited to their required function, finish and method of fabrication.

1.2 PRECEDENCE**General**

Order of precedence:

- The requirements of other worksections of the specification override conflicting requirements of this worksection.
- The requirements of worksections override conflicting requirements of their referenced documents. The requirements of the referenced documents are minimum requirements.

1.3 CROSS REFERENCES**General**

Requirement: Conform to the following:

- 0171 General requirements.

2 PRODUCTS**2.1 METALS****Coated steel**

Electrogalvanized (zinc) coating on ferrous hollow and open sections: To AS 4750.

Metallic-coated: Steel coated with zinc or aluminium-zinc alloy as follows:

- Ferrous open sections by an in-line process: To AS/NZS 4791.
- Ferrous hollow sections by a continuous or specialised process: To AS/NZS 4792.
- Metallic-coated steel sheet: To AS 1397. Metal thicknesses specified are base metal thicknesses.

Steel wire: To AS/NZS 4534.

Stainless steel

Bars: To ASTM A276/A276M.

Plate, sheet and strip: To ASTM A240/A240M.

Welded pipe (plumbing applications): To AS 1769.

Welded pipe (round, square, rectangular): To ASTM A554.

3 EXECUTION**3.1 GENERAL****Metal separation**

Incompatible sheet metals: Prevent direct contact between incompatible metals. Provide separation by one of the following:

- Apply an anti-corrosion low moisture transmission coating such as alkyd zinc phosphate primer or aluminium pigmented bituminous paint to contact surfaces.
- Insert a concealed, non-metallic separation layer such as polyethylene film, adhesive tape, neoprene, nylon or bituminous felt.

Incompatible fixings: Do not use.

Incompatible service pipes: Install lagging or grommets. Do not use absorbent, fibrous or paper products.

Brazing

General: Make sure brazed joints have sufficient lap to provide a mechanically sound joint.

Butt joints: Do not use butt jointing for joints subject to load. If butt joints are used, do not rely on the filler metal fillet only.

Filler metal: To AS/NZS 1167.1.

Finishing

Visible joints: Finish visible joints made by welding, brazing or soldering using methods appropriate to the class of work (including grinding or buffing) before further treatment such as painting, galvanizing or electroplating. Make sure self-finished metals are without surface colour variations after jointing.

Preparation

General: Before applying decorative or protective prefinishes to metal components, complete welding, cutting, drilling and other fabrication, and prepare the surface using a suitable method.

Standard: To AS 1627 series.

Priming steel surfaces: If site painting is documented to otherwise uncoated mild steel or similar surfaces, prime as follows:

- After fabrication and before delivery to the works.
- After installation, repair damaged priming and complete the coverage to unprimed surfaces.

Welding

Aluminium: To AS/NZS 1665.

Stainless steel: To AS/NZS 1554.6.

Steel: To AS/NZS 1554.1.

3.2 STAINLESS STEEL FINISHES

Pre-assembly

Mechanically polished and brushed finishes: Apply grit faced belts or fibre brushes that achieve uni-directional finishes with buffing, as required to provide the following:

Bead blasted finish: Provide a uniform non-directional low reflective surface by bead blasting. Do not use sand, iron or carbon steel shot. Blast both sides of austenitic stainless steel to equalise induced stress.

Post-assembly pre-treatment

Heat discolouration: Remove by pickling.

Welds: Grind excess material, brush, and polish to match the pre-assembly finish.

Post-assembly finish

Electropolish finish for external installations: Provide an electro-chemical process to stainless steel type 316.

Brushed electropolish finish: Conform to the following:

- Pre-assembly finish: No. 4 brushed finish.
- Post-assembly finish: Provide an electro-chemical processed finish to achieve a No. 7 to No. 8 brushed finish.

Mirror electropolish finish:

- Pre-assembly finish: Mill finish 2B or mirror polished finish.
- Post-assembly finish: Provide an electro-chemical processed finish to achieve a No. 8 mirror like finish.

Completion

Cleaning: Clean and rinse to an acid free condition and allow to dry. Do not use carbon steel abrasives or materials containing chloride.

Protection: Secure packaging or strippable plastic sheet.

3.3 ELECTROPLATING

Electroplated coatings

Chromium on metals: To AS 1192.

- Service condition number: At least 2.

Nickel on metals: To AS 1192.

- Service condition number: At least 2.

Zinc on iron or steel: To AS 1789.

3.4 ANODISING

General

Standard: To AS 1231.

Thickness grade: To AS 1231 Table H1.

Atmospheric environment: Interior: Mild, Exterior: Severe

3.5 PREPAINTING

Air-drying enamel

Application: Spray or brush.

Finish: Full gloss.

General use:

- Primer: Two-pack epoxy primer to AS/NZS 3750.13.
- Top coats: 2 coats to AS 3730.6.

Oil resistant use:

- Primer: Two-pack epoxy primer to AS/NZS 3750.13.
- Top coats: 2 coats to AS/NZS 3750.22.

Equipment paint system

Description: Brush or spray application using paint as follows:

- Full gloss enamel finish coats, oil and petrol resistant: To AS/NZS 3750.22, two coats.
- Prime coat to metal surfaces generally: To AS/NZS 3750.19 or AS/NZS 3750.20.
- Prime coat to zinc-coated steel: To AS 3730.15 or AS/NZS 3750.16.
- Undercoat: To AS/NZS 3750.21.

Prepainted metal products

Standard: To AS/NZS 2728.

Product type as noted in AS/NZS 2728: Not lower than the type appropriate to the documented atmospheric corrosivity category.

Two-pack liquid coating

Application: Spray.

Finish: Full gloss.

Primer: Two pack epoxy primer to AS/NZS 3750.13.

Topcoat:

- Internal use: Proprietary polyurethane or epoxy acrylic system.
- External use: Proprietary polyurethane system.

3.6 COMPLETION

Damage

Damaged prefinishes: Remove and replace items, including damage caused by unauthorised site cutting or drilling.

Repair

Metallic-coated sheet: If repair is required to metallic-coated sheet or electrogalvanizing on inline galvanized steel products, clean the affected area and apply a two-pack organic primer to AS/NZS 3750.9.

0184 TERMITE MANAGEMENT

1 GENERAL**1.1 RESPONSIBILITIES****General**

Requirement: Provide termite management systems, as documented.

Performance

Objective: To achieve building protection.

1.2 CROSS REFERENCES**General**

Requirement: Conform to the following:

- 0171 General requirements.

1.3 STANDARD**General**

Termite management systems: To AS 3660.1.

1.4 SUBMISSIONS**Certification**

Certificate of installation: Submit certificate to AS 3660.1 Appendix A3.

Operation and maintenance manuals

Maintenance regime: For systems requiring post construction monitoring, provide a maintenance manual with the details of the following:

- Inspection frequency.
- Instructions for inspection of termite activity and treatment effectiveness.
- Contact details of installers and manufacturer's authorised supplier of replacement parts/components.
- Reapplication requirements.

Products and materials

Product data: For each product/material, submit manufacturer's data include the following:

- Construction details, material description and dimensions of individual components.
- Treatments and application procedures.

Type tests: Submit results, as follows:

- Termite management systems to AS 3660.3.

Records

Soil treatment application report: After completing treatment application, submit a report with the following details:

- Date and time of application.
- Moisture content of soil before application.
- Termiticide brand name and manufacturer.
- Quantity of undiluted termiticide used.
- Dilutions, methods, volumes used, and rates of application.
- Areas of application.
- Water source for application.
- Termiticide brand name and manufacturer.
- Quantity of termiticide used.

Management system report: At the end of the defects liability period, submit a report on the efficacy and status of the termite management system.

Tests

Site tests: Submit test results for chemical termite management systems.

Warranties

Management system warranty: Submit the manufacturer's warranty.

2 PRODUCTS

2.1 PHYSICAL SYSTEMS**Concrete slab**

Standard: To AS 3660.1 Section 4.

Slab penetration and joint protection : Collar: To AS 3660.1 clause 4.3.2.4.2

Termite caps and sheeting

Standard: To AS 3660.1 Section 5.

Material: Mesh, stainless steel 316 minimum

2.2 CHEMICAL SYSTEMS**General**

Standard: To AS 3660.1 Section 7.

3 EXECUTION

3.1 PHYSICAL SYSTEMS**Concrete slab**

Standard: To AS 3660.1 Section 4.

Termite caps and sheeting

Standard: To AS 3660.1 Section 5.

3.2 CHEMICAL SYSTEMS**General**

Standard: To AS 3660.1 Section 7.

Testing

Site test: To AS 3660.1 Appendix E.

3.3 COMPLETION**Termite management system notice**

General: Permanently fix a durable notice in a prominent location to BCA B1.4(i)(ii) or BCA 3.1.4.4.

Waste materials

Progressive cleaning: Make sure no waste materials which could attract termites remain on the site.

Warranties

Type: Renewable.

Minimum period: 10 years

Form of warranty: Repair

Completion inspection

Report: At the end of the defects liability period, inspect the termite management systems and prepare a report on their efficacy and status.

0185 TIMBER PRODUCTS, FINISHES AND TREATMENT

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide timber products with finishes and treatments, as documented.

Performance

Requirements:

- Appropriate for durability and fire-resistance.
- Appropriate certification for the finishing applications.

1.2 PRECEDENCE

General

Order of precedence:

- The requirements of other worksections of the specification override conflicting requirements of this worksection.
- The requirements of worksections override conflicting requirements of their referenced documents. The requirements of the referenced documents are minimum requirements.

1.3 CROSS REFERENCES

General

Requirement: Conform to the following:

- 0171 *General requirements.*
- 0184 *Termite management.*
- 0671 *Painting.*

1.4 STANDARDS

General

Sawn and milled products:

- Hardwood: To AS 2796.1.
- Softwood: To AS 4785.1.

Reconstituted wood based panels:

- Particleboard: To AS/NZS 1859.1.
- Dry process fibreboard: To AS/NZS 1859.2.
- Decorative overlaid wood panels: To AS/NZS 1859.3.
- Wet process fibreboard: To AS/NZS 1859.4.

Plywood:

- Structural: To AS/NZS 2269.0.
- Interior: To AS/NZS 2270.
- Exterior: To AS/NZS 2271.
- Marine: To AS/NZS 2272.

Glued laminated timber: To AS/NZS 1328.1.

Laminated veneer lumber: To AS/NZS 4357.0.

1.5 INTERPRETATION

Abbreviations

General: For the purposes of this worksection the following abbreviations apply:

- EWPA: Engineered Wood Products Association of Australasia.
- LVL: Laminated Veneer Lumber.
- MDF: Medium Density Fibreboard.

Definitions

General: For the purposes of this worksection the definitions given in AS/NZS 4491 and the following apply:

- Dry process fibreboard (MDF): Panel material with a nominal thickness of 1.5 mm or greater, manufactured from lignocellulosic fibres (derived from wood or other materials) with application of heat and/or pressure, the bond of which is derived from a synthetic adhesive added to the fibres and the panels are manufactured with a forming moisture content of less than 20%.
- Particleboard: Panel material manufactured under pressure and heat from particles of wood (wood flakes, chips, shavings, sawdust and similar) and/or lignocellulosic material in particle form (flax shives, hemp hurds, bagasse fragments, rice hulls, wheat straw and similar) with the addition of an adhesive.
- Wet process fibreboard: Panel material with a nominated thickness of 1.5 mm or greater, manufactured from lignocellulosic fibres (derived from wood or other materials) with application of heat and/or pressure, the bond of which is derived from the felting of the fibres and the panels are manufactured with a forming moisture content greater than 20%.

1.6 SUBMISSIONS

Products and materials

Chain of custody of forest products: Submit the following as evidence of conformity to

CERTIFICATION, Timber source certification:

- Third party certification of supplier's chain of custody management system.
- Formal claim of chain of custody by supplier.

Pressure preservative treatment: For timber required to be pressure treated, submit a certificate or other evidence showing that the timber has been treated.

2 PRODUCTS

2.1 GENERAL

Storage and handling

General: Deliver timber products to site in unbroken wrapping or containers and store so that the moisture content is not adversely affected.

Product identification

Preservative treated timber: Marking to include the following:

- A unique identifier for the treatment plant.
- A unique identifier for the preservative.
- Hazard class.

2.2 CERTIFICATION

Timber source certification

Requirement: Use timber products originating from sustainably managed forests.

Certification: FSC

Engineered timber product certification and identification

Branding: Brand timber products under the authority of a certification scheme applicable to the product. Locate the brand on faces or edges which will be concealed in the works.

2.3 FIRE-RESISTANCE

General

Timber structures: To AS/NZS 1720.4.

2.4 DURABILITY

General

Requirement: Provide timbers with natural durability appropriate to the conditions of use, or preservative-treated timber of equivalent durability.

Natural durability class: To AS 5604.

Naturally termite-resistant timbers: To AS 3660.1 Appendix C.

Timber quality: Free of core wood (material within 50 mm of the tree's centre) and free of splits, checks, loose knots and cavities. Free of sapwood (lighter coloured wood found on the outer layer of the tree).

Lyctid susceptible timbers: Do not provide untreated timbers containing lyctid susceptible sapwood.

Untreated sapwood: If used, place to the outside of joints or in locations exposed to higher levels of ventilation.

Preservative treatment

Sawn and round timbers: To AS 1604.1.

Reconstituted wood-based products: To AS/NZS 1604.2.

Plywood: To AS/NZS 1604.3.

Laminated veneer lumber (LVL): To AS/NZS 1604.4.

Glued laminated timber products: To AS/NZS 1604.5.

Moisture content

Test: Methods as follows:

- Timber: To AS/NZS 1080.1.
- Plywood: To AS/NZS 2098.1.
- Reconstructed wood-based products: AS/NZS 4266.1.

Protection: Protect timber and timber products stored on site from moisture and weather. For milled, prefinished, prefabricated and similar elements that are to be protected in the final structure, provide temporary weather protection until the permanent covering is in place.

2.5 FINISHING

Production finish

Hardwood: To AS 2796.1 Table B1.

Softwood: To AS 4785.1 Table B1.

Surface finish: Dressed

Surface coating

Painting and staining: To *0671 Painting*.

Application: To the manufacturer's specification.

3 EXECUTION

3.1 JOINTS

General

Joints and connections: Use hot-dipped galvanized or stainless steel fasteners, composite bolts, nails or nailed metal connectors.

Timber-to-timber interfaces: Provide a seal coating of preservative treatment and include inside bolt holes and the end grain of the timber.

Water retention: Avoid details that may trap water including housed, checked or birdsmouth joints.

Fasteners: To prevent chemical treatments reacting with fasteners, install to manufacturer's recommendations.

3.2 SHRINKAGE RESTRAINT

General

Requirement: Use seasoned timber, if possible, to avoid shrinkage restraint, particularly where timber elements are integrated with steel and/or concrete.

Moisture content: Use finishes and end-grain sealants to minimise moisture content changes.

Fasteners: Align fasteners along member axis and use single fasteners at joints.

Connections: Use connections that allow for movement without adversely affecting the performance of the connection.

Unseasoned timber: Provide as follows:

- Drill holes 10% oversize.
- Use species with similar shrinkage values to reduce movement and shrinkage.

- For framing provide adequate clearance at the top of masonry veneer and face fixed members to reduce vertical movement.

3.3 FINISHING

Ploughing

General: Back plough boards liable to warp (e.g. if exposed externally on one face). Make the width, depth and distribution of ploughs appropriate to the dimensions of the board and degree of exposure.

Painting

Edges: Chamfer edges of work to receive paint or similar coatings.

Priming: For woodwork to be painted, prime hidden surfaces before assembly.

Working with treated timber

Safety: Handle preservative treated timber to the manufacturer's recommendations and to NOHSC 2003 and the recommendations of NOHSC 3007.

0193 BUILDING ACCESS SAFETY SYSTEMS
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1 GENERAL**1.1 RESPONSIBILITIES****General**

Requirement: Provide building access safety systems, as documented.

Performance

Roofing and cladding: Maintain waterproofing integrity without damage or distortion. Maintain the structural integrity of the supporting elements.

1.2 DESIGN**General**

Designer: Equipment supplier.

Requirements

General: To 0171 General requirements, **DESIGN**.

Responsibility: Design coordination.

Performance requirements: To AS/NZS 1891.2 Section 4.

Authority requirements: WHS requirements.

Access: Provide a system for three workers at any one time, to access the following:

- Full extent of gutters.
- Roof mounted plant and equipment.
- Roof areas within 2.5 m of fall hazards not otherwise protected by parapets or guard rails.
- External façade areas including glazing.
- External lighting.
- Aerials and telecommunications equipment.

1.3 CROSS REFERENCES**General**

Requirement: Conform to the following:

- 0171 General requirements.

1.4 STANDARDS**General**

Personal equipment for working at height: To AS/NZS 1891.1, AS/NZS 1891.2, AS/NZS 1891.3, AS/NZS 1891.4 and AS 1891.5.

Rope access system: To AS/NZS 4488.1, AS/NZS ISO 22846.1 and AS/NZS ISO 22846.2.

1.5 INTERPRETATION**Abbreviations**

General: For the purposes of this worksection the following abbreviations apply:

- PPE: Personal protective equipment.

Definitions

General: For the purposes of this worksection the definitions given in AS/NZS 1891.1, AS/NZS 5532 and AS/NZS ISO 22846.1 apply.

1.6 SUBMISSIONS**Certification**

General: Submit certification of installed system.

Design documentation

General: To 0171 General requirements, **DESIGN DOCUMENTS** and the following:

- Calculations: Submit calculations by a professional engineer experienced in building access safety systems.
- Certification: Submit certification by a professional engineer experienced in building access safety systems design as evidence of conformance to documented requirements.
- Drawings: Submit the following drawings:
 - . Layout of anchors and system components in plan and elevation.
 - . Proposed methods of fixing to each substrate type in the building.

Marking and labelling

Requirement: Samples and schedules of proposed marking and labels for each system component.

Operation and maintenance manuals

General: Submit a manual describing the following:

- Limitations of the system.
- Operation procedures and methods.
- PPE user manuals.
- Care and maintenance requirements.

Products and materials

Manufacturers data: Submit manufacturer's data including the following:

- Product technical data sheets.
- Installation and maintenance recommendations.

Type tests: Submit results, as follows:

- Personal equipment for working at height.
- Rope access systems.
- Fixed ladders.
- Single point anchors.

Subcontractors

General: Submit names and contact details of proposed suppliers and installers as recommended by the manufacturer.

Tests

Site tests: Submit results of proof load tests of drilled-in anchors.

Warranties

Requirement: Submit the warranties for each type of building access safety system, as documented.

1.7 INSPECTION

Post installation inspection

Personal equipment for working at height inspection interval: Maximum 12 months.

Rope access system inspection requirements: To AS/NZS ISO 22846.2 clause 6.7

Rope access system inspection interval: Maximum 6 months.

2 PRODUCTS

2.1 GENERAL

Product identification

General: Mark to show the following:

- Manufacturer's identification.
- Installer's contact details.
- Intended location.
- Load rating and direction.
- Current inspection/service date.
- Batch number or serial number of the components.

2.2 FALL PROTECTION SYSTEMS

Access safety system

System: Combination fall arrest and restraint system.

Anchors

Single point anchors: To AS/NZS 5532.

Vertical lifeline and ladder systems

Product: Vertical rail systems including cables, fixed ladders, guides and fall arrestor trolleys.

Fixed ladders: To AS 1657.

Personal protective equipment (PPE)

Harness: Supply two full body harnesses to AS/NZS 1891.1 with shock absorbing lanyards to AS 1891.5.

Storage: PPE storage holdall supplied by the manufacturer.

Tests

Personal equipment for working at height: Tested as follows:

- Harnesses: To AS/NZS 1891.1 Section 4.
- Horizontal lifeline and rail systems: To AS/NZS 1891.2.
- Lanyard assemblies and pole straps: To AS 1891.5 clause 3.4.

Rope access systems:

- Rope grabs and descenders: Static load test to AS/NZS 4488.1 Appendix A.
- Back-up type rope grabs and descenders: Dynamic load and performance test to AS/NZS 4488.1 Appendix B.

Warranties

Warranty terms: As offered by manufacturer.

3 EXECUTION

3.1 INSTALLATION

Standards

Personal equipment for working at height: To the AS/NZS 1891 series.

Rope access systems: to AS/NZS 4488.1.

Subcontractor

Installer: Registered installer, approved by the manufacturer.

Labels and signage

General: To AS/NZS 1891.4 clause 2.2.9.

3.2 TESTING

Proof load test for anchors

Drilled-in anchors: Load test drilled-in anchors used in shear and not in axial tension (direct pull-out) before use.

3.3 TRAINING

General

Responsibilities: Coordinate the training of owner's facilities management personnel in conformance with *0171 General requirements*.

Training records: Video record all training sessions. Catalogue and include recordings with the operation and maintenance manuals.

3.4 COMPLETION

Reinstatement

Extent: Repair or replace damage to the roofing and rainwater system. If the work cannot be repaired satisfactorily, replace the whole area affected.

Touch up: If it is necessary to touch up minor damage to prepainted metal roofing, do not overspray onto undamaged surfaces.

Cleaning

Roofing and rainwater drainage system: Remove debris, metal swarf, solder, sealants and unused materials.

Warranties

Requirement: Cover materials and workmanship in the terms of the warranty in the form of interlocking warranties from the supplier and installer.

- Form: Against failure of materials and execution under normal environment and use conditions.
- Period: As offered by the supplier/manufacturer.

3.5 MAINTENANCE

General

Preventative and mandatory system maintenance: By an Accredited Height Safety Inspector/Certifier, in conformance with AS/NZS 1891.4 Section 9 and manufacturer's maintenance/recertification recommendations.

Checklist for all inspections: To AS/NZS 1891.2 Supp 1 Table 8, and AS/NZS 1891.4 Section 9 and Appendices C and D.

The installer/competent person: To AS/NZS 1891.4 clause 1.4.2.

Regular scheduled periodic inspections

Standard: To AS/NZS 1891.4 Section 9.

Completion certificate:

- Provide inspection, testing and certification by an Accredited Installer and/or Accredited Height Safety Inspector:
 - . Upon completion of the installation at the date for practical completion.
 - . Upon the expiry of the defects liability period or 12 months after completion of the installation whichever is the lesser, and valid for a further 12 months period.
- Record the date of the next system inspection and period of validity and display the certificate at the access points of the work area or on the individual system components where provision is made.

Inspection after a fall or other event

Standard: To AS/NZS 1891.4 clause 9.5.

On-going maintenance

Certificate: Submit the completion certificates and notify the proprietor of the requirement for continued interval testing.

0279 PAVING – ON PEDESTALS

1 GENERAL**1.1 RESPONSIBILITIES****General**

Requirement: Provide paving, as documented.

Performance

Requirements:

- Consistent in colour and finish.
- Resistant to expected loads in use.
- Pavers capable of spanning between pedestal supports when subjected to imposed loads.
- Resistant to any wind uplift forces.
- Set out with joints accurately aligned in both directions.
- Within documented level tolerances.

1.2 CROSS REFERENCES**General**

Requirement: Conform to the following:

- 0171 General requirements.

1.3 STANDARDS**Slip resistance**

Classification: To AS 4586.

1.4 INTERPRETATION**Definitions**

General: For the purposes of this worksection the following definitions apply:

- Absolute level tolerance: Maximum deviation from design levels.
- Lippage: Height deviation between adjacent units.
- Pavers: Units made from concrete, clay, stone and/or other inorganic raw materials, generally over 20 mm thick, used as coverings for horizontal surfaces.
- Pedestal: The structure directly supporting the pavers, including head, base, column, any adjustment and any locking devices.
- Relative level tolerance: Maximum deviation from a 3 m straightedge laid on the surface.

1.5 TOLERANCES**Completed paving**

Level tolerance:

- Absolute: ± 8 mm.
- Relative: 8 mm.

Lippage: Less than 2 mm.

1.6 SUBMISSIONS**Execution details**

Margins: If it appears that an alternative set out, spacing widths between pavers or minor variations in overall dimensions will avoid cut pavers, submit a proposal.

Operation and maintenance manuals

General: Submit a manual describing care and maintenance of the paving and pedestals, including procedures for future height adjustment to maintain installation tolerances and for maintaining the slip-resistance classification stating the expected life of the slip-resistance classification.

Products and materials

Pavers: Submit evidence from paving manufacturer of paver suitability for installation on pedestals, being supported only on the corners of the paver.

Type tests: Submit results, as follows:

- Slip resistance of pavers.
- Accelerated wear test of pavers.
- Stone paver properties.

Waterproof membrane: Submit evidence of the waterproofing membrane's suitability for pedestals and pavers to be installed over and that it is also UV resistant/stable.

Samples

Pavers: Submit labelled samples of pavers, showing the range of variation in colour and finish.

Pedestals: Submit a sample of each component of the pedestal support system.

Shop drawings

General: Submit shop drawings to a scale that best describes the detail, showing the following:

- Paver size.
- Any required paver reinforcement.
- Pattern.
- Grid layout.
- Pedestal locations.
- Pedestal heights.
- Starting point.
- Finished levels.

Subcontractors

Substrate acceptance: Submit evidence of the installer's acceptance of the substrate before commencing installation.

Tests

Site tests: Submit results, as follows:

- Slip resistance test of completed installations.

Warranties

Requirement: Submit warranties to **COMPLETION, Warranties.**

2 PRODUCTS

2.1 GENERAL**Storage and handling**

Pedestals: Deliver and store in the manufacturer's original sealed packaging in a dry environment. Inspect for damage upon delivery.

2.2 PEDESTAL SYSTEM**Description**

Description: Proprietary system to support pavers.

2.3 CONCRETE AND CLAY PAVERS**General**

Standard: To AS/NZS 4455.2.

Properties

Requirement: To AS/NZS 4455.2 Table 2.8.

Application to AS/NZS 4455.2 Table 2.8: Residential – pedestrians only.

Salt attack resistance grade to AS/NZS 4455.2 Table 2.7: Exposure grade.

3 EXECUTION

3.1 PREPARATION

Substrates

Drying and shrinkage: Before installing any waterproof membrane or locating pedestals, allow at least the following times to elapse (for curing and initial shrinkage) for these substrates:

- Concrete slabs: 28 days.
- Toppings on slabs: A further 21 days.

Preparation: Before starting the installation of pedestals, make sure substrates are as follows:

- Broom clean and free from any oil, deposit, finish or projection which may impair the performance of the pedestal system or any waterproofing membrane that has been installed.
- Complete, including the installation of any documented waterproofing membrane, drainage mat, insulation or protection board.
- Sloped to provide positive and adequate drainage.

Extent of protection: If protection to any documented waterproof membrane is only required under each pedestal, extend protection a minimum of 25 mm beyond the edge of each pedestal base.

Compressive strength of insulation placed beneath a pedestal: Sufficient to support the loads transmitted through the pedestal upon completion.

Perimeter

Containment: Provide adequate restraint to all assemblies of insulation, protection board, drainage mat, pedestals and pavers to the perimeter of the paving area.

Fixtures

General: Before paving make sure that fixtures interrupting the surface are accurately positioned in their designed or optimum locations relative to the paving layout. Allow for movement between paving and fixtures.

3.2 INSTALLATION

Set-out

Level: Establish and mark the support system level (finished paving elevation less the paver thickness) around the perimeter of the paving area.

Grid: Establish a grid on the substrate from the set-out point. The grid will reflect the joint lines in the completed paving. Use grid lines to check paver layout during installation.

Expansion joints: Do not locate pedestals directly over expansion joints in the substrate. Locate pedestals on one side or the other of any expansion joint in the substrate.

Margins: Provide whole or purpose-made pavers at margins where practicable, otherwise set out to give equal margins of cut pavers. If margins less than half paver width are unavoidable, locate the cut pavers where they are least conspicuous.

Pedestal installation

General: Install pedestals to the manufacturer's recommendations in complete rows, starting at one side of the perimeter, installing pavers and adjusting to the correct level as each subsequent row of pedestals are installed.

Location: Locate a pedestal at each intersection of grid lines.

Perimeter edge: Locate pedestal on grid line that meets perimeter, as close to the perimeter edge as possible.

Irregular cut pavers: Locate pedestals so any irregular shaped cut pavers are supported on, or as close as possible to, each corner of the paver.

Pedestal height adjustment

General: For adjustable height pedestals, set the pedestal to the required height before placing pavers onto pedestal. After placing pavers make fine vertical adjustments, as required.

Compensation for substrate slope

General: If required to install paving at a different slope to that of the substrate, compensate for the substrate slope to the manufacturer's recommendations.

Variations

General: If necessary, distribute variations in hue, colour, or pattern uniformly, by mixing pavers or paving batches before laying.

Thickness: Accommodate variations in paver thickness by placing shims under a paver corner on top of the pedestal head, to the manufacturer's recommendations.

3.3 TESTING**Completion tests**

Slip resistance of completed installation: To AS 4663.

3.4 COMPLETION**Spare pavers**

General: Supply spare matching pavers of each type for future replacement purposes. Store the spare materials on site.

Quantity: At least 1% of the quantity installed.

Cleaning

General: Leave pavements clean on completion.

Warranties

Pavers: As offered by manufacturer.

Pedestals: As offered by manufacturer.

4 SELECTIONS**4.1 PRODUCT****Pedestal schedule**

Properties	
Manufacturer	Elmich
Model	VersiPave GP
Type	Adjustable height
Height (mm)	To suit falls in slab below
Lockable	Not required
Bracing material	N/A
UV resistance	Required

Paver selection

Paver selection to be from Adbri Euro Slate / Classic range or National Tiles Beaton range.

0315 CONCRETE FINISHES

1 GENERAL**1.1 RESPONSIBILITIES****General**

Requirement: Provide finishes to formed and unformed concrete surfaces, as documented.

Performance

Requirement: Compatible with documented applied finishes.

1.2 CROSS REFERENCES**General**

Requirement: Conform to the following:

- 0171 General requirements.

1.3 STANDARDS**General**

Formed surfaces: To AS 3610.1.

Slip resistance

Classification: To AS 4586.

1.4 INTERPRETATION**Definitions**

General: For the purposes of this worksection the following definition applies:

- Green concrete: Concrete which has recently set but has not achieved any design strength.

1.5 TOLERANCES**Formed surfaces**

Form face deflections: To AS 3610.1 Table 3.3.4.1.

Straight elements: To AS 3610.1 Table 3.3.5.1.

Unformed surfaces

Flatness: To the **Flatness tolerance class table**, using a straightedge placed anywhere on the surface in any direction, for the documented class of finish.

Flatness tolerance class table

Class	Measurement	Maximum deviation (mm)
A	2 m straightedge	4
B	3 m straightedge	6
C	600 mm straightedge	6

1.6 SUBMISSIONS**Execution details**

Surface repairs: If surface repairs are required, submit proposed methods.

Tests

Site tests: Submit test results, as follows:

- Slip resistance test of completed installations.

2 PRODUCTS

2.1 MATERIALS

Surface modifiers

Hardeners, sealants and protectors: If documented, proprietary products conforming to the manufacturer's recommendations.

Markham Global "Aquron 2000 Medi+" to be applied to all internal areas.

Slip resistance treatment: If documented, proprietary products conforming to the manufacturer's recommendations.

3 EXECUTION

3.1 SURFACE MODIFIERS

General

Application: Apply to clean surfaces, to the manufacturer's recommendations.

3.2 FORMED SURFACES

General

Surface finish: To AS 3610.1 Table 3.3.3.1 and as documented in the **Surface finish class schedule** and the **Formed surface finishes schedule**.

Damage: Do not damage concrete works through premature removal of formwork.

Curing

Requirement: If formwork is stripped before the minimum curing period for the concrete has elapsed, continue curing the exposed faces as soon as the stripping is completed.

Evaluation of formed surfaces

General: If evaluation of formed surface is required, complete the evaluation before surface treatment.

Finishing methods

Requirement: If soffits of horizontal concrete elements or faces of vertical concrete elements are to have a finish other than an off-form finish, provide finishes as documented.

Form removal: If vertical face formwork needs to be removed for finishing methods, while the concrete is green, make sure the concrete has sufficiently set to prevent slump.

3.3 UNFORMED SURFACES

General

Surface finish: As documented in the **Unformed surface finishes schedule**.

Finished levels: Strike off, screed and level slab surfaces to finished levels and to the flatness tolerance class documented.

Finishing methods – primary finish

Machine float finish:

- After levelling, consolidate the surface using a machine float.
- Cut and fill and refloat immediately to a uniform, smooth, granular texture.
- Hand float in locations inaccessible to the machine float.

Steel trowel finish: After machine floating, finish as follows:

- Use power or hand steel trowels to produce a smooth surface relatively free from defects.
- When the surface has hardened sufficiently, re-trowel to produce the final consolidated finish free of trowel marks and uniform in texture and appearance.

Burnished finish: Continue steel trowelling until the concrete surface attains a polished or glossy finish, uniform in texture and appearance, and free of trowel marks and defects.

Wood float finish: After machine floating, use wood or plastic hand floats to produce the final consolidated finish free of float marks and uniform in texture and appearance.

Broom finish: After machine floating and steel trowelling use a broom or hessian belt drawn across the surface to produce a coarse even-textured transverse-scored surface.

Scored or scratch finish: After screeding, use a stiff brush or rake drawn across the surface before final set, to produce a coarse scored texture.

Sponge finish: After machine floating and steel trowelling, use a damp sponge to wipe the surface to produce an even textured sand finish.

Exposed aggregate finish: After floating and when concrete has stiffened, wet the surface and scrub with stiff fibre or wire brushes, flushing continuously with clean water, until the aggregate is uniformly exposed. Rinse the surface with water.

Finishing methods – supplementary finish

Abrasive blast: After steel trowelling, abrasive blast the cured surface to provide texture or to form patterns without exposing the coarse aggregate, using hard, sharp graded abrasive particles.

Coloured applied finish: After machine floating, apply a proprietary liquid or dry shake material to the manufacturer's recommendations and trowel to achieve the required appearance.

Stamped and coloured pattern finish: Provide a proprietary finishing system.

Polished finish: After steel trowelling, grind the cured surface of the concrete.

3.4 TESTING

Completion tests

Slip resistance of completed installation: To AS 4663.

4 SELECTIONS

4.1 SCHEDULES

Formed surface finishes schedule

Property		
Location	Exposed soffits	Exposed slab edges
Surface finish class to AS 3610.1	Class 3	Class 3
Formwork lining type	Coated plywood	Coated plywood

Surface finish class schedule

Property	Class 3
Colour control	Not required
Critical faces of elements	N/A
Distance between face steps (mm)	5mm
Repairs	Permitted

Unformed surface finishes schedule

Property						
Location	Resilient finishes incl. epoxy	Carpet	Floor tiles	Loading dock, staging, switch room	Exterior paths	Plant decks
Flatness tolerance class	Class A	Class B	Class C	Class B	Class B	Class B
Primary finish	Steel trowelled	Machine float	Scored finish	Machine float	Broom finish	Machine float
Supplementary finish	N/A	N/A	N/A	Sealer	Colour applied	Trafficable waterproof membrane

Property						
Slip resistance treatment	N/A	N/A	N/A	Slip resistance additive in sealer	N/A	N/A
Slip resistance classification	N/A	N/A	N/A	P1 / R9	P4 / R11	P4 / R11
Surface modifier	Markham Aquaron 2000 Medi+	Markham Aquaron 2000 Medi+	Markham Aquaron 2000 Medi+	N/A	N/A	N/A

0331B BRICK AND BLOCK CONSTRUCTION

1 GENERAL**1.1 RESPONSIBILITIES****General**

Requirement: Provide brick and block construction, as documented.

1.2 CROSS REFERENCES**General**

Requirement: Conform to the following:

- 0171 General requirements.

1.3 STANDARDS**General**

Materials and construction: To AS 3700.

1.4 TOLERANCES**General**

Requirement: To AS 3700 Table 12.1.

2 PRODUCTS**2.1 FIRE PERFORMANCE****Fire-resistance of building elements**

Fire-resistance level: Tested to AS 1530.4.

2.2 DURABILITY**General**

Exposure environment: Marine

Exposure locations: To AS 3700 clause 5.4.

2.3 MATERIALS**Masonry units**

Selections: As documented.

Standard: To AS/NZS 4455.1 and AS/NZS 4455.3.

Salt attack resistance grade: To AS 3700 Table 5.1.

Mortar materials

Mortar class: To AS 3700 Table 5.1- Interior and Exterior: M3, Below DPC / in contact with ground: M4

Cement: To AS 3972.

Lime: To AS 1672.1.

Sand: Fine aggregate with a low clay content and free from efflorescing salts, selected for colour and grading.

Water: Clean and free from any deleterious matter.

Admixtures: To AS 3700 clause 11.4.2.4.

Pigment: To EN 12878, and as follows:

- Integral pigment mix proportion: Not more than 10% by weight of cement.

Masonry cement mortar mix proportions table (cement:lime:sand), by volume

Refer structural engineering documentation.

Grout

Standard: To AS 3700 clause 11.7.

Minimum characteristic compressive strength: 12 MPa.

2.4 BUILT-IN COMPONENTS

General

Durability class of built-in components: To AS 3700 Table 5.1- Interior: R1, Exterior: R3, Below DPC / in contact with ground: R4.

Steel lintels

Angles and flats: To AS/NZS 3679.1.

Cold formed proprietary lintels: Designed to AS/NZS 4600.

Corrosion protection: To AS 2699.3.

Galvanizing: Do not cut after galvanizing.

Reinforcement

Standard: To AS/NZS 4671.

Corrosion protection: To AS 3700 clause 5.9.

Minimum cover: To AS 3700 Table 5.1.

Wall ties

Standard: To AS 2699.1.

Type: A.

Corrosion protection: To AS 2699.1.

Duty classification rating:

- Refer structural engineering documentation.

Connectors and accessories

Standard: To AS 2699.2.

Corrosion protection: To AS 2699.2.

Durability classification to AS 2699.2: R3 generally, R4 below DPC or in contact with the ground

Flashings and damp-proof courses

Standard: To AS/NZS 2904.

Slip joints

Standard: To AS 3700 clause 4.14.

3 EXECUTION

3.1 GENERAL

Weatherproofing

Requirement: Construct masonry as documented. Conform to BCA FP1.4.

Mortar mixing

General: Measure volumes accurately to the documented proportions. Machine mix for at least six minutes.

Protection

Masonry materials and components: Protect from ground moisture and contamination.

During construction: Cover the top surface of masonry to prevent the entry of rainwater and contaminants.

Bond

Type: Stretcher bond.

Building in

Embedded items: Build in wall ties and accessories as the construction proceeds. If not practicable to obtain the required embedment within the mortar joint in cored or hollow masonry units, fill appropriate cores with grout or mortar.

Steel door frames: Fill the backs of jambs and heads solid with mortar as the work proceeds.

Monolithic structural action

Construction at different rates or times: If two or more adjoining sections of masonry, including intersecting walls, are constructed at different rates or times, rake back or tie the intersections between those sections to obtain monolithic structural action in the completed work.

Header units: Except in stretcher bond facework, provide masonry header units, to AS 3700 clause 4.11.2.

- Spacing: 600 mm maximum.
- Location: Provide header units in the following locations:
 - . At engaged piers.
 - . At engagement of diaphragms with the leaves in diaphragm walls.
 - . At intersections of flanges with shear walls.
 - . At intersections with supporting walls and buttresses.
 - . Between leaves in solid masonry construction.

Mortar joints

General: Set out masonry with joints of uniform width and minimum cutting of masonry units.

Solid and cored units: Lay on a full bed of mortar. Fill perpends solid. Cut mortar flush.

Face-shell bedded hollow units: Fill perpends solid. Cut mortar flush.

Joint thickness: 10 mm.

Finish: Conform to the following:

- Externally: Tool to give a dense water-shedding finish.
- Internally: If wall is to be plastered, do not rake more than 10 mm to give a key.

Rate of construction

General: Regulate the rate of construction to eliminate joint deformation, slumping or instability.

Rods

Set-out: Construct masonry to the following rods:

- 90 mm high units: 6 courses to 600 mm.
- 190 mm high units: 3 courses to 600 mm.

Temporary support

General: If the final stability of the masonry is dependent on construction of (structural) elements after the masonry is completed, provide proposals for temporary support or bracing.

3.2 FACEWORK

Cleaning

General: Clean progressively as the work proceeds to remove mortar smears, stains and discolouration. Do not erode joints if using pressure spraying.

Acid solution: Do not use.

Colour mixing

Distribution: In facework, distribute the colour range of units evenly to prevent colour concentrations and banding.

Below ground

Facework: Commence facework at least one full course for blockwork, or two full courses for brickwork, below adjacent finished surface level.

Double face walls

Selection: Select face units for uniform width and double-face qualities in single-leaf masonry with facework both sides.

Preferred face: Before starting, obtain approval of the preferred wall face, and favour that face should a compromise be unavoidable.

Perpends

General: If other than vertically aligned perpends in alternate courses are proposed, provide details.

Sills and thresholds

General: Solidly bed sills and thresholds and lay them with the top surfaces draining away from the building.

Minimum size of cut unit: Three quarters full width.

3.3 DAMP-PROOF COURSES

Location

General: Locate damp-proof courses, as follows:

- Walls built off slabs on ground: In the first course above floor level.
- Walls adjoining infill floor slabs on membranes: In the course above the underside of the slab in internal walls and inner leaves of cavity walls. Project 40 mm and dress down over the membrane turned up against the wall.

Height: Not less than:

- 150 mm above the adjacent finished ground level.
- 75 mm above the finished paved or concrete area.
- 50 mm above the finished paved or concreted area and protected from the direct effect of the weather.

Installation

General: Lay in long lengths. Lap full width at angles and intersections and at least 150 mm at joints. Step as necessary, but not exceeding two courses per step for brickwork and one course per step for blockwork. Sandwich damp-proof courses between mortar.

Junctions: Preserve continuity of damp-proofing at junctions of damp-proof courses and waterproof membranes.

Lap sealing: Seal with a bituminous adhesive and sealing compound.

3.4 FLASHINGS

Location

General: Locate flashings, as follows:

- At roof abutments with walls: 30mm into the wall immediately above the roof and over-flash the roof apron flashing.

Installation

General: Sandwich flashings between mortar except where on lintels or shelf angles. Bed flashings, sills and copings in one operation to maximise adhesion.

Laps: If required, lap full width at angles and intersections and at least 150 mm at joints. Step as necessary, but not exceeding two courses per step for brickwork and one course per step for blockwork.

Lap sealing: Seal with a bituminous adhesive and sealing compound.

Pointing: Point up joints around flashings, filling voids.

3.5 CONTROL JOINTS

General

Location and spacing: Provide control joints to AS 3700 clause 4.8.

Control joint filling

Filler material: Provide compatible sealant and bond breaking backing materials which are non-staining to masonry. Do not use bituminous materials with absorbent masonry units.

- Bond breaking materials: Non-adhesive to sealant, or faced with a non-adhering material.
- Foamed materials: Closed-cell or impregnated, not water-absorbing.

Installation: Clean the joints thoroughly and insert an easily compressible backing material before sealing.

Sealant depth: Fill the joints with a gun-applied flexible sealant for a depth of at least two-thirds the joint width.

Fire-resisting control joints

General: If a control joint is located in an element of construction required to have a fire-resistance level (FRL), construct the control joint with fire-stopping materials which maintain the FRL of the element.

Fire-stopping: To AS 4072.1.

3.6 REINFORCED AND GROUTED BLOCKWORK

Cleaning core holes

General: Provide purpose-made cleanout blocks or machine cut a cleaning hole at the base of each grouted core.

Location: Locate on the side of the wall which is to be rendered or otherwise concealed.

Cleaning: Rod cores to dislodge mortar fins protruding from the blocks and mortar droppings from reinforcement. Remove through the clean-out blocks.

Grouting

Commencement: Do not commence until grout spaces have been cleaned out and the mortar joints have attained sufficient strength to resist blow-outs.

Height of lift: Limit the height of individual lifts in any pour to make sure that the grout can be thoroughly compacted to fill all voids.

Compaction: Compact by vibration or by rodding.

Topping up: On the completion of the last lift, top up the grout after 10 min and within 30 min, and vibrate or rod to mix with the previous pour.

3.7 LINTELS

Location

General: Install one lintel to each wall leaf, as documented.

Installation

General: Do not cut on site. Keep lintels 10 mm clear of heads of frames.

Steel lintels: Pack mortar between any vertical component and supported masonry units. For angles, install the long leg vertically.

Minimum bearing each end:

- Span not more than 1000 mm: 100 mm.
- Span more than 1000 mm and not more than 3000 mm: 150 mm.
- Span more than 3000 mm: To structural drawings.

Propping: Provide temporary props to lintels to prevent deflection or rotation.

- Minimum propping period: 7 days.

3.8 CONNECTORS AND ACCESSORIES

Slip joints

General: Install slip joints to top of all unreinforced masonry walls supporting concrete slabs and other concrete elements.

Protection: Keep the slip joints in place and protect from displacement.

Flexible masonry ties

General: Install stabilising ties at control joints and abutting structural elements, including columns, beams and slab soffits.

Locations and details: As documented.

4 SELECTIONS

4.1 SCHEDULES

Masonry performance schedule

Property	General	Below DPC or in contact with the ground
Fire-resistance level (FRL)	90/-/-	90/-/-
Characteristic unconfined compressive strength (MPa)	Refer Structural Engineer	Refer Structural Engineer
Coefficient of contraction	Refer Structural Engineer	Refer Structural Engineer
Coefficient of expansion	Refer Structural Engineer	Refer Structural Engineer

Property	General	Below DPC or in contact with the ground
Salt attack resistance category grade	General purpose	Exposure

Masonry schedule

Property	General	Below DPC or in contact with the ground
Name or type	Concrete block	Concrete block
Work size (mm)	390 x 190 x 190mm 390 x 290 x 190mm	390 x 190 x 190mm 390 x 290 x 190mm
Category	Hollow unit	Hollow unit
Sill units	Aluminium sub sill	N/A
Threshold units	N/A	N/A
Mortar: Cement	Type GP	Type SR
Mortar: Colour	Grey	Grey
Mortar: Mix proportions or mortar class	Class M3	Class M4
Unit mortar joints: Bond	Stretcher	Stretcher
Unit mortar joints: Shape or profile	Flush jointed	Flush jointed
Grout: Compressive strength (MPa)	Refer Structural Engineer	Refer Structural Engineer

0342 LIGHT STEEL FRAMING

1 GENERAL**1.1 RESPONSIBILITIES****General**

Requirement: Provide light steel floor, wall, roof and truss framing, as documented.

Performance

Requirements:

- Suitable for having flooring, linings, cladding and roofing fixed to it.
- Conforming to the documented performance criteria.
- Conforming to the requirements of NASH-1 or NASH-2.

1.2 CROSS REFERENCES**General**

Requirement: Conform to the following:

- 0171 General requirements.

1.3 STANDARDS**General**

Design, materials and protection: To AS/NZS 4600.

Residential and Low-rise steel framing: To NASH-1 (National Association of Steel Housing) and NASH-2.

1.4 INTERPRETATION**Definitions**

General: For the purposes of this worksection the definitions given in the NASH-1 and NASH-2 Standards apply.

1.5 TOLERANCES**General**

Manufacturing, assembly and installation tolerances: To NASH-1 Appendix D and NASH-2 Appendix A.

1.6 SUBMISSIONS**Certification**

Erected frame: Submit certification that the erected frame conforms to the documented project requirements.

Design documentation

General: Where the structural documentation defines performance criteria, submit, as follows:

- Design to AS/NZS 4600 or NASH-1: Independent design, documentation and certification from a professional engineer.
- To NASH-2: Certification of conformance to the requirements of NASH-2.

Reactions: Submit the location and magnitude of reactions that are to be accommodated by the support structure.

Floor and wall frame member sizes: Submit a schedule of proposed member sizes, certified as meeting stated project, and AS/NZS 4600 or NASH-2 requirements for span, spacings and loadings.

Shop drawings

General: Submit shop drawings, to a scale that best describes the detail, requirements for the documented configurations and loadings.

Prefabricated roof trusses: Include the following:

- Plan: Truss layout.

- Elevations: Arrangement of members, allowing for the accommodation of in-roof services, and the size and section type of each member.
- Method of assembly and connection details.
- Holding down and bracing: Details demonstrating capability to resist lateral and uplift forces.

Prefabricated wall frames: Include the following:

- Plan: Wall layout.
- Elevation: Arrangement of members, and size and section type of each member.
- Method of assembly, connection, holding down and bracing.

Prefabricated floor frames/cassettes: Include the following:

- Plan: Level of installation, arrangement of members, and size and section type of each member, including prefabricated floor joists.
- Method of assembly, connection, holding down and bracing.

Warranties

Requirement: Submit warranties to **COMPLETION, Warranties.**

2 PRODUCTS

2.1 GENERAL

Storage and handling

Requirement: Transport all components to site and store, if required, so that components or their coating are not damaged or distorted.

Frames and trusses: If required, store on a flat even surface and do not load with other items.

Exposure: Minimise exposure of components to the weather, both during storage, handling and after erection.

2.2 COMPONENTS

Damp-proof course

Membrane: To the membrane requirements of AS 2870 or AS/NZS 2904.

Type: Embossed polyethylene- not less than 1.00mm thickness

Cold-formed steel framing

General: Cold-formed sections from steel, metallic-coated to AS 1397.

Corrosion protection: To NASH-2 Section 8.

Framing members

Cold-formed steel framing for proprietary systems: To NASH-1 or NASH-2.

Fascias and barge boards

Product: Stramit fascia

Finish: Colorbond

Colour: "Surfmist" typically, "Woodland Grey" to roof outside staff room.

3 EXECUTION

3.1 GENERAL

Frame fabrication

Length: Cut members accurately to length so that they fit firmly against abutting members.

Service holes: If not pre-punched, form holes by drilling or punching, without compromising the structural integrity of the frame, located centrally within the centre third span of the element, conforming to the requirements of NASH-2.

Swarf: Immediately remove swarf and other debris from cold-formed steel framing.

Fastening

Prefabricated framing: Fasten framing elements using fasteners, as documented, to the fabricator's requirements.

Framing built in-situ: Use fasteners, as documented, from the following types:

- Bolting.
- Self-drilling, self-tapping screws.
- Blind rivets.
- Proprietary clinching system.
- Structural adhesives.
- Welding. On-site welded connections are not permitted.

Compatibility: Compatible with steel frame to prevent galvanic corrosion of dissimilar metals.

Welding

Burning: Avoid procedures that result in greater than localised burning of the sheets or framing members.

Prefabricated frames

General: Protect frames from damage or distortion during erection.

Unseasoned or CCA treated timber

General: Do not fix in contact with framing without fully painting the timber and/or the steel.

Earthing

Requirement: To AS/NZS 3000. Provide temporary earthing during erection until the permanent earthing is installed.

Protection

General: Restore coatings which have been damaged by welding or other causes. Thoroughly clean affected areas back to base metal and coat with a zinc rich organic primer.

Metal separation: Install lagging to separate non-ferrous service pipes and accessories from the framing.

Grommets: Provide grommets to isolate piping and wiring from cold-formed steel framing.

Site cut holes: Provide plastic bushes or grommets to site cut holes.

3.2 WALL FRAMING

Wall studs

General: Provide studs in single lengths without splices. Place a stud and a stiffened top plate under each structural load point from the roof or ceiling (except at openings). Provide multiple studs at points of concentrated load.

Maximum stud spacing: 600 mm.

Heads to openings

Requirement: Provide lintels appropriate to load and span.

Additional support

General: Provide additional support in the form of noggings, trimmers and studs for support and fixing of lining, cladding, hardware, accessories, fixtures and fittings.

Damp-proof course

Requirement: Provide damp-proof courses under the bottom plate of stud walls built off slabs or masonry dwarf walls, as documented or as follows if not documented otherwise:

- External walls (not masonry veneer): Turn up a minimum of 75 mm on the inside and tack to studs. Project 10 mm beyond the external slab edge or dwarf wall and turn down at 45°.
- Walls of bathrooms, shower rooms and laundries: Turn up a minimum of 150 mm on the wet side and tack to studs.

Installation: Lay in long lengths. Lap full width at angles and intersections and at least 150 mm at joints.

Junctions: Preserve continuity of damp-proofing at junctions of damp-proof courses, sarking and waterproof membranes.

3.3 ROOF AND CEILING FRAMING

Beam framing

General: Construct framing for flat or pitched roofs where the ceiling follows the roof line, consisting of prefabricated roof beams, rafters or purlins supporting both ceiling and roof covering.

Additional support

Requirement: Provide additional frame members at the following locations:

- Hanging light fittings.
- Ceiling fans.
- Access panels.
- Any other hanging services or fixtures and fittings.

Battens

Requirement: Supply and fix battens suitable for span, spacing and proposed roofing material.

Anti-ponding boards

Standard: To AS 4200.2.

3.4 TRUSSES**Fabrication**

Assembly: Factory assemble trusses.

Supports for in roof services

General: If walkways, mechanical plant or other services are to be supported within the roof space, provide support and make sure trusses have been designed to carry the loads.

Marking

General: Permanently mark each truss to show:

- Project identification.
- Manufacturer.
- Tag or number.
- Location.
- Support points.

Installation

Support: Support and fix trusses to the truss fabricator's recommendations.

Vertical movement: Over internal walls not providing support to trusses, provide at least 10 mm vertical clearance and use wall bracing methods which allow for vertical movements, to the truss fabricator's recommendations.

3.5 ROOF TRIM**Fascia, valley and barge boards**

Requirement: Fix fascia, valley gutter boards and barge boards in conformance with the manufacturer's recommendations.

3.6 COMPLETION**Cleaning**

General: On completion of framing remove debris from any gaps between members and make sure void between bottom chord of roof trusses and top of any non-supporting internal wall is clear.

Warranties

Requirement: Cover materials and workmanship in the terms of the warranty in the form of interlocking warranties from the supplier and the installer.

- Form: Against failure of materials and execution under normal environment and use conditions.
- Period: As offered by the supplier.

0411B WATERPROOFING – EXTERNAL AND TANKING

1 GENERAL**1.1 RESPONSIBILITIES****General**

Requirement: Provide external waterproofing and tanking systems to substrates, as documented.

Performance

Requirements: Conform to the following:

- Graded to falls to dispose of stormwater without ponding above the depth of lapped seams.
- Able to accommodate anticipated building movements.
- Able to accommodate its own shrinkage over the warranty life of the roofing system.
- Able to resist water under hydrostatic pressure.

1.2 CROSS REFERENCES**General**

Requirement: Conform to the following:

- 0171 General requirements.

1.3 STANDARDS**External waterproofing**

Membrane materials: To AS 4654.1.

Membrane design and installation: To AS 4654.2.

Stormwater drainage

Standard: To AS/NZS 3500.3.

1.4 INTERPRETATION**Definitions**

General: For the purposes of this worksection the definitions given in AS 4654.1 and AS 4654.2 and the following apply:

- Bitumen: A viscous material from the distillation of crude oil comprising complex hydrocarbons, which is soluble in carbon disulphide, softens when it is heated, is waterproof and has good powers of adhesion. It is produced as a refined by-product of oil.
 - . APP Bitumen: Bitumen modified with atactic (meaning non-crystalline or amorphous) polypropylene wax to form a plastomeric sheet. The membrane is reinforced with fibreglass or non-woven polyester (NWP).
 - . SBS bitumen: Bitumen modified with Styrene Butadiene Styrene, a thermoplastic rubber that undergoes a phase inversion at elevated temperature and converts to an elastomeric material. The membrane is reinforced with fibreglass or non-woven polyester (NWP).
- Bond breaker: A system preventing a membrane bonding to the substrate, bedding or lining.
- Double detail joint: A joint formed by turning up and bonding the horizontal membrane to a vertical substrate and adding an overflashing of membrane material bonded to the vertical substrate and folded over and bonded to the horizontal membrane. In certain situations the double detail can be achieved by bonding an angle profile of membrane material to the junction prior to laying the membrane.
- Liquid applied: A water-based formulation which cures to form an elastomeric membrane.
- Polyurethane: Water or solvent based formulations which moisture cure to form an elastic rubber membrane.
- PVC membrane: Flexible plastic sheet membrane (vinyl).
- Slip sheet: A sheet used to isolate the membrane system from the supporting substrate or from the topping or mortar bedding. The most common material is polyethylene.
- Substrate: The surface to which a material or product is applied.

1.5 SUBMISSIONS

Records

Placing records: Photographically record the application of membranes and label with the following information:

- Date.
- Portion of work.
- Substrate preparation.
- Weather during application and curing.
- Protection provided from traffic and weather.

Liquid membrane applications:

- Record wet film thickness once every 10 m² and compare to the manufacturers requirements.
- On completion of every 100 m² of each coat compare the amount of membrane used with the manufacturer's application rate and record the result.

Subcontractors

General: Submit names and contact details of proposed suppliers and installers as recommended by the manufacturer.

Warranties

Requirement: Submit warranties to **COMPLETION, Warranties.**

2 PRODUCTS

2.1 GENERAL

Storage and handling

General: Store and handle to the manufacturer's recommendations and as follows:

- Protect materials from damage.

2.2 MEMBRANES

Membrane systems

Requirement: Provide a proprietary membrane systems suitable for the intended external waterproofing.

Tanking systems

Requirement: Provide a proprietary membrane system suitable for the intended below ground tanking.

2.3 ACCESSORIES

Internal roof outlets

General: Proprietary funnel shaped sump cast into the roof slab, set flush with membrane, with a flat removable grating and provision for sealing the membrane into the base of the outlet.

Material: Bronze

Grating: Flat

Flashing

Pressure seal flashing: Proprietary to suit application

Fixing: Surface fixed and sealed

Control joint covers

Corners, crossovers, tees and bends: Factory mitred, welded and provided with 500 mm legs.

End closures: Factory folded and sealed to match joint cover profile.

2.4 PROTECTION

Protection board

Description: To suit application

2.5 SLIP SHEETS

Sheet material

Description: To suit application

2.6 DRAINAGE CELL PANELS

Planter bases

Material: Refer Landscape Architect's drawings

Protection: Refer Landscape Architect's drawings

Filter: Refer Landscape Architect's drawings

3 EXECUTION

3.1 PREPARATION

Substrates

General: Prepare substrates as follows:

- Fill all cracks in substrates wider than 1.5 mm with a filler compatible with the membrane system.
- Fill voids and hollows in concrete substrates with a concrete mix not stronger than the substrate.
- Remove projections.
- Remove deleterious and loose material.
- Remove all traces of a concrete curing compound if used.
- Leave the surface free of contaminants, clean and dust free.

Concrete substrates: Cure for more than 28 days.

Moisture content

Requirement: Verify that the moisture content of the substrate is compatible with the water vapour transmission rate of the membrane system by testing to AS 1884 Appendix A.

Falls

Requirement: Verify that falls in substrates are greater than 1:80.

Joints and fillets

Internal corners: Provide 45 deg fillets.

External corners: Round or arris edges.

Control joints: Prepare all substrate joints to suit the membrane system.

Priming

Compatibility: If required, prime the substrates with compatible primers for adhesion of the membrane system.

3.2 APPLICATION

Protection during installation

Damage: Protect membrane from damage during installation and for the period after installation until the membrane achieves its service characteristics that resist damage.

Drains

General: Prevent moisture from tracking under the membranes at drainage locations.

Drains and cages: Provide removable grates or cages to prevent blockage from debris. If the finished surface is above the level of the membrane, provide a slotted extension piece to bring the grate up to the level of the finished surface.

Overflows: Apply a bond breaker to the perimeter of the overflow outlet at its junction with the surface to which the membrane will be fixed. Turn the membranes into the overflow to prevent moisture from tracking behind the membrane.

Sheet membrane joints

Orientation of laps: Lap sheets on the upslope side of the roof fall over sheets on the downslope side.

End laps generally: Stagger end lap joints.

Bituminous sheet membranes:

- Side laps: 75 mm.
- End laps: 100 mm.
- Method: Heat welded.

Synthetic rubber membranes:

- Factory-vulcanized laps: More than 40 mm.

- Field side laps: More than 50 mm for side laps.
- Field end-laps: More than 100 mm for end laps.

PVC membranes:

- Factory welded laps: More than 30 mm.
- Field-welded laps:
 - . If used over insulation boards: More than 100 mm.
 - . Other instances: More than 75 mm overlaps.

Curing of liquid applied systems

General: To the manufacturers' instructions.

Control of movement

General: Provide control joints located over control joints in the substructure.

Fillets and bond breakers: Size to allow the membrane to accommodate movement.

Control joint covers: Install after fixing hobs and membranes.

Bonded membranes: Carry control joints in the substrate through to and into the surface finish.

Membrane terminations

Membrane upturns: Provide upturns above the maximum water level expected from the exposure conditions of rainfall intensity and wind.

- Height: To AS 4654.2 Appendix A, Table A1.
- Anchoring: Secure sheet membranes along the top edge.
- Edge protection: Protect edges of the membrane.

Waterproofing above vertical terminations: Waterproof the structure above the termination to prevent moisture entry behind the membrane using cavity flashings, capping, waterproof membranes or waterproof coatings.

Vertical upward terminations: Terminate under an overflashing.

Horizontal terminations: Do not provide. Use vertical terminations.

Membrane vertical penetrations

Pipes, balustrades, ducts, and vents: Provide separate sleeves for all pipes, ducts and vents, and fix to the substrate.

Membrane horizontal penetrations

Sleeves: Protect rigid PVC-U conduits and pipes with a sleeve of SBS bitumen in order to seal to the membrane without burning the PVC-U. Do not use high density polyethylene (HDPE), polypropylene (PP) pipes or flexible PVC conduit.

Membrane at balcony doors and windows

Requirement: Install membrane before the fixing of door or window frames.

Membrane upturn:

Vertical height above external finished floor level: Refer detail drawings.

Hobless and flush thresholds: Install membrane before the fixing of door or window frames with a continuous grated drain abutting the external face of the door or window sill.

Membrane around skylights and hatches

Requirement: Install membranes to upstands before the installation of the skylight or hatch.

Membrane at parapets

Requirement: Terminate membrane upstands under parapet flashing or capping giving 75 mm overlap. Do not top fix parapet cappings. Seal heads of fasteners against capping.

Membrane at gutters

Requirement: Terminate membrane over a corrosion resistant metal angle fixed to the gutter support substrate with the vertical leg of the angle turned down into the gutter at least 35 mm.

Membrane at post supports

Post supports fixed after membrane: Fix post support to substrate with countersunk fasteners over a waterproof resilient gasket cut to match the shape of the baseplate, and seal the perimeter of the baseplate to the membrane. Fix an overflashing of membrane which overlaps the base membrane at least 150 mm beyond the perimeter of the baseplate. Dress the overflashing closely around the post support and seal the edge of the penetration to the vertical member.

Membrane to planter boxes

Membrane: Extend root-resistant membrane at least 100 mm vertically above the soil fill level and secure.

Drainage: Grade the base of the planter to adequately sized drainage outlets and terminate the membrane in the outlets.

Drainage riser: Install a riser with drainage slots that extend from the membrane level to the top of the drainage cell. Extend the riser above the soil fill level and finish with a screw cap to provide access for drain clearing.

Protection board: Provide protection board to the full extent of the membrane including areas between soil level and the underside of flashings and cappings.

Drainage cell: Provide geo-filter fabric wrapped drainage cell to the base of the planter and turn geo-filter fabric up drainage riser at least 100 mm above drainage slots.

Cappings and flashings: Provide capping to the tops of planter walls to protect the membrane. Extend the capping to overlap the top of the protection board on the inside face of the planter wall. Where planter walls abut other walls, provide a flashing over the top of the membrane.

Membrane to below ground structures

Membrane: Externally apply membrane to all walls and return to horizontal surfaces to prevent water tracking around structure at joints and corners.

Protection board: Provide protection board to the full extent of the membrane.

Drainage cell: Provide geo-filter fabric wrapped drainage cell to vertical surfaces of the structure.

Reinforcement: Provide reinforcement to the membrane at junctions, corners and over joints to the manufacturer's recommendations.

Overlaying finishes on membranes

Compatibility: If a membrane is to be overlaid with another system such as tiles, pavers, ballast, insulation or soil, provide an overlaying system that is compatible with and will not cause damage to the membrane.

Bonded or partially bonded systems: If the topping or bedding mortar is to be bonded to the membrane, provide sufficient control joints in the topping or bedding mortar to reduce the movement over the membrane.

Slip sheet: If the topping or bedding mortar is structurally sufficient not to require bonding to the substrate, lay a double slip sheet over the membrane to separate it from the topping or bedding mortar.

Paint coatings: If maintenance pathways are indicated by a paving paint, use a paving paint which is compatible with the membrane.

3.3 COMPLETION**Protection**

General: Keep traffic off membrane surfaces until bonding has set or for 24 hours after laying, whichever period is the longer.

Reinstatement: Repair or replace faulty or damaged work. If the work cannot be repaired satisfactorily, replace the whole area affected.

Warranties

Waterproofing: Cover materials and workmanship in the terms of the warranty in the form of interlocking warranties from the supplier and the applicator.

- Form: Against failure of materials and execution under normal environment and use conditions.
- Period: As offered by the supplier.

4 SELECTIONS**4.1 EXTERNAL WATERPROOFING****Requirements schedule**

Property	MSU resident deck	Service decks	Raised planters
Traffic	Non-trafficable	Trafficable	Non-trafficable

Property	MSU resident deck	Service decks	Raised planters
Nature of traffic	N/A	Maintenance	N/A
Slip resistance classification	N/A	P4 / R11	N/A
Overlaying finish	Refer Section 0279 Paving – On Pedestals	N/A	N/A
Root and bioresistance	N/A	N/A	To AS 4654.1 Clauses 2.8 and 2.9

0421 ROOFING – COMBINED

1 GENERAL**1.1 RESPONSIBILITIES****General**

Requirement: Provide a roofing system and associated work, as documented.

Performance

Thermal qualities: Provide glazing with U-Value and Solar heat gain coefficient (SHGC), as documented.

Ambient climatic conditions

Design rainfall intensity (mm/h) to AS/NZS 3500.3: 261 (20 year ARI), 341 (100 year ARI)

Atmospheric corrosivity

Atmospheric corrosivity category: To *0171 General requirements*.

Distance from marine influence: 350 metres

Roof access

Type: Normal roof maintenance, access to PV panels

1.2 CROSS REFERENCES**General**

Requirement: Conform to the following:

- *0171 General requirements*.

- *0461 Glazing*.

1.3 INTERPRETATION**Abbreviations**

General: For the purposes of this worksection, the following abbreviations apply:

- EPS: Expanded polystyrene.
- PF: Phenolic foam.
- PIR: Rigid polyisocyanurate.
- PUR: Rigid polyurethane.
- XPS: Extruded polystyrene
- MW: Mineral wool.

1.4 TOLERANCES**Sheet metal roofing**

Supporting members: To AS 1562.1 clause 4.2.3.

1.5 SUBMISSIONS**Fire performance**

Combustibility: Submit evidence of conformity to PRODUCTS, **FIRE PERFORMANCE**, **Combustibility**.

Fire hazard properties: Submit evidence of conformity to PRODUCTS, **FIRE PERFORMANCE**, **Fire hazard properties**.

Operation and maintenance manuals

On completion: Submit a manual of recommendations from the roofing manufacturer or supplier for the maintenance of the roofing system including, frequency of inspection and recommended methods of access, inspection, cleaning, repair and replacement.

Products and materials

Safety glazing materials: Submit evidence of conformity to AS/NZS 2208 Appendix A.

Thermal insulation performance: Submit evidence of performance to AS/NZS 4859.1 and AS/NZS 4859.2.

Type tests: As appropriate for the project, submit evidence of conformity to the following:

- Metal roofing generally: Roof sheeting and fastenings to AS 1562.1 clause 5.4 for resistance to concentrated load and AS 1562.1 clause 5.5 for resistance to wind pressure.

Warranties

Roofing materials: Submit the manufacturer's published product warranties.

2 PRODUCTS

2.1 GENERAL

Storage and handling

Storage: To the manufacturer's recommendations and the following:

- Metal roofing materials: Store away from uncured concrete and masonry, on a level base and not in contact with other materials that cause staining, denting or other surface damage.

Handling metal roofing materials: As follows:

- Use gloves when handling precoated metal roofing material.
- Use soft soled shoes when fixing or working on roofs.
- Protect edges and surfaces from damage. Do not drag sheets across each other or over other materials.

Safety mesh

Standard: To AS/NZS 4389.

2.2 FIRE PERFORMANCE

Combustibility

Roofing: Tested to AS 1530.1.

Fire hazard properties

Insulation materials: Conform to the following, tested to AS/NZS 1530.3.

- Spread-of-Flame index: ≤ 9 .
- Smoke-Developed Index: ≤ 8 if Spread-of-Flame Index > 5 .

2.3 PROFILED SHEET METAL ROOFING

Standards

Design and materials: To AS 1562.1.

Fasteners

Prefinished exposed fasteners: Finish with an oven baked polymer coating to match the roofing material.

Profiled fillers

Type: Purpose-made closed cell polyethylene foam profiled to match the roofing profile.

Location: Provide profiled fillers under flashings to the following:

- Ridges.
- Eaves.
- Lapped joints in roof sheeting.

2.4 ROOF PLUMBING

General

Description: Flashings, cappings, gutters, rainheads, outlets, downpipes and accessories necessary to complete the roofing system.

Flashing and capping: Notched to match profile of roof sheeting.

Standards

Roof drainage: To AS/NZS 3500.3.

Metal rainwater goods: To AS/NZS 2179.1.

Flashings and cappings: To AS/NZS 2904.

3 EXECUTION

3.1 INSTALLATION

Protection

General: Keep the roofing and rainwater system free of debris and loose material during construction.

Thermal movement

Requirement: Allow for thermal movement in the roof installation and the structure, including movement in joints and fastenings.

Metal separation

Requirement: Prevent direct contact between incompatible metals, and between green hardwood or chemically treated timber and aluminium or coated steel, by one of the following methods:

- Applying an anti-corrosion, low moisture transmission coating to contact surfaces.
- Inserting a separation layer.

3.2 PROFILED SHEET METAL ROOFING

Installation

Standard: To AS 1562.1.

Swarf: Remove swarf and other debris as soon as it is deposited.

Accessories: Provide accessories with the same finish as roofing sheets to complete the roofing installation.

Pan type sheets

Removal: Install sheets so that individual sheets can be removed without damage.

Ridges and eaves

Sheet ends: Treat as follows:

- Project sheets 50 mm into gutters.
- Close off ribs at bottom of sheets using mechanical means or with purpose-made fillers or end caps.
- Turn pans of sheets up at tops and down into gutters by mechanical means.
- Provide pre-cut notched eaves flashing and bird proofing if required.
- Close off ridges with purpose-made ridge fillers of closed cell polyethylene foam.

Ridge and barge

Capping: Finish off along ridge and verge lines with purpose-made ridge capping or barge rolls.

3.3 ROOF PLUMBING

Jointing sheet metal rainwater goods

Butt joints: Make joints over a backing strip of the same material.

Soldered joints: Do not solder aluminium or aluminium/zinc-coated steel.

Sealing: Seal fasteners and mechanically fastened joints. Fill the holes of blind rivets with silicone sealant.

Flashings

Installation: Flash roof junctions, upstands, abutments and projections through the roof. Preform to required shapes if possible. Notch, scribe, flute or dress down as necessary to follow the profile of adjacent surfaces. Mitre angles and lap joints 150 mm in running lengths. Provide matching expansion joints at 6 m maximum intervals.

Upstands: Flash projections above or through the roof with two part flashings, consisting of a base flashing and a cover flashing, with at least 100 mm vertical overlap. Provide for independent movement between the roof and the projection.

Large penetrations in low pitch roofs: Extend the base flashing over the roofing ribs to the ridge to prevent ponding behind the penetrating element.

Wall abutments: Where a roof abuts a wall, provide as follows:

- In masonry walls, planked cladding or concrete: Step in courses to the roof slope. Interleave with damp proof course, if any.
- Raking in masonry: Build into the full width of the outer leaf. Turn up within cavity, slope inward across the cavity and fix to or build into the inner leaf at least 75 mm above the roofing line.

- Raking in concrete: Turn 25 mm into joints or grooves, wedge at 200 mm centres with compatible material and point up.

Fixing to pipes: Solder or seal with neutral cured silicone rubber and secure with either of the following:

- Clamping ring.
- Proprietary flexible clamping shoe with attached metal surround flashing.

Gutters

Gutter and sump support: Provide framing and lining to support valley gutters, box gutters and sumps. Line the whole area under the gutters and sumps.

Support: Adjustable rod / strap

Lining: Marine ply

Box gutter: Prefabricate box gutters to the required section and shape as follows:

- Form stop ends, downpipe nozzles, bends and returns.
- Dress downpipe nozzles into outlets.
- Overflows: Provide overflows to prevent back-flooding. Size to pass 100% of the design rainfall. Discharge overflows in visible locations and so water does not enter the building or cause damage to the building.
- Sumps: Refer hydraulic engineer.

Valley gutters: Profile to suit the valley boarding. Turn back both edges 180 x 6 mm radius. Nail or screw to the valley boarding at the top end to prevent the gutter creeping downwards.

Leaf guard location: To all eaves gutters.

External downpipes

General: Prefabricate downpipes to the required section and shape where possible. Connect heads to gutter outlets and, if applicable, connect feet to rainwater drains.

Access cover: Provide a removable watertight access cover at the foot of each downpipe stack.

Downpipe support: Provide supports and fixings for downpipes.

Internal downpipes

Jointing method: Refer hydraulic engineer's documents

Access: Provide access openings as follows:

- At each junction and bend.
- At the foot of each stack.
- At every second floor level.

Type of access opening: Vapour proof screw-on PVC fitting

Acoustic insulation: Mineral fibre pipe insulation 50 mm thick, spirally bound on with 1.5 mm wire at 150 mm pitch.

Building in: If pipes are built into masonry or concrete, spiral wrap the pipe (and insulation, if any) with building paper.

Rainwater disposal

System: Discharge to rainwater tanks and connection to stormwater drains

3.4 TESTING

Site tests

Internal downpipes: Test each stack hydrostatically in stages, each test to run over two storeys high for two hours. Remedy defects and retest if necessary.

3.5 COMPLETION

Reinstatement

Extent: Repair or replace damage to the roofing and rainwater system. If the work cannot be repaired satisfactorily, replace the whole area affected.

Damage to pre-painted finish: Replace panels with scratches in the pre-painted finish greater than 2 mm in width visible from the ground.

Fasteners: Make sure weather tight and external panel facings are not distorted.

Cleaning

Roofing and rainwater drainage system: Remove debris, metal swarf, solder, sealants and unused materials.

Exposed metal surfaces: Clean surfaces of substances that interfere with uniform weathering or oxidation.

Roof plumbing: Clean out spoutings, gutters and rainwater pipes after completion of roof installation.

Protection: After completion, remove protective coatings using methods to the manufacturer's recommendations.

Warranties

Requirement: Provide warranties for materials and workmanship warranties in the form of interlocking warranties as follows:

- Form: Against failure of materials and execution under normal environment and use conditions.
- Period: As offered by the supplier/manufacturer.

4 SELECTIONS**4.1 PROFILED SHEET METAL ROOFING****Profiled sheet metal roofing schedule**

Property		
Location	Typical	Counterpoint roofing outside staff room
Product	Lysaght	Lysaght
Profile	Klip-lok 700 Hi-strength	Klip-lok 700 Hi-strength
Material	Steel	Steel
Base metal thickness (BMT) (mm)	0.48	0.48
Finish	Colorbond	Colorbond
Colour	Surfmist	Woodland Grey
Fasteners	Concealed	Concealed

4.2 ROOF PLUMBING**Flashing and capping schedule**

Property		
Type	Cappings and flashings generally	Flashings to vent pipes
Product	-	Aquaseal "Original No.3" AOE3B
Material	Colorbond finished steel	EPDM rubber
Thickness and grade	Min 0.6mm	-
Colour	To match adjacent roofing	-

Roof plumbing schedule

Item	Type	Product	Material	Thickness/Grade	Colour/Shape/Size
Eaves gutter	Quad	Stramit	Colorbond finished steel	0.6mm BMT (G300) or 0.48mm BMT (G550)	Refer hydraulic engineer for dimensions, colour to match adjacent roof sheeting
Valley gutter	-	-	Colorbond finished steel	0.5mm BMT (G300) or 0.42mm BMT (G550)	Colour to match adjacent roof sheeting

Item	Type	Product	Material	Thickness/Grade	Colour/Shape/Size
Box gutter	Rectangular	-	Stainless steel, welded	0.55mm BMT, 304 grade	Refer hydraulic engineer for dimensions
Sump	-	-	Stainless steel, welded	0.55mm BMT, 304 grade	Refer hydraulic engineer for dimensions
Downpipe	Circular	-	PVC	-	Refer hydraulic engineer for dimensions, external DP's painted to match adjacent wall surface
Leaf guard	Aluminium mesh	-	Aluminium	-	4mm aluminium mesh with trims to match gutter colour

0431 CLADDING – COMBINED

1 GENERAL**1.1 RESPONSIBILITIES****General**

Requirement: Provide external wall cladding and associated work, as documented.

Atmospheric corrosivity

Atmospheric corrosivity category: To *0171 General requirements*.

Distance from marine influence: 350 metres

1.2 CROSS REFERENCES**General**

Requirement: Conform to the following:

- *0171 General requirements*.

1.3 INTERPRETATION**Abbreviations**

General: For the purposes of this worksection the following abbreviations apply:

- FC: Fibre cement.

1.4 TOLERANCES**Permitted deviations**

Flat sheet and panel cladding: To the manufacturer's recommendations.

Structural steelwork for wall cladding: ± 5 mm between bearing planes of adjacent supports.

1.5 SUBMISSIONS**Fire performance**

Combustibility: Submit evidence of conformity to PRODUCTS, **FIRE PERFORMANCE, Combustibility**.

Fire hazard properties: Submit evidence of conformity to PRODUCTS, **FIRE PERFORMANCE, Fire hazard properties**.

Fire-resistance level: Submit evidence of conformity to PRODUCTS, **FIRE PERFORMANCE, Fire-resistance of building elements**.

Operation and maintenance manuals

General: Submit manufacturer's published use, care and maintenance requirements.

Products and materials

Type tests: As appropriate for the project, submit results of facade testing as follows:

- Water penetration to AS/NZS 4284 .
- Structural testing to AS/NZS 4284 .
- Resistance to wind pressure:
 - . For non-cyclone regions to AS 4040.2.
 - . For cyclone regions to AS 4040.3 .
- Resistance to impact to AS/NZS 4040.5.

Warranties

Requirement: Submit warranties to **COMPLETION, Warranties**.

Cladding materials: Submit the manufacturer's product warranties.

Weatherproofing performance

Requirement: Submit evidence of conformity to PRODUCTS, **WEATHERPROOFING**.

2 PRODUCTS

2.1 GENERAL

Storage and handling

Requirement: Store and handle materials to the manufacturer's recommendations and the following:

- Protect materials including edges and surfaces from damage.
- Keep dry and unexposed to weather.
- Do not drag sheets or panels across each other or over other materials.
- Sheeting: Stack flat and off the ground on at least 3 evenly placed bearers.

Components

Cladding support: Provide components, as documented.

Fasteners and ties: Type, size, corrosion resistance class and spacing to the cladding manufacturer's recommendations.

Flashings: To AS/NZS 2904.

2.2 FIRE PERFORMANCE

Combustibility

Cladding: Tested to AS 1530.1.

Fire hazard properties

Group number: To AS 5637.1.

Insulation materials: Tested to AS/NZS 1530.3. Fire hazard indices as follows:

- Spread-of-Flame Index: ≤ 9 .
- Smoke-Developed Index: ≤ 8 if Spread-of-Flame Index > 5 .

Fire-resistance of building elements

Fire-resistance level: Tested to AS 1530.4.

Fire stops

Requirement: Where fire-stops and smoke flashings are placed between inner faces of the cladding and building elements (such as beam, slab or column faces), install and seal to meet fire test requirements.

2.3 WEATHERPROOFING

General

Requirement: Conform to BCA FP1.4 or BCA P2.2.2 as appropriate and to AS/NZS 4284.

2.4 FIBRE CEMENT (FC) SHEETS

General

Requirement: Proprietary single faced fibre cement sheets.

Standard: To AS/NZS 2908.2 and the following:

- Type A Category 3.

Finish: Smooth and even, free of imperfections such as chips.

Sealant and bond breaking tape: To the manufacturer's recommendations.

3 EXECUTION

3.1 GENERAL

Preparation

Substrates or framing: Before fixing cladding, check the alignment of substrates or framing and adjust if required.

Flexible underlay: Check that the underlay or insulation is restrained.

Cladding: Make sure the cladding is clean and free of dust and loose particles.

Installation

Standard: To AS 1562.1.

Requirement: Install cladding as follows:

- Fix sheeting firmly against framing to the manufacturer's recommendations.
- Plumb, level, straight and to documented tolerances.
- Fixed or anchored to the building structure in conformance with the wind action loading recommendations.
- Isolated from any building loads, including loads caused by structural deflection or shortening.
- Allow for thermal movement.

Cladding layout: Cut/fabricate and install cladding to suit the layout as documented.

Protection: Protect surfaces and finishes, including the retention of protective coatings during installation.

Proprietary systems or products

Requirement: Use panels and components from a single proprietary system and install to the manufacturer's recommendations.

Accessories and trim

Requirement: Provide accessories and trim required to complete the installation, or as documented.

Corner flashing for profiled and seamed metal sheets: Finish off at corners with purpose-made folded flashing strips.

Metal separation

Requirement: Prevent direct contact between incompatible metals, and between green hardwood or chemically treated timber and aluminium or coated steel, by either of the following methods:

- Apply an anti-corrosion, low moisture transmission coating to contact surfaces.
- Insert a separation layer.

Incompatible metal fixings: Do not use.

Horizontal cladding

Horizontal cladding surface:

- Minimum slope: 1:15.
- Staining: Slope away from visible vertical facade areas to prevent staining.

Defective and damaged parts

Defective components: Do not install component parts which are defective, including warped, bowed, dented, chipped, scratched, abraded or broken members.

Damaged parts: Remove and replace damaged parts during installation.

3.2 FC SHEET CLADDING

Joints

Control joints:

- Locate between the panel and fixing system and the supporting structure, as documented.
- Sheet edges: Square cut.
- Sealant: Do not apply finish coating over joint sealants.

Arrangement: Set out in even panels with joints coinciding with framing or as documented.

Fixing

General: Corrosion resistant nails or screws to the manufacturer's recommendations.

Eaves and soffit lining: Fix at 150 mm centres to soffit bearers at a maximum of 450 mm centres.

3.3 COMPLETION

Fasteners

Requirement: Adjust for weather tightness without distortion of external panel face.

Reinstatement

Extent: Repair or replace damage to the cladding. If the work cannot be repaired satisfactorily, replace the whole area affected.

Damage to pre-painted finish: Replace panels with scratches in the pre-painted finish.

Cleaning

Requirement: Remove excess debris, metal swarf, solder, sealants and unused materials.

Exposed metal surfaces: Clean surfaces of substances that interfere with uniform weathering or oxidation.

Protection: Remove protective coatings using methods required by the manufacturer after completion.

Panels: Clean surfaces with soft, clean cloths and clean water to the manufacturer's recommendations.

Warranties

Requirement: Cover materials and workmanship in the form of interlocking warranties from the supplier and installer.

- Form: Against failure of materials and execution under normal environment and use conditions.
- Period: As offered by the supplier.

Weatherproofing performance

Requirement: Submit evidence of conformity to PRODUCTS, **WEATHERPROOFING**.

4 SELECTIONS

4.1 PERFORMANCE

Cladding performance schedule

Properties	FC Sheeting
Combustibility	Non-combustible
R-value (m2.K/W)	Refer JV3 Report for required R-Value to building envelope
Acoustic characteristic	Refer to Acoustic Report for required acoustic rating to building envelope

4.2 PRODUCT

FC sheet cladding schedule

Property	To soffits generally	To Porte Cochere soffit
Product	James Hardie HardieFlex	James Hardie Versilux
Fixing system	Top-hat framing	Top-hat framing
Thickness (mm)	4.5mm	6mm
Finish	Paint	Paint
Colour	Refer Schedule 1 – External Finishes	Refer Schedule 1 – External Finishes
Joints	PVC H-mould	Black PVC eaves joiner, Part no. VEJ0630
Edge profile	Square	Square
Soffit lining perforations	N/A	N/A
Control joint width	6mm	6mm

0451B WINDOWS AND GLAZED DOORS

1 GENERAL**1.1 RESPONSIBILITIES****General**

Requirement: Provide windows and glazed doors, as documented.

Performance

Product design: Provide windows with sashes capable of being opened to satisfy the maintenance requirements, as documented.

1.2 CROSS REFERENCES**General**

Requirement: Conform to the following:

- 0171 General requirements.

1.3 STANDARDS**General**

Selection and installation: To AS 2047.

Building classification: Commercial, Class 9c

Glazing

Glass type and thickness: To AS 1288, if no glass type or thickness is nominated.

Materials and installation: To AS 1288.

Quality requirements for cut-to-size and processed glass: To AS/NZS 4667.

1.4 SUBMISSIONS**Certification**

Conformance: Submit evidence that window and door assemblies conform to AS 2047.

Sealant compatibility: Submit statements from all parties to the installation certifying the compatibility of sealants and glazing systems to all substrates.

Opacified glass: Submit a report, from the manufacturer, certifying that the proposed method of opacifying the glass will not be detrimental to the glass or affect the glass product warranty.

Toughened glass: For each batch of glass, submit certification from the manufacturer of heat soaking.

Protection of openable windows: Submit a certificate of on-site fall prevention testing.

Fire performance

Fire-resistance level: Submit evidence of conformity to PRODUCTS, **FIRE PERFORMANCE, Fire-resistance of building elements.**

Operation and maintenance manual

Window and door assemblies: Submit the window and glazed door manufacturer's published instructions for operation, care and maintenance.

Hardware: Submit the manufacturer's published recommendations for use, care and maintenance.

Products and materials

Safety glazing materials: Submit evidence of conformity to AS/NZS 2208 Appendix A.

Type tests: Submit results, as follows:

- Acoustic performance of windows and doors.
- Protection of openable windows.

Shop drawings

General: Submit shop drawings, to a scale that best describes the detail, showing the following:

- Full size sections of members.
- Hardware, fittings and accessories including fixing details.
- Junctions and trim to adjoining surfaces.

- Layout (sectional plan and elevation) of the window assembly.
- Lubrication requirements.
- Methods of assembly.
- Methods of installation, including fixing, caulking and flashing.
- Provision for vertical and horizontal expansion.
- Method of glazing, including the following:
 - . Rebate depth.
 - . Edge restraint.
 - . Clearances and tolerances.
 - . Glazing gaskets and sealant beads.

Subcontractors

General: Submit names and contact details of proposed manufacturers and installers.

Warranties

General: Submit warranties, as documented.

2 PRODUCTS

2.1 GENERAL**Storage and handling**

Storage: Store in a clean, dry area and unaffected by weather, to the manufacturer's recommendations. Protect from building materials and loose debris such as wet plaster, mortar, paint and welding splatter.

Handling: Handle frames to the manufacturer's recommendations and the following:

- Stack upright, off the ground and against a flat, vertical surface.
- Carry in the vertical position with sashes locked.
- Do not rack frames out of square.
- Do not remove any bands and corner bracing until after installation.

Acoustic performance

Windows and doors: Tested to AS 5218.

Protection of openable windows

Fall prevention: To BCA D2.24 and BCA 3.9.2.

Testing: To AS 5203.

Marking

Window assemblies: To AS 2047 Section 8.

2.2 FIRE PERFORMANCE**Fire-resistance of building elements**

Fire-resistance level: Tested to AS 1530.4.

2.3 GLASS**Performance**

Glass: Free from defects which detract from appearance or interfere with performance under normal conditions of use.

Glazing plastics: Free from surface abrasions, and warranted by the manufacturer for 10 years against yellowing or other colour change, loss of strength and impact resistance, and general deterioration.

Safety glass

Standard: To AS/NZS 2208.

Type: Grade A to AS 1288.

- Certification: Required.
- Certification provider: An organisation accredited by the Joint Accreditation System of Australia and New Zealand (JAS-ANZ).

Heat strengthening

Requirement: Heat strengthen all glass that requires extra strength and thermal resistance.

Standard: To ASTM C1048.

Heat soaking

Requirement: All toughened and heat strengthened glass products.

Standard: To EN 14179-1.

Unacceptable blemishes in heat-treated flat glass (including tinted and coated glass)

Standard: To AS/NZS 4667.

Insulating glass units (IGUs)

Selection and installation: To AS 4666.

2.4 GLASS IDENTIFICATION**Heat soaked glass**

Requirement: Marked to EN 14179-1 or certified by the manufacturer to AS 1288 clause 3.8.2.

Safety glazing materials

Identification: To AS 1288.

2.5 GLAZING MATERIALS**General**

Requirement: Glazing materials including putty, glazing compounds, sealants, gaskets, glazing tapes, spacing strips, spacing tapes, spacers, setting blocks and compression wedges appropriate for the conditions of application and required performance.

Compounds, sealants and tapes

Glazing tapes: To AAMA 800, specifications 804.3, 806.3, or 807.3, as applicable.

Glazing compounds: To AAMA 800 specification 802.3 (Types I or II), or 805.2, as applicable.

Narrow joint seam sealer: To AAMA 800 specification 803.3.

Exterior perimeter sealing compound: To AAMA 800 specification 808.3.

Non-drying sealant: To AAMA 800 specification 809.2.

Expanded cellular glazing tape: To AAMA 800 specifications 810.1.

Jointing materials

Requirement: Provide jointing and pointing materials to manufacturer's recommendations that are compatible with each other and with the contact surfaces and non-staining to finished surfaces. Do not provide bituminous materials on absorbent surfaces.

Elastomeric sealants

Sealing compound (polyurethane, polysulfide, acrylic): To ASTM C920 or ISO 11600.

Sealing compound (silicone): To ASTM C920 or ISO 11600.

Sealing compound (butyl): To ASTM C1311.

Primer

Compatibility: Apply the manufacturer's recommended primer to the surfaces in contact with sealant materials.

Control joints

Depth of elastomeric sealant: One half the joint width or 6 mm, whichever is the greater.

Foamed materials (in compressible fillers and backing rods): Closed-cell or impregnated types that do not absorb water.

Bond breaking: Provide backing rods, and other back-up materials for sealants, that do not adhere to the sealant.

2.6 SECURITY WINDOW GRILLES**General**

Requirement: Proprietary metal security screen and frames, fixed to the building structure with tamper resistant fastenings.

Security window grilles: To AS 5039.

2.7 ALUMINIUM FRAME FINISHES

Powder coatings

Service condition category to AS 3715: Category 5 (Exterior severe)

Colour: Duratec Zeus Timberland 90Z7315S, Duratec Zeus Matt Canvas Cloth 90077327M

Gloss level: Satin

2.8 ANCILLARY COMPONENTS AND FITTINGS

Extruded gaskets and seals

General: Provide seals, fit for purpose.

Materials: Non-cellular (solid) elastopressive seals as follows:

- Flexible polyvinyl chloride (PVC): To BS 2571, 100% solids with high consistency, ultraviolet stabilised.
- Rubber products (neoprene, ethylene propylene diene monomer (EPDM) or silicone rubber): To BS 4255-1.

Flashings

General: Corrosion resistant, compatible with the other materials in the installation, and coated with a non-staining compound where necessary.

Standard: To AS/NZS 2904.

Nylon brush seals

General: Dense nylon bristles locked into galvanized or stainless steel strips and fixed in a groove in the edge of the door or in purpose-made anodised aluminium holders fixed to the door with double sided PVC foam tape.

Pile weather strips

Standard: To AAMA 701/702.

Materials: Polypropylene or equivalent pile and backing, low friction silicone treated, ultraviolet stabilised.

Finned type: A pile weather seal with a central polypropylene fin bonded into the centre of the backing rod and raised above the pile level.

2.9 HARDWARE

Hardware documented generically

General: Provide hardware of sufficient strength and quality to perform its function, appropriate to the intended conditions of use, compatible with associated hardware, and fabricated with fixed parts firmly joined.

Window locks and latches

Standard: To AS 4145.3.

Performance:

- Durability: DW2
- Physical security: SW2
- Keying security: K1

Sash balances

Requirement: Match the spring strength of the balances to the sash weight they support.

Sash operators

Requirement: Provide sash operators, fit for purpose.

3 EXECUTION

3.1 GLASS PROCESSING

General

Processing: Perform required processes on glass, including cutting, obscuring, silvering and bending. Form necessary holes, including for fixings, equipment, access openings and speaking holes. Process exposed glass edges to a finish not inferior to ground arrised.

3.2 INSTALLATION

Glazing

General: Install the glass as follows:

- Permanently fix in place each piece of glass to withstand the normal loadings and ambient conditions at its location without distortion or damage to glass and glazing materials.
- No transfer of building movements to the glass.
- Watertight and airtight for external glass.

Temporary marking: Use a method which does not harm the glass. Remove marking on completion.

Toughened glass: Do not cut, drill, edge-work or permanently mark after toughening. Use installation methods which prevent the glass making direct contact with metals or other non-resilient materials.

Heat absorbing glass: In locations exposed to direct sunlight, provide wheel cut edges free from damage or blemishes, with minimum feather.

Preglazing

Window assemblies and glazed doors: Supply inclusive of glazing, shop preglazed.

Windows and glazed doors

General: Install windows and glazed doors frames as follows:

- Plumb, level, straight and true within building tolerances.
- Fixed or anchored to the building structure in conformance with the wind action loading requirements.
- Isolated from any building loads, including loads caused by structural deflection or shortening.
- Allow for thermal movement.

Weatherproofing

Flashing and weatherings: Install flashings, weather bars, drips, storm moulds, joint sealant and pointing to prevent water penetrating the building between the window frame and the building structure under the prevailing service conditions, including normal structural movement of the building.

Fixing

Fasteners and fastener spacing: Conform to the recommendations of the manufacturer.

Packing: Pack behind fixing points with durable full width packing.

Fasteners: Conceal fasteners.

Prepared masonry openings: If fixing of timber windows to prepared anchorages needs fastening from the frame face, sink the fastener heads below the surface and fill the sinking flush with a material compatible with the surface finish.

Joints

General: Make accurately fitted tight joints so that neither fasteners nor fixing devices such as pins, screws, adhesives and pressure indentations are visible on exposed surfaces.

Sealants:

- If priming is recommended, prime surfaces in contact with jointing materials.
- If frames are powder coated apply a neutral cure sealant.

Operation

General: Make sure moving parts operate freely and smoothly, without binding or sticking, at correct tensions or operating forces and are lubricated.

Protection

Removal: Remove temporary protection measures from the following:

- Contact mating surfaces before joining up.
- Exposed surfaces.

Trim

General: Provide mouldings, architraves, reveal linings, and other internal trim using materials and finishes matching the window frames. Install to make neat and clean junctions between frames and the adjoining building surfaces.

3.3 SECURITY WINDOW GRILLES

General

Installation: To AS 5040.

3.4 HARDWARE

Fasteners

Materials: Use materials compatible with the item being fixed and of sufficient strength, size and quality to perform their function.

- Concealed fasteners: Provide a corrosion-resistant finish.
- Exposed fasteners: Match exposed fasteners to the material being fixed.

Support: Provide appropriate back support (for example lock stiles, blocking, wall noggings and backing plates) for hardware fasteners.

- Hollow metal sections: Provide backing plates drilled and tapped for screw fixing, or provide rivet nuts with machine thread screws. Do not use self-tapping screws or pop rivets.

Proprietary window systems

Requirement: Provide the standard hardware and internal fixing points for personnel safety harness attachment, if required by and conforming to the governing regulations.

Operation

General: Make sure working parts are accurately fitted to smooth close bearings, without binding or sticking, free from rattle or excessive play, lubricated where appropriate.

Supply

Delivery: Deliver window hardware items, ready for installation, in individual complete sets for each window set, as follows:

- Clearly labelled with the intended location.
- In a separate dust and moisture proof package.
- Including the necessary templates, fixings and fixing instructions.

3.5 COMPLETION

Hardware

Adjustment: Leave the hardware with working parts in working order, and clean, undamaged, properly adjusted, and lubricated where appropriate.

Repair of finish

Polyester or fluoropolymer coatings: Contact supplier for approval to apply touch up products, otherwise replace damaged material.

Cleaning

Method: Clean with soft clean cloths and clean water, finishing with a clean squeegee. Do not use abrasive or alkaline materials.

Extent: All frames and glass surfaces inside and out.

Warranties

Window and door assemblies: Provide the manufacturer's published product warranties.

Hardware: Provide the manufacturer's published product warranties.

4 SELECTIONS

4.1 PERFORMANCE

Window and glazed door performance schedule

Property	
Total system U-Value (W/m ² .K)	Refer JV-3 Report
Total system SHGC	Refer JV-3 Report
Weighted sound reduction index (R _w or R _w + C _{tr})	Refer Acoustic Report
WERS Energy rating%: Heating	Refer JV-3 Report
WERS Energy rating%: Cooling	Refer JV-3 Report

Property	
AGWA Compliance Certificate	Required
Water penetration resistance (Pa)	300 Pa
Fire-resistance level (FRL)	N/A
Ultimate limit state (ULS) wind pressure (Pa)	To AS/NZS 1170.2
Serviceability limit state (SLS) wind pressure (Pa)	To AS/NZS 1170.2

4.2 WINDOWS AND GLAZED DOORS

Window and glazed door schedule

Property	General glazing	Sliding windows & doors	Curtain glazing	Servery opening
Suite description			150mm, centre glazed	
Generic description	Fixed glazed windows, glazed hinged doors, glazed concertina doors	Glazed sliding windows, glazed sliding doors	Fixed glazed windows, glazed sliding doors, glazed hinged doors, aluminium panels	Upward sliding frameless glazed window with decorative film applied
Frame material	Aluminium	Aluminium	Aluminium	Aluminium
Frame finish	Powder coated	Powder coated	Powder coated	Powder coated
Screen: Frame material and finish	N/A	Aluminium, powder coated to match window / glazed door frame	N/A	N/A
Screen: Mesh type	N/A	Stainless steel security	N/A	N/A
Glazing	Refer Acoustic Report & JV-3 Report	Refer Acoustic Report & JV-3 Report	Refer Acoustic Report & JV-3 Report	4mm toughened
Safety markings	To AS 1288 Clause 5.19 as required	To AS 1288 Clause 5.19 as required	To AS 1288 Clause 5.19 as required	N/A

0453B DOORS AND ACCESS PANELS

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide doors, frames, doorsets, security screen doors and fire-resisting doorsets, as documented.

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- 0171 General requirements.
- 0185 Timber products, finishes and treatment.
- 0455 Door hardware.

1.3 STANDARDS

General

Timber and composite doors: To AS 2688.

1.4 INTERPRETATION

Definitions

General: For the purposes of this worksection the definitions given in AS 2688 and the following apply:

- Fire-resisting doorset: A doorset which retains its integrity, provides insulation and limits, if required, the transmittance of radiation in a fire.
- Smoke-doorset: A doorset which restricts the passage of smoke.

1.5 SUBMISSIONS

Products and materials

Type tests: Submit results, as follows:

- Fire-resisting and smoke doorsets.
- Acoustic performance of doorsets.

2 PRODUCTS

2.1 FRAMES

Steel frames

Construction: Continuously welded from metallic-coated steel sheet sections, including accessories such as buffers, strike plates, spreaders, mortar guards, switch boxes, fixing ties or brackets, and cavity flashing with provision for fixing documented hardware and electronic security assemblies, and prefinished with a protective coating.

Base metal thickness (minimum):

- General: 1.1 mm.
- Fire-resisting doorsets: 1.5 mm.
- Security doorsets: 1.6 mm.

Metallic-coating class to AS 1397 interior: ZF100.

Metallic-coating class to AS 1397 exterior: Z275

Finish: Grind the welds smooth, cold galvanize the welded joints and shop prime.

Hardware and accessories: Provide 4 mm backplates and lugs for fixing hardware including hinges and closers. Screw fix the hinges into tapped holes in the backplates.

2.2 DOORS

General

Doors: Proprietary products manufactured for interior or exterior applications and for the finish required.

Materials

Standards: Conform to the following:

- Decorative laminated sheets: To AS/NZS 2924.1.
- Wet process fibreboard (including hardboard): To AS/NZS 1859.4.
- Dry process fibreboard (including medium density fibreboard): To AS/NZS 1859.2.
- Particleboard: To AS/NZS 1859.1.
- Plywood and blockboard for interior use: To AS/NZS 2270.
- Plywood and blockboard for exterior use: To AS/NZS 2271.
- Seasoned cypress pine: To AS 1810.
- Timber – hardwood: To AS 2796.1.
- Timber – softwood: To AS 4785.1.

Identification

Panel doors: Provide panels branded under the authority of a recognised certification scheme as applicable to the product. Locate the brand on faces or edges which will be concealed in the works.

Joinery doors

General: Provide joinery doors, as documented.

Flush panel doors

General: Provide flush panel doors of balanced construction, as documented.

Medium density fibreboard doors: Single thickness of moisture resistant general purpose medium density fibreboard with the same surface finish to both sides, for internal use.

Smoke doors: Solid core not less than 35 mm thick.

Construction

Adhesives:

- Internal: To AS/NZS 2270.
- External: To AS/NZS 2271.

Cut-outs: If openings are required in flush panel doors (e.g. for louvres or glazing), do not make cut-outs closer than the width of the stiles at the edges of the doors.

Edge strips: Minimum thickness 10 mm. Increase overall thickness to greater than 15 mm to accommodate the full depth of the rebate in rebated doors. Apply to the external edges of door after the facings are bonded to the door framing/core and finish flush with outside surface of the facings.

Double doors

Square edged doors: Bevel as necessary to prevent binding between the leaves.

Rebated meeting stiles: If not double acting doors, provide rebated meeting stiles or fix equivalent metal T stop to one leaf. Form rebates to suit standard rebated hardware.

Tolerances

Standard: To AS 2688 clauses 4.1 and 5.3.

2.3 DOORSETS

Acoustic performance

Doorsets: Tested to AS 5218.

Automatic door assemblies

Standard: To AS 5007.

Cavity sliding doors

General: Proprietary product comprising steel and timber frame construction with rigid steel top, base and rear supporting members and incorporating the overhead door track, ball race type wheel carriages, guides, stops, split jamb linings and removable pelmet.

Duct access panels

General: Proprietary products comprising metal-faced doors side-hung to steel door frames, including hardware and accessories such as hinges and lock and installation lugs.

Fire-resisting doorsets

Standard: To AS 1905.1 and BCA Spec C3.4.

2.4 ANCILLARY MATERIALS**Trims**

Timber: Solid timber at least 19 mm thick, mitred at corners.

Extruded gaskets and seals

Materials: Non-cellular (solid) elastopressive seals as follows:

- Flexible polyvinyl chloride (PVC): To BS 2571, 100% solids with high consistency, ultraviolet stabilised.
- Rubber products (neoprene, ethylene propylene diene monomer (EPDM) or silicone rubber): To BS 4255-1.

Flashings

General: Corrosion resistant, compatible with the other materials in the installation, and coated with a non-staining compound where necessary.

Standard: To AS/NZS 2904.

Jointing materials

General: Compatible with each other and with the contact surfaces and non-staining to finished surfaces. Do not provide bituminous materials on absorbent surfaces.

Nylon brush seals

General: Dense nylon bristles locked into galvanized steel strips and fixed in a groove in the edge of the door or in purpose-made anodised aluminium holders fixed to the door with double sided PVC foam tape.

Pile weather strips

General: Polypropylene or equivalent pile and backing, low friction silicone treated, ultraviolet stabilised.

Standard: To AAMA 701/702.

3 EXECUTION

3.1 FRAMES**General**

Frames: Install the frames as follows:

- Plumb, level, straight and true.
- Fixed or anchored to the building structure.
- Isolated from any building loads, including loads caused by structural deflection or shortening.

Frame fixing

Brackets: Metallic-coated steel:

- Width: Minimum 25 mm.
- Thickness: Minimum 1.5 mm.

Depth of fixing for building into masonry:

- Brackets: Minimum 200 mm.
- Expansion anchors: Minimum 50 mm.
- Plugs: Minimum 50 mm.
- Rods: Minimum 60 mm.

Jamb fixing centres: Maximum 600 mm.

Joints

General: Make accurately fitted joints where fasteners, pins, screws, adhesives and pressure indentations are not visible on exposed surfaces.

Aluminium frames

Building into masonry: Screw galvanized steel brackets twice to jambs and build in.

Fixing to masonry openings: Build in seasoned timber plugs to masonry joints or use proprietary expansion anchors and screw twice through jambs at each fixing.

Fixing to stud frame openings: Screw once to studs at each fixing.

Steel frames

Building into masonry: Attach galvanized steel rods to jambs, build in and grout up.

Fixing to masonry openings: Build in hairpin anchors and install locking bars, or use proprietary expansion anchors and screw twice through jambs at each fixing.

Fixing to stud frame openings: Attach galvanized steel brackets to jambs and screw twice to studs at each fixing.

Finishing

Trim: Provide mouldings, architraves, reveal linings, and other internal trim using materials and finishes matching the door frames to make neat and clean junctions between the frame and the adjoining building surfaces.

Seals

General: Provide the fixings, rebates, grooves, and clearances required for installation and operation of the seals. Allow seals unwound from coils to settle before use.

Weatherproofing

Flashings and weatherings: Install flashings, weather bars, drips, storm moulds, caulking and pointing to prevent water from penetrating the building between the door frame and the building structure under the prevailing service conditions, including normal structural movement of the building.

3.2 DOORS**Priming**

General: Prime timber door leaves on top and bottom edges before installation.

3.3 COMPLETION**Operation**

General: Make sure moving parts operate freely and smoothly, without binding or sticking, at correct tensions or operating forces and that they are lubricated where appropriate.

Protection

Temporary coating: On or before the date for practical completion, or before joining up to other surfaces, remove all traces of temporary coatings used as a means of protection.

4 SELECTIONS**4.1 DOOR TYPES SCHEDULE****Flush panel doors construction schedule**

Property	General doors	Fire resisting doorsets	Undercut doors
Door type	Solidcore	Proprietary doorset	Solidcore
Door thickness (mm)	As scheduled	-	As scheduled
Core material	Blockboard	-	Blockboard
Facing material	Hardboard	-	Hardboard
Inset panels: Type	Glazed panel as scheduled	N/A	N/A
Inset panels: Clear opening size (mm)	As scheduled	N/A	N/A
Finish	Paint	Paint	Paint
Floor clearance	10mm	3-10mm to AS 1905	Refer mechanical engr's documentation

Joinery doors construction schedule

Property		
Door type	Framed and panelled	Framed and glazed
Door thickness (mm)	As scheduled	As scheduled
Adhesive	Internal	Internal
Timber species or group	Victorian Ash TBC	Victorian Ash TBC
Timber grade	Select	Select
Finished sizes (mm): Top rails and stiles	120mm	120mm
Finished sizes (mm): Intermediate rails	90mm	N/A
Finished sizes (mm): Bottom rails	165mm	165mm
Finished sizes (mm): Muntins	N/A	N/A
Panels: Material	Veneered plywood to match frame	Glazed
Panels: Thickness (mm)	19mm	4mm toughened, frosted finish
Finish	Clear	Clear
Floor clearance	10mm	10mm

4.2 DOORSETS SCHEDULE**Automatic doorset schedule**

Property	
Pedestrian traffic	Medium
Door configuration	Bi-part slide
Drive type	Electromechanical
Drive location	Surface applied
Motion sensor control device	Infra-red
Aluminium frame finish	Powder coated
Powder coating: Service condition category	Category 5 (Exterior severe)
Powder coating: Product	Dulux Duratec Zeus
Powder coating: Gloss level	Satin
Colour	Timberland 90Z7315S
Design wind pressure	To AS/NZS 1170.2

0454B OVERHEAD DOORS

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide overhead doors, as documented.

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- 0171 General requirements.

1.3 STANDARDS

General

Garage doors and other large access doors: To AS/NZS 4505.

1.4 SUBMISSIONS

Operation and maintenance manual

General: Submit the manufacturer's published instructions for operation, care and maintenance.

2 PRODUCTS

2.1 GENERAL

Door assembly

Requirement: Proprietary system complete with the manufacturer's standard operating system, hardware, and accessories.

Marking and labelling

General: To AS/NZS 4505 Section 8.

2.2 ROLLING CURTAIN AND ROLLING SHUTTER DOORS

General

Requirement: Materials and finishes, as documented.

Curtain

Rolling curtain: Continuous roll formed profiled steel.

Bottom rail

Requirement: Provide a stiffening member as follows:

- Interlocking with the bottom edge or lowest part of the curtain.
- Extending between the inner faces of the vertical guides.
- Formed or adapted as required for sloping floors or threshold.

Wind locks

General: Provide wind lock end clips and guides to retain the curtain in wide openings or under extreme wind conditions.

Locking hardware

General: Provide furniture and lockset to manually operated door to accommodate master keyed cylinder as specified by Assa Abloy. Provide key switch to motorised doors to accommodate master keyed cylinder as specified by Assa Abloy.

Drum

Maximum drum deflection: 1/360th of the span.

Springs: Helical torsion springs housed in the drum and arranged to counterbalance the curtain weight without exceeding the safe working stress of the spring material.

Operation method

General: Method of opening and closing the door:

- Manual: As scheduled.
 - . Chain: By pulling on a chain passing over a sprocket on the drum, with reduction gears where necessary.
- Motorised: As scheduled.

2.3 OPERATION**Manual operation**

General: Install so that the force required to operate the door manually does not exceed 220 N.

Motorised operation

General: Provide a motorised door operating system incorporating the following:

- An electric motor with limit switches, and of adequate capacity to operate the specified door smoothly and without strain.
- Overload cutout.
- Automatic safety system to stop and reverse door if obstructed while closing, or stop door if obstructed while opening.
- Photocell or IR beam safety device.
- Manual release handle to disengage door from drive mechanism in the event of a power failure.
- Operation by push-button (internal) and key switch (external), located 1500 mm above floor level.

3 EXECUTION

3.1 INSTALLATION**General**

Requirement: Install overhead doors in conformance with the manufacturer's recommendations and as documented.

Preparation

Substrate: Before start of installation, check the alignment of substrates or framing and adjust if required.

Frames, guides and tracks

Requirement: Install frames, guides and tracks as follows:

- Plumb, level, straight, true, and within tolerances and clearances recommended by the manufacturer.
- Fixed or anchored to the building structure using mechanical fixings suitable for the substrate and the imposed loads.
- Isolated from any building loads, including loads caused by structural deflection or shortening.

3.2 COMPLETION**Operation**

General: Make sure moving parts operate freely and smoothly, without binding or sticking, at correct tensions or operating forces and that they are lubricated where appropriate.

Safety: Make sure all safety features are operating.

Remote control devices: Make sure devices are programmed and operating.

Protection

Temporary coating: On or before the date for practical completion of the works, or before joining up to other surfaces, remove all traces of temporary coatings used for protection.

Warranties

General: Submit the manufacturer's published product warranties.

4 SELECTIONS

4.1 PERFORMANCE

Overhead door schedule

Property	RS1 - Maintenance	RS2 – Bin Room	RS3 – Hobby Shed
Classification to AS/NZS 4505	General purpose – low cycle	General purpose – medium cycle	General Purpose – low cycle
Ultimate wind pressure rating	-	-	To AS/NZS 1170.2
Wind-borne debris impact rating	Not required	Not required	Required
Operation method	Motorised	Manual	Motorised
Finish	Colorbond	Colorbond	Colorbond
Colour	Surfmist	Surfmist	Surfmist

0455P ASSA ABLOY DOOR HARDWARE

5 GENERAL**5.1 RESPONSIBILITIES****General**

Requirement: Provide door hardware, as documented.

5.2 COMPANY CONTACTS**ASSA ABLOY technical contacts**

Website: www.assaabloy.com.au/en/local/au/contact/

Lorient door seals: www.lorient.com.au/contact

5.3 CROSS REFERENCES**General**

Requirement: Conform to the following:

- 0171 General requirements.
- ASSA ABLOY door hardware schedule.

5.4 MANUFACTURER'S DOCUMENTS**Technical manuals**

ASSA ABLOY materials and installation manuals:

www.assaabloyopeningsolutions.com.au/en/local/au/

Lorient door seal data sheets, installation manuals and CAD downloads: www.lorient.com.au

5.5 INTERPRETATION**Abbreviations**

General: For the purposes of this worksection, the abbreviations given in AS 4145.1 Appendix D apply.

Definitions

General: For the purposes of this worksection, the general definitions given in AS 4145.1 Section 2 and Appendix E apply.

5.6 SUBMISSIONS**Execution details**

Door hardware schedule: Submit a door hardware schedule, prepared by ASSA ABLOY Australia.

- Information sources: This worksection and the contract drawings.

Re-use of recovered hardware: Submit a proposal describing the standard of cleaning, repair and testing of recovered items and the location where each is to be reused.

Key control system:

- New works: Submit details of the proprietary key control security system proposed by the lock manufacturer for locks required to accept a group key (master, grandmaster).
- Alterations and additions: Submit details to extend the existing key control security system for locks required to accept a group key.

Operation and maintenance manuals

Automatic door operators: Submit the installer's proposal for continuing maintenance after completion on an annual renewal basis.

Manual: Submit the manufacturer's published recommendations for use, care and maintenance of the hardware provided.

Records

Door hardware schedule: Submit an amended schedule, prepared by ASSA ABLOY Australia or their designated door hardware supplier, showing changes to the contract door hardware schedule resulting from the following:

- Approval of a hardware sample.
- Acceptance of an ASSA ABLOY alternative to the specification.
- A contract variation to a door hardware requirement.

Key coding system: Submit the lock manufacturer's record of the key coding system showing each lock type, number and type of key supplied, key number for re-ordering, and name of supplier.

Samples

Generic items: Submit samples of nominated hardware items.

Subcontractors

Automatic door operators: Submit names and contact details of proposed supplier and installer.

Warranties

Requirement: Submit warranties, as documented.

6 PRODUCTS

6.1 GENERAL**Product substitution**

Other products: Conform to PRODUCTS, **GENERAL**, **Substitutions** in *0171 General requirements*.

Product identification

General: Marked to show the following:

- Manufacturer's identification.
- Product brand name.
- Product type.
- Quantity.
- Product reference code and batch number.
- Date of manufacture.

Supply

Delivery: Deliver door hardware items, ready for installation, in individual complete sets for each door, as follows:

- Clearly labelled to show the intended location.
- In a separate dust and moisture proof package.
- Including the necessary templates, accessories fixings and fixing instructions.

Hardware specified generically: Hardware of the required strength and quality to perform its function, appropriate to the intended conditions of use, suitable for use with associated hardware, and fabricated with fixed parts firmly joined.

Replacement items

Door hardware: Match items being replaced with the existing, or as documented. Upgrade hinges as necessary to conform to **Hinges for timber doors table** and **Hinges for aluminium doors table**.

6.2 LOCKS AND LATCHES**Standard**

General: To AS 4145.2.

Padlocks

Standard: To AS 4145.4.

Lock and latch classification

Rating systems: To AS 4145.1 Section 3.

Performance requirements: To AS 4145.2 Section 3.

Commercial Project requirements:

- Key Latch Retraction
- Universal Functionality
- Australian Made

Multi-Residential Project requirements:

- Rating systems: To AS 4145.1 Section 3.

6.3 HINGES

Butt hinge materials

Timber doors in timber or steel frames:

- Material: Stainless steel
- Product: Lockwood series.

Aluminium framed doors in aluminium frames:

- Material: Stainless steel
- Product: Interfold stainless steel or high tensile aluminium with fixed stainless steel pins in nylon bushes, and with nylon washers to each knuckle joint.

Heavy Duty doors: Provide severe duty hinges with phosphorus bronze bushings.

Doors fitted with closers: Provide low friction ball bearing hinges.

Fire-resisting doors: To AS 1905.1.

Power transfer hinges: Do not load and install with other compatible hinges.

Lift-off doors: If toilet cubicles require lift-off doors, provide lift-off hinges and allow for door panel with sufficient clearance at the head allow door removal.

Timber solid core doors

Number of hinges: Determine the number of hinges required based on the nominated door leaf size and weight only. For other door leaf sizes or for doors with applied finishes, use the weight of the door to determine the number of hinges required. For doors fitted with door closers with backcheck, add 20 kg to door weight.

Size of hinges: Determine the size of the hinge based on the door leaf thickness:

- 35 to 43 mm thick door: 100 x 75 mm butt hinges with a minimum thickness of 2.5 mm.
- 44 to 55 mm thick door: 100 x 100 mm butt hinges with a minimum thickness of 2.5 mm.
- > 55 mm thick door: To the door hardware schedule.
- For alternative hinge calculations, use ASSA ABLOY [hinge calculator](#).

Hinge pin: Supply fixed pins to hinges of doors opening out or designated as a security doors. For all other doors, provide loose pins.

Wide throw: If necessary, use wide throw hinges to achieve the required door swings in the presence of obstacles such as nibs, deep reveals and architraves.

Hinges for timber doors table

Nominal door leaf size (L x W x T) (mm)	Door leaf weight (kg)	Number of hinges
2040 x 400 x 35	≤ 19	2
2040 x 600 x 35	≤ 29	2
2040 x 720 x 35	≤ 35	3
2040 x 820 x 35	≤ 39	3
2040 x 920 x 35	≤ 44	3
2040 x 1020 x 35	≤ 49	4
2040 x 720 x 40	≤ 37	3
2040 x 820 x 40	≤ 42	3
2040 x 920 x 40	≤ 48	3
2040 x 1020 x 40	≤ 52	4
2040 x 720 x 50	≤ 45	3
2040 x 820 x 50	≤ 50	3
2040 x 920 x 50	≤ 57	3
2040 x 1020 x 50	≤ 68	4
2400 x 720 x 40	≤ 50	4
2400 x 820 x 40	≤ 52	4
2400 x 920 x 40	≤ 55	4

Nominal door leaf size (L x W x T) (mm)	Door leaf weight (kg)	Number of hinges
2400 x 1020 x 40	≤ 60	4
2400 x 1220 x 50	≤ 72	5
2040 x 920 x 70	≤ 88	Pivot hinges

Aluminium doors

Application: Aluminium hinges for aluminium doors, or for doors of other materials in aluminium frames of a weight of 40 kg or less.

Hinges for aluminium doors table

Nominal hinge size (L x W x T) (mm)	Door leaf weight (kg)	Knuckles (minimum)	Screws/hinge leaf (minimum)
100 x 70 x 3	≤ 30	3	3
100 x 80 x 3.5	≤ 50	5	4
130 x 50 x 3.4	≤ 75	Interfold	3
Length (L) is the dimension along the knuckles, not including hinge tips, if any, and width (W) is the dimension across both hinge leaves when opened flat.			

6.4 DOOR HANGING SYSTEMS

General

Requirement: Provide sliding door tracks and guides, as documented.

6.5 ANCILLARIES

Bolts

General: Barrel bolts, flush bolts and tower bolts with keepers, including lock plates, staples, ferrules or floor sockets.

Mortar guards

General: For steel door frame installations, provide mortar guards designed to allow the full extension of the lock tongue or similar devices and the correct operation of the locking mechanism.

Strike plates

General: For steel door frame installations, provide strike plates designed to allow the full extension of the lock tongue or similar devices and the correct operation of the locking mechanism.

Rebated doors

General: For mortice locks or latches to rebated doors, provide purpose-made rebated pattern items.

6.6 DOOR CONTROLLERS

Standard

General: To AS 4145.5.

Performance

Requirement: Door controllers, pivots, floor or overhead door closers, and automatic door operators, suitable for the door type, size, weight, sliding action and swings required and the operating conditions, including wind and air conditioning pressure.

Automatic doors

Glazed sliding:

- Proprietary item: ASSA ABLOY Entrance Systems.

Automatic door operators

General: Complete automatic door operators for opening and closing doors, including door hanging (sliding gear) and electrical connection to distribution board.

Requirement: Conform to the following:

- Refer CableComm documents for automatic activation methods, operation and power failure modes.

Installation: Provide necessary recesses and core-holes, grout in components where required, and repair any damage. Provide cover plates for access to units in door heads, frames or transoms.

Automatic adjustable function: If the door opening angle or width is manually set below the maximum possible, under conditions of continuous traffic the doors must automatically creep to full opening, returning to reduced opening on the next cycle.

Key switch: If there is no separate access to the enclosure, provide a key switch mounted externally for opening and closing the door from outside the enclosure without the transmitter. Provide two keys.

Closers

Hinged and pivot doors:

- Fire-resisting doors: Closers tested and certified for use as components of fire-resisting door assemblies:
 - . Standard: To AS 1905.1.

6.7 ELECTRONIC CONTROL DEVICES

General

Requirement: Electric strikes, magnetic holders, wireless electric door handles, electric locks and/or similar devices to suit door construction and hardware.

Electromagnetic hold-open devices: To AS 1905.1 and AS 1670.1.

Glass doors: Electric strikes or magnetic holders.

Double leaf doors (solid frame): Magnetic holders or wireless electric door handles.

Activation

Activation device: Keypads, card readers or other activation devices located next to entry points.

External: Weatherproof (IP56) hoods or housings for external units.

Mounting height: 900 to 1100 mm from floor level and not less than 500 mm from internal corners.

6.8 KEYING

Keying requirements

Standard: To AS 4145.2 for keying security

Requirement: Provide door hardware and keys, as documented.

Temporary construction keys and cylinders

Requirement: Provide one of the following:

- Loan cylinder, if specified: Install for construction locks and replace at practical completion.
- Construction keyed master key cylinder: Keep up-to-date records of keys issued including recipient's name, company and contact details, date issued and date returned.

Delivery of keys

Great grandmaster, grandmaster and master keys: Arrange for delivery direct to the principal.

For locks keyed to differ and locks keyed alike: Check the quantity against key records, and deliver keys to the contract administrator at practical completion.

Group keying

Keying platform: Refer Assa Abloy schedule.

Key control level: Refer Assa Abloy schedule.

Existing system extension: Obtain the details of existing group or master key systems of the system to be extended.

Extensions to existing system: Existing Rockpool facilities at Morayfield and Carseldine.

Future extensions: Provide master and grandmaster group keying systems capable of accommodating future extensions.

Proprietary keying control security system: Provide for cylinder or pin-tumbler locks that accept a group key (e.g. master key, maison key).

Stamping: Stamp keys and lock cylinders to show the key codes and/or door number as scheduled.

Identification

Labelling: Supply each key with a purpose-made plastic or stamped metal label legibly marked to identify the key, attached to the key by a metal ring.

Key material

Lever locks: Malleable cast iron or mild steel.

Pin tumbler locks: Nickel alloy, not brass.

Number of keys table

Key code	Key type	Minimum number of keys
GGMK	Great grandmaster keys	2
GMK	Grandmaster keys	2
MK	Master keys	2 per code group
KD	Locks keyed to differ	2 per lock
KA	Locks keyed alike:	
	- 2 locks in code group	4
	- 3 to 10 locks in code group	6
	- 11 to 40 locks in code group	10
	- 41 and over locks in code group	1 per 4 locks or part thereof

6.9 DOOR SEALS

Standards

Quality management for manufacture: To ISO 9001.

Acoustic applications minimum standard: To BCA F5.5.

Acoustic applications: Tested to ISO 10140-2 and rated to AS/NZS ISO 717.1.

Fire door assemblies: To AS 1530.4 and in conformance with AS 1905.1.

Smoke door assemblies: NCC DTS: To NCC Spec C3.4.

Smoke door assemblies: Performance based: Tested to AS 1530.7 and leakage in conformance with AS 6905.

Combined fire and smoke door assemblies: To NCC Spec C3.4, AS 1530.4, AS 1905.1 and AS 1530.7.

Doors for buildings in bushfire-prone areas: To AS 3959, AS 1530.4, AS 1530.8.1 and AS 1530.8.2.

Weather and energy sealing applications: To AS/NZS 4420.1 and AS 2047.

Access doors for people with disability: To AS 1428.1.

Aluminium extrusions

Material: Commercial grade alloy 6060 T5.

Finish to visible extrusions: Satin clear anodising, or as documented.

Thickness:

- Perimeter seal extrusions: Minimum 15 µm.
- Threshold plates and threshold plate seals: Minimum 20 µm.

PVC gaskets

Lorient proprietary grade PVC extrusions:

- Food grade with integral antimicrobial additive.
- Service temperature: -5° C to +70° C.

Silicone rubber gaskets

Lorient proprietary flame-retarded silicone rubber extrusions:

- Service temperature: -60° C to + 230° C.

Fasteners

Unexposed applications: Zinc-plated self-drilling/self-tapping fasteners supplied with each product.

External coastal exposure applications: Substitute the standard fasteners supplied with equivalent stainless steel versions.

7 EXECUTION

7.1 INSTALLATION

General

Handing: Before supply, verify on site, the correct handing of hardware items.

Operation: Make sure working parts are accurately fitted to smooth close bearings, without binding or sticking, free from rattle or excessive play, lubricated where appropriate.

Mounting height

Locks and latches: Centreline of the door knob or lever spindle above finished floor: 1000mm

Locks

Cylinders: Fix vertically and with consistent key alignment.

Door stops

Fixing: Fix on the floor, skirting or wall, as appropriate, to prevent the door or door furniture striking the wall or other surface.

Fasteners

Materials: Provide materials compatible with the item being fixed, and of sufficient strength, size and quality to perform their function.

- Concealed fasteners: Provide a corrosion resistant finish to concealed fasteners.
- Exposed fasteners: Match exposed fasteners to the material being fixed.

Security: Locate exposed fasteners to lock furniture on the inside faces of external doors and on the inside faces of internal doors to lockable rooms.

Support: Provide appropriate back support (for example lock stiles, blocking, wall noggings and backing plates) for hardware fasteners.

- Hollow metal sections: Provide backing plates drilled and tapped for screw fixing, or provide rivet nuts with machine thread screws. Do not use self-tapping screws or pop rivets.

Floor springs

General: Form a recess in the floor slab for the floor spring box, securely fix and grout the box in place so that the cover plate is flush with the finished floor.

Hinges

Metal frames: Fix hinges using metal thread screws.

Timber doorsets: Install butt hinges in housings equal in depth to the thickness of the hinge leaf (except for hinges designed for mounting without housing), and fix with countersunk screws.

Door seals

Backset: Consider appropriate back set clearance requirements for hinging, latching furniture and automatic closers.

Installation: To the manufacturer's recommendations for each product.

Door assembly preparations: Mortise, semi-rebate or groove door assemblies to match the dimensions recommended in installation instructions.

7.2 COMPLETION

Adjustment

General: Leave the hardware properly adjusted with working parts in working order, and clean, undamaged, properly adjusted, and lubricated where appropriate.

Automatic door operators: Maintain and adjust the system throughout the defects liability period.

Keys

Contractor's keys: Immediately before practical completion, replace or reset cylinders to which the contractor has had key access during construction to exclude the contractor's keys.

Warranties

Automatic door operators: Provide interlocking warranties from the supplier and installer covering materials and workmanship.

Mechanical Products: 25 Years

- Exception, Yale Mechanical Products: 10 Years.

Form of warranty: Repair or replacement as required.

8 SELECTIONS

8.1 ASSA ABLOY SCHEDULE

General

Refer Assa Abloy schedule for all product selections.

8.2 PRODUCT FINISHES

General

Requirement: All hardware finishes to be Satin Chrome, or like finish depending on the availability and base material of the specified items.

Satin Chrome finishes: Plated using trivalent process.

0457 EXTERNAL SCREENS

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide external screens, as documented.

Performance

Requirement: Conform to the following:

- Plumb, level, straight and true within the building tolerances of the structural system.
- Undamaged and free of surface defects or distortions.
- Fixed or fastened to the building structure.
- Able to resist wind and other actions without vibration or permanent distortion.

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- 0171 General requirements.

1.3 STANDARDS

General

Aluminium framed sunscreens, awnings and shutters:

- Stress analysis of members: To AS/NZS 1664.1 or AS/NZS 1664.2.

Horizontal screen loadings: To AS/NZS 1170.1.

Electrically operated external louvres and blinds:

- Drive motors: To AS/NZS 60335.2.97.

Access for maintenance: To AS 1657.

1.4 INTERPRETATION

Abbreviations

General: For the purposes of this worksection the following abbreviations apply:

- BMS: Building Management System.
- PVC-U: Unplasticised polyvinylchloride.

Definitions

General: For the purposes of this worksection, the following definitions apply:

- Screen: Includes sunscreens, trafficable sunscreens, external louvres and blinds, shutters, awnings and pergolas fixed to building facades or openings; to control sunlight and/or provide privacy, to screen plant and equipment, or to provide an architectural feature. It applies to fixed, adjustable, operable and automatically controlled types.

1.5 SUBMISSIONS

Certification

Sealant compatibility: Submit statements from all parties to the installation that certify the compatibility of sealants with screen components, finishes and all substrates.

Execution detail

Embedded fixings: Submit details of any proposed alternative methods of fixing.

Fire performance

Combustibility: Submit evidence of conformity to PRODUCTS, **FIRE PERFORMANCE**,

Combustibility.

Fire hazard properties: Submit evidence of conformity to PRODUCTS, **FIRE PERFORMANCE**, **Fire hazard properties**.

Operation and maintenance manuals

Requirement: At completion, submit the screen manufacturer's recommendations for operation, care and maintenance.

Prototypes

General: Erect a prototype of each screen assembly, including at least one example of each component in the system, including attachments to the structure, flashing, caulking, sealing and infill materials.

Location and extent: As directed on site.

Samples

General: Submit samples of the following:

- Sections proposed for frame members, battens, accessories, cover panels and trim.
- Joints made, using proposed techniques.
- Colour samples of prefinished production material (e.g. anodised or thermoset powder coated extrusions or sheet, glazing, infill panel material or fabric), each at least 200 x 200 mm, showing the limits of the range of variation in the selected colour, if any, for each component of the screens specified.
- Accessory and hardware items documented descriptively or by performance (i.e. not proprietary items). Include handles, operators, controls, switches, sensors, motors, fixing clips, anchor brackets and attachments, fixings, gaskets and weather seals.

Labelling: Label each sample, giving the brand and product name, manufacturer's code reference, date of manufacture and intended building location.

Shop drawings

General: Submit shop drawings to a scale that best describes the detail, calculations and specifications conveying the following information:

- Layout of the screen assembly (sectional plans, vertical sections, and elevations of each building face where screens are to be installed).
- Full size sections of typical members including mullions, transoms, subheads, sills, subsills, battens, infill panel material or fabric, beads, bearings, linkages, exposed fixings, sealant beads, glazing gaskets, splice plates, trays and cover strips, with notes specifying the proposed materials.
- Lubrication requirements for adjustable or operable screens.
- Method of assembly, including isometric or axonometric and exploded views of typical framing junctions, showing panel to panel joints (for modular systems).
- Method of installation, including the following:
 - . Location and magnitude of reactions to be accommodated by the support structure.
 - . Type and location of fasteners and other attachments to be cast or otherwise built into the building structure.
 - . Erection tolerances.
 - . Accurate locations and full size details of machined slots, keyholes and other penetrations in frame extrusions for lifting and installing the units.
 - . Junctions and trim to adjoining surfaces.
 - . Caulking and flashing.
 - . Locations of visible heads of fasteners.
- Provision for differential vertical or horizontal movements, including the following:
 - . Thermal expansion and contraction.
 - . Frame deflections.
- Details of motor and operating mechanism enclosures.
- Method of draining the assembly, including details showing the following:
 - . Pressure equalised drained joints.
 - . Location, number and size of weepholes.
- Connection points to rainwater or stormwater systems.
- Hardware, fittings and accessories including window cleaning restraints and visible heads of fasteners.

- Infill panel stiffening.
- Location and power requirements of motors, sensors and controls.
- Wiring diagrams of control systems BMS interface details.
- Scale drawings and descriptions of prototype external screens.

Warranties

Requirement: Submit warranties as documented.

1.6 INSPECTION**Notice**

Inspection: Give notice so that inspection may be made of the following:

- Prototypes.

2 PRODUCTS**2.1 GENERAL****Storage and handling**

General: Deliver, unload and store external screens, components and accessories in unbroken manufacturer's packaging.

Marking

Requirement: Before the separate parts of the screens are delivered to the site, provide suitable and sufficient marks or other means for identifying each part, and for showing its correct location and orientation, when installed.

2.2 FIRE PERFORMANCE**Combustibility**

Cladding: Tested to AS 1530.1.

All screens are to be non-combustible to comply with NCC C1.14.

2.3 MATERIALS GENERALLY**Structural steel**

Design and materials: To AS 4100.

Welding: To the AS/NZS 1554 series.

Galvanizing: To AS/NZS 4680.

2.4 METAL FINISHES**Anodising**

Standard: To AS 1231.

Thickness: ≥ 15 microns to 20 microns.

Hot-dip galvanizing

Minimum coating mass/thickness: To AS/NZS 4680.

Powder coating

Application to aluminium and aluminium alloy substrates for architectural applications: To AS 3715 and as appropriate AAMA 2603, AAMA 2604 and AAMA 2605.

Application to metal substrates other than aluminium for architectural applications: To AS 4506.

2.5 FIXED AWNINGS**Fixed metal awnings**

Requirement: Provide a fixed awning comprising solid aluminium cladding panels fixed to the wall adjacent to windows and doors as detailed on drawings.

Expansion joints

Requirement: Allow for expansion and contraction in continuous sections at spacings not exceeding the manufacturer's recommendations, or 6 m, whichever is the lesser.

Fixing: Provide a fixing system appropriate to the panel material that will retain the panel without distortion or dislocation.

2.6 FIXED SCREENS

General

Requirement: Provide fixed screen assemblies able to withstand the permissible-stress-design wind pressure for that location without failure or permanent distortion of members, and without blade flutter.

Expansion joints

Requirement: Allow for expansion and contraction in continuous sections (e.g. continuous battens, interlocking mullions) at spacings not exceeding those recommended by the manufacturer, or 6 m, whichever is the lesser.

Fixed metal battens

Requirement: Metal battens mounted in a metal perimeter frame or subframe, or on carrier frames, installed horizontally or vertically.

Battens: Rolled or extruded metal, or extruded metal battens swaged together with cross bars to form self-supporting panels.

Pergolas

Supports: Support wide horizontal batten assemblies on posts mounted on terraces and balconies to form pergolas. Maintain the integrity of waterproofing membranes when fixing posts or brackets to terraces and balconies.

3 EXECUTION

3.1 FABRICATION

Aluminium fabrication and construction

Standard: To AS/NZS 1664.1 or AS/NZS 1664.2.

Fasteners

Requirement: Provide fasteners of sufficient strength and quality to perform their required function.

Joints

Requirement: Make accurately fitted tight joints so that neither fasteners nor fixing devices create pressure indentations that are visible on exposed faces. Where heads of fasteners are unavoidably visible, finish them to match the adjacent surface.

Protection

Corrosion protection: Provide protection against corrosion that may be caused in metals by products or processes normally employed on a building site or by normal atmospheric or other ambient conditions and by-products including rainwater, drinking and drinking water, airborne salt and airborne pollution.

Durability: Provide materials resistant to exposure to weather and UV radiation so that their colour, surface finish, flexibility and water resistance are maintained.

Temporary measures: Do not use adhesive tape, film or paper, or applied coatings liable to bond to the substrate, when exposed to sunlight or weather, as temporary measures to protect screen components during the course of the works. If temporary measures are used, remove all traces, particularly from contact mating surfaces before joining up.

Operation

Requirement: Provide moving parts which operate freely and smoothly, without vibration, rattling, binding or sticking, and at correct tensions or operating forces. Lubricate if appropriate.

3.2 WELDING

General

Quality: Provide finished welds descaled and free of surface and internal cracks, slag inclusion and porosity. Provide continuous welding unless permanently concealed.

Restrictions: Do not weld as follows:

- On site.
- On finished surfaces.
- Next to a finished surface or glass, unless the adjacent surface is protected from damage.

3.3 EMBEDDED FIXINGS

General

Fixing: Fix screens to the building structure by one of the following methods, and as documented:

- Fasteners cast into the concrete of the building structure. Do not displace reinforcement, when locating embedded items.
- Chemical fixings, expanding bolt sockets.
- Bolting or welding to brackets or structural framing.

Standard for embedment

For concrete: To AS 3600.

For masonry: To AS 3700.

Fixing brackets

Requirement: Provide fasteners and other methods of attachment of the screens to the structure with the following characteristics:

- Three-way adjustment to accommodate fabrication and construction tolerances.
- Provision for building movements while fixing the screens in their correct positions.
- Adequacy for structural design actions.

Protection

Cast-in items: Prevent the entry of concrete slurry into bolt holes, channels, and other openings for the fasteners. Fill the openings using an easily removed water repellent material before casting in.

Placement

Tolerance:

- Maximum deviation from correct position: 13 mm.

Fastener channels embedded parallel or perpendicular to the edge of a concrete structural member:

- Minimum length of embedded anchor: 200 mm.
- Minimum distance from the concrete edge to the nearest part of the anchor: 100 mm.

3.4 INSTALLATION

Installation tolerance

Alignment:

- Maximum deviation of any member from its true alignment (plumb, level, or line of slope): 1:1000, up to a maximum of 10 mm in a continuous run of members in one direction.
- Maximum misalignment between adjoining members: 1 mm.

Position:

- Maximum deviation of any part from its true position: 10 mm

Reference lines and marks

Requirement: Provide on each floor, in agreed locations, accurate perimeter offset reference lines, plumb with corresponding lines on other floors, and height benchmarks.

Cleaning

Requirement: During erection, promptly remove foreign matter from the screens without damage to finishes. Do not use abrasive cleaners or acid.

3.5 COMPLETION

Cleaning

Method: Clean all visible surfaces with soft clean cloths and clean water or approved cleanser, finishing with a clean cloth. Do not use abrasive or alkaline materials.

Warranties

Requirement: Cover materials and workmanship in the terms of the warranty from the manufacturer.

4 SELECTIONS

4.1 PERFORMANCE

External screen performance schedule

Property	Fixed screens	Awnings
P/H values	N/A	N/A
Design wind pressure	To AS/NZS 1170.2	To AS/NZS 1170.2

4.2 EXTERNAL SCREENS

Fixed screen schedule

Note: Refer drawings for screen type designations on table below.

Property	B21-B30, B31-B45, B46-B50, B51-B65, B71-B80	B8, Bike Store, Balustrading, Loading Dock Gate	B7, B9, B10-B15
Frame material	Aluminium	Aluminium	Aluminium
Frame finish	Powder coated	Powder coated	Powder coated
Frame colour	Duratec Zeus Timberland Satin 90Z7315S	Duratec Zeus Timberland Satin 90Z7315S	Duratec Zeus Matt Canvas Cloth 90077327M
Batten material	Aluminium	Aluminium	Aluminium
Batten finish	Powder coated	Powder coated	Powder coated
Batten colour	Duratec Sunshine Gloss 90N2084G	Duratec Zeus Timberland Satin 90Z7315S	Duratec Zeus Matt Canvas Cloth 90077327M

Fixed screen schedule

Property	B1-B6	Pergolas, Trellis	
Frame material	N/A	Aluminium	
Frame finish	N/A	Powder coated	
Frame colour	N/A	Duratec Zeus Timberland Satin 90Z7315S	
Batten material	Aluminium	Aluminium	
Batten finish	Powder coated	Powder coated	
Batten colour	Knotwood Vue Bronze	Knotwood Vue Bronze	

Fixed awning schedule

Property	
Description	Sun / rain hoods to windows and doors
Panel material	Aluminium
Panel finish	Powder coated
Panel colour	Dulux Duratec Zeus Timberland Satin 90Z7315S

0511B LINING

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide internal lining systems, as documented.

Performance

Requirement: Provide lining system with a surface that is:

- Resistant to impacts expected in use.
- Resistant to moisture encountered under expected environmental conditions.
- Free of irregularities.
- A suitable substrate for the nominated final finish.

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- 0171 General requirements.

1.3 INTERPRETATION

Definitions

General: For the purposes of this worksection the definitions given in AS/NZS 4491 and the following apply:

- Fibre cement sheet linings: Treated cellulose fibre in a matrix of cement and sand autoclaved sheet, sealed on one side.

1.4 TOLERANCES

Permitted deviations

Bearing surface of finished framing:

- Gypsum lining: To AS/NZS 2589 clause 4.2.2.
- Other lining: 4 mm from a 1.8 m straightedge.

1.5 SUBMISSIONS

Fire performance

Fire hazard properties: Submit evidence of conformity to PRODUCTS, **FIRE PERFORMANCE**, **Fire hazard properties**.

Warranties

Lining materials: Submit the manufacturer's published product warranties.

2 PRODUCTS

2.1 GENERAL

Storage and handling

Requirement: Dry and undamaged lining stacked in pallets horizontally on a smooth, level surface. Prevent distortion or moisture ingress.

Handling: Do not drag sheets across each other or across other materials. Protect edges, corners and surface from damage.

2.2 FIRE PERFORMANCE

Fire hazard properties

Group number: To AS 5637.1.

2.3 PLASTERBOARD

General

Standard: To AS/NZS 2588.

Location: Refer drawings

Grade: Refer drawings

Thickness (mm): Refer drawings

Edge finish: Recessed to suit flush jointing

2.4 FIBRE CEMENT

General

Standard: To AS/NZS 2908.2.

Wall and ceiling linings: Type B category 2.

Minimum thickness: 6 mm.

Location: Refer drawings

Edge finish: Recessed to suit flush jointing

2.5 ADHESIVES, SEALANTS AND FASTENERS

Adhesives

For wallboards: Gunnable synthetic rubber/resin based mastic contact adhesive formulated for bonding flooring and wallboards to a variety of substrates.

Sealants

Fire-resisting sealant: Non-hardening sealant, compatible with the materials to be sealed and having a fire-resistance rating equal to that of the building element it seals.

Acoustic sealant: Non-hardening sealant compatible with the materials to be sealed.

Fasteners

Steel nails: Hot-dip galvanized.

3 EXECUTION

3.1 CONSTRUCTION GENERALLY

Conditions

Commencement: Do not start lining work until the building or installation area is enclosed and weathertight, and all wet trades have been completed.

Substrates

Requirement: Plumb, level, in true alignment and to the lining manufacturer's recommendations.

Timber, steel framing and battened masonry: To AS/NZS 2589 clause 4.2.

Preparation: Before fixing linings, check and adjust the alignment of substrates or framing, if necessary.

Battens

General: Fix at each crossing with structural framing members, to solid walls or ceiling support.

Provide wall plugs in solid substrates.

Ceiling linings

General: Do not install until the timber roof structure is fully loaded for at least 14 days.

Accessories and trim

General: Provide accessories and trim as necessary to complete the installation.

Adhesives

General: Provide adhesive types appropriate for the purpose, and apply them so they transmit the loads imposed without causing discolouration of the finished surfaces.

Fire-resisting and acoustic rated installations

Sealing: Apply sealant to the manufacturer's recommendations and as follows:

- Around services pipes and penetrations.
- Electrical outlets and recessed lights: Line back and sides of fixture with plasterboard and seal around fixture junction with sealant.

- Around perimeter of lining panels: Provide continuous runs of sealant.

3.2 PLASTERBOARD LINING

Installation

Gypsum plasterboard and fibre reinforced gypsum lining: To AS/NZS 2589.

Level of finish and jointing: To AS/NZS 2589 clause 3.1.

Supports

General: Install timber battens or proprietary cold-formed galvanized steel furring channels as follows:

- Where framing member spacing exceed the recommended spacing.
- Where direct fixing of plasterboard is not possible, due to the arrangement or alignment of the framing or substrate.
- Where the lining is the substrate for tiled finishes.
- If required for penetrations for services, including mechanical grilles and lighting fixtures.
- If required to support fixtures.

Multiple sheet layers

Application: Fire-resisting and acoustic rated walls.

Joints: Fill and flush up all joints and fasteners in each layer and caulk up perimeters and penetrations before installing following layers. Stagger all sheet joints by minimum 200 mm.

Joints

Flush joints: Provide recessed edge sheets and finish flush using perforated paper reinforcing tape.

Butt joints: Make joints over framing members or provide back blocking.

External corner joints: Make joints over metallic-coated steel corner beads.

Dry joints: Provide square edged sheet and finish with a PVC-U joining section.

Control joints: Provide purpose-made metallic-coated control joint beads at not more than 12 m centres in walls and ceilings and to coincide with structural control joints.

Wet areas: Install additional supports, flashings, trim and sealants as required.

Joints in tiled areas: Do not apply a topping coat after bedding perforated paper tape in bedding compound.

3.3 FIBRE CEMENT LINING

Installation

Joints and layout: Run sheets across the framing members. In flush jointed applications, stagger end joints in a brick pattern and locate them on framing members, away from the corners of large openings. Provide supports at edges and joints.

Supports

General: Install timber battens or proprietary cold-formed galvanized steel furring channels as follows:

- Where framing member spacing exceed the recommended spacing.
- Where direct fixing of fibre cement is not possible, due to the arrangement or alignment of the framing or substrate.
- Where the lining is the substrate for tiled finishes.
- If required for penetrations for services, including mechanical grilles and lighting fixtures.
- If required to support fixtures.

Fixing

Timber framed construction: Nail only or combine with adhesive.

Steel framed construction: Screw only or combine with adhesive.

Wall framing: Conform to the following:

- Do not fix to top and bottom plates or noggings.
- In tiled areas: Provide an extra row of noggings immediately above wall-to-floor flashings. Fix sheet at 150 mm centres to each stud and around the perimeter of the sheet.

Masonry wall construction: Conform to the following:

- Direct fixing: Adhesive fix to the masonry except where lining forms a substrate for tiled finish.
- Furring channels: Fix using screw and/or adhesive.

Ceilings: Fix using screw and/or adhesive to ceiling furring members. Do not fix sheets directly to the bottom chords of trusses.

- Ceiling battens: Fix at 600 mm maximum centres.

Wet areas: Do not use adhesive fixing alone.

Multiple sheet layers

Application: Fire-resisting and acoustic rated walls.

Joints: Fill and flush up all joints and fasteners in each layer and caulk up perimeters and penetrations before installing following layers. Stagger all sheet joints by minimum 200 mm.

Joints

Joint width:

- Butt joints: 1 to 2 mm.
- Exposed joints: 10 mm maximum.

Joint backing for exposed joints: Black self-adhesive polyurethane tape.

Flush joints: Provide recessed edge sheets and finish flush using perforated paper reinforcing tape.

External corner joints: Make joints over metallic-coated steel corner beads.

Dry joints: Provide square edged sheet and finish with a PVC-U joining section.

Control joints: Provide control joints to coincide with structural control joints and as follows:

- Walls: ≤ 7.2 m centres.
- Ceilings: To divide into bays not larger than 10.8×7.2 m.
- Soffit linings: To divide into bays not larger than 4.2×4.2 m or 5.6×3.6 m.
- Control joint beads: Purpose-made metallic-coated.
- Support: Provide framing parallel to the joint on each side. Do not fix the lining to abutting building surfaces.

Wet areas: Provide additional supports, flashings, trim and sealants as required.

Joints in tiled areas: Bed perforated paper tape in bedding compound. Do not apply a topping coat.

- Control joints: Not more than 4.2 m centres and space to suit joints required in tiling.
- Internal corners: Reinforce with metallic-coated steel angles. In corners subject to continuous moisture, flash over the angle and under the sheeting with continuous bitumen coated aluminium flashing.

3.4 TRIM AND ACCESSORIES

General

Requirement: Provide trim such as beads, mouldings and stops to make neat junctions between lining components, finishes and adjacent surfaces.

Proprietary items: Provide complete with installation accessories.

Timber and MDF trim: Fix using full length so that trim is secure and without movement. Where nail or screw fixings are used, make sure fastener finishes sufficiently below face of trim so that stopping piece finishes flush with the face.

3.5 COMPLETION

General

Damaged or marked lining and components: Replace.

Cleaning: Clean completed surfaces to remove irregularities and leave panels smooth and clean, to the manufacturer's recommendations. If required, sand with fine paper to remove irregularities and refinish panel surface.

- Debris and unused material: Remove from site.

Warranties

Requirement: At practical completion, submit warranties against defective materials and installation.

0520 PARTITIONS – COMBINED

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide partition systems, as documented.

Performance

Strength and stability: To remain stable, and without rattle and signs of deflection or permanent deformation under normal conditions of use, including the slamming of doors.

Serviceability: To support imposed dead loads, seismic loads, wind loads, including designated eccentric loads and not to deflect in excess of the following, where H is the height of the partition:

- The lesser of H/240 or 30 mm for partitions subjected to wind loads and lined with flexible material.
- The lesser of H/360 or 20 mm for partitions subjected to wind loads and lined with brittle materials.
- H/500 for eccentric loads.

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- 0171 General requirements.

1.3 INTERPRETATION

Definitions

General: For the purposes of this worksection the following definitions apply:

- Partition - glazed: A partition system consisting of a suite of exposed sections forming door and window frames, ceiling channels, sills, glazing and accessories; and generally intended for use in conjunction with framed and lined partition systems.

1.4 TOLERANCES

Framed and lined partitions

Finished framing: To AS/NZS 2589 clause 4.2.2.

1.5 SUBMISSIONS

Certification

Installed partitions: Submit a certificate from an independent testing authority as evidence that the partition system installed conforms to the documented weighted sound reduction index (R_w).

Toughened glass: For each batch of glass, submit certification from the manufacturer as evidence of heat soaking.

Fire performance

Fire hazard properties: Submit evidence of conformity to PRODUCTS, **FIRE PERFORMANCE, Fire hazard properties.**

Fire-resistance level: Submit evidence of conformity to PRODUCTS, **FIRE PERFORMANCE, Fire-resistance of building elements.**

Operation and maintenance manuals

Requirement: Submit on completion.

Products and materials

Manufacturer's data: Submit manufacturer's standard product literature for each system type.

Safety glazing materials: Submit evidence of conformity to AS/NZS 2208 Appendix A.

Type tests: Submit results as follows:

- Impact resistance.
- Pressure resistance.
- Surface indentation resistance.

- Weighted sound reduction index (R_w): To AS/NZS ISO 717.1.

Shop drawings

General: Submit shop drawings to a scale that best describes the detail, showing the following:

- Plans, sections and elevations of the installation.
- Full size sections of members and details of partition intersections and terminations.
- Dimensions, clearances, tolerances, and provision for expansion.
- Junctions and trim to adjoining surfaces.
- Doors (note if supplied by others) and frames, including door seals, and door stops coordinated with documented door thicknesses.
- Coordination with documented door hardware.
- Glass types, thicknesses and glazing methods.
- Details of safety markings that make glass visible.
- Glass processing required for fixing hardware to frameless glass doors.
- Methods of fixing partitions.
- Details of acoustic treatments to joints.
- Method of providing reticulation of services, access to services, and service outlets.
- Performance data of components and assemblies.
- Specification of materials and finishes.

Subcontractors

General: Submit names and contact details of proposed suppliers and installers.

Substrate acceptance: Submit evidence of the installer's acceptance of the wall, floor and ceiling substrate before starting installation.

Warranties

General: Submit warranties on completion, as documented.

2 PRODUCTS

2.1 GENERAL**Storage and handling**

Glass and glazing materials: Store in a clean, dry area unaffected by weather and to the manufacturer's recommendations. Protect from building materials and loose debris such as wet plaster, mortar, paint and welding spatter.

Handling glass: To the manufacturer's recommendations and without damage.

Sealants

General: Sealant types appropriate for the partition's documented acoustic rating and fire-resistance levels, and compatible with partition materials and building substrate.

2.2 FIRE PERFORMANCE**Fire hazard properties**

Group number: To NCC Spec C1.10 and AS 5637.1.

Fire-resistance of building elements

Fire-resistance level: Tested to AS 1530.4.

2.3 FRAMED AND LINED PARTITIONS**Light steel framing**

Requirement: Proprietary framing system of metallic-coated folded steel strip lipped studs and channel section top and bottom tracks and noggings.

Sections and members: To AS/NZS 4600.

Plasterboard

Standard: To AS/NZS 2588.

Fibre cement

Standard: To AS/NZS 2908.2.

Wall and ceiling linings: Type B category 2.

Minimum thickness: 4.5 mm.

Accessories

General: Accessories necessary to complete the installation including the following:

- Corner beads.
- Stop beads.
- Shadowlines.
- Control joints.
- Sheet metal and MDF partition end caps.

Adhesives

General: Adhesives of types appropriate to their purpose and substrates, applied to transmit the loads imposed without causing discolouration of finished surfaces.

2.4 GLAZED PARTITIONS

General

Requirement: Proprietary non-load bearing glazed partition suite comprising main frames, door frames, sills, ceiling channels and other extrusions and accessories to form a complete and finished system, as documented.

Frames

Aluminium extrusions: To AS/NZS 1866.

2.5 GLASS

Standards

Glass type and thickness: To AS 1288, if no glass type or thickness is nominated.

Materials and installation: To AS 1288.

Quality requirements for cut-to-size and processed glass: To AS/NZS 4667.

Terminology for work on glass: To AS/NZS 4668.

Performance

Glass: Free from defects which detract from appearance or interfere with performance under normal conditions of use.

Heat soaking

Requirement: All toughened and heat strengthened glass products.

Standard: To EN 14179-1.

Safety glazing materials

Standard: To AS/NZS 2208.

Type: Grade A to AS 1288.

Certification: Required.

- Certification provider: An organisation accredited by the Joint Accreditation System of Australia and New Zealand (JAS-ANZ).

Glass identification

Safety glazing materials: Identify each piece or panel, to AS 1288.

Heat soaked glass: Marked to EN 14179-1 or certified by the manufacturer to AS 1288 clause 3.8.2.

Unacceptable blemishes in heat-treated flat glass (including tinted and coated glass)

Standard: To AS/NZS 4667.

2.6 GLAZING MATERIALS

General

Requirement: Glazing materials including putty, glazing compounds, sealants, gaskets, glazing tapes, spacing strips, spacing tapes, spacers, setting blocks, shims and compression wedges appropriate for the conditions of application and required performance.

Glazing tapes

Standards: To AAMA 800, Products coded 804.3, 806.3 or 807.3, as applicable.

Jointing materials

General: Jointing and pointing materials which are compatible with each other and with the contact surfaces and non-staining to finished surfaces. Do not provide bituminous materials on absorbent surfaces.

Primer

Compatibility: Apply the manufacturer's recommended primer to the surfaces in contact with sealant materials.

Extruded gaskets and seals

General: Provide seals, as required.

Materials: Non-cellular (solid) elastopressive seals as follows:

- Rubber products (neoprene, ethylene propylene diene monomer (EPDM) or silicone rubber): To BS 4255-1.
- Flexible polyvinyl chloride (PVC): To BS 2571, E type compounds, colour fastness grade B.

2.7 ALUMINIUM FRAME FINISHES**Powder coatings**

Colour: Duratec Zeus Timberland

2.8 PLENUM BAFFLES**General**

Requirement: Plenum baffles that maintain the documented fire-resistance level and acoustic performance of the partitions.

Types

Refer to acoustic report for details to maintain required acoustic rating.

Fire resistant partitions to continue to u/s slab soffit or to u/s of roof sheeting to comply with NCC.

3 EXECUTION**3.1 GENERAL****Preparation**

Substrate: Prepare the substrate to receive the partitions.

3.2 FRAMED AND LINED PARTITIONS**Partition erection**

General: Install partitions plumb, level, on their correct alignment, and firmly fixed.

Building movements:

- Provide clearances or deflection heads so that partitions are not damaged by structural building movements including long-term slab deflection.
- If fire-resistance levels or acoustic ratings are required, provide a resilient foam or mastic seal with properties equal to those required for the partition.

Suspended slabs: Provide deflection heads.

Structural floor control joints

General: Do not run or fix partitions framing across control joints.

Acoustic rated partitions

General: Isolate the frames from floors, ceilings and vertical abutments with beads of non-hardening sealant compatible with the materials to be sealed. Refer to acoustic report.

Trim

General: Provide trim such as beads, mouldings, stops and skirtings to make neat junctions between lining components, finishes and adjacent surfaces.

Sealing fire-resisting and acoustic rated partitions

General: Apply sealant to the manufacturer's recommendations and as follows:

- Around services pipes and penetrations.
- Electrical outlets and recessed lights: Line back and sides of fixture with plasterboard and seal around fixture junction with sealant.

- Around perimeter of lining panels: Provide continuous runs of sealant.
Refer acoustic report for details.

3.3 LIGHT STEEL FRAMES IN FRAMED AND LINED PARTITIONS

Tracks

General: Conform to the following:

- Fix bottom tracks to floor substrate.
- Fix top wall tracks to suspended ceiling grid or as documented.
- Fix deflection head tracks to the structural soffit above.

Fixing to masonry: Provide masonry anchors of expansion or chemical grout type. Do not use explosive-driven fastenings.

Fixing to metal deck roofs: Provide for vertical uplift movement, as documented.

Fixing to suspended ceilings: Provide intermediate support and bracing at maximum 1500 mm centres and at all load concentrations, doorways and jamb studs.

Seismic movement: If required, do not butt wall tracks or deflection heads against each other. Provide 10 mm clearance between tracks, or as documented.

Track fixing: Fix top and bottom tracks at 600 mm maximum centres generally, and 100 mm from ends. Splice plates at ends to maintain continuity and alignment.

Stud framing

General: Provide studs in single lengths without splices. Rotate intermediate studs into tracks for friction fixing. Screw fix jamb studs, corner studs and wall intersection studs to tracks.

Fixing: Fix noggings at 1350 mm maximum centres vertically and as required for skirtings and wet area lining. Make sure that faces of noggings and studs are accurately aligned.

Lintels: Install a stiffened top plate lintel for spans of 1800 mm or greater.

Curved partitions

Stud spacing: Conform to the sheeting manufacturer's recommendations for curved partitions.

Jambs

General: Install boxed double studs at jambs and heads to all openings.

Additional frame support

General: Provide frame support for fixing the following:

- Floor and wall mounted fixed joinery units, furniture and equipment.
- All wet area fittings and fixtures.
- All grabrails and handrails.

Stud stiffening: Provide stud stiffening to support wall-hung joinery units and equipment with:

- Full height close fitting timber inserts.
- Boxed steel lipped studs.

Stud service holes

General: Use factory pre-cut flared holes, or provide site cut holes punched or drilled on the centreline of the member and fit proprietary plastic bushes or grommets. Splice additional stiffening to studs if site cut service holes exceed 1/3 the depth of the member.

Metal separation

General: Isolate non-ferrous service pipes and accessories from the metal framing.

Earthing

Permanent earthing: Required.

Temporary earthing: Provide temporary earthing during erection until the permanent earthing is installed.

Cavity walls

General: If bridging is nominated, provide to the manufacturer's recommendations.

Staggered stud framed walls

General: Provide studs staggered at 300 mm centres set in oversized top and bottom plates so that each face has stud fixings at 600 mm centres.

3.4 LIGHT TIMBER FRAMES IN FRAMED AND LINED PARTITIONS

Moisture content

General: Do not install framing that does not meet the following values tested to AS/NZS 1080.1:

- Air conditioned buildings: 8 to 10%.
- Intermittently heated buildings: 10 to 12.5%.
- Unheated buildings: 12 to 15%.

Framing

General: Construct wall frames to AS 1684.4 Section 6, as appropriate for internal walls.

Double faced walls: Provide gauged timbers in studs, noggings and plates.

3.5 PLASTERBOARD LINING IN FRAMED AND LINED PARTITIONS

Installation

Gypsum plasterboard and fibre reinforced gypsum lining: To AS/NZS 2589.

Finish level: Level 4 for exposed areas, Level 3 for concealed areas.

Multiple sheet layers

Application: Fire-resisting and acoustic rated partitions.

Joints:

- Fill and flush up all joints and fixings in each layer and caulk up perimeters and penetrations before installing following layers.
- Stagger all sheet joints: Minimum 200 mm.

Joints and joint treatment

General: Install joint accessories as documented, in conformance with manufacturer's recommendations. Install plumb, level and true to line.

Flush joints: Use joint reinforcing tape bedded in joint compound with recessed edge sheets and finish flush.

Butt joints: Make joints over framing members or provide back blocking.

External corner joints: Bed purpose fabricated perforated metallic-coated steel corner beads in joint compound.

Ceiling junctions: Install purpose fabricated perforated metallic-coated steel shadowline to top of partition.

Sheet metal partition end caps: Provide purpose fabricated perforated metallic-coated steel end caps, sized for partition thickness and bedded in joint compound.

MDF end caps: Provide recessed edge sheets and finish flush using joint reinforcing tape and joint compound.

Dry joints: Use square edged sheet and finish with a PVC-U joining section.

Control joints: Provide purpose-made perforated metallic-coated control joint beads at not more than 12 m centres in partitions and to coincide with structural control joints. Bed in joint compound.

Wet areas: Provide additional supports, flashings, trim and sealants as required.

Joints in tiled areas: Bed reinforcing tape in joint compound. Do not apply a topping coat.

3.6 FIBRE CEMENT LINING IN FRAMED AND LINED PARTITIONS

Installation

General: Install as follows:

- Run sheets across the framing members.
- In flush jointed applications, stagger end joints in a brick pattern and locate joints on framing members, away from the corners of large openings.
- Provide supports at edges and joints.
- Do not fix to top and bottom plates or noggings.

Timber framing: Nail only or combined with adhesive.

Steel framing: Screw only or combined with adhesive.

Tiled and wet areas: Provide an extra row of noggings immediately above wall-to-floor flashings. Fix sheet at 150 mm centres to each stud and around the perimeter of the sheet. Do not use adhesive fixing alone.

Multiple sheet layers

Application: Fire-resisting and acoustic rated partitions.

Joints:

- Fill and flush up all joints and fixings in each layer and caulk up perimeters and penetrations before installing following layers.
- Stagger all sheet joints: Minimum 200 mm.

Joints and joint treatment

General: Install joint accessories as documented, in conformance with manufacturer's recommendations. Install plumb, level and true to line.

Flush joints: Use joint reinforcing tape bedded in joint compound with recessed edge sheets and finish flush.

External corner joints: Bed purpose fabricated perforated metallic corner beads in joint compound.

Ceiling junctions: Install purpose fabricated perforated metallic-coated steel shadowline to top of partition.

Sheet metal partition end caps: Provide purpose fabricated perforated metallic-coated steel end caps, sized for partition thickness and bedded in joint compound.

MDF end caps: Provide recessed edge sheets and finish flush using joint reinforcing tape and joint compound.

Dry joints: Use square edged sheet and finish with a PVC-U joining section.

Control joints: Provide control joints to coincide with structural control joints and as follows:

- Walls: ≤ 7.2 m centres.
- Control joint beads: Purpose-made metallic-coated.
- Support: Provide framing parallel to the joint on each side. Do not fix the lining to abutting building surfaces.

Wet areas: Provide additional supports, flashings, trim and sealants as required.

Joints in tiled areas: Bed reinforcing tape in joint compound. Do not apply a topping coat.

- Control joints: At maximum 4.2 m centres and spaced to suit joints required in tiling.
- Internal corners: Reinforce with metallic-coated steel angles. In corners subject to continuous moisture, flash over the angle and under the sheeting with continuous bitumen coated aluminium flashing.

3.7 GLAZED PARTITION SYSTEMS

General

Requirement: Conform to manufacturer's recommendations and assembly details.

Frame erection

Frames: Install main frames, sills, ceiling channels, door and window frames and other framing members as follows:

- Plumb, level, square, straight and true.
- Fixed or anchored to the building structure.
- Isolated from any building loads, including loads caused by structural deflection or shortening.
- Joints tightly fitted and neatly aligned.
- Door and window openings accurately sized.
- Use concealed fixings.

Sealant

Acoustic sealant: If documented or if required to maintain rated acoustic performance, bed sill and ceiling channels in acoustic sealant.

Glass processing

Processing: Perform required processes on glass, including cutting, obscuring, silvering and bending. Form necessary holes, including for fixings, hardware, equipment, access openings and speaking holes. Process exposed glass edges to a finish not inferior to ground arised.

Framed glazing

Assembly: Provide proprietary glazing beads and resilient (PVC, butyl or similar) glazing tapes, gaskets and inserts, to hold the glass firmly without distortion and to withstand the documented loadings.

Frameless glazing

Assembly: Join the vertical edges of adjacent glass panels with a clear structural silicone jointing compound.

Support: For frameless installations not fixed directly to the building structure, provide adequate connection of the top and bottom glazing channels or bead to resist lateral loads.

3.8 PLENUM BAFFLES**Baffles**

General: Install plenum baffles tightly butted to building structure, service ducts, pipes and conduits and to the top of the partition or to the top of the suspended ceiling directly above the line of the partition. Seal joints, penetrations and intersections and maintain the required performance.

Fire-resisting partitions

General: If a suspended ceiling of equivalent fire-resistance is not provided, either extend the partitions to the underside of the structural soffit, or provide plenum baffles of equivalent fire-resistance level.

Acoustic rated partitions

Refer to acoustic report for details to maintain required acoustic rating.

3.9 COMPLETION**Cleaning**

General: Remove protective coverings, replace damaged glass and leave the work clean, polished, free from defects, and in good condition.

Rectification

General: Correct any defects to joints, remove any excess joint compound, and leave the partition installation complete, clean and ready for the application of finishes.

Warranties

Requirement: Warrant against defective materials and installation.

Warranty terms: Repair or replacement as required.

Minimum period: As offered by the manufacturer.

0531B SUSPENDED CEILINGS – COMBINED
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1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide suspended ceilings, as documented.

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- 0171 General requirements.

1.3 STANDARDS

General

Suspended ceilings: To AS/NZS 2785.

1.4 INTERPRETATION

Definitions

General: For the purposes of this worksection the definitions given in AS/NZS 2785 and the following apply:

- Ceiling unit: Tile, panel, plank, strip or open grid supported within a ceiling suspended system.

1.5 TOLERANCES

Suspension system

Flatness, twist, winding and bow: 1.5 mm deviation from a 1.5 m straightedge placed in any position.

Sheeted or flush ceiling system

Suspension system bearing surface for flush lined ceiling: To AS/NZS 2589 Table 4.2.2.

Deflection: To AS/NZS 2785 Table 2.4.5.

1.6 SUBMISSIONS

Fire performance

Fire hazard properties: Submit evidence of conformity to PRODUCTS, **FIRE PERFORMANCE, Fire hazard properties.**

Fire-resistance level: Submit evidence of conformity to PRODUCTS, **FIRE PERFORMANCE, Fire-resistance of building elements.**

Products and materials

Type tests: Submit results as follows:

- Weighted suspended ceiling normalized level difference: To AS/NZS ISO 717.1.
- Weighted sound absorption coefficient: To AS ISO 11654, as tested to AS ISO 354.

Shop drawings

Set-out drawings: Submit proposed set-out, indicating cut ceiling units if any, before installation.

Coordinate with plenum services layouts, building structure and other factors affecting the layout.

2 PRODUCTS

2.1 GENERAL

Storage and handling

Requirement: Store suspended ceiling system and components in a dry and secure storage area, unaffected by weather.

2.2 FIRE PERFORMANCE

Fire hazard properties

Group number: To NCC Spec C1.10 and AS 5637.1.

Fire-resistance of building elements

Fire-resistance level: Tested to AS 1530.4.

2.3 SUSPENSION SYSTEM

Proprietary suspension system

General: As documented.

Protective coatings for steel components: To AS/NZS 2785 Appendix F.

2.4 CEILING UNITS

General

Ceiling units: As documented.

2.5 LINING

Plasterboard

Standard: To AS/NZS 2588.

Sealants

Fire-resisting sealant: Non-hardening sealant compatible with the ceiling materials and to the documented fire-resistance level.

Acoustic sealant: Non-hardening sealant compatible with the ceiling materials. Refer to acoustic report.

3 EXECUTION

3.1 GENERAL

Working environment

General: Do not start work before the building is enclosed, wet work is complete and dry, and all work above the ceiling, including services, is complete.

Protection

General: Protect existing work from damage during the installation.

Partitions

General: If partitions are attached to the underside of the ceiling systems, include the partition mass in the seismic mass of the ceiling.

Stability

General: Install the ceilings level and fix to prevent looseness or rattling of ceiling components under normal conditions.

Structure-borne sound

General: Provide a ceiling system which does not amplify structure-borne sound. Provide suitable proprietary products or systems for reducing contact vibrations between structure and ceiling.

Control of movement

Abutments: Install the ceiling to allow for differential movement at abutting surfaces.

Alignment: Align ceiling control joints with structural control joints. Do not bridge structural control joints.

Curtain recesses

General: As detailed. Provide curtain track support.

3.2 SUSPENSION SYSTEM

Ceiling grid

Set-out: Align ceiling unit joints and centrelines of visible suspension members with documented grid lines. If not documented, set out with equal margins.

Suspension system

Support members: Install support members as follows:

- Space as required by the loads on the system and the type of ceiling.
- Allow for the installation of services and accessories, including ductwork, light fittings and diffusers.
- Provide additional back support or suspension members for the fixing of services and accessories to prevent distortion, overloading or excessive vertical deflection.

- Allow for access for maintenance of services.

Failure: Provide a ceiling system where failure of any one suspension point does not cause a progressive failure of the ceiling.

Height adjustment: Provide height adjustment with a length adjustment device at each suspension point, permitting length variation of at least 50 mm.

Grid members: If required, notch grid members at the junction with the perimeter trim to make sure the ceiling units lay flat on the perimeter trim.

Restriction: Do not attach the suspension system to the lip or flange of purlins.

Services

Support: Conform to the following:

- If the service has not been designed to accept the ceiling load, do not fix suspension members to services (e.g. ductwork).
- If services obstruct the ceiling supports, provide bridging and suspension on each side of the services.
- Do not support services terminals on ceiling units.

Bracing

General: Provide bracing to prevent lateral movement and to resist the imposed horizontal seismic force.

Bulkheads

General: Integrate bulkheads with the ceiling structure and brace to prevent lateral movement. If the ceiling is terminated at a bulkhead, provide for seismic requirements.

External suspended soffits

General: Support external suspended soffits on rigid members capable of carrying the loads from imposed actions. Install members to minimise any eccentricity, and carry the upward and downward loads from wind actions through to the supporting structure.

Fasteners

General: Provide concealed fasteners. If material supporting hangers is less than 3 mm thick, do not use screw fasteners.

3.3 CEILING UNITS

Installation

Fitting: Fit ceiling units accurately and neatly, without distortion, and free from air leakage and staining.

Lock clips: If ceiling units are exposed to loads from wind actions or if required for security, insert lock clips at the junction of carrier rails and units.

Pattern and texture: Set out patterned or heavily textured materials with a consistent direction of pattern or texture, or as documented.

Service penetrations

General: Provide openings for all services elements, including light fittings, ventilation outlets, detectors, sprinklers and loudspeakers. If services pass through ceiling grid members, provide additional grid members and support or relocate service.

Cut ceiling unit edges

General: Conceal, or finish to match prefinished edges, including at openings for services elements.

3.4 PLASTERBOARD LINING

Installation

Gypsum plasterboard and fibre reinforced gypsum plaster: To AS/NZS 2589.

Suspended flush ceilings: Fix using screws or screws and adhesive to ceiling members or support frame.

Multiple sheet layers

Application: Fire-resisting and acoustic rated ceilings.

Joints: Fill and flush up all joints and fixings in each layer and caulk up perimeters and penetrations before installing following layers. Stagger all sheet joints by minimum 200 mm.

Joints

Flush joints: Provide recessed edge sheets and finish flush using perforated paper reinforcing tape.

Butt joints: Make joints over framing members or otherwise provide back blocking.

External corner joints: Make joints over metallic-coated steel corner beads.

Control joints: Align lining control joints with structural control joints and as follows:

- Ceilings: At maximum 12 m centres.
- Control joint beads: Purpose-made metallic-coated.
- Location: If possible, position joints to intersect light fixtures, vents or air diffusers.

Wet areas: Install additional supports, flashings, trim and sealants, as required.

3.5 ACCESS PANELS

Finish

General: Match the access panels to the ceiling in appearance and performance.

Identification

General: Provide each access panel with an identification mark.

Non-demountable ceilings

General: Provide access panels supported and anchored to permit ready removal and refixing.

Reinforcement

General: Reinforce the back of the access panel to prevent warping and facilitate handling.

3.6 SMOKE RESERVOIRS

General

As detailed to comply with NCC.

3.7 TRIM

General

Trim: Provide trim at junctions with other building elements and surfaces, including walls, beams and penetrations, consistent with the materials and finishes of the ceiling system.

Accessories

General: Provide accessories as part of the proprietary ceiling system necessary to complete the installation.

Plasterboard cornices

Fixing: Mitre at corners and adhesive fix with cornice cement. Pin in place at cornice edges until adhesive sets, remove pins and fill holes.

Fire-resisting walls

Requirement: Seal to soffit with sealant with an equivalent fire-resistance level before fixing decorative cornices, if any.

3.8 COMPLETION

Spares

General: Provide spare matching ceiling components, as follows, and store the spare materials on site where directed:

- Supporting system: One spare supporting member (hanger or framework member) for every 100 members or part thereof of the same type installed in the ceiling.
- Ceiling units: One spare unit for every 50 units or part thereof installed in the ceiling.
- Accessories: One spare of each type for every 50 units or part thereof installed in the ceiling.

4 SELECTIONS

4.1 LINING

Sheet lining schedule

Property		
Location	Typical	Kitchen
Material	Plasterboard	Plasterboard
Thickness (mm)	13mm	13mm

Property		
Configuration	Single layer	Single layer
Plasterboard: Grade	Varies - refer drawings	Moisture resistant
Plasterboard: Level of finish to AS/NZS 2589	Level 4	Level 5
Plasterboard cornice: Size	Varies – refer drawings	90mm
Plasterboard cornice: Profile	Varies – refer drawings	Scotia

0551B JOINERY

1 GENERAL**1.1 RESPONSIBILITIES****General**

Requirement: Provide joinery, as documented.

1.2 CROSS REFERENCES**General**

Requirement: Conform to the following:

- 0171 General requirements.

1.3 TOLERANCES**General**

Requirement: Fabricate and install joinery items to substrates undamaged, plumb, level, straight and free of distortion.

Tolerances table

Property	Tolerance
Plumb and level	1:800
Offsets in flush adjoining surfaces	0.5 mm
Offsets in revealed adjoining surfaces	2 mm
Alignment of adjoining doors	0.5 mm
Difference in scribe thickness for joinery items centred between walls	2 mm
Doors centred in openings	0
Joints in finished surfaces	0

1.4 SUBMISSIONS**Operation and maintenance manuals**

General: Submit manufacturer's published recommendations for service use.

Products and materials

Manufacturer's data: Submit manufacturer's product data.

Proprietary items: Submit the manufacturer's standard drawings and details showing:

- Methods of construction.
- Assembly and fixing, with dimensions and tolerances.

Shop drawings

General: Submit shop drawings to a scale that best describes the detail, showing the following:

- Overall dimensions.
- Materials, thicknesses and finishes of elements including doors, divisions, shelves and benches.
- Type of construction including mitre joints and junctions of members.
- Hardware type and location.
- Temporary bracing, if required.
- Procedures for shop and site assembly and fixing.
- Locations of benchtop joints.
- Stone benchtop layout including joint arrangement and penetrations.
- Locations of sanitary fixtures, stoves, ovens, sinks, and other items to be installed in the units.
- Relationship of fixture to adjacent building elements.
- Details of fabrication involving other trades or components.

- Proposals for the break-up of large items as required for delivery to the site.
- Proposed method of joining the modules of large items.

Timing: Before fabrication.

2 PRODUCTS

2.1 DELIVERY AND STORAGE

General

Requirement: Deliver joinery units to site in unbroken wrapping or containers and store so that its moisture content is not adversely affected. Do not store in areas of wet plaster. Store in an adequately ventilated space away from heat and direct sunlight. Keep storage time to a minimum by delivering items only when required for installation.

2.2 JOINERY MATERIALS AND COMPONENTS

Visible work

Clear finished timber and veneer: Make sure all visible surfaces are free of branding, crayon or chalk marks and of blemishes caused by handling.

Joinery timber

Hardwood for trim: To AS 2796.1.

Hardwood for furniture: To AS 2796.3.

Seasoned cypress pine: To AS 1810.

Softwood for trim: To AS 4785.1.

Softwood for furniture: To AS 4785.3.

Finished sizes of milled timbers: Not less than the documented dimensions unless qualified by a term such as nominal, out of or ex to which industry standards for finished sizes apply.

Plywood

Interior use generally: To AS/NZS 2270.

Interior use, exposed to moisture: To AS/NZS 2271.

Visible surface with a clear finish: Veneer quality A.

Other visible surfaces: Veneer quality B.

Wet process fibreboard (including hardboard)

Standard: To AS/NZS 1859.4.

Particleboard

Standard: To AS/NZS 1859.1.

Melamine overlaid particleboard: Particleboard overlaid on both sides with low pressure melamine.

Dry process fibreboard (including medium density fibreboard)

Standard: To AS/NZS 1859.2.

Melamine overlaid medium density fibreboard: Medium density fibreboard overlaid on both sides with low pressure melamine.

Decorative overlaid wood panels

Standard: To AS/NZS 1859.3.

High-pressure decorative laminate (HPDL) sheets

Standard: To AS/NZS 2924.1.

Classification: VGF

Minimum thickness: Conform to the following:

- For horizontal surfaces fixed to a continuous substrate: 1.2 mm.
- For vertical surfaces fixed to a continuous substrate: 0.8 mm.
- For post formed laminate fixed to a continuous substrate: 0.8 mm.
- For vertical surfaces fixed intermittently (e.g. to studs): 3.0 mm.
- For edge strips: 0.4 mm.

Stone facings

General: Provide stone or engineered stone slabs within the visual range of the approved samples. Repair mud veins or lines of separation that are integral to the selected pattern with resin fillers and back lining.

Splashbacks

Glass: Toughened safety glass to AS/NZS 2208.

Glass type: Printed- refer Interior Designer

Stainless steel: Type 304, No. 4 finish.

2.3 VENEERS**Timber veneer**

Veneer quality: To AS/NZS 2270.

Grades (minimum requirement):

- Select grade, veneer quality A, for visible surfaces to have clear finish or to have no coated finish.
- General purpose grade, veneer quality B, for other visible surfaces.

Requirement: Provide veneers slip matched and flitch batched and falling within the visual range of the approved samples.

Veneered item: Panels to framed doors

Veneer timber species: To match timber framing to doors

2.4 JOINERY ASSEMBLIES**General**

Standard: To AS 4386.

Plinths

Material: Select from the following:

- Exterior general purpose plywood.
- High moisture resistant particleboard.
- High moisture resistant medium density fibreboard.

Thickness: 16 mm.

Fabrication: Form up with front and back members and full height cross members at not more than 900 mm centres.

Fasteners: Conceal with finish.

Installation: Scribe to floor and secure to wall to provide level platform for carcasses.

Carcasses

Material: Select from the following:

- Overlaid high moisture resistant particleboard.
- Overlaid high moisture resistant medium density fibreboard.

Thickness: 16 mm.

Joints: Select from the following:

- Proprietary mechanical connections.
- Dowels and glue.
- Screws and glue.
- Proprietary joining plates and glue.

Adjustable shelves: Support on proprietary pins in holes bored at equal centres vertically.

- Spacing: 32 mm.

Fasteners: Conceal with finish.

Installation: Secure to walls at not more than 600 mm centres.

Drawer fronts and doors

Material: Select from the following:

- Melamine overlaid high moisture resistant particleboard.
- Melamine overlaid high moisture resistant medium density fibreboard.

Thickness: 16 mm.

Door size: Not exceeding 1.5 m² on face, with 2400 mm maximum height and 900 mm maximum width.

Drawer fronts: Rout for drawer bottoms.

Drawer backs and sides

Material: PVC film wrapped particleboard.

Thickness: 12 mm.

Installation: Mitre corners leaving outer skin of foil intact, finish with butt joints, glue to form carcass and screw to drawer front. Rout for drawer bottoms.

Note: Proprietary metal drawer sides of suitable depth integrated with drawer slides may be used as an alternative.

Drawer bottoms

Material: PVC film laminated hardboard.

Thickness: 3 mm.

Drawer and door hardware

Hinge types: Concealed metal hinges with the following features:

- Nickel plated.
- Adjustable for height, side and depth location of door.
- Integrated soft and self-closing action.
- Hold open function.

Piano hinges: Chrome plated steel, extending full height of doors.

Slides: Metal runners and plastic rollers with the following features:

- 30 kg loading capacity.
- Integrated soft and self-closing action.
- Closure retention.
- White thermoset powder coating or nickel plated.

2.5 WORKING SURFACES

Laminated benchtops

Exposed edges: Extend laminate over shaped nosing, finishing more than 50 mm back on underside. Splay outside corners at 45°.

Balance underside: Extend laminate to the undersides of benchtops.

Installation: Scribe to walls. Fix to carcass at least twice per 600 mm length of benchtop.

Joint sealing: Fill joint with sealant matching finish and clamp with proprietary mechanical connectors.

Stone benchtops

Material: Refer interior finishes schedule

Balance underside: Laminate undersides of benchtops.

2.6 OTHER MATERIALS

Tactile ground surface indicators

Tactile ground surface indicators to stairs: To AS/NZS 1428.4.1.

3 EXECUTION

3.1 JOINERY

General

Joints: Provide materials in single lengths whenever possible. If joints are necessary, make them over supports.

Framing: Frame and trim where necessary for openings, including those required by other trades.

Concealed surfaces: Prime surfaces concealed by substrates.

Deficiencies: Examine joinery units for completeness and remedy deficiencies.

Substrate: Damp clean and vacuum substrate surfaces that will be permanently concealed.

Acclimatisation

General: Acclimatise the joinery items by stacking in the in-service conditions with air circulation to all surfaces after the following are complete:

- Air conditioning operational.
- Lighting operational.
- Site drainage and stormwater works are complete.
- Space fully enclosed and secure.
- Wet work complete and dry.

Accessories and trim

General: Provide accessories and trim necessary to complete the installation.

Fasteners

Visibility: Do not provide visible fasteners except in the following locations:

- Inside cupboards and drawer units.
- Inside open units, in which case provide proprietary caps to conceal fixings.

Visible fasteners: Where fasteners are unavoidable on visible joinery faces, sink the heads below the surface and fill the sinking flush with a material compatible with the surface finish. In surfaces which are to have clear or tinted finish, provide matching wood plugs showing face (not end) grain. In surfaces which are to have melamine finish, provide proprietary screws and caps finished to match.

Fix joinery units to substrates as follows:

- Floor mounted units: 600 mm centres maximum.
- Wall mounted units: To each nogging and/or stud stiffener.

Fasteners: Screws with washers into timber or steel framing, or masonry anchors.

Adhesives

General: Provide adhesives to transmit the loads imposed and for the rigidity of the assembly, without causing discolouration of finished surfaces.

Finishing

Junctions with structure: Scribe, plinths, benchtops, splashbacks, ends of cupboards, kickboards and returns to follow the line of structure.

Joints: Scribe internal and mitre external joints.

Edge strips: Finish exposed edges of sheets with edge strips which match sheet faces.

Matching: For surfaces which are to have clear or tinted finish, arrange adjacent pieces to match the grain and colour.

Hygiene requirements: To all food handling areas and voids at the backs of units in all areas, seal all carcass and junctions wall/floor, and cable and pipe entries with silicone beads for vermin proofing. Apply water resistant sealants around all plumbing fixtures and make sure sealants are fit for purpose.

Benchtops

Installation: Fix to carcass at least twice per 600 mm length of benchtop.

Joint sealing: Fill joints with sealant matching the finish colour and clamp with proprietary mechanical connectors.

Edge sealing: Seal to walls and carcasses with a sealant, which matches the finish colour.

Glass splashbacks

Adhesive: Fix with non-acidic silicone adhesive. Apply at the rate recommended by the manufacturer.

Installation: Clean the back of the glass panel and apply walnuts of adhesive together with double sided adhesive tape for temporary support, and affix directly to the substrate.

Labelling

General: Permanently mark each unit of furniture with the manufacturer's name, on an interior surface.

3.2 TRIM**General**

Requirement: Provide trims such as architraves, beads, mouldings, stops and skirtings to make neat junctions to openings and between lining components, finishes and adjacent surfaces.

Fixing

To masonry walls: Screw with wall plugs at 600 mm centres maximum.

To stud walls: Nail to plate or framing at 600 mm centres maximum.

3.3 COMPLETION

Protection

Timber treads: Provide full timber or plywood casing.

Cleaning

Temporary coatings: On or before completion of the works, or before joining up to other surfaces, remove all traces of temporary protective coatings.

Requirement: Remove all dust, marks and rubbish from all surfaces and internal spaces. Clean and polish all self-finished surfaces such as anodised and powder coated metals, sanitary ware, glass, tiles and laminates.

4 SELECTIONS

4.1 TRIM

Trim schedule

Property	Typical	Skirting to Foyers & Corridors
Skirtings: Timber species or group	FJ Pine	FJ Pine
Skirtings: Grade	Standard	Standard
Skirtings: Size (h x t) (mm)	66mm x 12mm	185mm x 18mm
Skirtings: Profile	Intrim SK06	Intrim SK93
Skirtings: Finish	Pre-primed, painted	Pre-primed, painted
Pelmet:	MDF as detailed on drawings	
Pelmet: Finish	Painted	

0552B METALWORK - FABRICATED

1 GENERAL**1.1 RESPONSIBILITIES****General**

Requirement: Provide metal fixtures, as documented.

Performance

Requirements:

- Undamaged, plumb, level and straight or as documented.
- Free of surface defects or distortions or as documented.

1.2 CROSS REFERENCES**General**

Requirement: Conform to the following:

- 0171 General requirements.

1.3 STANDARDS**General**

Access for maintenance: To AS 1657

Tactile indicators: To AS/NZS 1428.4.1

1.4 TOLERANCES**General**

Requirement: ± 2 mm from design dimensions.

1.5 SUBMISSIONS**Design documentation**

General: Engage a professional engineer and submit certification for the design and installation of:

- Pipe rail handrails and balustrades

Operation and maintenance manuals

General: Submit manufacturer's published recommendations for service use.

Products and materials

Proprietary items: Submit the manufacturer's product data standard drawings and details showing:

- Methods of construction.
- Assembly and fixing, with dimensions and tolerances.

Stainless steel: For each batch of stainless steel supplied to the works, submit the certificate of conformance or test certificate to the applicable standard, as documented.

Stainless steel welding: Before fabrication commences, submit evidence of qualification of the welding procedure by testing to AS/NZS 1554.6 clause 4.7 or evidence of prequalification to AS/NZS 1554.6 clause 4.12.

Shop drawings

General: Submit shop drawings to a scale that best describes the detail, showing the following information:

- Overall and detail dimensions.
- Details of fabrication and components.
- Details of fabrication involving other trades or components.
- Information necessary for site assembly.
- Proposals for the break-up of large items as required for delivery to the site.
- Proposed method of joining the modules of large items.

2 PRODUCTS

2.1 GENERAL

Storage and handling

Requirement: Store and handle fabricated metalwork, as follows:

- Deliver to site in unbroken wrapping or packing.
- Store on a level base, away from uncured concrete and masonry and areas of wet plaster.
- Do not store in contact with other materials that may cause staining, denting or other surface damage.
- Use gloves when handling precoated finishes.
- Keep storage time to minimum by delivering items only when required for installation.

Marking

General: Provide suitable and sufficient marks or other means for identifying each member of site-erected assemblies, and for their correct setting out, location, erection and connection. Mark bolted connections to show the bolting category. Do not mark stainless steel by notching.

2.2 MATERIALS

Metals and components

Performance: Provide metals and components in quantity, lengths and cross-sections of strength and stiffness suited to their required function, finish, fabrication and method of installation.

Fasteners

Performance: Provide fasteners to resist galvanic corrosion in materials of structural and mechanical strengths and corrosion resistance at least equal to that of the lowest resistant metal in the connection.

Materials: Provide fasteners as follows:

- To copper and copper alloys: Copper or copper-alloy fixing devices only.
- To aluminium and aluminium alloys: Aluminium alloy or non-magnetic stainless steel fixing devices only.
- To stainless steel: Appropriate stainless steel materials only.

3 EXECUTION

3.1 CONSTRUCTION GENERALLY

Aluminium structures

Standard: To AS/NZS 1664.1 or AS/NZS 1664.2.

Metals

Incompatible metals: Separate using concealed layers of suitable materials in appropriate thicknesses.

Fabrication

Workshop: Fabricate and pre-assemble items in the workshop wherever practicable.

Edges and surfaces: Keep clean, neat and free from burrs and indentations. Remove sharp edges without excessive radiusing.

Tube bends: Form bends in tube without deforming the cross section and the material thickness.

Colour finished work: Match colours of sheets, extrusions and heads of fasteners.

Thermal movement: Accommodate thermal movement in joints and fastenings.

Joints

General: Fit joints to an accuracy appropriate to the class of work. Finish visible joints made by cutting, drilling, welding, brazing or soldering using grinding, buffing or other methods appropriate to the class of work, before further treatment.

Self-finished metals: Free of surface colour variations, after jointing.

Joints: Fit accurately to a fine hairline or as documented.

Splicing

General: Provide structural members in single lengths.

3.2 WELDING AND BRAZING

Welding

Quality: Provide finished welds which are free of surface and internal cracks, welding slag, and porosity.

Site welds: Avoid site welding wherever possible. If required, locate site welds in positions for down hand welding.

Butt weld quality level: Not inferior to the appropriate level recommended in AS/NZS 1554.1 Section 6, AS/NZS 1554.6 Section 6 or AS/NZS 1665 Section 6, as appropriate.

Brazing

General: Make sure brazed joints have sufficient lap to provide a mechanically sound joint.

Butt joints: Do not use butt joints for joints subject to load. If butt joints are used, do not rely on the filler material only.

3.3 STAINLESS STEEL FABRICATION

Welding stainless steel

Certification of welders: To AS 1796.

Riveting

General: Use only to join stainless steel sheet or strip less than 1 mm thick. Drill (not punch) the rivet hole, and drive the rivet cold. On completion, clean and passivate the riveted assembly.

Soldering

General: Do not solder stainless steel.

3.4 PIPE RAIL HANDRAILS AND BALUSTRADES

Fabrication

Method: Welding.

Joints: Produce smooth unbroken surfaces at joints. Scribe the joints between posts and rails. Make end-to-end joints over an internal sleeve.

Bends: Make changes of direction in rails by evenly curved pipe bends.

Free ends: Seal the free ends of pipes with fabricated or purpose-made end caps.

Fixing to structure

General: Provide fabricated predrilled or purpose-made brackets or post bases, and attach the piping to the building structure with fixings, including bolts into masonry anchors, and coach screws or bolts into timber, of metal compatible with the piping.

Galvanizing

General: If possible, complete fabrication before galvanizing; otherwise apply a zinc-rich primer to affected joint surfaces.

Other protective coatings

General: Apply other protective coatings as documented and to the manufacturer's recommendations.

Domed buttons

General: Provide domed buttons adjacent to ends of handrails at all floor levels to comply with AS 1428.2

3.5 BOLLARDS

Bollards

General: Where salient corners of the structure require protection from mechanical damage, provide metal bollards as follows:

- Consisting of circular hollow section with plate welded to top and plate flange welded to base.
- Securely fixed to concrete slab by bolts into appropriate anchors.

Location: As detailed on drawings.

Material: Mild steel tube.

Dimensions (mm):

- Height: Top surface: 1200mm above adjacent finished surface level.
- Diameter: 140mm nom.

- Material thickness: 6mm nom.
- Finish: Galvanized and painted.

Fixing: Countersunk bolts through base flange, bolts flush with top of flange. Note: Allow for 900mm deep, 450mm diameter reinforced concrete footing to bollards located in car park.

3.6 COMPLETION

Cleaning

Temporary coatings: On or before completion of the works, or before joining up to other surfaces, remove all traces of coatings used as temporary protection.

0581B SIGNAGE

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide signage systems, as documented.

Performance

Requirement: Provide signage as follows:

- Appropriately secured.
- Located within a clear line of vision.
- To contrast with the background.
- With clean, well defined edges or arrises, and free from blemishes.

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- 0171 General requirements.
- 0921 Low voltage power systems.

1.3 STANDARDS

Signs

Safety signs - design and use: To AS 1319.

Signs and graphics for disability access: AS 1428.1 and AS 1428.2.

Tactile wayfinding signs: To AS 1428.4.2.

2 PRODUCTS

2.1 MATERIALS

Materials standards

Aluminium:

- Plate for engraving: Alloy and temper designation 6063-0 to AS 2848.1.
- For casting: To AS 1874.
- Finishes:
 - . Anodising: To AS 1231.
 - . Powder coating: To AS 3715 and AAMA 2604.

Stainless steel:

- External: Type 316. Mirror electropolish surface finish.
- Internal: Type 304. No. 4 brushed (general purpose polished) surface finish.

Plastics:

- PVC-U sheet: Semi-rigid sheet.
- Rigid cellular polystyrene: To AS 1366.3, class VH for cut-out shapes.

Brass and bronze: Plate, sheet and strip: To AS 1566.

- Finish: Patinated.

Glass type and thickness: To AS 1288.

Photoluminescent exit signs: To BCA E4.8(b).

Adhesive

General: Proprietary solvent based contact adhesive compatible with the substrate and signage material.

3 EXECUTION

3.1 WORKMANSHIP

Production

General: Form signage and graphic items accurately with clean, well defined edges or arises, free from blemishes.

Engraving to two layer plastic laminate: Engrave lettering to expose the lower laminate.

Engraved and filled: Lettering precision cut and filled colouring material. Clean faces of all filling material.

Casting: Produce shapes free of pits, scale, blow holes or other defects, hand or machine finished if necessary.

Laser cut lettering: Individual vinyl letters with self-adhesive backing.

Printed lettering: Lettering and graphic images screen/digitally printed on:

- Film with self-adhesive backing.
- Acrylic sheet.
- Aluminium plate.
- Stainless steel plate.

Large format digital printing: Lettering and graphic images screen printed film with self-adhesive backing.

Signwriting: Lettering and graphic images hand painted direct to the background by a tradesman with recognised qualifications and demonstrated skills.

Fabricated: Three dimensional, formed as follows:

- Laser cutting from solid material and hand finished as necessary.
- Moulding: Individual plastic hollow three dimensional characters and shapes formed by:
 - . Injection moulding.
 - . Vacuum forming.
- Built-up individual shapes by fabricating the faces and edges from separate pieces neatly and securely joined.

3.2 INSTALLATION

General

Requirement: Install signage and graphic items level and plumb, securely mounted, with concealed corrosion and theft-resistant fixings.

Self-adhesive signs

Requirement: Fix free of bubbles and creases.

Aluminium and stainless steel signs

Aluminium or stainless steel pin fixing of plates: Epoxy fit to substrate.

Illuminated signs

Electrical fittings: Provide a junction box for power connection, and the necessary lamps with proper mountings, protection, and accessories including wiring transformers and insulators. Install signs and conceal cabling to *0921 Low voltage power systems*.

3.3 COMPLETION

Cleaning

General: Remove protective coverings, replace damaged signage and leave the work clean, polished, free from defects, and in good condition.

Warranties

Requirement: Installer's warranty against defective workmanship or incorrect installation.

4 SELECTIONS

4.1 STATUTORY SIGNS

Termite protection

Position	In or near meter box or similar
Message	Details of termite management system Indicate: - The method of protection - The date of installation - The life expectancy of a chemical barrier as listed on the appropriate authority's pesticides register label - The installer's recommendation for inspections
Sign type	Laminated page(s)
Conformance	BCA 3.1.4.4, BCA B1.4(i)(ii) AS 3660.1 Appendix A

Required fire door and required smoke door

Position	On or adjacent to the door, on the side of the door that faces a person seeking egress, and if the door is in the held open position, on either the wall adjacent the doorway or both sides of the door.
Message if auto door with auto hold open device	FIRE SAFETY DOOR – DO NOT OBSTRUCT
Message if self-closing door	FIRE SAFETY DOOR DO NOT OBSTRUCT DO NOT KEEP OPEN
Message if door discharging from a fire isolated exit	FIRE SAFETY DOOR – DO NOT OBSTRUCT
Letter height (minimum)	20 mm
Sign type	
Conformance	BCA D2.23

Braille and tactile exit signage

Position	To BCA Spec D3.6 for every door described in BCA E4.5
Message	Exit (and) Level (followed by the floor level number)
Letter height (minimum)	BCA Spec D3.6
Sign type	Acrylic sheet
Conformance	BCA E4.5, BCA D3.6 and BCA Spec D3.6

Fire hydrants

Position	Cupboard door or adjacent the FHR
Message	FIRE HYDRANT
Letter height (minimum)	External cabinets: 75 mm Internal cabinets: 50 mm
Sign type	White adhesive backed vinyl
Conformance	AS 2441 AS 2419.1

	BCA E1.3 and BCA E1.4
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Fire brigade booster assembly cabinet location sign

Position	Cabinet doors
Message	FIRE HYDRANT BOOSTER, or FIRE HYDRANT AND SPRINKLER BOOSTER, or COMBINED FIRE HYDRANT AND SPRINKLER BOOSTER, as appropriate. If a feed fire hydrant is enclosed in the cabinet, add the symbol FH within a 100 mm circle of thickness and colour to match lettering.
Letter height (minimum)	50 mm
Sign type	Adhesive backed vinyl
Conformance	AS 2419.1 clause 7.10.1

Fire brigade booster assembly – Notice of pressure

Position	Adjacent or within the cabinet or recess
Message	BOOST PRESSURE: ↔ kPa TEST PRESSURE: ↔ kPa
Letter height (minimum)	25 mm
Sign type	Adhesive backed vinyl
Conformance	AS 2419.1 clause 7.10.1

Fire brigade relay pumps

Position	At each pump location
Message	FIRE BRIGADE RELAY PUMP
Letter height (minimum)	75 mm
Sign type	Adhesive backed vinyl
Conformance	AS 2419.1 clause 7.7

Boosters in series with pumps

Position	Adjacent the pressure gauge
Message	WARNING-THESE BOOSTERS ARE CONNECTED IN SERIES (RELAY) WITH THE FIXED ON-SITE FIRE PUMPS WHICH MAY BE RUNNING. THIS GAUGE SHOWS THE TRUE BOOST PRESSURE AT THE FIXED ON-SITE PUMP DISCHARGE
Letter height (minimum)	25 mm
Sign type	Adhesive backed vinyl
Conformance	AS 2419.1 clause 7.6

Portable fire extinguishers – cabinet

Position	Cabinet
Message	FIRE EXTINGUISHER
Letter height (minimum)	32 mm
Sign type	Adhesive backed vinyl
Conformance	AS 2444 clause 3.6 Fire Brigade

Portable fire extinguishers – location signs

Position	As nominated in AS 2444 clause 3.2 at every installed extinguisher nominated BCA Table E1.6
Message	Prescribed graphic
Letter height (minimum)	16 mm
Sign type	Computer generated adhesive backed vinyl graphic
Conformance	AS 2444 clause 3.3 Fire Brigade

Fire blankets

Position	As nominated in AS 2444 clause 6.4 at every blanket location
Message	Prescribed graphic
Letter height (minimum)	
Sign type	Computer generated adhesive backed vinyl graphic
Conformance	AS 2444 clauses 6.3, 6.4 and Figure 6.1 Fire Brigade

Regulatory carpark signs: Low clearance

Position	Entry to obstruction where clearance is: - 3 m or less – car and light van use only - 4.6 m – all other cases
Message	LOW CLEARANCE 3.9 m
Sign type	AS/NZS 2890.1 R6-11 or R6-16
Conformance	AS/NZS 2890.1 clause 4.3.4

Regulatory carpark signs: Stop and Give Way

Position	As required for traffic control
Message	Graphic nominated in AS/NZS 2890.1 clause 4.3.4(b)
Sign type	AS/NZS 2890.1 R1-1 (Stop), R1-2 (Give Way)
Conformance	AS/NZS 2890.1 clause 4.3.4

Regulatory carpark signs: Speed limit

Position	As required for traffic control
Message	Graphic nominated in AS/NZS 2890.1 clause 4.3.4(c)
Sign type	AS/NZS 2890.1 R4-1
Conformance	AS/NZS 2890.1 clause 4.3.4

Regulatory carpark signs: Hump warning

Position	As required for traffic control
Message	Graphic nominated in AS/NZS 2890.1 clause 4.3.4(d)
Sign type	AS/NZS 2890.1 W5-10
Conformance	AS/NZS 2890.1 clause 4.3.4

Regulatory carpark signs: Electrical vehicle charging station

Position	Designated car space
Symbol	Select electric vehicle parking space graphic- size approx. 1000 x 1000mm
Sign type	Pavement marking paint.
Compliance	N/A

Regulatory carpark signs: Disabled persons parking facilities

Position	Designated car space
Symbol	Graphic size and position nominated in AS/NZS 2890.6 clause 3.1, Figure 3.1.
Sign type	Pavement marking paint.
Conformance	AS/NZS 2890.6 clause 3.1

Unisex accessible sanitary facilities

Position	To BCA Spec D3.6
Message	- Braille and tactile signage incorporating the international symbol of access. - Indicate suitability for left or right handed use.
Symbol size	AS 1428.2 clause 16, Table 1.
Letter height (minimum)	Braille: BCA Spec D3.6 Raised characters: Sans serif type font 20 mm.
Sign type	Acrylic sheet
Conformance	AS 1428.1 BCA D3.6

Ambulant sanitary facilities

Position	To BCA Spec D3.6
Message	Braille and tactile signage incorporating the male/female ambulant symbol.
Symbol size	AS 1428.2 clause 16, Table 1.
Letter height (minimum)	Braille: BCA Spec D3.6 Raised characters: Sans serif type font 20 mm.
Sign type	Acrylic sheet
Conformance	AS 1428.1 BCA D3.6

Non-accessible sanitary facilities

Position	At each bank of sanitary facilities that are not provided with an accessible unisex sanitary facility.
Message	- Braille and tactile signage incorporating the international symbol of access. - Indicate location of the nearest accessible unisex sanitary facility.
Letter height	AS 1428.2 clause 17, Table 2.
Symbol size	AS 1428.2 clause 16, Table 1.
Sign type	Acrylic sheet

Conformance	AS 1428.1 BCA D3.6
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Non-accessible pedestrian entrance

Position	At each non-accessible pedestrian building entrance.
Message	Signage incorporating the international symbol of access to direct a person to the location of the nearest accessible pedestrian entrance
Letter height	AS 1428.2 clause 17, Table 2.
Symbol size	AS 1428.2 clause 16, Table 1.
Sign type	Acrylic sheet
Conformance	AS 1428.1 BCA D3.6

Hearing augmentation

Position	Where hearing augmentation is installed to BCA D3.7
Message	Braille and tactile signage incorporating the international symbol of deafness. Identify: - Type of hearing augmentation. - Area covered within the room. - If receivers are being used and where the receivers can be obtained.
Letter height (minimum)	BCA Spec D3.6
Symbol size	AS 1428.2 clause 16, Table 1
Sign type	Acrylic sheet
Conformance	BCA D3.7 BCA Spec D3.6 AS 1428.1

Main switchboard - room or enclosure, excluding Class 1 dwellings

Position	The room or enclosure containing the main switchboard
Message	MAIN SWITCHBOARD
Letter height (minimum)	20mm
Sign type	Adhesive backed vinyl
Conformance	AS/NZS 3000 clause 2.10.2.4

0611 RENDERING AND PLASTERING

1 GENERAL**1.1 RESPONSIBILITIES****General**

Requirement: Provide plaster finishes as documented.

Performance

Requirements:

- Resistant to impacts expected in use.
- Free of irregularities.
- Consistent in texture and finish.
- Firmly bonded to substrates for the expected life of the application.
- Without obvious shrinkage cracks.
- As a suitable substrate for the nominated final finish.
- Non-combustible to comply with NCC.

1.2 CROSS REFERENCES**General**

Requirement: Conform to the following:

- 0171 General requirements.

1.3 INTERPRETATION**Abbreviations**

General: For the purposes of this worksection the following abbreviations apply:

- CRF: Cement render – finish.
- CRM: Cement render – medium.
- CRS: Cement render – stronger.
- CRW: Cement render – weaker.
- GPF: Gypsum plaster – finish.

Definitions

General: For the purposes of this worksection the following definitions apply:

- Base coat: A plaster coat applied before the application of the finish coat.
- Bonding treatment: A treatment of a substrate which improves adhesion of a plaster system.
- Finish coat (rendering and plastering): The final coat of a coating system.
- Finishing treatment (plastering): The treatment applied to a finish coat which may include processes and results.
- Plaster: A mixture of binders, aggregate and water which is applied to substrates in a plastic state and dries and cures to a hard surface which may subsequently be decorated:
 - . Cement plaster: Contains Portland cement as the principal binder.
 - . Gypsum plaster: Contains hydrated or anhydrous calcium sulfate as the principal binder.
- Plastering: The process of coating the framing or solid surfaces of a building with a plastic material which hardens and then may be decorated or remain self-finished.
- Plastering system: One or more coats of plaster and associated treatments comprising some or all of the following in sequence:
 - . Base coat 1 or 2.
 - . Bonding treatment.
 - . Finish coat.
 - . Finishing treatment.
- Render, rendering: Plaster, plastering, usually single coat and usually cement:lime:sand.

- Substrate: The surface to which a material or product is applied.

1.4 TOLERANCES

Tolerances table

Description	Alignment	Tolerance
Walls and other vertical structures	Vertical	6 mm in 2400 mm
Reveals sides	Vertical	3 mm in 1800 mm
Reveals head up to 1800 mm	Horizontal	3 mm in 1800 mm
Reveals head over 1800 mm	Horizontal	5 mm max
Reveals, piers, beams, wall stop ends up to 300 mm	Square	3 mm max
Reveals, piers, beams, wall stop ends over 300 mm	Square	5 mm max
Radius of corners	Round	Should not vary by more than $\pm 10\%$ over the length of the arris.

1.5 SUBMISSIONS

Prototype

Plaster systems: Prepare prototypes of each plaster system complete with beads and other embedded items:

- Size: 1200 x 2400 mm.

1.6 INSPECTION

Notice

Inspection: Give notice so that inspection may be made of the following:

- Prototypes ready for inspection.

2 PRODUCTS

2.1 GENERAL

Storage and handling

General: Store materials in a dry, well-ventilated and secure storage area, unaffected by weather.

2.2 MATERIALS AND COMPONENTS

Accessories

Beads: Provide metal proprietary sections manufactured for fixing to substrates and/or embedding in the plaster to form and protect plaster edges and junctions.

Metal lath: Provide a proprietary product manufactured from raised expanded metal for use with plaster:

- Mass/unit area: 1.84 kg/m² or greater.
- Material thickness: 0.70 mm or greater.
- Mesh size: 9.5 x 28.6 mm.

Metallic-coatings to AS 1397: For beads or lath in cement plaster: To the **Corrosion resistance and durability table**.

Admixtures

Plasticisers or workability agents: Do not use in cement plasters.

Aggregates

Sand: Fine, sharp, well-graded sand with a clay content between 1% and 5% tested to AS 1141.12, and free from efflorescing salts.

Sand grading for base coat plaster table

Sieve size (mm)	Percent passing
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Sieve size (mm)	Percent passing	
	Minimum	Maximum
4.75	100	100
2.36	90	100
1.18	60	90
0.6	35	70
0.3	10	30
0.15	0	5
0.075	0	3

Bonding products

General: Proprietary products manufactured for bonding cement-based plaster to solid substrates.

Cement

Standard: To AS 3972.

Type: GP.

Colouring products

General: Provide proprietary products manufactured for colouring cement plaster.

Integral pigment proportion: 5% maximum weight of cement.

Cornice cement

General: Provide a proprietary product manufactured for use with the cornice.

Cornices

Cast plaster: Proprietary item.

Corrosion resistance and durability

Compliance: To the **Corrosion resistance and durability table** or provide proprietary products with metallic and/or organic coatings of equivalent corrosion resistance and as follows:

- Galvanize: To AS/NZS 4680.

Corrosion resistance and durability table

Atmospheric corrosivity category to AS 4312	Metal lath, beads and embedded items	Minimum cement content (mix type) above damp-proof course
C1 and C2	Galvanize after fabrication 300 g/m ²	CRW
	Stainless steel Type 316	
	Powder coated aluminium	CRM
C3	Stainless steel Type 316 Powder coated aluminium	CRM
C4	Stainless steel Type 316 Powder coated aluminium	CRS

Note: For categories C5 and CX seek specialist advice.

Curing products

General: Provide proprietary products manufactured for use with the plaster system.

Gypsum plaster

General: Provide a proprietary product containing calcium sulfate hemihydrate with additives to modify setting.

Lime

Limes for building: To AS 1672.1.

Lime putty

General: Prepare lime putty as follows:

- Stand dry hydrate of lime to AS 1672.1 and water for 24 hours or more without drying out.
- Stand quicklime and water for 14 days or more without drying out.

Mixes

General: Select a mix proportion to suit the conditions of application.

Measurement: Measure binders and sand by volume using buckets or boxes. Do not allow sand to bulk by absorption of water.

Plaster mixing: Machine mix for 3 to 6 minutes.

Strength of successive coats: Make sure successive coats are no richer in binder than the coat to which they are applied.

Mix proportion table – Cement render, by volume

Mix type		Substrate	Upper and lower limits of proportions by volume		
			Cement	Lime	Sand
Single or multi-coat systems with integral finishing treatments Base coats in multi-coat systems with cement or gypsum finishes	CRS	Dense and smooth concrete and masonry	1	0	3
			1	0.5	4.5
	CRM	Regular clay or concrete masonry	1	0.5	4.5
			1	1	6
	CRW	Lightweight concrete masonry and other weak substrates	1	1	6
			1	2	9
Second coat - Internal	CRF	Cement render base coats	1	1	6
			1	2	9
Second coat - External	CRF	Cement render base coats	1	1	5
			1	2	6

Mix proportion table – Gypsum finish coat, by volume

Mix type		Substrate	Upper and lower limits of proportions by volume			
			Gypsum	Cement	Lime putty	Sand
Gypsum finish coats	GPF	Cement render base coats	1	-	1.5	-
			1	-	2	-

Mix proportion table – Gypsum finish coat, by weight

Gypsum plaster (kg)	Lime putty (kg)
17	25
34	50
51	75

Control joint products

General: Provide proprietary products manufactured for use with the plastering system and to accommodate the anticipated movement of the substrates and/or the plaster.

Water

General: Clean and free from any deleterious matter.

3 EXECUTION**3.1 PREPARATION****Substrates**

General: Provide substrates as follows:

- Clean and free from any deposit or finish which may impair adhesion of plaster.
- If framed or discontinuous, support members in full lengths without splicing.
- If solid or continuous, remove excessive projections and fill voids and hollows with plaster stronger than the first coat and not weaker than the substrate.

Absorbent substrates: If suction is excessive, control it by dampening without over-wetting, and do not plaster substrates showing surface moisture.

Dense concrete: If not sufficiently rough to provide a mechanical key, roughen by scabbling or the like to remove 2 mm of the laitance and expose the aggregate before applying a bonding treatment.

Painted surfaces: Remove paint and hack the surface at close intervals.

Untrue substrates: If the substrate is not sufficiently true for conformity with the thickness limits for the plaster system, or has excessively uneven suction resulting from variations in the composition of the substrate, apply additional coats without exceeding the thickness limits for the substrate or system.

Beads

Location: Fix beads as follows:

- Angle beads: At all external corners.
- Drip beads: At all lower terminations of external plaster.
- Beads for control of movement: At all control joints.
- Stop beads: At all terminations of plaster and junctions with other materials or plaster systems.

Joints in beads: Provide dowels to maintain alignment.

Mechanical fixing to substrate: ≤ 300 mm centres.

Bonding treatment

General: If bonding treatment is required, throw a wet mix onto the background. Mix proportions to the following:

- Cement plaster (cement:sand): 1:2.
- Gypsum plaster (gypsum:sand): 1:2.

Curing: Keep continuously moist for 5 days or more and allow to dry before applying plaster coats.

Thickness: ≥ 3 mm and < 6 mm.

Embedded items

General: To the **Corrosion resistance and durability table**. If there are water pipes and other embedded items, sheath them to permit thermal movement.

Lath

Location: Provide lath as follows:

- Chases: If chases or recesses are 50 mm wide or greater, fix metal lath extending 75 mm or more beyond each side of the chase or recess.
- Masonry and concrete substrates: If mechanical key cannot be attained by scabbling and bonding, fix metal lath.
- Metal and other non-porous substrates: Fix metal lath to provide a key.

Installation: Fix lath as follows:

- General: Run the long way of the mesh across supports with strands sloping downwards and inwards from the intended face of the plaster.
- Fixing: Mechanically fix at centres of 150 mm or less.
- Laps: Tie with 1.25 mm galvanized wire at centres of 150 mm or less. Do not stop edges of sheets at corners but bend around.
- On solid substrates: Space the lath 5 mm or more clear of the substrate.
- Support spacing: ≤ 400 mm.

3.2 APPLICATION

Plastering

Base coats: Scratch-comb each base coat in two directions when it has stiffened.

Metal lath: Press the plaster through the apertures of expanded metal lath and wings of beads.

Incidental work

General: Return plaster into reveals, beads, sills, recesses and niches. Plaster faces, ends, and soffits of projections in the substrate, such as string courses, sills, pilasters and corbels. Run neatly finished throating on soffits of external projections. Trim around openings. Plaster exposed internal surfaces of built-in cupboards.

Joining up

General: If joining up is required, make sure joints are imperceptible in the finished work after decoration.

Control joints

General: Provide joints in the finish to coincide with control joints in the substrate. Make sure the joint in the substrate is not bridged during plastering.

Size:

- Depth: Extend the joint right through the plaster and reinforcement to the substrate.
- Width: 3 mm, or the same width as the substrate joint, whichever is greater.

Damp-proof courses: Do not continue plaster across damp-proof courses.

Plastering on metal lath: Provide control joints to divide the plastering area into rectangular panels of 10 m² or less.

V-joints: Provide V-joints, cut right through the plaster to the substrate, at the following locations:

- Abutments with metal door frames.
- Abutments with other finishes.
- Junctions between different substrates.

Cornices

General: Accurately cut and mitre corners. Match and align ornament. Do not make butt joints in the length of a cornice unless required, or if full lengths are not available.

Installation: Butter edges, mitres and joins for the full length of the cornice with adhesive.

Mechanical fixing: If cornice projects across a ceiling 400 mm or more, provide additional mechanical fixing as follows:

- Fixing centres: ≤ 600 mm.

Plaster thickness table

Substrate	Cement render, total thickness of single or multi-coat work (mm)	Gypsum/lime plaster (mm)
Dense concrete walls	15 max	3 max
Dense concrete ceilings	9 max	3 max
Brickwork and blockwork	12 min	3 max
Lightweight concrete and blocks	12 min	3 max
Metal lath measured from the face of the lath.	18 min	3 max

Temperature

General: If the ambient temperature is less than 10°C or more than 30°C, make sure the temperature of mixes, substrates and reinforcement at the time of application are between 5°C and 35°C.

3.3 FINISHES**Finishing treatments**

Plain even surfaces: Work the hardening plaster as follows:

- Bag: Rub the finish coat when set firm with a hessian bag or similar.
- Carborundum stone: Rub the finish coat when set hard with a carborundum stone to achieve a finish free from sand.
- Foam float: Float finish coat on application with a wood or plastic float to an even surface and finish with a foam float to achieve a fine sand textured finish.
- Steel trowel: Steel trowel finish coat to a smooth dense surface which is not glass-like and is free from shrinkage cracks and crazing.
- Wood or plastic float: Float the finish coat on application to an even surface with a wood or plastic float.

Ornamental patterned surfaces: Work the hardening plaster with a trowel or other tool for the documented type.

Sprayed textured surfaces: Spray plaster onto a substrate using a purpose-designed machine.

Stippled textured surfaces: Work the hardening plaster with a stiff brush.

Rough thrown surfaces: Throw plaster onto a substrate or pebbles onto a plastic plaster base for the documented type.

3.4 COMPLETION

Curing

General: Prevent premature or uneven drying out and protect from the sun and wind.

Keeping moist: If a proprietary curing agent is not used, keep the plaster moist as follows:

- Base coats and single coat systems: Keep continuously moist for 2 days and allow to dry for 5 days before applying further plaster coats.
- Finish coats: Keep continuously moist for 2 days.

0621 WATERPROOFING – WET AREAS

1 GENERAL**1.1 RESPONSIBILITIES****General**

Requirement: Provide wet area waterproofing systems, as documented.

Performance

Requirements:

- Grade to floor wastes, to dispose of water without ponding.
- Prevent moisture entering the substrate or adjacent areas.

1.2 CROSS REFERENCES**General**

Requirement: Conform to the following:

- 0171 General requirements.

1.3 STANDARDS**Waterproofing wet areas**

Standard: To AS 3740.

1.4 INTERPRETATION**Definitions**

General: For the purposes of this worksection the definitions given in AS 3740 and the following apply:

- Bond breaker: A system preventing a membrane bonding to the substrate, bedding or lining.
- Membranes (waterproof): Impervious barriers to liquid water which may be:
 - . Installed below floor finishes.
 - . Installed behind the wall sheeting or render and termed External.
 - . Installed to the face of the wall sheeting or render and termed Internal.
 - . Applied in liquid or gel form and air cured to form a seamless film.
 - . Applied in sheet form with joints lapped and sealed.
- Shower tray: An internal or external liquid applied or sheet membrane system used to waterproof the floor and the wall/floor junctions of a shower area.
- Substrate: The surface to which a material or product is applied.
- Waterproof (WP): The property of a material that does not allow moisture to penetrate through it.
- Waterproofing systems: Combinations of membranes, flashings, drainage and accessories which form waterproof barriers and which may be:
 - . Loose-laid.
 - . Bonded to substrates.
- Water resistant (WR): The property of material that restricts moisture movement and will not degrade under conditions of moisture.
- Wet area: An area within a building supplied with a floor waste.

1.5 SUBMISSIONS**Products and materials**

Documentation: Submit copies of product manufacturer's:

- Product data sheets.
- Type tests certificates verifying conformance to AS/NZS 4858 Table 8.1.

Records

Placing records: Photographically record the application of membranes and information as follows:

- Date.

- Portion of work.
- Substrate preparation.
- After primer application.
- After membrane application.
- Protection provided from traffic.
- Flood test results.

Warranties

Requirement: Submit warranties to **COMPLETION, Warranties.**

2 PRODUCTS

2.1 GENERAL**Storage and handling**

General: Store and handle to the manufacturer's recommendations and as follows:

- Protect materials from damage.

Total VOC limits

Requirement: Conform to the following maximum TVOC content:

- Waterproof membrane: 250 g/L.

2.2 MEMBRANES**Standards**

Standard: To AS/NZS 4858.

Membrane systems

Requirement: Provide a proprietary membrane system suitable for the intended internal wet area waterproofing.

2.3 ACCESSORIES**Water stop angles**

Material: Rigid, corrosion resistant angles compatible with the waterproof membrane system.

Bond breakers

Requirement: Compatible with the extensibility class of the membrane to be used.

Material: Purpose made bond breaker tapes and closed cell foam backing rods or fillets of sealant.

Flashings

Requirement: Flexible waterproof flashings compatible with the waterproof membrane system.

Liquid membrane reinforcement

Requirement: Flexible fabric compatible with the waterproof membrane system.

Sealants

Requirement: Waterproof, flexible, mould-resistant and compatible with host materials.

Adhesives

Requirement: Waterproof and compatible with host materials.

3 EXECUTION

3.1 PREPARATION**Substrates**

General: Make sure substrates are as follows:

- Clean and free of any deposit or finish which may impair adhesion of membranes.
- If walls are plastered, remove loose sand.
- If walls or floors are framed or discontinuous, support members are in full lengths without splicing.
- If floors are solid or continuous:
 - . Excessive projections are removed.

- Voids and hollows greater than 10 mm with abrupt edges are filled with a cement:sand mix not stronger than the substrate nor weaker than the bedding.
- Depressions less than 10 mm are filled with a latex modified cementitious product with feathering eliminated by scabbling the edges.
- Cracks in substrates wider than 1.5 mm are filled with a filler compatible with the membrane system.

Concrete substrates: Cure for more than 28 days.

External corners: Round or arris edges.

Moisture content

Requirement: Verify that the moisture content of the substrate is compatible with the water vapour transmission rate of the membrane system by testing to AS 1884 Appendix A.

Falls

Membrane directly under the floor finish: Make sure the fall in the substrate conforms to the fall documented for the finish.

Sheet substrate fastening

Requirement: Fasten or adequately fix to the supporting structure.

Water stop angles

Requirement: Provide water stop angles at door thresholds and shower enclosures to support the waterproof membrane at junctions between waterproofed and non-waterproofed areas.

Sizing: Size the vertical leg of the water stop angle to conform to the requirements of AS 3740.

Corners: Cut the horizontal leg and bend the vertical leg at corners instead of forming vertical joints between separate lengths of angle.

Fixing: Fix water stop angles to the substrate with compatible sealant or adhesive and corrosion-resistant countersunk or wafer head screws.

Priming

Compatibility: If required, prime the substrates with compatible primer for adhesion of the membrane system.

Bond breakers

Requirement: After the priming of surfaces, provide bond breakers at all wall/floor, hob/wall junctions and at control joints where the membrane is bonded to the substrate.

Sealant fillet bond breakers:

- Application: Form a triangular fillet or cove of sealant to internal corners within the period recommended by the membrane manufacturer after the application of the primer.
- Widths: 5 mm x 5 mm to vertical corners. 6 mm x 6 mm to 9 mm x 9 mm to horizontal corners.

Backing rod bond breakers: Retain in position with continuous length of tape pressed firmly in place against the surfaces on each side of the rod.

3.2 APPLICATION

Protection

Damage: Protect membrane from damage during installation and for the period after installation until the membrane achieves its service characteristics that resist damage.

Extent of waterproofing

Waterproof or water resistant surfaces: To the requirements of BCA F1.7 for Class 2, 3 and 4 buildings, or BCA 3.8.1.2 for Class 1 buildings.

Sheet membrane joints

Bituminous sheet membranes:

- Side laps at least 75 mm.
- End laps at least 100 mm.

Synthetic rubber membranes:

- Factory-vulcanized laps at least 40 mm.
- Field side laps at least 50 mm for side laps.
- Field end-laps at least 100 mm for end laps.

PVC membranes:

- Factory welded laps at least 30 mm.
- Field-welded laps at least 75 mm.

Vertical membrane terminations

Upstands: At least 150 mm above the finished tile level of the floor or 25 mm above the maximum retained water level, whichever is the greater.

Anchoring: Secure sheet membranes along the top edge.

Edge protection: Protect edges of the membrane.

Flashings

Junctions between waterproof surfaces: Provide a bond breaker at internal corners behind flashings.

Junctions between waterproof surfaces and other surfaces: Provide a bead of sealant at the following junctions:

- Waterproof and water resistant surfaces.
- Water resistant and water resistant surfaces.
- Water resistant and non-water resistant surfaces.

Perimeter flashings: Provide continuous flashings to the full perimeter of waterproof areas at wall/floor junctions and to water stop angles.

Vertical flashings: Provide vertical corner flashings continuous across wall/wall junctions to at least 1800 mm above finished floor level.

Vertical liquid applied flashings:

- Return legs at least 40 mm on each wall.
- Overlap the vertical termination of the floor waterproofing membrane at least 20 mm.

Vertical sheet flashings:

- Return legs at least 50 mm on each wall.
- Overlap shower tray upstands at least 50 mm.
- Do not penetrate flashing with wall lining fasteners.

Reinforcement: At coves, corners and wall/floor junctions with gaps greater than 3 mm reinforce liquid applied membranes with reinforcement fabric tape recommended by the membrane manufacturer. Fold the tape in half lengthways and imbed it in the first flashing coat of membrane with one half of the tape on each side of the corner or joint. Apply a second coat of liquid membrane to seal the fabric.

Door jambs and architraves

Requirement: If the bottom of door jambs and architraves do not finish above the floor tiling, waterproof their surfaces below tile level to provide a continuous seal between the perimeter flashing to the wall/floor junction and the water stop angle.

Drainage connections

Floor wastes: Provide floor wastes of sufficient height to accommodate the thickness of floor finishes and bedding at the outlet position. Position drainage flange to drain at membrane level. Turn membrane down 50 mm minimum into the floor waste drainage flanges, and adhere to form a waterproof connection.

Floor wastes in shower trays: Provide drainage of the tile bed and a waterproof connection between the tray and the drain.

Preformed drainage channels:

- With continuous drainage flanges: Provide a continuous waterproof connection between the membrane and the channel.
- Without drainage flanges: Provide continuous waterproofing under the channel and terminate the membrane at a floor waste with a recessed drainage flange.

Unenclosed showers

Requirement: Extend membrane at least 1500 mm into the room from the shower rose outlet, on the walls and floor.

Taps and spouts

Requirement: Waterproof penetrations for taps and spouts with proprietary flange systems or a sealant.

Provision for servicing: Install taps so tap washers or ceramic discs can be serviced without damaging the waterproofing seal.

Recessed soap holders

Construction: Support all faces of the recess and line with the same sheet material as the adjacent wall. Fall base of recess towards the shower area. Flash all junctions and waterproof all surfaces.

Curing of liquid applied systems

General: To the manufacturer's instructions.

Curing: Allow membrane to fully cure before tiling.

Overlaying finishes on membranes

Requirement: Protect waterproof membranes with compatible water resistant surface materials that do not cause damage to the membrane.

Suitable materials: Conform to AS 3740.

Bonded or partially bonded systems: If the topping or bedding mortar is required to be bonded to the membrane, provide sufficient control joints in the topping or bedding mortar to reduce the movement over the membrane.

3.3 COMPLETION**Protection**

General: Keep traffic off membrane surfaces until bonding has set or for 24 hours after laying, whichever period is the longer.

Reinstatement: Repair or replace faulty or damaged work.

Warranties

Requirement: Cover materials and workmanship in the terms of the warranty in the form of interlocking warranties from the supplier and the applicator.

- Form: Against failure of materials and execution under normal environment and use conditions.
- Period: As offered by the supplier.

0631B CERAMIC TILING

1 GENERAL**1.1 RESPONSIBILITIES****General**

Requirement: Provide tiling systems to walls, floors and other substrates, as documented.

Performance

Requirement:

- Consistent in colour and finish.
- Firmly bonded to substrates for the expected life of the installation.
- Set out with joints accurately aligned in both directions and wall tiling joints level and plumb.
- Direct all water flowing from supply points to drainage outlets without leakage to the substrate or adjacent areas.

1.2 CROSS REFERENCES**General**

Requirement: Conform to the following:

- *0171 General requirements.*

1.3 STANDARDS**Tiling**

General: Conform to the recommendations of those parts of AS 3958.1 which are referenced in this worksection.

Slip resistance

Classification: To AS 4586.

1.4 TOLERANCES**Completed tiling**

Requirement: To the recommendations of AS 3958.1 clause 5.4.6.

1.5 SUBMISSIONS**Operation and maintenance manuals**

General: Submit a manual describing care and maintenance of the tiling, including procedures for maintaining the slip-resistance classification stating the expected life of the slip-resistance classification.

Product and materials

Type tests: Submit results, as follows:

- Slip resistance of tiles.

Samples

General: Submit labelled samples of tiles, including fittings, accessories, grout and sealants, illustrating the range of variation in colour and finish.

Sample panels: Prepare a sample panel of each type of tiling system as follows:

- Size: > 2 m².
- Include samples of junction details and trim.
- Preserve the panel until related work is complete.

Tests

Site tests: Submit results, as follows:

- Slip resistance of completed installation.

2 PRODUCTS

2.1 UNDERLAY

Acoustic underlay

General: Provide proprietary product recommended by the manufacturer as compatible with the tiling system. Refer Acoustic Report for acoustic attenuation requirements.

2.2 TILES AND ACCESSORIES

Tiles

Standard: To AS 13006.

Coves, nosings and skirtings: Provide matching stop-end and internal and external angle tiles moulded for that purpose.

Exposed edges: Purpose-made border tiles with the exposed edge (whether round, square or cushion) glazed to match the tile face. If such tiles are not available, mitre tiles on external corners.

Accessories

General: Provide tile accessories which match the composition, colour and finish of the surrounding tiles.

Tactile ground surface indicators

Standard: To AS/NZS 1428.4.1.

2.3 ADHESIVES

General

Standard: To AS ISO 13007.1.

Type

General: Provide adhesives compatible with the materials and surfaces to be adhered, and as documented.

Prohibited uses: Do not provide the following combinations:

- Cement-based adhesives on wood, metal, painted or glazed surfaces, gypsum-based plaster.
- Organic solvent-based adhesives on painted surfaces.
- Organic PVC-based adhesives and organic natural rubber latex adhesives in damp or wet conditions.
- PVA (polyvinyl acetate) based adhesives in wet areas or externally.

2.4 MORTAR

Materials

Cement type to AS 3972: GP.

- White cement: Iron salts content $\leq 1\%$.
- Off-white cement: Iron salts content $\leq 2.5\%$.

Lime: To AS 1672.1.

Sand: Fine aggregate with a low clay content selected for grading, sharp and free from efflorescing salts.

Measurement of volume: Measure binders and sand by volume using buckets or boxes. Do not allow sand to bulk by absorption of water.

Bedding mortar

Mix proportion (cement:sand), by volume: Select proportions from the range 1:3 to 1:4 for satisfactory adhesion. Provide minimum water.

Terracotta tiles: Use proprietary polymer modified mortar.

Mixing: To AS 3958.1 clause 2.15.

Water

General: Clean and free from any deleterious matter.

2.5 GROUT

Type

Cement based proprietary grout: Mix with water. Fine sand may be added as a filler in wider joints.

Terracotta tiles: Use proprietary polymer modified grout.

General purpose cement based grout: Mix with fine sand. Provide minimum water consistent with workability.

Mix proportions (cement:sand), by volume:

- For joints < 3 mm: 1:2.
- For joints ≥ 3 mm: 1:3.

Pigments

Pigments for coloured grout: Provide colourfast fillers compatible with the grout material. For cement-based grouts, provide lime-proof natural or synthetic metallic oxides compatible with cement.

2.6 CONTROL JOINTS

Control joint materials

Control joint strip: A proprietary control joint consisting of a neoprene core sandwiched between metal plates with lugs or ribs for mechanical keying. Set flush with the finished surface.

Proprietary slide plate divider strip: An arrangement of interlocking metal plates grouted into pockets formed in the concrete joint edges.

Sealant: One-part self-levelling non-hardening mould resistant, silicone or polyurethane sealant applied over a backing rod. Finish flush with the finished surface.

- Floors: Trafficable, shore hardness greater than 35.

Backing rod: Compressible closed cell polyethylene foam with a bond-breaking surface.

3 EXECUTION

3.1 SUBSTRATES

Drying and shrinkage

General: Before tiling, allow at least the following times to elapse (for initial drying out and shrinkage) for these substrates:

- Concrete slabs: 42 days.
- Concrete blockwork: 28 days.
- Toppings on slabs and rendering on brick or blockwork: A further 21 days.
- Rendering swimming pool shell: A further 21 days minimum.

3.2 PREPARATION

Standard

Preparation: To the recommendations of AS 3958.1 Section 4.

Ambient temperature

General: If the ambient temperature is less than 5°C or greater than 35°C, do not lay tiles.

Substrates without wet area membranes

General: Conform to the following:

- Clean off of any deposit or finish which may impair adhesion or location of tiles.
- If framed or discontinuous, support members are in full lengths without splicing.
- If solid or continuous:
 - . Remove excessive projections.
 - . Fill voids and hollows greater than 10 mm with abrupt edges with a cement:sand mix not stronger than the substrate or weaker than the bedding.
 - . Fill depressions less than 10 mm with a latex modified cementitious product and eliminate feathering by scabbling the edges.

Absorbent substrates: If suction is excessive, control it by dampening but avoid over-wetting and do not apply mortar bedding to substrates showing surface moisture.

Dense concrete: If not sufficiently rough to provide a mechanical key, roughen by scabbling or the like to remove 3 mm of the surface and expose the aggregate; then apply a bonding treatment.

Substrates with wet area membranes

General: Make sure substrates are as follows:

- Clean and free of any deposit or finish which may impair adhesion or location of tiles.
- Compatible with all components of the floor system.

3.3 FIXING UNDERLAY

Installation

Requirement: Lay in staggered (brick) pattern, perpendicular to the direction of the subfloor, with joints in the underlay not coinciding with joints in the subfloor. Fix with fasteners and fastener spacing to the manufacturers recommendations.

3.4 TILING GENERALLY

Cutting and laying

Cutting: Cut tiles neatly to fit around fixtures and fittings and at margins where necessary. Drill holes without damaging tile faces. Cut recesses for fittings such as soap holders. Rub edges smooth without chipping.

Laying: Return tiles into sills, reveals and openings. Butt up to returns, frames, fittings, and other finishes. Strike and point up beds where exposed. Remove tile spacers before grouting.

Variations

General: Distribute variations in hue, colour, or pattern uniformly, by mixing tiles or tile batches before laying.

Protection

Floor tiles: Keep traffic off floor tiles until the bedding has set and attained its working strength.

Cleaning: Keep the work clean as it proceeds and protect finished work from damage.

3.5 SETTING OUT

Tile joints

Joint widths: Set out tiles to give uniform joint widths within the following limits:

- Floors:
 - . Dry pressed tiles: 3 mm.
 - . Extruded tiles: 6 mm.
 - . Vitrified: 3 to 5 mm.
 - . Quarry tiles: 6 to 12 mm.
 - . Chemical resistant epoxy jointed tiling: 5 to 6 mm.
- Large and/or irregular floor tiles: 6 to 12 mm.
- Mounted mosaics: To match mounting pattern.
- Walls:
 - . Dry pressed tile: 1.5 mm.
 - . Extruded tile: 6 mm.

Joint alignment: Set out tiling with joints accurately aligned in both directions and wall tiling joints level and plumb.

Joint position: Set out tiles from the centre of the floor or wall to be tiled.

Margins

General: Provide whole or purpose-made tiles at margins where practicable, otherwise, set out to give equal margins of cut tiles. If margins less than half a tile width are unavoidable, locate the cut tiles where they are least conspicuous.

Fixtures

General: If possible, position tiles so that holes for fixtures and other penetrations occur at the intersection of horizontal and vertical joints or on the centre lines of tiles. Continue tiling fully behind fixtures which are not built in to the tiling surface. Before tiling make sure fixtures interrupting the tile surfaces are accurately positioned in their designed or optimum locations relative to the tile layout.

3.6 FALLS AND LEVELS

Grading

General: Grade floor tiling to even and correct falls to floor wastes and elsewhere as required. Make level junctions with walls. Where falls are not required, lay level.

Fall, general: 1:100 minimum.

Fall, in shower areas: 1:60 minimum.

Change of finish: Maintain finished floor level across changes of floor finish including carpet.

3.7 BEDDING

Standard

Cement mortar: To AS 3958.1 clause 5.5.

Adhesive: To AS 3958.1 clause 5.6.

Preparation of tiles

Adhesive bedding: Fix tiles dry; do not soak.

Mortar bedding: Soak porous tiles in water for half an hour and then drain until the surface water has disappeared.

Terracotta tiles: Use pre-sealed tiles or apply a breathable sealer and lay dry. If a final sealed finish is selected, use a compatible laying sealer.

Bedding

General: Use bedding methods and materials which are appropriate to the tile, the substrate, the conditions of service, and which leave the tile firmly and solidly bedded in the bedding material and adhered to the substrate. Form falls integral with the substrate.

Thin adhesive beds

General: Provide only if the substrate deviation is less than 3 mm, tested with a 3 m straightedge. Cover the entire tile back with adhesive when the tile is bedded.

Thickness: 1.5 to 3 mm.

Thick adhesive beds

General: Provide on substrates with deviations up to 6 mm, tested with a 3 m straightedge, and with tiles having deep keys or frogs.

Nominal thickness: 6 mm.

Adhesive bedding application

General: Apply adhesive by notched trowel to walls and floors and direct to tiles if required, to provide evenly distributed coverage after laying as follows:

- Domestic internal walls: > 65%.
- Domestic internal floors: > 80%.
- Other wall and floors: > 90%.
- Wet areas and bench tops: 100%.

Pattern of distribution of adhesive: To the recommendations of AS 3958.1 clause 5.6.4.3. Verify by examining one tile in ten as work proceeds.

Wall tile spacers: Do not use spacer types that inhibit the distribution of adhesive.

Curing: Allow the adhesive to cure for the period nominated by the manufacturer before grouting or allowing foot traffic.

Mortar beds

For floor tiles: Either lightly dust the screeded bed surface with dry cement and trowel level until the cement is damp, or spread a thin slurry of neat cement, or cement-based thin bed adhesive, on to the tile back. Do not use mortar after initial set has occurred.

- Nominal thickness: 20 to 40 mm.

Thick reinforced beds: Place mortar bed in two layers, and incorporate the mesh reinforcement in the first layer.

3.8 CONTROL OF MOVEMENT

General

Requirement: Provide control joints carried through the tile and the bedding to the recommendations of AS 3958.1 clause 5.4.5 and as follows:

- Floor location:
 - . Over structural control joints.
 - . To divide complex room plans into rectangles.

- . Around the perimeter of the floor.
- . At junctions between different substrates.
- . To divide large tiled areas into bays.
- . At abutments with the building structural frame and over supporting walls or beams where flexing of the substrate is anticipated.
- Wall location:
 - . Over structural control joints.
 - . At junctions with different substrate materials when the tiling is continuous.
 - . At vertical corners in shower compartments.
- Depth of joint: Right through to the substrate.
- Sealant width: 6 to 25 mm.
- Depth of elastomeric sealant: One half the joint width, or 6 mm, whichever is the greater.

3.9 GROUTED AND SEALANT JOINTS

Grouted joints

General: Commence grouting as soon as practicable after bedding has set. Clean out joints as necessary before grouting.

Face grouting: Fill the joints solid and tool flush. Clean off surplus grout. Wash down when the grout has set. When grout is dry, polish the tiled surface with grout film remover and a clean cloth.

Edges of tiles: Grout exposed edge joints.

Epoxy grouted joints: Make sure tile edge surfaces are free of extraneous matter such as cement films or wax, before grouting.

Mosaic tiles

Grouting mosaics: If paper faced mosaics are to be bedded in cement mortar, pre-grout the sheeted mosaics from the back before fixing. After fixing, rub grout into the surface of the joints to fill any voids left from pre-grouting. Clean off surplus grout. When grout has set, wash down. If necessary, use a proprietary cement remover.

Sealant joints

General: Provide joints filled with sealant and finished flush with the tile surface as follows:

- Where tiling is cut around sanitary fixtures.
- At internal corners of walls in showers.
- Around fixtures interrupting the tile surface, for example pipes, brackets, bolts and nibs.
- At junctions with elements such as window and door frames and built-in cupboards.

Material: Anti-fungal modified silicone.

Width: 5 mm.

Depth: Equal to the tile thickness.

3.10 JOINT ACCESSORIES

Floor finish dividers

General: Finish tiled floors at junctions with differing floor finishes with a corrosion-resistant metal dividing strip fixed to the substrate using mechanical fixings, with top edge flush with the finished floor. If changes of floor finish occur at doorways, make the junction directly below the closed door. Grout up underneath to provide continuous support.

Stepping: Less than 5 mm.

Adjustments

Requirement: Check that the height of the floor finish divider is sufficient for the topping and tile thickness. Adjust as required with a matching flat bar adhesive fixed to the divider angle.

Weather bars

General: Provide a corrosion-resistant metal weather bar under hinged external doors. Locate under the centres of closed doors.

3.11 TESTING

Completion tests

Slip resistance of completed installation: To AS 4663.

Impact sound insulation rating of completed installation: To AS ISO 717.2.

3.12 COMPLETION

Cleaning

General: Clean tiled surfaces using an appropriate tile cleaning agent, and polish.

Spare tiles

General: Supply spare matching tiles and accessories of each type for future replacement purposes.

Store the spare materials on site.

Quantity: At least 1% of the quantity installed.

4 SELECTIONS

4.1 SCHEDULES

Refer finishes schedule

0651B RESILIENT FINISHES

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide resilient floor finishes to substrates, as documented.

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- 0171 General requirements.

1.3 STANDARDS

General

Installation: To AS 1884.

Slip resistance

Classification: To AS 4586.

1.4 SUBMISSIONS

Fire performance

Fire hazard properties: Submit evidence of conformity to PRODUCTS, **FIRE PERFORMANCE**, **Fire hazard properties**.

Operation and maintenance manuals

General: Submit manufacturer's instructions for care and maintenance for each type of finish.

Products and materials

Manufacturer's data: Submit the manufacturer's product data sheets for each type of finish, and the manufacturer's recommendations for its application including the following, as appropriate:

- Thickness and width of sheet, or size of tile or plank.
- Adhesive and jointing method.
- Resistance to wear, indentation, chemicals, light and fire.
- Flexibility and bending strength.

Type tests: Submit results, as follows:

- Slip resistance to AS 4586.

Subcontractors

Substrate acceptance: Submit evidence of installer's acceptance of the flooring substrate before starting installation.

Warranties

Requirement: For each type of resilient finish specified, submit the manufacturer and installer's warranty of the material, workmanship and application.

2 PRODUCTS

2.1 FIRE PERFORMANCE

Fire hazard properties

Critical radiant flux: Tested to AS ISO 9239.1.

2.2 UNDERLAYS

Cementitious

General: Polymer modified cementitious smoothing and self-levelling compound.

Thickness: 3 mm minimum.

Moisture barrier**General**

Description: Water-based moisture barrier to the resilient finish and adhesive manufacturer's recommendations, if required.

2.3 ADHESIVES**General**

Requirement: To the resilient finishes manufacturer's recommendations.

2.4 SHEETS, TILES AND PLANKS**Linoleum**

Standard: To EN ISO 24011.

Polyvinyl chloride (PVC)

Resilient floor covering, homogeneous: To EN ISO 10581.

Resilient floor covering, heterogeneous: To EN ISO 10582.

Resilient floor covering, jute or polyester felt backing: To EN 650.

Resilient floor covering, with foam layer: To EN 651.

Resilient floor covering, with particle based enhanced slip resistance: To EN 13845.

Resilient floor covering, semi-flexible polyvinyl chloride tiles: To EN ISO 10595.

3 EXECUTION**3.1 SUBCONTRACTORS****General**

Requirement: Use specialist installers recommended by the material manufacturers.

3.2 PREPARATION**Substrates**

General: To AS 1884 Section 3.

Substrate tolerance table

Property	Length of straightedge laid in any direction	Max. deviation under the straightedge
Planeness	2000 m	4 mm
Abrupt deviation tolerance	150 mm	0.5 mm

Concrete substrates

Requirement: Do not start installation of the resilient finishes until the concrete substrate conforms to AS 1884 clause 3.1 and the adhesive and resilient finish manufacturers' recommendations.

Substrate rectification: Conform to the following:

- Surface treatments: Mechanically remove any incompatible surface treatments, including the following:
 - . Sealers and hardeners.
 - . Curing compounds.
 - . Waterproofing additives.
 - . Surface coatings and contamination.
- Surface quality: Remove projections and fill voids and hollows with a smoothing and self-levelling compound compatible with the adhesive. Allow filling or levelling compound to dry to manufacturer's recommendations.

Cleaning: Remove loose materials or dust.

Working environment

General: Do not start work before the building is enclosed, wet work is complete and dry, overhead work is complete and good lighting is available. Protect adjoining surfaces.

3.3 INSTALLATION

General

Requirement: To AS 1884 Section 5 and the manufacturer's recommendations.

Sheet set-out

General: Set out sheets to give the minimum number of joints. Position joints away from areas of high stress. Run sheet joints parallel with the long sides of floor areas, vertically on non-horizontal surfaces.

Tile set-out

General: Set out tiles from centre of room. If possible, cut tiles at margins only to give a cut dimension of at least 100 mm x full tile width. Match edges and align patterns. Arrange the tiles so that any variation in appearance is minimised.

Plank set-out

General: Set out planks from centre of room. Align patterns, texture and grain in one direction.

Edges

General: Make sure edges are firm, unchipped and machine-cut accurately to size and square to the face, and that edges are square to each other before installation.

Joints

Doorways: Where changes of floor finish occur at doorways, locate the joint on the centreline of the door leaf in the closed position.

Expansion joints

General: To the manufacturer's recommendations for joint widths, and area and length limitations.

Junctions

General: Scribe neatly up to returns, edges, fixtures and fittings. Finish flush with adjoining surfaces.

Rolling

General: If rolling is required, roll the finish in multiple directions before the adhesive sets.

Change of finish

General: Maintain finished floor level across changes of floor finish including carpet.

Cleaning

General: Keep the surface clean as the work proceeds.

3.4 TILING

Vinyl tiles and planks

Laying: Lay as follows:

- Loose lay: Interlock tongue and groove edges of rigid planks. Tap down with rubber mallet.
- Adhesive fix: Apply acrylic adhesive over whole subfloor surface.

3.5 SHEETING

Welded joints

Thermal welding: After fixing, groove the seams using a grooving tool and weld the joints with matching filler rod, using a hot air welding gun. When the weld rod has cooled, trim off flush.

Chemical welding: Apply seaming compound 100 mm wide to the substrate centrally under the seam. Roll the seam until the compound is forced up into the joint. Clean off flush with a damp cloth.

Epoxy jointing: Join seams with epoxy adhesive.

3.6 JOINTS AND ACCESSORIES

Accessories

General: Provide purpose-made matching moulded accessories for nosings, coves, skirtings, edge cover strips and finishes at junctions, margins, and angles, if available. Otherwise, form accessories from the sheet material. Provide solid backing for radiused coves and nosings.

Edge strips

General: Provide edge cover strips at junctions with different floor finishes and to exposed edges.

Metal cover strip: Extruded tapered strip 25 mm wide, of the same thickness as the sheet or tile. Fix with matching screws to timber bases or to masonry anchors in concrete bases, at 200 mm maximum centres.

Control joints

Location: Provide control joints as follows:

- Over structural control joints.
- At junctions between different substrates.

Depth of joint: Right through to the substrate.

Sealant width: 6 to 25 mm.

Depth of elastomeric sealant: One half the joint width, or 6 mm, whichever is the greater.

Control joint materials – sheet flooring

Proprietary slide plate divider strip: Provide interlocking metal plates grouted into pockets formed in the concrete joint edges to finish flush with the flooring surface.

Control joints schedule – proprietary slide plate

Property	
Location	Refer structural engineering drawings
Product	Latham FXA-25 TBC with structural engineer
Material	Aluminium

Coved skirtings

Site formed coving: Carry the flooring material up over a profiled coving section to form the skirting and mitre and weld all joints. Make sure the radius of the coving section conforms to the floor finish manufacturer's recommendations for sheeting material and thickness.

3.7 COMPLETION**Protection**

Finished floor surface: Keep traffic off floors for a minimum of 24 hours after laying or until bonding has set, whichever period is the longer. Avoid contact with water for minimum 7 days after laying.

Cleaning

General: Clean the finished surface. Buff and polish. Before the date for practical completion, mop and leave the finished surface clean and undamaged on completion.

Spare materials

General: Supply spare matching resilient finishes and accessories of each type for future replacement purposes. Store the spare materials on site where directed.

Quantity: At least 1% of the quantity installed.

4 SELECTIONS**4.1 PRODUCT SCHEDULES**

Refer finishes schedule

0652B CARPETS

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide textile floor coverings and underlays to subfloors, as documented.

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- 0171 General requirements.

1.3 STANDARDS

Slip resistance

Classification: To AS 4586.

1.4 SUBMISSIONS

Fire performance

Fire hazard properties: Submit evidence of conformity to PRODUCTS, **FIRE PERFORMANCE**, **Fire hazard properties**.

Operation and maintenance manuals

Contents: Submit maintenance manuals with the following:

- A technical specification of the carpet installation.
- The manufacturer's recommendations for use, care and maintenance of the carpet to AS/NZS 3733.
- The names and address of the supplier and manufacturer of each component.

Products and materials

Manufacturer's documentation: Submit copies of the following data:

- Product data sheets.

Slip resistance classification: Submit evidence of conformity to documented requirements.

Type tests: Submit results of testing to **PRODUCTS, TESTS**, as evidence of conformity to documented requirements.

Subcontractors

General: Submit name and contact details of proposed suppliers and installers.

Substrate acceptance: Submit evidence of installer's acceptance of the subfloor/substrate before starting installation.

Warranties

General: Submit the manufacturer's product warranties.

2 PRODUCTS

2.1 GENERAL

Storage and handling

Requirement: Store on a flat, clean, dry, well ventilated and secure storage area, elevated above the subfloor and unaffected by weather.

2.2 FIRE PERFORMANCE

Fire hazard properties

Critical radiant flux: To NCC Spec C1.10 and tested to AS ISO 9239.1.

2.3 CARPET

Tolerances

Requirement: To AS/NZS 1385.

Batching

Requirement: In a single area and for each documented type, quality, or colour, use carpet from one manufacturing batch and dye lot.

Antimicrobial treatment

Requirement: Non-metallic, colourless, odourless, positively charged polymer applied during manufacturing to form a molecularly bonded surface to resist bacteria and mould growth.

Insect resistance

Requirement: Carpets and underlays comprising materials either inherently resistant to insect attack or treated against insect attack by moth and carpet beetle, by application of insect resist agents (IRA) to the yarn during wet processing at the manufacturing stage.

Stain and soil resistance

Requirement: Carpet with one or more of the following:

- Fluoro-treatments: Fluorochemical soil and liquid repelling chemical treatment applied during manufacturing.
- Stain blockers: Colourless acid-based dye stainblocker applied to dyed fibres.

Total VOC

Total VOC emission tested to ISO 10580: < 0.5 mg/m²/h.

2.4 CARPET TILES**General**

Type: Non-stick, non-curling tiles capable of being taken up without damage and then re-laid in different positions.

Marking: On the back, showing manufacturer's instructions or directional arrow for laying.

Tolerances

Requirement: Conform to the following:

- Dimensional tolerance: 0.2%.
- Squareness: Maximum difference of 2 mm between lengths of diagonals.

Sustainable carpet tile backing

Re-usable backing: Proprietary vinyl backing to carpet tiles capable of separation and recycling in new carpet tiles.

2.5 MATS**General**

General: Provide a mat made to fit each designated mat recess.

2.6 UNDERLAYS**Application**

Performance: To AS 2455.1 clause 1.5.2.

Soft underlay

Standard: To AS 4288.

2.7 OTHER MATERIALS**Adhesives**

General: Compatible with the floor covering material, and suitable for bonding it to the subfloor to AS 2455.1 clause 1.5.3.

Friction compound: Suitable for holding carpet tiles in position without permanent sticking.

Hot-melt adhesive tapes

General: Commercial grade glass fibre and cotton thermoplastic adhesive-coated tape 60 mm wide on a 90 mm wide metal foil base and backed with silicone-coated release paper.

Preformed carpet grippers

General: Architectural plywood carpet grippers with 3 rows of corrosion-resistant angled pins of length appropriate to the carpet type to AS 2455.1 clause 1.5.4.

Size (minimum): 33 mm wide x 7 mm thick.

Location: At edges, except where edge strips are used. Provide double grippers to edges where recommended by the manufacturer.

Edge strips

Type: Heavy duty edge strip appropriate to the floor covering type (tackless or adhesive fixed), capable where necessary of accommodating different levels of adjacent floor finishes.

Form: Metal moulding or extrusion, with vinyl inserts.

Location: At exposed edges of the carpet, and at junctions with differing floor finishes or finishes of a different thickness. Where edge strips occur at doorways, locate the junctions directly below the closed door.

3 EXECUTION**3.1 PREPARATION****General**

Pre-installation requirements: To AS 2455.1 Section 2.

- Carpet tiles: Pre-laying requirements including access panel floors to AS 2455.2 clause 4.

Working environment: Do not start work before the building is enclosed, wet work is complete and dry, overhead work is complete and good lighting is available.

Protection: Protect adjoining surfaces.

Substrate

General: Conform to the following:

- To AS 2455.1 or AS 2455.2, as appropriate.
- Clean and free of any deposit or finish which may impair adhesion or location and functioning of control joints.
- Free of any imperfections, including ridges, indentations and projections which may adversely affect the installed carpet.

Concrete substrate rectification: Remove projections, grind as necessary and fill voids and hollows with a levelling compound compatible with the adhesive to achieve the required tolerance.

Raised areas rectified by grinding: Test the freshly exposed concrete surface for pH and obtain verification of compatibility with the adhesive.

Moisture content: Do not start installation unless:

- Concrete: The moisture content of the concrete has been tested to AS 2455.1 Appendix B and the values in AS 2455.1 Appendix B and AS 2455.2 Appendix B as appropriate have been obtained.

Alkalinity: Do not start installation unless:

- Concrete: The alkalinity of the concrete has been tested to AS 2455.1 Appendix B and the values in AS 2455.1 Appendix B and AS 2455.2 Appendix B as appropriate have been obtained.

Fixtures: Remove door stops and other fixtures, and refix in position undamaged on completion of the installation. Make sure fixings penetrate substrate and are stable.

Substrate tolerance table

Property	Length of straightedge laid in any direction	Max. deviation under the straightedge
Flatness Class B	3 m	6 mm
Smoothness	150 mm	1 mm
Planar	2000 mm	4 mm

3.2 INSTALLATION - CARPET**General**

Requirement: To AS 2455.1 Section 3 and the manufacturer's recommendations.

Setting out

Joints in underlay: Make sure joints in underlay do not coincide with carpet joints. Do not carry underlay over carpet grippers or edge strips.

Partition layout: Confirm that permanent partitions have been installed before starting carpet laying.

Seaming methods

Woven carpet: Machine or hand sew. Do not provide glued taped seams unless selvages are woven to suit and recommended by manufacturer.

Tufted carpet: Seam with hot-melt adhesive tape.

Seam sealing: Apply appropriate seam sealer to each cut edge.

Cutting laid carpet

Method: If penetrations through laid carpet are necessary for electrical, telephone or other outlets, cut the carpet either by cross cutting or by cutting rectangular or circular openings.

Cutting holes in concrete floors: Protect the carpet and remove concrete particles and dust on completion. Replace the cut carpet over the opening without any signs of fraying or other damage, and fix with a peel-up adhesive, or resew.

3.3 INSTALLATION - CARPET TILES**General**

Installation: To AS 2455.2 and the manufacturer's recommendations.

3.4 COMPLETION**Cleaning**

Requirement: Progressively clean the work. Remove waste, excess materials and adhesive.

Final cleaning: When the installation is complete, clean the carpet as necessary to remove extraneous matter, marks and soiling and to lift the pile where appropriate.

Protection

Requirement: Provide fabric drop sheets. Do not use plastic sheeting. If wheeled traffic is to follow carpet installation, protect with hardboard sheets butted and fixed with adhesive tape.

4 SELECTIONS**4.1 SCHEDULES**

Refer finishes schedule.

0657 RESIN BASED SEAMLESS FLOORING

1 GENERAL**1.1 RESPONSIBILITIES****General**

Requirement: Provide resin based floor finishes to substrates, as documented.

Performance

Requirement:

- Forming a strong permanent bond to the substrate.
- Impermeable to liquids.
- Hygienic and easily cleaned.
- Slip-resistant or chemical resistant.

1.2 CROSS REFERENCES**General**

Requirement: Conform to the following:

- 0171 General requirements.

1.3 STANDARDS**Slip resistance**

Classification: To AS 4586.

1.4 INTERPRETATION**Abbreviations**

General: For the purposes of this worksection the following abbreviations apply:

- MMA: Methyl methacrylate.

Definitions

General: For the purposes of this worksection the following definitions apply:

- Resin based seamless floor finish: Any combination of a resin based flooring system that combines two part resins, with or without an aggregate, to provide a continuous floor coating without joints except those that may already exist in the substrate.
- Substrate: The surface to which a material or product is applied.

1.5 SUBMISSIONS**Fire performance**

Fire hazard properties: Submit evidence of conformity to PRODUCTS, **FIRE PERFORMANCE**, **Fire hazard properties**.

Operation and maintenance manuals

Requirement: At completion, submit the manufacturer's published use, care and maintenance instructions.

Products and materials

Manufacturer's data: Submit the manufacturer's technical product data for each type of finish, and recommendations for its application in the project, including the following:

- Composition, thickness, finish and time between coats for multi-coat work.
- Safety data sheets.

Type tests: Submit results as follows:

- Slip resistance.

Samples

Resin based flooring generally: For each required finish, submit a sample of the coating on a suitable base, showing the thickness of each coat.

- Slip resistance: If documented, demonstrate conformance in the sample.

Labelling: Label each sample identifying the following:

- Brand.
- Product name.
- Manufacturer's reference code (including the code for each layer of a multi-layer system).

Size: 300 x 300 mm minimum.

Subcontractors

General: Submit names and contact details of proposed suppliers and applicators.

Substrate acceptance: Submit evidence of applicator's acceptance of the coating substrate before starting installation.

Tests

Site tests: Submit results, as follows:

- Slip resistance test of completed installations.
- Surface pH test.
- Substrate moisture content test.

Warranties

Requirement: Submit warranties to **COMPLETION, Warranties**.

2 PRODUCTS

2.1 GENERAL

Storage and handling

Delivery: Check all deliveries to site for quantities, damage and material conformance.

Storage: Store materials to the manufacturer's recommendations, with seals and labels intact and legible. Maintain temperatures at 10°C to 30°C or within the recommended range. Do not use materials that have been stored longer than the manufacturer's maximum recommended shelf life.

2.2 FIRE PERFORMANCE

Fire hazard properties

Critical radiant flux: Tested to AS ISO 9239.1.

2.3 SEAMLESS FINISHES

Materials

Product supply: Supply all resin flooring mix components in pre-measured units in the correct proportion ready for mixing.

Resin flooring system: Floor coating systems consisting of primer, waterproofing membrane, reinforcing membrane, as appropriate and as recommended by the manufacturer.

Reinforcement: Flexible fibreglass fabric that inhibits substrate cracks transferring to the resinous flooring finish.

Resin flooring type table

Finish type	Description	Durability*	Typical thickness
Floor seal	Applied in 2 or more coats. Generally solvent or waterborne.	LD	≤ 150 µm
Floor coating	Applied in 2 or more coats. Generally solvent free.	LD/MD	150 to 300 µm
High build floor coating	Applied in 2 or more coats. Generally solvent free.	MD	300 to 1000 µm
Multi-layer flooring	Aggregate dressed systems based on multiple layers of floor coatings or flow applied floorings.	MD/HD	> 2 mm

Finish type	Description	Durability*	Typical thickness
Flow applied flooring	Self-smoothing or self-levelling flooring, having a smooth surface.	MD/HD	2 to 3 mm
Resin screed flooring	Trowel finished, heavily filled systems, generally incorporating a surface seal coat to minimise porosity.	MD/HD	> 4 mm
Heavy duty flowable flooring	Having a smooth surface or slip-resistant finish	HD/VHD	4 to 9 mm
Heavy duty resin flooring	Trowel finished, aggregate filled systems effectively impervious throughout their thickness	VHD	> 6 mm
*Note: - LD (Light duty): Light foot traffic, occasional rubber tyred vehicles. - MD (Medium duty): Regular foot traffic, frequent fork lift truck traffic, occasional hard plastic wheeled trolleys. - HD (Heavy duty): Constant fork lift truck traffic, hard plastic wheeled trolleys, some impact. - VHD (Very heavy duty): Severe heavily loaded traffic and impact			

Surface regularity for wearing surface table

Class	Maximum permissible departure from a 2 m straightedge laid in contact with the floor (mm)	Application
SR1	3	High standard: Special floors.
SR2	5	Normal standard: Normal use in commercial and industrial buildings
SR3	10	Utility standard: Where surface regularity is less critical

2.4 OTHER MATERIALS

Tactile ground surface indicators

Standard: To AS/NZS 1428.4.1.

3 EXECUTION

3.1 GENERAL

Subcontractors

Requirement: Use specialist applicators recommended by the material manufacturer.

Ambient conditions

General: Do not start work before the building is enclosed and wet work is complete and dry.

Room and floor temperature: Maintain at temperatures recommended by the manufacturer for a minimum of 72 hours before and after the floor installation.

Lighting: Provide permanent lighting or if not in place, simulate permanent lighting conditions during flooring application.

Protection

Adjacent surfaces: Protect adjacent surfaces by masking or other methods and maintain free of the flooring finish.

Ventilation: Provide adequate ventilation and fire protection at mixing and application locations to the manufacturer's recommendations including smoke, spark and flame prohibition.

Finished installation: Prevent exposure to traffic, water and chemicals until flooring is fully cured.

Removal of fixtures and fittings

Fixtures: Remove door stops and other fixtures within or adjacent to the work area.

Labelling and storage: Attach labels or mark fixtures using a non-permanent method, identifying the location and refixing instructions, if required. Store and protect against damage.

Difficult to remove fixtures: If removal is impractical, apply surface protection before substrate preparation.

3.2 PREPARATION

Substrate condition

Requirement: Sound, clean and free of any deposit or finish, including laitance, efflorescence, curing compounds, dirt and grease, which may impair bonding or is incompatible with the floor coating.

Concrete surface: Cured for at least 28 days and free of water for at least 7 days.

Concrete moisture content: Do not start installation of the resin based seamless flooring until the concrete substrate conforms to AS 1884 Section 3.1 and the flooring manufacturer's recommendations.

Substrate alkalinity: Verify the concrete pH is within the range recommended by the manufacturer.

Substrate adhesion: Perform adhesion tests as recommended by the manufacturer, do not proceed with application unless the substrate passes the test.

Grouts, patching materials and metal embedments: Make sure these are compatible with the resin flooring.

Substrate tolerances table

Property	Length of straightedge laid in any direction	Maximum deviation under the straightedge
Flatness Class A	2 m	4 mm
Smoothness	150 mm	1 mm
Projections	50 mm	0.5 mm

Substrate correction

Concrete surface cleaning and preparation: Remove contaminants by high pressure water jetting and roughen mechanically by shot blasting, planing or grinding.

Concrete surface treatments: Mechanically remove by shot blasting, planing or grinding the following:

- Sealers and hardeners.
- Curing compounds.

Resin flooring ≤ 3 mm: Remove laitance or surface sealers by grinding or light contained shot blasting. Do not remove by percussive scabbling.

Precast unit surfaces: Leave as cast and wash and clean by wire brushing to remove any dirt. Do not mechanically scabble.

Existing concrete substrates: Abrade and remove the uppermost cement matrix mechanically by grinding, planing or shot blasting. Repair damaged and deteriorated concrete to the resin flooring manufacturer's recommendations.

Patching and filling: Remove projections and fill voids and hollows with an epoxy resin based repair mortar compatible with the seamless flooring system, to the manufacturer's recommendations.

3.3 MIXING

Unfilled systems

Two component systems: Blend together with a mechanical mixer to form a homogenous mix.

Filled systems

Requirement: Mix mechanically to the resin flooring manufacturer's recommendations.

Order of mixing: Mix liquid components first, gradually add fillers and/or aggregates while continuing to mix until fillers and/or aggregates have been wetted out by the resin.

3.4 APPLICATION

General

Requirement: Apply components of the resin flooring system to the manufacturer's recommendations to produce a uniform, monolithic wearing surface.

Priming

Coating application: Apply primer over prepared substrate at the manufacturer's recommended spreading rate with a stiff brush, roller or trowel. Fully saturate the substrate surface.

Porous or open textured surfaces: If required to minimise pin holes, apply a second coat to achieve full saturation.

Multi-layer, flow applied and heavy duty flowable flooring: Allow primer to reach a tack-free state before applying the resin flooring. If required to assist flooring application, incorporate a light scatter of dry graded aggregate while the primer is wet.

Resin screed flooring: Allow primer to reach a semi-set (tacky) state before applying the resin flooring.

Curing: Maximum 48 hours at 15°C to 20°C before applying the resin flooring. If curing exceeds 48 hours, mechanically prepare the surface and reapply primer.

Perimeter edges

Integral cove edges or skirting: Apply cove skirting mix to wall surfaces and perimeter edges before applying flooring. Mask adjacent surfaces, mix, prime, trowel, sand and apply top coat of the skirting to the manufacturer's recommendations. Round all internal and external corners.

Resin coatings

Floor seal, floor coating and high build floor coating: Apply by brush or roller to the manufacturer's recommendations.

Curing: Allow first coat to cure for 16 to 24 hours until it is tack-free before applying second coat.

Flow applied systems

Flow applied and heavy duty flowable flooring: Apply by spreading evenly over the surface, using a serrated trowel, pin rake or squeegee. Immediately follow by rolling with a spiked roller to release entrapped air and assist in smoothing out.

Partially set or thickened areas: Do not use spiked roller on these areas.

Multi-layer flooring

Requirement: Apply to **Resin coatings** and/or **Flow applied systems** to the manufacturer's recommendations.

Trowel applied resin flooring

Resin screed and heavy duty resin: Spread mixed product over the primed substrate by trowel, screed box, or between screeding laths or bars to achieve uniform overall thickness.

Finish: Steel trowel to a uniform finish. Keep trowel clean at all times by using a minimum amount of solvent or water.

Hygienic surface: Conform to the following:

- Resin screed: If required, seal surface with one or two coats of compatible resin sealer applied by brush, roller or squeegee after the screed has cured sufficiently.
- Heavy duty resin: If an impervious screed system is used, additional resin seals are not required.

Reinforcement

Fibreglass fabric: If reinforcing is required to minimise problems arising from cracks or bay joints in the substrate, after applying the primer and a thin layer of resin, roll in the fibreglass fabric. Overlap the fabric by 50 mm minimum at joins and apply the final resin layer before the first layer fully hardens.

Curing

Finished flooring: Allow to cure to the manufacturer's recommendations before exposure to light traffic and 3 to 7 days before exposure to heavy traffic, wet cleaning or chemicals.

Uncured resin flooring: Maintain minimum 3°C above dew point or below 75% relative humidity to reduce the risk of blooming on the floor finish.

3.5 JOINTS AND ACCESSORIES

Junctions

General: Finish junctions flush with adjoining surfaces. If changes of floor finish occur at doorways locate the joint on the centreline of the closed door leaf.

Control joints

Location: Provide control joints in resin based seamless flooring as follows:

- Over structural control joints.
- At junctions between different substrates.

Flooring finish: If possible, carry the seamless finish material over the edges of the control joint in the substrate. Provide a sealant joint as follows:

- Sealant width: 6 to 25 mm.
- Sealant depth: One half the joint width, or 6 mm, whichever is the greater.
- Sealant: One part, flexible, abrasion resistant sealant applied over a backing rod. Finish flush with the seamless flooring surface.
- Trafficable floors: Shore hardness greater than 35.
- Backing rod: Compressible closed cell polyethylene foam with a bond-breaking surface.

3.6 TESTING**Substrate tests**

Moisture content: Test subfloors for suitability for the installation of resin based seamless flooring to AS 1884 Appendix A.

- Maximum relative humidity of concrete: To AS 1884 Appendix A3.2.

Surface pH: Test concrete subfloor for suitability for the installation of resin based flooring to AS 1884 Appendix C.

- Maximum pH: 10.

Completion tests

Slip resistance of completed installation: To AS 4663.

3.7 COMPLETION**Reinstatement**

Extent: Repair or replace faulty or damaged work. If the work cannot be repaired satisfactorily, replace the whole area affected.

Removed fixtures and fittings

Requirement: Reinstall undamaged hardware and fittings on completion of the installation.

Warranties

Requirement: Provide interlocking warranties from the supplier and applicator covering materials and workmanship.

- Form: Against failure of materials and execution under normal environment and use conditions.
- Period: As offered by the supplier and applicator.

4 SELECTIONS**4.1 PRODUCTS****Resin flooring finish schedule**

Property	
Finish type	High build floor coating
Product	Hychem SupaFloor T
Location	Bin Room
Colour	Cloud Grey N22
Gloss	High gloss
Pattern	N/A
Aggregate	White aluminium oxide CA46 grade as per manufacturer's instructions
Slip resistance	R11
Surface regularity	SR3

0671P DULUX PAINTING

1 GENERAL**1.1 RESPONSIBILITIES****General**

Requirement: Provide DuluxGroup/Dulux coating systems to substrates, as documented.

Performance

Requirement:

- Consistent in colour, gloss level, texture and dry film thickness.
- Free of runs, sags, blisters, or other discontinuities.
- Paint systems which are fully opaque or at the documented level of opacity.
- Clear finishes at the level of transparency consistent with the product.
- Fully adhered.
- Resistant to environmental degradation within the manufacturer's stated life span.

1.2 COMPANY CONTACTS**DuluxGroup/Dulux technical contacts**

Architects and Specifiers' Hotline (Paint, Acratex, Protective Coatings): 13 23 77.

Powder Coatings Technical Advice Hotline: 13 24 99.

Website: www.dulux.com.au/contact-us/architects-and-specifiers

1.3 CROSS REFERENCES**General**

Requirement: Conform to the following:

- 0171 General requirements.

1.4 STANDARDS**Painting**

General: To the recommendations of those parts of AS/NZS 2311 referenced in this worksection.

1.5 MANUFACTURER'S DOCUMENTS**Technical manuals**

Product Guide: www.dulux.com.au/specifier/products

Duspec Product Data Sheets, SDS, paint system selection: www.dulux.com.au/specifier/duspec

1.6 INTERPRETATION**Abbreviations**

General: For the purposes of this worksection the following abbreviations apply:

- ASU: Acrylic sealer undercoat multipurpose combo product.
- DFT: Dry film thickness.
- OFC: Off form concrete.
- PDS: Product data sheet.
- PRN: Paint reference number.
- PSU: Primer sealer undercoat multipurpose combo product.
- WFT: Wet film thickness.

Definitions

General: For the purposes of this worksection the definitions given in AS/NZS 2310 and the following apply:

- Gloss: The optical property of a surface, characterised by its ability to reflect light specularly.

- Gloss unit: Numerical value for the amount of specular reflection relative to that of a standard surface under the same geometric conditions.
- Levels of gloss finish: When the specular direction is 60 degrees, surfaces with the following specular gloss reading is defined as follows:
 - . Full gloss: Over 85 gloss units.
 - . Gloss: Over 50 and up to 85 gloss units.
 - . Semi-gloss (satin): Over 20 and up to 50 gloss units.
 - . Low gloss (low sheen): Over 5 and up to 20 gloss units.
 - . Flat finish (matt): Up to 5 gloss units.
- Opacity: The ability of a paint or textured and membrane coating to obliterate the colour difference of a substrate.
- Paint or coating system: A product in liquid form, which when applied to a surface, forms a dry film having protective, decorative or other specific technical properties.
- Primer, prime coat: The first coat of a painting system that helps bind subsequent coats to the substrate and which may inhibit its deterioration.
- Sealer: A product used to seal substrates to prevent the following:
 - . Materials from bleeding through to the surface.
 - . Reaction of the substrate with incompatible top coats.
 - . Undue absorption of the following coat into the substrate.
- Substrate: The surface to which a material or product is applied.
- Undercoat: An intermediate coat formulated to prepare a primed surface or other prepared surface for the finishing coat.

1.7 SUBMISSIONS

Products and materials

General: Dulux coatings systems have been selected for this project. Submit the following details at least 3 weeks before the paint is required:

- Paint brand name and product range quality statement.
- Safety data sheets (SDS) showing the health and safety precautions to be taken during application.
- The published recommendations for maintenance.

Subcontractors

Specialist applicators: Submit name and contact details of proposed specialist applicators.

Warranties

Requirement: Submit the coating manufacturer's warranties as follows:

Material warranty: Submit the manufacturer's material warranty as follows:

- Extent: Paintwork generally.
- Terms: Paint systems are suitable for their intended use.
- Warranty period: As defined by the manufacturer.

Material performance warranty: Submit an alternative performance warranty as follows:

- Extent: Protective coatings on structural steel.
- Terms: Submit the performance criteria as defined by the manufacturer.
- Measure: As defined by the manufacturer.
- Warranty period: As defined by the manufacturer.

Timing: Before the application of the paint system.

2 PRODUCTS

2.1 GENERAL

Product substitution

Other products: Conform to PRODUCTS, **GENERAL, Substitutions** in 0171 General requirements.

Storage and handling

General: Store materials not in use in tightly covered containers in well-ventilated areas with temperatures maintained at the manufacturer's recommendations.

Delivery: Deliver paints to the site in the manufacturer's labelled and unopened containers.

Product identification

General: Marked to show the following:

- Manufacturer's identification.
- Product brand name.
- Product type.
- Quantity.
- Product reference code and batch number.
- Date of manufacture.

2.2 PAINTING MATERIALS**Combinations**

General: Do not combine paints from different manufacturers in a paint system. Dulux paint products and coating systems have been selected and specified for this project. Any unauthorised product substitution will void the warranties.

Clear timber finish systems: Provide only the combinations of putty, stain and sealer recommended by the manufacturer of the top coats.

Tinting

General: Provide only products which are colour tinted by the manufacturer or supplier.

Toxic ingredients

General: To the *Poisons Standard (SUSMP)* Part 2 Section 7.

Standards

Paint types: Conform to the Australian Standard referenced in the **OCP/Dulux paint type reference table**.

DuluxGroup/Dulux paint type reference table legend**Key:**

ASU = Acrylic Sealer/Undercoat.

NE = No Equivalent.

PSU = Primer/Sealer/Undercoat.

Low VOC products are noted in the Table.

^ Use is discouraged in favour of water based paints because of environmental concerns.

These paints have either limited availability or low requirement in the Building Industry.

DuluxGroup/Dulux paint type reference table

Paint type	DuluxGroup/Dulux material description	Dulux PDS No.	PRN AS/NZS 231 1 (Table 4.2)	Standard
Semi-gloss solvent-borne: interior	Dulux Super Enamel Semi-Gloss	DD0028	B3	AS 3730.5
Semi-gloss water-borne, interior /exterior trim (alt B8b)	Dulux Aquanamel Semi Gloss (low VOC)	DD1281	B41	AS 3730.2
Gloss solvent-borne: aerosols	Dulux Spray Pak	DD0009	B4#	NE
Full gloss solvent-borne: exterior	Dulux Super Enamel Full Gloss Dulux Metalshield Premium UV Resistant High Gloss	DD0026 LI 011	B5a	AS 3730.6
Full gloss	Dulux Super Enamel Full Gloss	DD0026	B5b	AS 3730.6

Paint type	DuluxGroup/Dulux material description	Dulux PDS No.	PRN AS/NZS 231 1 (Table 4.2)	Standard
solvent-borne: interior				
Full gloss waterborne interior/exterior trim (alt B9b)	Dulux Aquanamel Gloss (low VOC)	DD1282	B42	AS 3730.2
Flat latex: interior ceilings	Dulux White Ceiling Paint (low VOC)	DD0225 1	B6a	AS 3730.1
Flat latex: interior ceilings (tinted colours)	Dulux Enviro ₂ Tintable Ceiling Flat (low VOC)	DD1466	B6a	AS 3730.1
Low gloss latex: exterior	Dulux Weathershield Low Sheen Acrylic	DD0053	B7b	AS 3730.8
Low gloss latex: interior	Dulux Wash&Wear Low Sheen Acrylic (low VOC)	DD0207 0	B7a	AS 3730.3
	Dulux Wash&Wear +Plus Kitchen & Bathroom Low Sheen (low VOC)	DD0207 4		
Low gloss latex: interior	Dulux Professional Steriguard Acrylic Low Sheen	DD0199 0	B7a	AS 3730.3
Semi-gloss latex: exterior	Dulux Weathershield Semi Gloss Acrylic	DD0037	B8b	AS 3730.9
Semi-gloss latex: interior	Dulux Wash&Wear Semi Gloss Acrylic (low VOC)	DD0207 1	B8a	AS 3730.2
	Dulux Wash&Wear +Plus Kitchen & Bathroom Semi Gloss (low VOC)	DD0207 5		
Semi-gloss waterborne latex: interior	Dulux Professional Steriguard Water Based Enamel Semi Gloss	DD0199 3	B42	AS 3730.2
Gloss latex: exterior	Dulux Weathershield Gloss	DD0054	B9b	AS 3730.10
Gloss latex: interior	Dulux Wash&Wear Gloss	DD0207 2	B9a	AS 3730.12
Gloss waterborne interior/exterior trim (alt B9a/B9b)	Dulux Aquanamel Gloss (low VOC)	DD1282	B42	AS 3730.1
Gloss waterborne latex: interior	Dulux Professional Steriguard Water Based Enamel Gloss	DD0199 2	B42	AS 3730.1
Wood primer, solvent-borne	Dulux 1 Step Oil Based Primer Sealer Undercoat	DD1698	B10	AS 3730.13
Wood primer, latex	Dulux 1 Step Acrylic Primer Sealer Undercoat	DD0247 9	B10a	AS 3730.17

Paint type	DuluxGroup/Dulux material description	Dulux PDS No.	PRN AS/NZS 2311 (Table 4.2)	Standard
Metal primer for steel – solvent-borne	Dulux Metalshield All Surface Primer	DI1640	B11	AS 3730.21
Metal primer, latex (domestic)	Dulux Precision All Metal Primer (water based, low VOC)	DD02166	B11a#	AS 3730.15
Metal primer for zinc-coated surfaces, latex	Dulux Professional Galvanised Iron Primer (water based, low VOC)	DD0156	B12a	AS 3730.15
Metal primer for non ferrous metals (domestic)	Dulux Precision All Metal Primer (water based, low VOC)	DD02166	B13	AS 3730.17
Zinc-rich organic binder/primer for steel	Dulux Zinc Rich 1P Primer	DI0541	B14	AS 3730.9
Concrete and masonry sealer	Dulux Sealer Binder Dulux Acratex Acraprime 501/2 Berger Gold Label Acrylic Block Filler	DD02165 DA0442 DD0217	B15	AS 3730.22
Clear low viscosity paint for concrete	Dulux AquaTread Concrete Sealer (low VOC) Dulux Luxafloor WB Acrylic Dust Sealer Gloss	DD1187 DC02643	B15a	NE
Moisture resistant plasterboard sealer binder	Dulux 1 Step Acrylic Primer Sealer Undercoat (low VOC)	DD02479	B15a	AS 3730.18
Concrete and masonry, latex wallboard sealer, sealer/undercoat,	Dulux Acrylic Sealer Undercoat (low VOC) Dulux 1 Step Acrylic Primer Sealer Undercoat (low VOC)	DD1402 DD02479	B16	AS 3730.18
Undercoat, solvent-borne	Dulux 1 Step Oil Based Primer Sealer Undercoat	DD1698	B17	AS 3730.14
Undercoat, latex: exterior	Dulux 1 Step Acrylic Primer Sealer Undercoat (low VOC) Dulux Acratex Water Based 501/1	DD02479 DD0441	B17a	AS 3730.18
Undercoat, latex: interior	Dulux 1 Step Acrylic Primer Sealer Undercoat (low VOC) Dulux Acrylic Sealer Undercoat (low VOC)	DD02479 DD1402	B17a	AS 3730.18
Wood Stain - spirit	Feast Watson Proof tint	DW0729	B18	NE

Paint type	DuluxGroup/Dulux material description	Dulux PDS No.	PRN AS/NZS 231 1 (Table 4.2)	Standard
Wood Stain - oil	Feast Watson Liming White Cabot's Interior Stain Oil Based	DW0749 DW0661	B18	
Wood Stain - latex	Intergrain UltraDeck® Timber Stain (interior/exterior) (low VOC) Cabot's Interior Stain Water Based	DW0261 3 DW1636	B18a	NE
Interior clear varnish, solvent-based, one-pack	Feast Watson Floorclear – Gloss, Satin Feast Watson Clear Varnish – Gloss, Satin, Matt – not suitable for floors Feast Watson Stain & Varnish – not suitable for floors Feast Watson Stain & Varnish Liming White – Gloss, Satin – not suitable for floors	DW0736 DW0737 DW1611 DW1612 DW1617 DW1295 DW0180 4 DW0180 5	B19	AS 3730.25 or AS 3730.27 (for floors)
Interior clear latex varnish, water-based, one-pack	Cabot's Cabothane Clear Water Based Gloss, Satin or Matt (low VOC) – not suitable for floors Feast Watson Liming White Floor Finish Cabot's Stain & Varnish Water Based Gloss, Satin – not suitable for floors	DW1644 DW1645 DW0186 7 DW0180 0 DW1634 DW1635	B19a	NE or AS 3730.27 (for floors)
Floor varnish, solvent based, clear (moisture cure)	Feast Watson Commercial Maxithane – Gloss, Satin	DW0701 DW0703	B20	AS 3730.27
Floor Varnish, water-based, one-pack	Intergrain Enviropro Endure 1 Pack - Matt, Satin, Gloss (low VOC)	DW1418 DW1419 DW1420	B20	AS 3730.27
Floor varnish, clear or tinted, two-pack	Intergrain Enviropro Endure 2 Pack - Gloss, Satin, Matt	DW1421 DW1422 DW1423	B20	AS 3730.27
Exterior latex stain, semi-transparent	Intergrain UltraDeck® Timber Stain (low VOC)	DW0261 3	B22	AS 3730.16
Fence stain, latex paints,	Dulux Weathershield Garden Shades – Low Sheen	DD0055	B22b	AS 3730.16

Paint type	DuluxGroup/Dulux material description	Dulux PDS No.	PRN AS/NZS 2311 (Table 4.2)	Standard
opaque	Cabot's Timbercolour Deck & Exterior Paint	DW02256		
Exterior stain, solvent-borne, opaque	Feast Watson Timber & Deck Stain	DW01894	B23#	AS 3730.28
Exterior stain, solvent-borne, semi-transparent	Feast Watson Exterior Stain & Varnish Gloss	DW02468	B23a	NE
Paving paint for concrete, solvent	Berger Jet Dry Paving Paint range	DD0081	B24	AS 3730.29
Paving paint for concrete, latex	Berger Jet Dry Aqua Tread Satin	DD1163	B24a	NE
Roofing paint, latex (Solar reflectance)	Dulux AcraTex 962 COOLROOF with InfraCOOL Technology™	DA1471	B25	
Intumescent paints	Dulux Protective Coatings	Protective Coatings link	B28#	NE
Epoxy paint, two-pack, solvent-borne topcoats, interior only	Dulux Durebild STE 2 Pack Epoxy (high build & surface tolerant) Dulux Duremax GPE	DI1109 DI1115	B29	AS/NZS 3750.1
Epoxy paint, two-pack, solvent-borne topcoats, exterior & pools		N/A	B29	AS/NZS 3750.1
Epoxy paint, two-pack, water based, interior only	Dulux Luxafloor ECO2 (low VOC) Dulux Enviropoxy WBE	I1315 DI1120	B29a	NE
High Build Recoatable two-pack, solvent-borne gloss polyurethane	Dulux Weathermax HBR Luxathane HPX	DI1156 DC02059	B29c B29c	NE
Stain sealer, solvent-borne for water soluble stains	Dulux Precision High Opacity Stain Blocker	DD02065	B30	NE
Stain sealer, water based for oil stains	Dulux Precision Maximum Strength Adhesion Primer	DD02066	B30	

Paint type	DuluxGroup/Dulux material description	Dulux PDS No.	PRN AS/NZS 231 1 (Table 4.2)	Standard
Chalk sealer, surface conditioner	Dulux Sealer Binder Dulux Acraprime Solvent Based Primer	DD02165 DA0442	B31	NE
Anti-mould (treatment or wash for timber)	Intergrain Mould Preventer	DW01967	B32	NE
Water-repellent for masonry	Dulux AquaBan	DD0002	B33	NE
Creosote stain	No longer used	N/A	B35	NE
Paint remover, solvent-borne	Selleys Polystrippa Paint Stripper	Poly	B36a	NE
Paint remover, chemical	Selleys Polystrippa Renovators' Choice	Poly	B36b	NE
Bituminous paints	No longer used	N/A	B37	NE
High build membrane or texture coatings for masonry and concrete: exterior	Dulux Acratex Range	Acratex	B38b	AS/NZS 4548.1 AS/NZS 4548.2 AS/NZS 4548.3 AS/NZS 4548.4
Texture finish latex coatings for masonry and plasterboard: interior only	Dulux Effects Range (interior)	Effects range link	B38a	NE
Clear or colourless coatings (waterborne) for timber, exterior	Intergrain UltraClear Exterior – Gloss, Satin Note: not suitable for decking.	DW1401 DW1400	B39	NE
Clear coatings (waterborne) for timber, interior	Cabot's Cabothane Clear Water Based Gloss, Satin & Matt (low VOC)	DW1644 DW1645 DW01867	B39	NE
Clear or colourless coatings (waterborne) for timber, interior floors	Intergrain Enviropro Endure 1 Pack - Matt, Satin, Gloss (low VOC) Intergrain Enviropro Endure 2 Pack - Matt, Satin, Gloss	DW1420 DW1419 DW1418 DW1423 DW1422 DW1421	B39	AS 3730.27
Sanding sealer	Feast Watson Sanding Sealer	DW0744	B40	NE
Semi-gloss	Dulux Aquanamel Semi-Gloss	DD1281	B41	NE

Paint type	DuluxGroup/Dulux material description	Dulux PDS No.	PRN AS/NZS 231 1 (Table 4.2)	Standard
latex, interior trim (alt B8b)	(low VOC)			
Gloss or full gloss latex, interior trim	Dulux Aquanamel Gloss (low VOC)	DD1282	B42	NE
Penetrating tung oil type varnish or wax for timber floors: interior	Intergrain Enviropro Hard Wax Oil 0769 Feast Watson Tung Oil	DW0253 3 DW0733	B43	NE
Penetrating tung oil type varnish for timber floors: exterior	Intergrain Nature's Timber Oil Feast Watson Traditional Timber Oil	DW0769 DW0179 5	B43	NE
Gloss pigmented polyurethane	Dulux Luxathane R Dulux Luxathane HPX Dulux Weathermax HBR	DD1137 DC0205 9 DI1156	B44	AS/NZS 3750.6
Powder coatings for non-ferrous metals	Dulux Powder Coat Range		B45b	AS 3715
Powder coatings for ferrous metals	Dulux Powder Coat Range (www.duluxpowders.com.au)		B45b	AS 4506

Low VOC compliance reference table

Green Star Interiors	VOC Limits MAX g/litre	DULUX Products compared to the GBCA specification	VOC g/litre Untinted
COMPLIANCE CRITERIA – GBCA specifications (obtain latest figures).			
Walls and ceilings - interior semi-gloss	16	Dulux Enviro ₂ Interior Semi-Gloss	1
Walls and ceilings - interior semi-gloss	16	Dulux Wash&Wear Semi Gloss Dulux Wash&Wear +Plus Kitchen&Bathroom Semi Gloss	16 16
Walls and ceilings - interior low sheen	16	Dulux Enviro ₂ Interior Low Sheen	1
Walls and ceilings - interior low sheen	16	Dulux Wash&Wear Low Sheen Dulux Wash&Wear +Plus Kitchen& Bathroom Low Sheen	16 16
Walls and ceilings - interior flat-washable	16	Dulux Enviro ₂ Interior Matt	1
Ceilings - interior flat	14	Dulux Enviro ₂ Interior Tintable ceiling Flat	1

Green Star Interiors	VOC Limits MAX g/litre	DULUX Products compared to the GBCA specification	VOC g/litre Untinted
Ceilings - interior flat	14	Dulux White Ceiling Paint	14
Trim - interior gloss	75	Dulux Aquanamel Gloss Dulux Professional Steriguard Water Based Enamel Gloss	50 74
Trim - interior semi-gloss	75	Dulux Aquanamel Semi Gloss Dulux Professional Steriguard Water Based Enamel Semi Gloss	53 74
Trim - interior semi-gloss	75	Dulux EnvirO ₂ Water Based Enamel Semi Gloss	1
Timber primer	30	Dulux Acrylic Sealer Undercoat	5
Latex primer for galvanized iron and zincalume NOT FOR HDG	60	Dulux Professional Total Prep	45
Latex primer for galvanized iron and zincalume NOT for HDG	60	Dulux Professional Galvanised Iron Primer	< 60
Interior latex undercoat	65	Dulux EnvirO ₂ Acrylic Sealer Undercoat (ASU)	1
Interior latex undercoat	65	Dulux Prepcoat Acrylic Sealer Undercoat	< 5
Exterior latex undercoat	65	Dulux 1 Step Acrylic Primer Sealer Undercoat (PSU) Dulux Professional Total Prep	<37 45
Interior sealer	65	Dulux EnvirO ₂ Acrylic Sealer Undercoat (ASU)	1
Interior concrete sealer	65	Dulux Luxafloor Eco2 (clear) + colours Dulux Luxafloor WB (Clear) + colours	10 10
One and two pack performance coatings for floors	140	Dulux Luxafloor Eco2 concrete Dulux Luxafloor WB concrete Intergrain Enviropro Timber Endure One Pack Intergrain Enviropro Timber Endure Two Pack	10 10 <90 <135 (Part A & B)

3 EXECUTION

3.1 PREPARATION

Standard

General: To AS/NZS 2311 Section 3.

Order of work

Other trades: Before painting, complete the work of other trades as far as practicable within the area to be painted, except for the installation of fittings, floor sanding and laying flooring materials.

Clear finishes: Complete clear timber finishes before commencing opaque paint finishes in the same area.

Protection

General: Before painting, clean the area and protect it from dust contamination. Use drop sheets and masking agents to protect surfaces, including finished surfaces and adjacent finishes, during painting.

Fixtures and furniture: Remove door furniture, switch plates, light fittings and other fixtures before painting, and conform to the following:

- Labelling and storage: Attach labels or mark fixtures using a non-permanent method, identifying location and refixing instructions, if required. Store and protect against damage.

Difficult to remove fixtures: Where removal is impractical or difficult, apply surface protection before substrate preparation and painting.

Substrate preparation – generally

General: Prepare substrates to receive the documented paint system.

Cleaning: Clean down the substrate surface. Do not cause damage to the substrate or the surroundings.

Filling: Fill cracks and holes with fillers, sealants, putties or grouting cements as appropriate for the finishing system and substrate, and sand smooth.

- Clear finish: Provide filler tinted to match the substrate.

Clear timber finish systems: Prepare the surface so that its attributes will show through the clear finish without blemishes, using methods including the following:

- Removal of bruises.
- Removal of discolourations, including staining by oil, grease and nailheads.
- Bleaching where necessary to match the timber colour sample.
- Puttying.
- Fine sanding, with the last abrasive no coarser than 220 grit, so that there are no scratches across the grain.

Treated surfaces: If surfaces have been treated with preservatives or fire retardants, make sure the paint system is compatible with the treatment and does not adversely affect its performance.

Iron and steel: Remove weld spatter, slag, burrs, or any other objectionable surface irregularities and radius all edges to a minimum of 2 mm. Degrease by solvent or alkaline cleaning.

Iron and steel blast cleaning: To AS 1627.9 and to the class specified in the specified protective treatment. Provide a surface roughness or profile appropriate for the specified treatment. Where steelwork to be abrasive cleaned includes irregular shapes allow for special equipment to achieve required abrasive cleaning.

Structural steel: All exposed fixings including bolts, screws and the like, are to be painted to match adjacent steelwork paint system.

Concrete and masonry: Before application to very smooth concrete, brick or masonry, either acid etch, mechanically grind or abrasive track blast the surface as appropriate to provide a suitable key for the subsequently applied coating and to remove laitance. Remove loose friable matter before filling surface discontinuities.

Set plaster surfaces: Do not apply solvent borne paint or other impervious coatings if the moisture content at the surface, tested with a moisture meter, exceeds 12%.

Unpainted surfaces

Standard: To AS/NZS 2311 Section 3.

Previously painted surfaces

Preparation of steel substrates with protective coatings: To AS 2312.1 Section 8 and AS 1627.1.

Reconditioned damaged surfaces in galvanized steel: To AS/NZS 4680 clause 8.

Cleaning external surfaces

Sound external surfaces other than timber: Remove dirt, grease, loose and foreign matter, efflorescence and mould by water blasting or steam cleaning without damaging the surface. Remove

remaining loose material with hand tools. Use sanding blocks to preserve the arrises of masonry and stone details.

Efflorescence: Eliminate the source of salt and water before cleaning. Allow surface to dry for 15 to 30 days before repainting.

New masonry: Allow 30 days for the masonry to cure and pH level to stabilise before painting.

3.2 PAINTING SYSTEMS

Dulux paint systems

Requirement: Apply paint systems as documented in the **Interior painting schedule** and the **Exterior painting schedule**.

General: Apply the paint system nominated for each substrate to the referenced manufacturer's Product Data Sheets (PDS) and Spec Sheets and include:

- The number and order of coats.
- The paint type for each coat.

Additional coats: Apply if necessary to:

- prepare porous or reactive substrates with prime or seal coats consistent with the manufacturer's recommendations;
- achieve the total film thickness or texture specified; or
- achieve a satisfactory opacity, in the specified or required colour.

Painting systems

Standards: The scheduled DuluxGroup/Dulux paint systems override AS/NZS 2311 as follows:

- New unpainted interior surfaces: To AS/NZS 2311 Table 5.1.
- New unpainted exterior surfaces: To AS/NZS 2311 Table 5.2.
- Standard: To AS/NZS 2311 clause 5.2. Provide the following final coats:
 - . High build textured or membrane finishes for concrete and masonry: B38 using products conforming to the AS 4548 series.
 - . Two-pack gloss pigmented polyurethane: B44.
 - . Two-pack epoxy: B29.
 - . Two-pack water based epoxy: B29A.

Paint Reference Number (PRN): The number in brackets against the individual product refers to the Paint Ref. No. (PRN) listed in the **DuluxGroup/Dulux paint type reference table** (See **PRODUCTS**) and AS/NZS 2311 Table 4.2.

3.3 APPLICATION

Standard

General: To AS/NZS 2311 Section 6.

Light levels

General: During preparation of surfaces, painting and inspection, maintain light levels such that the luminance (photometric brightness) of the surface is equal to the specified permanent artificial illumination conditions or 400 lux, whichever is the greater.

Substrate moisture content

Requirement: Use a moisture meter to demonstrate that the moisture content of the substrate is at or below the recommended maximum level for the type of paint and the substrate material.

Paint application

General: Apply the first coat immediately after substrate preparation and before contamination of the substrate can occur. Apply subsequent coats after the manufacturer's recommended drying period has elapsed.

Painting conditions

General: Unless the paint is recommended for such conditions, do not paint under the following conditions:

- Dusty conditions.
- Relative humidity: > 85%.
- Surface temperature: < 10 °C or > 35 °C.

Priming timber before fixing

General: Apply one coat of wood primer, and 2 coats to end grain, to the back of the following before fixing in position:

- External fascia boards.
- Timber door and window frames.
- Bottoms of external doors.
- Associated trims and glazing beads.
- Timber board cladding.

Spraying

General: If the paint application is by spraying, use conventional or airless equipment which conforms to the following:

- Satisfactorily atomises paint being applied.
- Does not require paint to be thinned beyond the maximum amount recommended by the manufacturer.
- Does not introduce oil, water or other contaminants into the applied paint.

Paint with known health hazards: Provide personal protection, masking, ventilating and screening facilities to AS/NZS 4114.

Sanding

Clear finishes: Sand the sealer using abrasives no coarser than 320 grit without cutting through the colour. Take special care with round surfaces and edges.

Repair

Requirement: Clean off marks, paint spots and stains progressively and restore damaged surfaces to their original condition.

Maintenance painting: To AS/NZS 2311 Section 8.

Repair of galvanizing

Cleaning: For galvanized surfaces which have been subsequently welded, power tool grind to remove all surface contaminants, including rust and weld splatter. Prime affected area immediately after cleaning.

Primer: Type 2 organic zinc-rich coating for the protection of steel to AS/NZS 3750.9.

Tinting

General: Tint each coat of an opaque coating system so that each has a noticeably different tint from the preceding coat where possible, except for top coats in systems with more than one top coat.

Services

General: Paint all new services and equipment, including those in plant rooms, if not embedded, except chromium, anodised aluminium, GRP, PVC-U, stainless steel, non-metallic flexible materials and normally lubricated machined surfaces.

Proprietary items: Repaint only if damaged.

Windows

Operation: Make sure opening windows function correctly before and after painting.

Doors

Drying: Maintain door leaf in the open position during drying. Do not allow door hardware or accessories to damage the door finish during the drying process.

Wet paint warning

Notices: Place in a conspicuous location and do not remove until the paint is dry.

Exclusions

Exclude the following surfaces from paint systems (unless specifically requested):

- Flexible duct connections, rubber hoses and mountings and other non-metallic flexible fittings.
- Wire rope and machined surfaces.
- Metals plated or specially finished for appearance, bronze, brass, copper and stainless steel (except as specified in the *Pipe identification* clause of the *Services* worksections).
- Aluminium frames.
- Prefinished aluminium frames to windows and doors, and trim.

- Metal floor duct covers.
- Raised access floors.
- Floors.
- Fair faced brickwork, blockwork, stonework, artificial stone and exposed aggregates.
- Sprayed vermiculite.
- Floors, paving, roads unless otherwise specified.
- Timber roof structure.
- Concealed timber roof structure.
- Timber ceiling and eaves lining.
- Exterior timber sheeting.
- Exterior timber stairs and decking.
- Plastic finishes generally
- Inside of service ducts, heat exchangers, pipes and valves.
- Shower seats, store shelving, work benches.
- Those parts of timber fixtures, such as insides of cupboards, not visible when doors are closed, unless otherwise specified. Insides of bathroom cabinets are not excluded and shall be painted.
- Self-finished surface such as glass and plastic laminates.
- Door hardware, including hinges.

3.4 COMPLETION

General

Protection and masking: Remove masking and protection coverings before paint has dried.

Cleaning: On completion of painting, remove splatters from adjacent finished surfaces by washing, scraping or other methods which do not scratch or damage the surface.

Reinstatement: Repair, replace or refinish any damage, including works of other trades. Touch up new damaged paintwork or misses only with the paint batch used in the original application.

Fixtures: Refix removed and undamaged fixture in the original location, make sure they are properly fitted and in proper working order.

Disposal of paint and waste materials

Requirement: Conform to requirements of the local government authority.

Spares

Spare material: Supply clearly labelled sealed containers of each type, coat and colour of paint/coating from the same batch, for future repair purposes.

4 SELECTIONS

Refer Dulux Project Specification.

0672 TEXTURED AND MEMBRANE COATINGS
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1 GENERAL**1.1 RESPONSIBILITIES****General**

Requirement: Provide coating systems to substrates, as documented.

Performance

Requirement:

- Consistent in colour, gloss level, texture and dry film thickness.
- Free of runs, sags, blisters, or other discontinuities.
- Fully opaque coating systems.
- Clear finishes at the level of transparency consistent with the product.
- Fully bonded.
- Resistant to environmental degradation within the manufacturer's stated life span.
- Accommodating movement in the substrate between control joints
- Non-combustible to comply with NCC..

1.2 CROSS REFERENCES**General**

Requirement: Conform to the following:

- 0171 General requirements.

1.3 STANDARDS**Textured and membrane coatings**

General: Comply with the recommendations of those parts of AS/NZS 2311 which are referenced in this worksection.

1.4 INTERPRETATION**Definitions**

General: For the purposes of this worksection the following definitions apply:

- Aggregate filled textured latex coating: An aggregate filled medium to high profile textured coating selected for aesthetic purposes to provide maximum relief from underlying surface irregularities according to the application technique used.
- Gloss: The optical property of a surface, characterised by its ability to reflect light specularly.
- Gloss unit: Numerical value for the amount of specular reflection relative to that of a standard surface under the same geometric conditions.
- High-build low profile latex coating: A water based coating designed to be used over textured coatings to increase the exposure performance of the system.
- Latex extensible wall coating (or membrane coating): A non-aggregate flexible watertight finish.
- Levels of gloss finish: When the specular direction is 60 degrees, surfaces with the following specular gloss reading is defined as follows:
 - . Full gloss: Over 85 gloss units.
 - . Gloss: Over 50 and up to 85 gloss units.
 - . Semi-gloss (satin): Over 20 and up to 50 gloss units.
 - . Low gloss (low sheen): Over 5 and up to 20 gloss units.
 - . Flat finish (matt): Up to 5 gloss units.
- Non-aggregate textured latex coating: A latex coating selected for aesthetic purposes to provide decorative profiles according to the application technique used.
- Opacity: The ability of a paint or textured and membrane coating to obliterate the colour difference of a substrate.

- Paint or coating system: A product in liquid form, which when applied to a surface, forms a dry film having protective, decorative or other specific technical properties.
- Primer, prime coat: The first coat of a painting system that helps bind subsequent coats to the substrate and which may inhibit its deterioration.
- Substrate: The surface to which a material or product is applied.
- Undercoat: An intermediate coat formulated to prepare a primed surface or other prepared surface for the finishing coat.

1.5 SUBMISSIONS

Operation and maintenance manuals

Requirement: At completion, submit the manufacturer's published use, care and maintenance instructions.

Products and materials

General: Submit the selected manufacturer's details at least 3 weeks before the coating is required, as follows:

- Coating brand name.
- Product data sheets.

Samples

General: Submit labelled samples of each coating system, on representative substrates, showing surface preparation, colour, gloss level, texture, and physical properties.

Coated samples schedule

Substrate	Coating system	Colour/texture	Sample size
Concrete blockwork	Refer Dulux specification- Spec AUSA5059	Dulux "Ecru" S15D1	300 x 300mm
Concrete blockwork	Refer Dulux specification- Spec AUSA5059	Dulux "Domino" SG6G8	300 x 300mm
Concrete blockwork	Refer Dulux specification- Spec AUSA5059	Dulux "Sunshine Surprise" PB1B2	300 x 300mm

Subcontractors

General: Submit name and contact details of proposed specialist applicators.

Substrate acceptance: Submit evidence of applicator's acceptance of the coating substrate before starting installation.

Warranties

Requirement: Submit warranties to **COMPLETION, Warranties.**

2 PRODUCTS

2.1 GENERAL

Delivery

General: Deliver coatings to the site in the manufacturer's labelled and unopened containers.

Storage and handling

General: Store materials not in use in tightly covered containers in well-ventilated areas with temperatures maintained at the manufacturer's recommendations.

2.2 COATINGS

Standards

Coating types:

- Wall coatings - latex extensible: To AS/NZS 4548.1.
- Latex finish coatings – high-build, low profile: To AS/NZS 4548.2.

- Latex – textured coatings – non aggregate: To AS/NZS 4548.3.
- Latex – textured coatings – aggregate filled: To AS/NZS 4548.4.

Combinations

General: Do not combine coatings from different manufacturers in a coating system.

Tinting

General: Provide only products which are colour tinted by the manufacturer.

Toxic ingredients

General: To the *Poisons Standard (SUSMP)* Part 2 Section 7.

3 EXECUTION

3.1 PREPARATION**Standard**

General: To AS/NZS 2311 Section 3.

Order of work

Other trades: Before applying textured and membrane coatings, complete the work of other trades as far as practicable within the area to be coated.

Protection

Fixtures: Remove door furniture, switch plates, light fittings and other fixtures before starting coating, and refix in position undamaged on completion of the coating.

Adjacent surfaces: Protect adjacent finished surfaces liable to damage from coating operations.

Substrates

General: Prepare substrates to receive the coating systems.

Cleaning: Clean down the substrate surface. Do not cause undue damage to the substrate or damage to, or contamination of, the surroundings.

Filling: Fill cracks and holes with fillers, sealants or grouting cements as appropriate for the coating system and the substrate.

Moisture content: Use a moisture meter to demonstrate that the moisture content of the substrate is at or below the recommended maximum level for the type of coating and the substrate material.

Wet paint warning

General: Place notices conspicuously and do not remove them until the coating is dry.

3.2 APPLICATION**Proprietary coating systems**

General: Apply the complete coating system to the manufacturer's recommendations.

Standard

Methods of application: To AS/NZS 2311 Section 6.

Light levels

General: ≥ 400 lux.

Coating conditions

General: Unless the coating system is recommended by the manufacturer for such conditions, do not apply under the following conditions:

- Dusty conditions.
- Relative humidity: $> 85\%$.
- Surface temperature: $< 10^{\circ}\text{C}$ or $> 35^{\circ}\text{C}$.

Coating application

Timing: Apply the first coat immediately after substrate preparation and before contamination of the substrate can occur. Apply subsequent coats after the manufacturer's recommended drying period has elapsed.

Spraying

Coatings with known health hazards: Not permitted on site.

Repair

General: Clean off marks, coating spots and stains progressively and restore damaged surfaces to their original condition.

3.3 COMPLETION

Cleaning

General: On completion of coatings, remove splatters by washing, scraping or other methods which do not scratch or damage adjacent finished surfaces.

Reinstatement: Repair, replace or refinish any damage, including works of other trades. Touch up new damaged coatings or misses with the coating product batch used in the original application.

Fixtures: Refix removed and undamaged fixtures in their original location, make sure they are properly fitted and in proper working order.

Disposal of products and waste materials

Requirement: Conform to requirements of the local government authority.

Warranties

Requirement: Provide the coating manufacturer's warranty.

Interlocking performance warranty: Provide an interlocking performance warranty that includes materials and application:

- Form: Against failure of materials and execution under the normal environment and use conditions.

4 SELECTIONS

Refer Dulux Project Specification.

0673 POWDER COATINGS

1 GENERAL**1.1 RESPONSIBILITIES****General**

Requirement: Provide powder coating systems to substrates, as documented.

1.2 CROSS REFERENCES**General**

Requirement: Conform to the following:

- 0171 General requirements.

1.3 STANDARDS**General**

Application to aluminium and aluminium alloy substrates for architectural applications: To AS 3715 and AAMA 2603, AAMA 2604 and AAMA 2605 as appropriate.

Application to metal substrates other than aluminium for architectural applications: To AS 4506.

1.4 INTERPRETATION**Definitions**

General: For the purposes of this worksection the following definitions apply:

- Powder coating: The process of preparing, applying, fusing and curing a thermoset powder coating material to a substrate:
 - . Thermoset powder coating: A mixture of finely ground particles of pigment and resin sprayed on to a prepared substrate. Charged powder particles adhere to electrically grounded surfaces until heated and fused into a smooth coating in a curing oven.
 - . Polyester powder coating: Uses an enhanced polyester resin.
 - . Fluoropolymer powder coating: Uses PTFE (poly tetra fluoro ethylene) for aluminium substrates.
- Substrate: The surface to which a material or product is applied.

1.5 SUBMISSIONS**Products and materials**

Coating manufacturer: Submit the following details at least 3 weeks before fabrication:

- Recommended coating system for the nominated service condition.
- Brand name.
- Storage and handling recommendations.
- Product data sheets.
- Maintenance recommendations.

Samples

Powder coating samples: Submit samples of each coating system on representative substrates, showing surface preparation, colour, gloss level, texture, and physical properties.

Coated samples schedule

Substrate	Coating system	Colour/texture	Sample size/Number
Aluminium	Duratec	Zeus Timberland Satin 90Z7315S	300 x 300mm
Aluminium	Duratec	Zeus Matt Canvas Cloth 90077327M	300 x 300mm
Aluminium	Duratec	Sunshine Gloss 90N2084G	300 x 300mm

Subcontractors

Specialist applicators: Submit name and contact details of proposed specialist applicators as registered by the coating manufacturer.

Warranties

General: Submit the coating manufacturer's warranties, as documented. Duratec – 20 year durability warranty.

2 EXECUTION

2.1 PREPARATION

Substrate pre-treatment

Powder coating to aluminium: To AS 3715 Appendix G.

Powder coating to metals, other than aluminium: To AS 4506 Appendix I.

2.2 COMPLETION

Cleaning

Aluminium architectural applications: Clean completed assembly to AS 3715 Appendix C.

Metal, other than aluminium, architectural applications: Clean completed assembly to AS 4506 Appendix D.

0811S SANITARY FIXTURES

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide sanitary fixtures, as documented.

1.2 STANDARDS

General

Design for access and mobility: AS 1428.1 and AS 1428.2.

2 PRODUCTS

2.1 GENERAL

Authorised products

Standard: Listed in the WaterMark Product Database, unless otherwise required by the Network Utility Operator.

Labelling

Water efficiency labelling: Provide only products conforming to and labelled to the Water Efficiency Labelling Scheme (WELS).

3 EXECUTION

3.1 SANITARY FIXTURES

General

Requirement: Install to manufacturer's recommendations.

4 SELECTIONS

Refer Schedule 3 – Hydraulic FFE Schedule

0812S TAPWARE

1 GENERAL

1.1 RESPONSIBILITIES**General**

Requirement: Provide tapware, as documented.

1.2 STANDARDS**General**

Design for access and mobility: To AS 1428.1 and AS 1428.2.

2 PRODUCTS

2.1 GENERAL**Authorised products**

Requirement: Listed in the WaterMark Product Database, unless otherwise required by the Network Utility Operator.

Labelling

Water efficiency labelling: Provide only products conforming to and labelled to the Water Efficiency Labelling Scheme (WELS).

3 EXECUTION

3.1 TAPWARE**General**

Requirement: Install to manufacturer's recommendations.

4 SELECTIONS

4.1 TAPWARE

Refer Schedule 3 – Hydraulic FFE Schedule

