Penrith Regional Gallery Café Kitchen

Architectural Specification

88 River Road, Emu Plains NSW 2750

Revision	Date	Approved by
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1 GENERAL

1.1 GENERAL

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

Occupied premises

General: For the parts of the site, documented in the **Occupied premises schedule**:

- Allow occupants to continue in secure possession and occupancy of the premises for the required period.
- Maintain safe access for occupants.
- Arrange work to minimise nuisance to occupants and for their safety.
- Protect occupants against weather, dust, dirt, water or other nuisance.

Proposals: Submit details of proposed methods.

- Purpose of submission: Information only.

Occupied premises schedule

Occupants	Occupied premises	Period of occupancy
Gallery staff and patrons	Gallery	Entire duration of the project
Café staff and patrons	Anchor House Kitchen	Entire duration of the project. Anchor House Kitchen to remain operational throughout the entire works

Protection of persons and property

Temporary works: Provide and maintain required hoardings, barricades, guards, fencing, footpaths, signs, lighting, watching 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.

Control of runoff stormwater: Ensure stormwater is controlled so it does not flow onto public areas

Rectification

Accessways, 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.

Interruption 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 areas

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

Conditions for work on adjoining property: Photographic dilapidation survey to include Anchor House Kitchen and immediate surrounds including stone path in front of the Servery and Gallery public toilets.

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 each property described in the **Adjoining properties to be recorded schedule**:

- Inspect the property with the architect and owner and occupant of 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 to Council Project Manager for review and sign off prior to construction commencing on site. Keep the other endorsed copy on site.

- Purpose of submission: Information only.

Adjoining properties to be recorded schedule

Title
Anchor House Kitchen
Stone path in front of servery
Stone path in front of Gallery public toilets

Access roads

Owner's existing roads: Use only designated roads.

Parking

Contractors are to park their vehicles on on-street parking located on River Road. The galleries off-streert parking spaces are not to be used by contractors.

Use of existing services

General: Existing services may be used as temporary services for the performance of the contract subject to conditions of use, as documented in the **Existing services schedule**.

Existing services schedule

Service	Conditions of use
Power	During contract period for construction-related uses
Water	During contract period for construction-related uses

Site Amenities

- Provide Portaloo in Gallery carpark for contractors use.

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).

Number of helmets: 2

Temporary fence

Requirement: Provide suitable fencing to the perimeter of the construction compound. Ensure clear access to café, gallery and toilets is maintained for Gallery and Café patrons.

Project signboards

General: Provide project-specific signboards and the following:

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

1.3 BUILDING THE WORKS

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 owner'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: Updated programmed to be submitted with each progress claim.

Site meetings

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

Frequency: Weekly unless otherwise noted.

Minutes: Council Project Manager to 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.

Progress photographs

General: Take colour progress photographs within 2 working days, before each site meeting. At each site meeting submit the digital files. Identify the date, time, location and orientation. Photographs of new underground services prior to backfill and any services to be concealed to be taken and submitted as a record to the Project Manager.

- Purpose of submission: Information only.

Minimum frequency: As required

Minimum number: 1 copy

Format: JPEG

Persons other than contractor

Facilities: Refer to person other than contractor documentation.

Contractor/person other than contractor interfaces: Refer to person other than contractor documentation.

1.4 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, for each property described in the **Adjoining properties to be recorded schedule**, inspect the property with the architect and owner and occupant of the property, recording any damage that has occurred since the pre-commencement inspection.

Pest eradication

General: Employ suitably qualified pest exterminators. At practical completion, verify that completed works are free of pest types documented in the Request for Tender documents.

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.

1.5 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 (ASMM6).

1.6 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, as documented in the **Prior applications and approvals schedule**.

Prior applications and approvals schedule

Prior notices given and applications made	Fees paid	Permits, approvals and authorisations received
Penrith City Council	Yes	Pending

Authority conditions schedule

Authority	Document	Condition
Penrith City Council	Development Application	Refer to attached Conditions of Consent
Penrith City Council	Construction Certificate	Refer to attached Conditions of Consent

0171 GENERAL REQUIREMENTS

1 GENERAL

1.1 RESPONSIBILITIES

General

Worksections and referenced documents:

The requirements of other worksections of the specification override conflicting requirements of this worksection.

The requirements of the worksections override conflicting requirements of their referenced documents.

The requirements of the referenced documents are minimum requirements.

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

Common requirements

Requirement: Conform to the following worksections:

- *0181 Adhesives, sealants and fasteners.*
- *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, mounting upon a chair, or using a movable ladder, and in any case not more than 2.0 m above the ground, floor or platform.
- 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.
- 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.

- Fire hazard properties: Terminology to BCA A2.4.
- 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 (government) authority: 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 based metal thicknesses.
  - Ferrous open sections zinc coated 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 BCA.
- 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.
- Registered testing authority:
  - An organisation registered by the National Association of Testing Authorities (NATA) to test in the relevant field; or
  - An organisation outside of Australia registered by an authority recognised by NATA through a mutual recognition agreement; or
  - An organisation recognised as being a Registered Testing Authority under legislation at the time the test was undertaken.
- Required: Required by the contract documents, the local council 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, prototypes and sample panels.
- Statutory authority: A public sector entity created by legislation, that is, a specific law of the Commonwealth, State or Territory.
- 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.
- 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.

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.
- 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.
- 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 drawing, evidence of conformance to product certification schemes, performance and rating tables and installation and maintenance recommendations.
- 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.
  - Certificates for type tests.
  - Fire hazard properties: Evidence of conformance of proposed proprietary products to documented requirements for fire hazard properties.
  - Test reports for testing performed under the contract to **EXECUTION**, **TESTING**.
- 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: Penrith City Council's nominated Project Manager

Submission times

Submission response times: Allow in the construction program for at least the following times:

- Shop drawings: 5 days
- Samples and prototypes: 3 days

- Product data: 3 days
- Product/design substitution or modification: 5 days

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. Include service connection requirements and product certification.

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

Transmission medium: Email

1.8 INSPECTION

Notice

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

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

Minimum notice: As documented in the **Notices schedule**.

Light levels

Requirements: To AS/NZS 1680.2.4.

Attendance

General: Provide attendance for documented inspections and tests.

2 PRODUCTS

2.1 GENERAL

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 in conformance with the recommendations of the manufacturer or supplier.

Proprietary items/systems/assemblies: Assemble, install or fix to substrate in conformance with the recommendations of the manufacturer or supplier.

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

Sealed containers

General: 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.

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).
- Materials that use chlorofluorocarbon (CFC) or hydro chlorofluorocarbon (HCFC) in the manufacturing process.

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 equal to or greater than 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.

2.2 MATERIALS AND COMPONENTS

Consistency

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

Corrosion resistance

General: Conform to the following atmospheric corrosivity category as defined in AS 4312 and the AS/NZS 2312 series.

Exterior atmospheric corrosivity category: C3

Interior atmospheric corrosivity category: C1

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).

3 EXECUTION

3.1 SAMPLES

General

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

3.2 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.
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.
Submission medium: Electronic (PDF)
Drawing size: A3 or A1 as applicable
Building work drawings for building services: On dimensioned drawings show all:
- CAD base drawings: DWG (AutoCAD V.2015)

3.3 OFF-SITE DISPOSAL

Removal of material

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

3.4 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 nominated as fire-resistance or acoustic rated.

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

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

Concrete blockwork chasing table

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

3.5 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.

3.6 SERVICES CONNECTIONS

Connections

General: Connect to network distributor services or service points. Excavate to locate and expose connection points. Reinstate the surfaces and facilities that have been disturbed.

Network distributors' requirements

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

3.7 SERVICES INSTALLATION

General

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

Installation: Install equipment and services plumb, fix securely and organise reticulated services neatly. Allow for movement in both structure and services.

Concealment: Unless otherwise documented, conceal all cables, ducts, trays and pipes except where installed in plant spaces, ceiling spaces and riser cupboards. If possible, do not locate on external walls.

Lifting: Provide heavy items of equipment with permanent fixtures for lifting as recommended by the manufacturer.

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

Arrangement: Arrange services so that services running together are parallel with each other and with adjacent building elements.

Dissimilar metals

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

Vibration: Arrange and support piping so that it remains free from vibration whilst permitting necessary movements. 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.

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.

3.8 BUILDING PENETRATIONS

Penetrations

Requirement: Maintain the required structural, fire 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 or conduit penetrates 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 an annular space around the pipe or pipe insulation of at least 12 mm.
- Prime paint ferrous surfaces.
- Terminations:
  - If cover plates are fitted: Flush with the finished building surface.
  - In fire-resisting and acoustic rated building elements: 50 mm beyond finished building surface.
  - In floors draining to floor wastes: 50 mm above finished floor.
  - Elsewhere: 5 mm beyond finished building surface.
  - Termite management: To AS 3660.1.
- Thickness:
  - Metal: 1 mm or greater.
  - PVC-U: 3 mm or greater.

Sleeves for cables: For penetrations of cables not enclosed in conduit through ground floor slabs, beams and external walls provide sleeves formed from PVC-U pipe sections.

3.9 CONCRETE PLINTHS

Construction

General: Provide concrete plinths as documented and under all equipment located on concrete floor slabs as follows:

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

3.10 SUPPORT AND STRUCTURE

General

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

3.11 PIPE SUPPORTS

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 to balance the mass of the pipe and its contents.

Saddles: Do not provide saddle type supports for pipes greater than DN 25.

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 fixings 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

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	9.5
65 to 90	12.7
100 to 125	15.8
150 to 200	19.0

3.12 PLANT AND EQUIPMENT

General

Location: Locate so that 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.

3.13 ACCESS FOR MAINTENANCE

General

Requirement: Provide access for maintenance of plant and equipment.

Standards: Conform to the relevant requirements of AS 1470, AS 1657, AS/NZS 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.

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: Modify manufacturer’s standard equipment when necessary to provide the plant access documented.

Clearances

Minimum clearances for access: Conform to the following:

- ≥ 2100 mm clear vertically above horizontal floors, ground and platforms.
- Preferably ≥ 750 m clear, but in no case less than 600 mm horizontally between equipment or between equipment and building features including walls.
- If tools are required to operate, adjust or remove equipment, provide sufficient space so that the tools can be used in their normal manner and without requiring the user to employ undue or awkward force.
- If equipment components are hinged or removable, allow the space recommended by the manufacturer.
- Within plant items: Conform to the preceding requirements, and in no case 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 that 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 that large and/or heavy items can be moved with the minimum of 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 provide access for maintenance, arranged so it can be repeatedly removed and replaced 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 that 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 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. Arrange plant so that, to the greatest extent possible, switchboards are visible from the plant being operated.

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

3.14 VIBRATION SUPPRESSION

General

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

3.15 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/NZS 2312.1 Sections 6, 7 and 8, as applicable.

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

Corrosion protection: Provide corrosion protection for the following:

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

Protection methods: 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.

Low VOC emitting paints

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

3.16 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.

Equipment concealed in ceilings

Location: Provide a label on the ceiling, indicating the location of each concealed item requiring access for routine inspection, maintenance and/or operation. In tiled ceilings, locate the label on the ceiling grid closest to the item access point. In flush ceilings, locate adjacent to closest access panel. Items to be labelled include but are not limited to:

- Fan coil units and terminal equipment (e.g. VAV terminals).
- Fire and smoke dampers.
- Isolating valves not directly connected to items otherwise labelled.
- Motorised dampers.
- Wall mounted equipment in occupied areas: Provide labels on wall mounted items in occupied areas including the following:
  - Services control switches.
  - Temperature and humidity sensors.

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.

3.17 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.

3.18 RECORD DRAWINGS

General

Requirement: Show 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

Progress recording: Keep one set of drawings on site at all times, expressly for the purpose of marking changes made during the progress of the works.

Drawing layout: Use the same borders and title block as the contract drawings.

Quantity and format: Conform to **SUBMISSIONS.**

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 quantity and format documented for **SUBMISSIONS.**

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.
- 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.
- Fixings.
- 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.

CAD base drawings: DWG

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

3.19 OPERATION AND MAINTENANCE MANUALS

General

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 technical worksections require that manuals be submitted, include corresponding material in the operation and maintenance manuals.

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

Contents

Requirement: Include the following:

- Table of contents: For each volume. Title to match cover.
- Directory: Names, addresses, email addresses and telephone and facsimile numbers of principal consultant, subconsultants, contractor, subcontractors and names of responsible parties.
- Record drawings: Complete set of record drawings, full size.
- Drawings and technical data: As necessary for the efficient operation and maintenance of the installation. Include:
  - Switchgear and controlgear 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.
- Installation description: General description of the installation.
- Systems descriptions and performance: Technical description of the systems installed and mode of operation, presented in a clear and concise format readily understandable by the principal's staff. Identify function, normal operating characteristics, and limiting conditions.
- Systems performance: Technical description of the mode of operation of the systems installed.
- Baseline data: To AS 1851, AS/NZS 1668.1 and AS 1670.1.
- Documentation to AS 1851 including the schedule of essential functionality and performance requirements.
- Digital photographic records to **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.
  - Copies of manufacturers' warranties.
  - Product certification.
  - Test certificates for each service installation and all equipment.
  - Test reports
  - Test, balancing and commissioning reports.
  - Control system testing and commissioning results.
- 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.
  - Procedures for seasonal changeovers.
  - 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 including 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, being those items subject to wear or deterioration and which 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 so that changes in the system over time can be identified.
  - Instructions for use of tools and testing equipment.
  - 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.
  . For hard copies: In binders which match the manuals, loose leaf log book pages designed for recording completion activities including operational and maintenance procedures, materials used, test results, comments for future maintenance actions and notes covering the condition of the installation. Include completed log book pages recording the operational and maintenance activities performed up to the time of practical completion.
  . Number of pages: The greater of 100 pages or enough pages for the maintenance period and a further 12 months.
- 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

Scope: Provide the same material as documented for hardcopy in electronic format.

Quantity and format: Conform to **SUBMISSIONS , Electronic submissions**.

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

Format – hard copy

General: A4 size loose leaf, in commercial quality, 4 ring binders with hard covers, each indexed, divided and titled. Include the following features:

- Cover: Identify each binder with typed or printed title *OPERATION AND MAINTENANCE MANUAL*, to spine. Identify title of project, volume number, volume subject matter, and date of issue.
- Dividers: Durable divider for each separate element, with typed description of system and major equipment components. Clearly print short titles under laminated plastic tabs.
- Drawings: Fold drawings to A4 size with title visible, insert in plastic sleeves (one per drawing) and accommodate them in the binders.
- Pagination: Number pages.
- Ring size: 50 mm maximum, with compressor bars.
- Text: Manufacturers' printed data, including associated diagrams, or typewritten, single-sided on bond paper, in clear concise English.

Number of copies: 3.

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.

3.20 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: 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.
- Fasteners: Suitable for the particular use, capable of transmitting imposed loads and maintaining the rigidity of the assembly.

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

Samples

Visible joint sealants: Submit colour samples.

Products and materials

Sealants: Submit technical data sheets.

Warranties

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

2 PRODUCTS

2.1 ADHESIVES

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.

Fire-resisting control joints

General: Provide sealant materials that maintain the nominated fire-resistance level (FRL).

- Fire-stopping: To AS 4072.1.

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 metallic coating thickness (µm)	Material
C1 and C2	Electroplated zinc or Hot-dip galvanized	30	Stainless steel 316
C3	Hot-dip galvanized	50	Stainless steel 316
C4 and T	Stainless steel 316	-	Stainless steel 316

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.
- 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.

0183 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*.

1.4 SUBMISSIONS

Samples

General: Submit samples of the following:

- Stainless steel: One sample of every documented surface finish.
- Anodising: One sample of every colour and finishing option.

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 1665.

Stainless steel: To AS/NZS 1554.6.

Steel: To AS/NZS 1554.1.

3.2 STAINLESS STEEL FINISHES

General

Requirement: Provide a surface finish to match the approved sample.

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:

- Finish designation: No. 4 brushed finish.

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.

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.

3.3 ANODISING

General

Standard: To AS 1231.

Thickness grade: To AS 1231 Table H1.

Application: AA20

Colour: Clear

Finish: Satin

3.4 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 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.

3.5 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: Submit manufacturer's data for each product/material of 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, inspect all components of the termite management system and submit a report on the efficacy and status of the system.

Tests

Site tests: Submit test results, as follows:

- Chemical termite management systems: To AS 3660.1 Appendix E.

Warranties

Management system warranty: Submit the manufacturer's warranty.

1.5 INSPECTION

Notice

Inspection: Give notice so that inspection may be made of the following:

- Completed earthworks or substrate preparation before system application/installation.
- The completed termite management system.

2 PRODUCTS

2.1 PHYSICAL SYSTEMS

Concrete slab

Standard: To AS 3660.1 Section 4.

Termite caps sheeting

Standard: To AS 3660.1 Section 5.

Granular materials

Standard: To AS 3660.1 Section 6.

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 cap and strip shields

Standard: To AS 3660.1 Section 5.

Granular materials

Standard: To AS 3660.1 Section 6.

3.2 CHEMICAL SYSTEMS

General

Standard: To AS 3660.1 Section 7.

Testing

Site test: To AS 3660.1 Appendix E.

3.3 TESTING

Completion tests

Chemical termite management systems: To AS 3660.1 Appendix E.

3.4 COMPLETION

Termite management system notice

General: Permanently fix a durable notice in a prominent location to BCA B1.4(i)(ii) or BCA 3.1.3.4.

Waste materials

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

Completion inspection

Report: At the end of the defects liability period, inspect the termite management systems and submit 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-processed fibreboard: To AS/NZS 1859.2.
- Decorative overlaid wood panels: To AS/NZS 1859.3.
- Wet-processed 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:

- EWPAA: Engineered Wood Products Association of Australia.
- 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 processed fibreboard: 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 processed 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

Rainforest species: Submit source certification.

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

Treated timber: Submit safety data sheets for preservative treated timber.

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.

Marking

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 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 4266.3.

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.

Termite treatment

Requirement: To *0184 Termite management*

2.3 FINISHING

Production finish

Hardwood: To AS 2796.1 Table B1.

Softwood: To AS 4785.1 Table B1.

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 educe 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 manufacturer's recommendations and to NOHSC 2003 and the recommendations of NOHSC 3007.

0201 DEMOLITION

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Carry out demolition, as documented.

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- *0171 General requirements*.

1.3 STANDARD

General

Demolition: To AS 2601.

1.4 INTERPRETATION

Definitions

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

- Demolition: The complete or partial dismantling of a building or structure, by pre-planned and controlled methods or procedures.
- Dilapidation record: The photographic or video and written record, before commencement of demolition work, of the condition of the portion of the existing building retained, adjacent buildings, and other relevant structures or facilities.
- Dismantle: The reduction of an item to its components in a manner to allow re-assembly.
- Recover: The disconnection and removal of an item in a manner to allow re-installation.

1.5 SUBMISSIONS

Off-site disposal

Disposal location: Submit the locations and evidence of conformance with the relevant authorities for the disposal of material required to be removed from the site.

Records

Dilapidation record: Submit a copy of the dilapidation record to the Project Manager and obtain their written agreement to the contents of the record, before commencement of demolition.

1.6 INSPECTION

Notice

Inspection: Give notice so that inspection may be made of the following:

- Adjacent structures before commencement of demolition.
- Services before disconnection or diversion.
- Services after reconnection or diversion.

2 EXECUTION

2.1 SUPPORT

Temporary support

General: If temporary support is required, certification for its design and installation is required from a professional engineer engaged by the contractor.

Existing buildings: Until permanent support is provided, provide temporary support for sections of existing buildings which are to be altered and which normally rely for support on work to be demolished.

Ground support: Support excavations for demolition of underground structures.

Adjacent structures: Provide supports to adjacent structures where necessary, sufficient to prevent damage resulting from the works.

- Lateral supports: Provide lateral support equal to that given by the structure to be demolished.
- Vertical supports: Provide vertical support equal to that given by the structure to be demolished.

Permanent supports

General: If permanent supports for adjacent structures are necessary and are not documented, give notice and obtain instructions.

Weather protection

General: If walls or roofs are opened for alterations and additions or the surfaces of adjoining buildings are exposed, provide temporary covers to prevent water penetration. Provide covers to protect existing plant, equipment and materials intended for re-use.

Dust protection

General: Provide dustproof screens, bulkheads and covers to protect existing finishes and the immediate environment from dust and debris.

Security

General: If a wall or roof is opened for alterations and additions, provide security against unauthorised entry to the building.

Temporary screens

General: Fill the whole of designated temporary openings or other spaces using dustproof and weatherproof temporary screens, fixed securely to the existing structure, and installed to shed water to avoid damage to retained existing elements or adjacent structures and contents.

Type: Timber framed screens sheeted with 12 mm plywood and painted. Seal the junctions between the screens and the openings.

Exposed surfaces

General: Where necessary, protect and weatherproof the surfaces of adjacent structures exposed by demolition.

Existing services

Location: Before commencing demolition, locate and mark existing underground services in the areas which will be affected by the demolition operations.

Utility services: Contact DIAL BEFORE YOU DIG to identify location of underground utility services pipes and cables.

Excavation: Do not excavate by machine within 1 m of existing underground services.

2.2 DEMOLITION – BUILDING WORKS

Dilapidation record

Purpose: Use the dilapidation record to assess the damage and rectification work arising from the demolition work.

Availability: Keep the records of the investigations on site and available for inspection until the date of practical completion of the contract.

Concrete slabs

General: Using a diamond saw, neatly cut back or trim to new alignment with a clean true face existing concrete slabs to be partially demolished or penetrated. Do not overcut at corners.

Recycling: If concrete crushing is proposed on site, submit details of plant and environmental controls.

Explosives

General: Do not use explosives.

2.3 DEMOLITION – BUILDING SERVICES

General

Requirement: Decommission, isolate, demolish and remove from the site all existing redundant equipment including associated components that become redundant as a result of the demolition.

Breaking down: Disassemble or cut up equipment where necessary to allow removal.

Recovered materials: Recover all components associated with the listed items. Minimise damage during removal and deliver to the locations scheduled.

2.4 HAZARDOUS MATERIALS

Identified hazardous material

Register: Hazardous materials have been identified as present on site and a Hazardous materials register has been prepared.

Hazardous materials removal

Standard: To AS 2601 clause 1.6.2.

Procedure for asbestos removal: In accordance with *How to safely remove asbestos* by Safe Work Australia.

2.5 COMPLETION

Notice of completion

General: Give at least 7 working days' notice of completion of demolition so that adjacent structures may be inspected following completion of demolition.

Rectification: Repair any damage arising out of demolition work. Obtain written acceptance from the owner of each adjoining property of the completeness and standard of the rectification work.

Temporary support

General: Clear away at completion of demolition.

0221 SITE PREPARATION

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide site preparation, as documented.

Outline of the works: Extension to existing Café Kitchen. Refer to Architectural drawings.

Incidental works

Generally: Undertake the following:

- Reinstatement: Reinstate undeveloped ground surfaces to the condition existing at the commencement of the contract.
- Minor trimming: As required to complete the works, as documented.

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:

- Authorities: Any authority or agency covering statutory requirements relating to the project, including clearances for work in that particular area.
- Clearances: A formal certificate, approval or condition issued by an authority to allow work to be carried out in a particular area.
- 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.

1.4 SUBMISSIONS

Execution details

Requirement: Submit details of methods and equipment proposed for the following:

- Clearing and grubbing.
- Tree removal and transplanting.

1.5 INSPECTION

Notice

Inspection: Give notice so that inspection may be made of the following:

- Enclosures around trees to be retained.
- Trees to be removed.

2 EXECUTION

2.1 EXISTING SERVICES

General

Requirement: Before commencing earthworks, locate and mark existing underground services in the areas which will be affected by the earthworks operations including clearing, excavating and trenching.

Utility services: Contact DIAL BEFORE YOU DIG to identify location of underground utility services pipes and cables.

Excavation: Do not machine excavate within 1 m of existing underground services.

Existing service lines: If required, divert services detected during excavation to new routes, clear of the building, and reconnect to the Network Utility Operator's requirements.

2.2 SITE CLEARING

Extent

Requirement: Clear only areas to be occupied by works such as structures, paving, excavation, regrading and landscaping or other areas designated to be cleared.

Contractor's site areas: If not included within the areas documented above, clear generally only to the extent necessary for the performance of the works.

Clearing and grubbing

Clearing: Remove everything on or above the site surface, including rubbish, scrap, grass, vegetable matter and organic debris, scrub, trees, timber, stumps, boulders and rubble.

Grubbing: Grub out stumps and roots over 75 mm diameter to a minimum depth of 500 mm below subgrade under buildings, embankments or paving, or 300 mm below finished surface in unpaved areas. Backfill holes remaining after grubbing with sand material to prevent ponding of water. Compact the material to the relative density of the existing adjacent ground material.

Redundant/decommissioned works: Remove works, including slabs, foundations, pavings, drains and access chambers covers found on the surface.

Surplus material

Topsoil and excavated material: Continually remove unwanted stripped soil and other material from the site as the work proceeds, including any material dropped on footpaths or roadways.

2.3 EXISTING WORKS TO BE RETAINED

Marking

Requirement: Mark out works with 1 m high 50 x 50 mm timber stakes with yellow plastic tapes attached to prevent accidental damage.

2.4 COMPLETION

Clean up

Progressive cleaning: Keep the work included in the contract clean and tidy as it proceeds and regularly remove from the site waste and surplus material arising from execution of the work, including any work performed during the defects liability period or the plant establishment period.

Removal of plant: Within 10 working days of the date of practical completion, remove temporary works, construction plant, buildings, workshops and equipment which does not form part of the works, except what is required for work during the defects liability period or the plant establishment period. Remove these on completion.

Vermin management

Requirement: Employ an approved firm of pest exterminators and provide a certificate from the firm stating that the completed works is free of vermin.

0223 SERVICE TRENCHING

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide trenching for underground services, as documented.

Design

Steel shoring and trench lining systems: To AS 4744.1.

Hydraulic shoring and trench lining equipment: To AS 5047.

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- *0171 General requirements.*
- *0271 Pavement base and subbase.*

1.3 STANDARDS

General

Earthworks: To AS 3798.

1.4 INTERPRETATION

Abbreviations

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

- CBR value: California Bearing Ratio value.

1.5 TOLERANCES

General

Earthworks: To **TOLERANCES** in *0222 Earthwork*.

1.6 SUBMISSIONS

Execution details

Excavation method: Submit details of proposed equipment and method of excavation, including the following:

- Service location and type: A plan of the trench works showing the location and type of service.
- Open excavation: Proposed duration.
- Shuttering and/or bracing of trench sides: If required for safety and stability, provide proposals.

1.7 INSPECTION

Notice

Inspection: Give notice so that inspection may be made at the following stages:

- Service trenches excavated before laying the service.
- Services laid in trenches and ready for backfilling.

2 PRODUCTS

2.1 FILL MATERIALS

General

Requirement: Provide fill materials including borrow or imported fill to **FILL MATERIALS** and **BORROW OR IMPORTED FILL** in *0222 Earthwork*.

3 EXECUTION

3.1 EXISTING SERVICES

Location

Requirement: Before commencing service trenching, locate and mark existing underground services in the areas which will be affected by the service trenching operations.

Utility services: Contact DIAL BEFORE YOU DIG to identify location of underground utility services pipes and cables.

Excavation

General: Do not excavate by machine within 1 m of existing underground services.

3.2 EXISTING SURFACES

Concrete and asphalt pavements

Method: Sawcut trench set out lines for the full depths of the bound pavement layers except where the set out line is located along expansion joints.

Removal of concrete and asphalt: Break out concrete or asphalt pavement material between the trench set out lines, remove and dispose of off-site.

Segmental paving units

Removal: Take up segmental paving units both full and cut by hand, between the trench set out lines, and neatly stack on wooden pallets.

Concrete edging: Break out, remove and dispose of off-site.

Concrete subbase: If present, sawcut along the trench set-out lines.

Grass

Removal method: Neatly cut grass turf between trench set-out lines into 300 mm squares.

Grass suitable for re-use: Take up and store the turf and water during the storage period, otherwise remove and dispose of it off-site.

Small plants, shrubs and trees

Small plants required for re-planting: Take up and store. Wrap the rootball in a hessian or plastic bag with drain holes and water during the storage period.

Unsuitable vegetation: Remove and dispose of off-site.

3.3 EXCAVATING

Site preparation

As found site conditions: To **GEOTECHNICAL** in *0222 Earthwork*.

Records of measurement: If records of measurement are required, to **RECORDS OF MEASUREMENT** in *0222 Earthwork*.

Remove topsoil: To **REMOVAL OF TOPSOIL** in *0222 Earthwork*.

Excavation

General: Excavate for underground services in conformance with the following:

- To required lines and levels, with uniform grades.
- Straight between access chambers, inspection points and junctions.

- With stable sides.
- Width tolerance: ± 50 mm, unless constrained by adjacent structures.
- Excavation: To **EXCAVATION** and **ADJACENT STRUCTURES** in *0222 Earthwork*.

Trench widths

General: Keep trench widths to the minimum, consistent with the laying and bedding of the relevant service and construction of access chambers and pits.

Trench depths

General: As required by the relevant service and its bedding method.

Adjacent to footings: If excavation is necessary below the zone of influence of the underside of adjacent footings, give notice, and provide support for the footings as instructed.

Obstructions

General: Clear trenches of sharp projections. Cut back roots encountered in trenches to at least 600 mm clear of services. Remove other obstructions including stumps and boulders which may interfere with services or bedding.

Tree protection: To AS 4970.

Dewatering

General: Keep trenches free of water. Place bedding material, services and backfilling on firm ground, free of surface water.

Excess excavation

General: If trench excavation exceeds the correct depth, reinstate to the correct depth and bearing value using compacted bedding material or sand stabilised with 1 part of cement to 20 parts of sand by volume.

Stockpiles

Excavated material for backfill: If required, segregate the earth and rock material and stockpile, for re-use in backfilling operations.

Locations: Do not stockpile excavated material against tree trunks, buildings, fences or obstruct the free flow of water along gutters where stockpiling is permitted along the line of the trench excavation.

Disposal: If stockpiling is not permitted, dispose of excavated material off-site.

Unsuitable material

Disposal: Remove unsuitable material from the bottom of the trench or at foundation level and dispose of off-site. Replace with backfill material to **FILL MATERIALS** to *0222 Earthwork*.

Boring

Subcontractor: If under road boring is required instead of trenches, engage a suitably qualified subcontractor to do the work.

3.4 TRENCH BACKFILL

General

Place fill: To **PLACING FILL** in *0222 Earthwork*.

Timing: Backfill service trenches as soon as possible after laying and bedding the service, if possible on the same working day.

Marking services: Underground marking tape to AS/NZS 2648.1.

Bedding, haunch, side and overlay zones

Installation and material: To the particular utility authority or utility service requirements. Secure pipes against floatation.

Overlay zone thickness: Maximum 300 mm immediately over the utility service.

Topsoil areas: Complete the backfilling with at least 100 mm of topsoil.

Material in reactive clay areas: In sites classified M, M-D, H1, H1-D, H2, H2-D, E or E-D to AS 2870, re-use excavated site material at a moisture content within ± 1% of that of the adjoining in situ clay.

Selected material zone

Extent: The section of trench within the zone, if applicable.

Backfill material: Selected material free from stones larger than 100 mm maximum dimension and the fraction passing a 19 mm Australian Standard sieve to have a 4 day soaked CBR value, in conformance with AS 1289.6.1.2, and not less than that of the adjacent selected material zone.

Trees

Backfill at trees: Backfill minimum 300 mm thick, around tree roots with a topsoil mixture. Place and compact in layers of 150 mm minimum depth to a dry density equal to that of the surrounding soil.

Do not place backfill: Above the original ground surface around tree trunks or over the root zone.

Watering: Thoroughly water immediately after backfilling the tree root zone.

Compaction

Control moisture within backfill: To **FILL MOISTURE CONTROL** in *0222 Earthwork*.

Layers: Compact all material in layers not exceeding 150 mm compacted thickness. Compact each layer to the required relative compaction before starting the next layer.

Compaction: To **COMPACTION REQUIREMENTS FOR FILL AND SUBGRADE** in *0222 Earthwork* and AS 3798 Section 5.

Frequency of testing: To AS 3798 clause 8.7.

Precautions: If compacting adjacent to utility services, use compaction methods which do not cause damage or misalignment.

3.5 SURFACE RESTORATION

Subbase and base

Material: Crushed rock, DGS20 or DGB20 material configured in layers and depths to match existing and adjacent work.

Supply and installation: To *0271 Pavement base and subbase*.

Compaction: Uniformly compact each layer of the subbase and base courses over the full area and depth within the trench to a relative compaction of 100% when tested in conformance with AS 1289.5.4.1.

Compaction test frequency: Minimum 1/every second layer/50 m² of restoration surface area.

Pathways and paved areas generally

Restoration materials: Consistent with the surface existing before commencement of the works.

Subbase: 150 mm crushed stone DGB20 compacted to 100% relative compaction in conformance with AS 1289.5.4.1.

Lippage at patches: Match the surface level at any point along the patch's edge with the adjoining footpath surface within ± 5 mm.

Concrete surfaces

Construction: Conform to the following:

- Prime coat the cut edges of the existing surfaces with cement slurry. Lay and compact concrete so that the edges are flush and the centre is cambered 10 mm above the adjoining existing surfaces.
- Material: 25 MPa concrete.
- Surface finish and pattern: Match existing adjoining work.
- Minimum thickness: 100 mm or the adjacent pavement thickness, whichever is thicker.
- Reinforcement and dowels: If required, provide steel reinforcement with dowels into the adjacent concrete.
- Expansion joints: 15 mm thick preformed jointing material of bituminous fibreboard placed where new concrete abuts existing concrete and in line with joints in existing concrete.
- Control joints:
  - Form control joints strictly in line with the control joints in existing concrete.
  - Around electricity supply poles: Terminate the concrete paving 200 mm from the pole and fill the resulting space with cold mix asphalt.

Curing: Cure by keeping continuously wet for 7 days.

Asphalt footpaths

Materials and installation: To *0272 Asphaltic concrete* or *0273 Sprayed bituminous surfacing*, as appropriate.

Thickness: Match the adjoining footpath.

Finish: Compact to a smooth even surface.

Segmental paving units

Materials and installation: To *0276 Paving – sand bed* or *0275 Paving – mortar and adhesive bed* as appropriate and as follows:

- Laying: Re-lay to match the pattern and surface levels of the existing paving.
- Damaged paving units unsuitable for relaying: Replace paving units with new units of the same material, type, size and colour as the existing.

Landscaped areas

In topsoil areas: Complete the backfilling with topsoil for at least the top 100 mm.

Lawn: Re-lay stockpiled turf. If existing turf is no longer viable, re-sow the lawn over the trench and other disturbed areas.

Planted areas: Overfill to allow for settlement.

0224 STORMWATER – SITE

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide stormwater drainage, as documented.

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- *0171 General requirements.*
- *Hydraulic Engineering Documentation*

1.3 STANDARDS

Stormwater drainage

Standard: To AS/NZS 3500.3.

1.4 INTERPRETATION

Definitions

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

- Pipe surround: Includes pipe overlay, pipe side support, side zone and haunch zone.

1.5 INSPECTION

Notice

Inspection: Give notice so that inspection may be made at the following stages:

- Concealed or underground services prior to being covered.
- Upon completion.

2 PRODUCTS

2.1 MATERIALS

Concrete and mortar

Concrete: To AS 3500.3 clause 2.9 and the following:

- Grade: N15.
- Cement: To AS 3972.
  - Type: GP, GL or GB.

Steel reinforcement:

- Bars and machine welded mesh: To AS/NZS 4671.

Joints

Solvent cement and priming fluid: To AS/NZS 3879.

Type of pipes and fittings

Fibre reinforced cement (FRC): To AS 4139 and the following:

- ≤ 450 mm diameter: Rubber ring joints to AS 4139.
- > 450 mm diameter: With a purpose machined internal spigot and socket system within the pipe wall.

Glass-reinforced polyester (GRP): To AS 3571.1.

Cast iron access chamber covers and frames: To AS 1830 or AS 1831, as appropriate.

Polyvinyl chloride (PVC): To AS/NZS 1254, AS/NZS 1260 or AS 1273, as appropriate.

Polyethylene (PE): To AS/NZS 4129, AS/NZS 4130, ISO 8770 or AS/NZS 2033, as appropriate.

Precast concrete: To AS/NZS 4058.

Rubber ring joints/elastomeric seals: To AS 1646.

Plastic pipe for subsoil drainage: To AS 2439.1.

Vitrified clay or ceramic: To AS 1741.

Bedding material

Bed and haunch zones: Provide granular material graded to the AS 1141 series.

Bedding material grading table

Sieve size (mm)	Weight passing %	
	Bed and haunch	Side zones
75.0	-	100
19.0	100	-
9.5	-	50 - 100
2.36	50 - 100	30 - 100
0.60	20 - 90	15 - 50
0.30	10 - 60	-
0.15	0 - 25	-
0.075	0 - 10	0 - 25

Filter material

General: Provide filter materials consisting of natural clean washed sands and gravels and screened crushed rock conforming to AS/NZS 3500.3 clause 2.13.1.

2.2 GEOTEXTILES

General

Requirement: Provide polymeric fabric formed from plastic yarn composed of at least 85% by weight propylene, ethylene amide or vinylidene chloride and containing stabilisers or inhibitors which provide resistance to deterioration due to ultraviolet light.

Subsoil drainage

Filter: Conform to AS/NZS 3500.3 clause 2.13.2.

2.3 PREFABRICATED PITS

General

Requirement: Provide precast or prefabricated pits in conformance with AS/NZS 3500.3 clauses 2.12.8 and 7.5.

Metal access covers and grates

Standard: To AS 3996.

Cover finish and load classification: Provide access cover and grate with the documented finish, slip resistance and load class.

2.4 STORMWATER DRAINAGE PUMPS

General

Standard: To AS/NZS 3500.3 Section 8.

Requirement: Conform to **Pumped discharge system** in *0814 Hydraulic pumps*.

3 EXECUTION

3.1 PIPING

General

Laying: Lay lengths separately with the barrel bearing evenly on the prepared bedding.

Sockets: Lay with sockets pointing upstream.

Cleaning: Clean pipe interior of dirt, debris, mortar and other foreign matter.

Protection: Provide temporary caps over the ends of incomplete sections to prevent the entry of foreign matter.

3.2 TOLERANCES

Pipeline tolerances table

	Permissible angular deviation from the documented alignment	Permissible displacement from the documented positions
Horizontal	1:300	15 mm
Vertical	1:500	5 mm
Note: These tolerances are conditional on falls to outlets being maintained and no part of a pipeline having less than the documented gradient.		

3.3 STORMWATER DRAINS

Location

General: Provide stormwater drains to connect surface drains, subsoil drains and drainage pits to the outlet point or point of connection. Make sure that location of piping will not interfere with other services and building elements not yet installed or built. Subject to the preceding and documented layouts, follow the most direct route with the least number of changes in direction.

Laying

General: Lay in straight lines between changes in direction or grade with socket end placed upstream. If other pipes are adjacent, set each pipe true to line and complete each joint before laying the next pipe. If work is not continuous, cap open ends to prevent entry of foreign matter.

Identification

General: Lay a detectable strip or plastic tape in the trench after pipe laying, testing and initial backfilling.

Pipe underlay (bedding)

General: Bed piping on a continuous underlay of bedding material, minimum 75 mm, maximum 150 mm thick after compaction. Grade the underlay evenly to the gradient of the pipeline.

Chases: If necessary, form chases to prevent projections such as sockets and flanges from bearing on the trench bottom or underlay.

Pipe surrounds

General: Place the material in the pipe surround in layers, maximum 200 mm loose thickness, and compact without damaging or displacing the piping.

Trench backfill

General: Backfill the remainder of the trench to the underside of the subgrade with fill material in conformance with *0222 Earthwork*.

Lifting holes

General: Seal lifting holes in all pipes with plastic preformed plugs or 3:1 (sand:cement) mortar, before the commencement of backfilling.

Anchor blocks

General: If necessary, to restrain lateral and axial movement of the stormwater pipes, provide anchor blocks at junctions and changes of grade or direction conforming to AS/NZS 3500.3 clause 7.9.

Encasement

General: As documented in the **Stormwater pipeline schedule**.

Location: Encase the pipeline in concrete at least 150 mm above and below the pipe, and 150 mm each side or the width of the trench, whichever is the greater.

3.4 SUBSOIL DRAINS

General

Requirement: Provide subsoil drains to intercept groundwater seepage and prevent water build-up behind walls and under pavements. Connect subsoil drains to surface drains or to the stormwater drainage system as applicable.

Piping: As documented in the **Subsoil pipeline schedule**.

Trench width: ≥ 450 mm.

Trench floor: Grade the trench floor evenly to the gradient of the pipeline. If the trench floor is rock, correct any irregularities with compacted bedding material.

Pipe depth: Provide the following minimum clear depths, measured to the crown of the pipe, where the pipe passes below the following elements:

- 100 mm below subgrade level of the pavement, kerb or channel.
- 100 mm below the average gradient of the bottom of footings.
- 450 mm below the finished surface of unpaved ground.

Jointing

General: At junctions of subsoil pipes, provide tees, couplings or adaptors to AS 2439.1.

Pipe underlay (bedding)

General: Bed piping on a continuous underlay of bedding material, minimum 75 mm, maximum 150 mm thick after compaction. Grade the underlay evenly to the gradient of the pipeline.

Chases: If necessary, form chases to prevent projections such as sockets and flanges from bearing on the trench bottom or underlay.

Pipe surrounds

General: Place the material in the pipe surround in layers, maximum 200 mm loose thickness, and compact without damaging or displacing the piping.

Depth of overlay:

- To the underside of the bases of overlying structures such as pavements and channels.
- To within 150 mm of the finished surface of unpaved or landscaped areas.

Geotextiles

Marking: To AS 3705.

Laying: Place geotextile as documented.

Protection: Provide heavy duty protective covering. Store clear of the ground and out of direct sunlight. During installation do not expose the filter fabric to sunlight for more than 14 days.

Filter socks

General: Provide permeable polyester socks, capable of retaining particles 0.25 mm and greater. Securely fit or join the sock at each joint.

3.5 PITS

Installation

General: Prepare foundation, install pit and connect pipes, to manufacturer's recommendations.

Location: At junctions, changes of gradient and changes of direction of stormwater drains, as documented.

Finish to in situ exposed surfaces

General: Provide a smooth, seamless finish, using steel trowelled render or concrete cast in steel forms.

Corners: Cove or splay internal corners.

Metal access covers and grates

Cover levels: Top of cover or grate, including frame:

- In paved areas: Flush with the paving surface.
- In landscaped areas: 25 mm above finished surface.
- Gratings taking surface water runoff: Locate to receive runoff without ponding.

3.6 TESTING

Pre-completion tests

General: Before backfilling or concealing, carry out the following tests:

- Site stormwater drains and main internal drains: Air or water pressure test to AS/NZS 3500.3 Section 9.

Leaks: If leaks are found, rectify and re-test.

3.7 COMPLETION

Cleaning

General: Clean and flush the whole installation.

0271 PAVEMENT BASE AND SUBBASE

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide base and subbase courses as documented.

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:

- Base: One or more layers of material, forming the uppermost structural element of a pavement and on which the surfacing may be placed.
- Flexible pavement: A pavement which obtains its load-spreading properties from intergranular pressure, mechanical interlock and cohesion between the particles of the pavement material.

1.4 INSPECTION

Notice

Inspection: Give notice so that inspection may be made of the following:

- Prepared subgrade.
- Proof rolling of subbase before spreading of base.
- Proof rolling of base before sealing.

2 PRODUCTS

2.1 BASE AND SUBBASE MATERIAL

Granular material

Requirement: Provide unbound granular materials, including blends of two or more different materials, which when compacted develop structural stability and are uniform in grading and physical characteristics.

Crushed rock

Requirement: Provide crushed rock as follows:

- Base: 20 mm nominal.
- Subbase: 40 mm nominal.

Recycled materials

Requirement: Provide recycled materials as follows:

- Base and subbase: Conform to the **Limits on use of recycled and manufactured materials as constituent materials table** and the **Undesirable material properties table**.

Natural gravel

Requirement: Provide unbound natural gravel materials as follows:

- Base: 20 mm nominal.
- Subbase: 20 mm nominal.

Subbase material properties and test methods table

Property and test method	Differentiating criteria	Material requirements	
		Crushed rock	Natural gravel
Particle size distribution or grading (% passing through sieve) to AS 1289.3.6.1	**Sieve size (mm)**	—	—
	53.0 mm	100	100
	37.5	90 - 100	95 - 100
	26.5	74 - 96	80 - 97
	19.0	62 - 86	—
	13.2	—	—
	9.5	42 - 66	48 - 85
	4.75	28 - 50	35 - 73
	2.36	20 - 39	25 - 58
	0.425	8 - 21	10 - 33
	0.075	3 - 11	3 - 21
Maximum dry compressive strength on fraction passing 19 mm sieve (only applies if plasticity index is less than 1) to AS 1141.52	—	min 1.0 MPa	min 1.0 MPa
4 day soaked CBR (98% modified compaction) to AS 1289.6.1.1	—	min 30%	min 30%

Limits on use of recycled and manufactured materials as constituent materials table

Recycled material	Unbound or modified base and subbase	Bound base and subbase
Iron and steel slag	100%	100%
Crushed concrete	100%	100%
Brick	20%	10%
RAP	40%	40%
Fly ash	10%	10%
Furnace bottom ash	10%	10%
Crushed glass fines	10%	10%

Undesirable material properties table

Property and test method	Differentiating criteria	Material requirements		
		Crushed rock	Recycled material	Natural gravel
Undesirable constituent materials (% retained on a 4.75 mm sieve) to RMS T276	**Material type**	—	—	—
	Type I - Metal, glass, stone, ceramics and slag	—	max 2.0 %	—
	Type II - Plaster, clay lumps and other friable material	—	max 0.5%	—
	Type III - Rubber, plastic, paper, cloth, paint, wood and other vegetable matter	—	max 0.1%	—

Base material properties and test methods table

Property and test method	Differentiating criteria	Material requirements		
		Crushed rock	Recycled material	Natural gravel
Particle size distribution or grading (% passing through sieve) AS 1289.3.6.1	**Sieve size (mm)**	—	—	—
	26.5	100	100	100
	19.0	95 - 100	95 - 100	93 - 100
	13.2	77 - 93	78 - 92	—
	9.5	63 - 83	63 - 83	71 - 87
	4.75	44 - 64	44 - 64	47 - 70
	2.36	29 - 49	30 - 48	35 - 56
	0.425	13 - 23	13 - 21	14 - 32
	0.075	5 - 11	5 - 9	6 - 20
CBR (98% modified compaction) to AS 1289.6.1.1	—	min 80%	min 80%	min 80%
Unconfined compressive strength to AS 5101.4	—	max 1.0 MPa	max 1.0 MPa	—

3 EXECUTION

3.1 SUBGRADE PREPARATION

General

Requirement: Prepare the subgrade in conformance with *0222 Earthwork*.

3.2 PLACING BASE AND SUBBASE

General

Weak surfaces: Do not place material on a surface that is weakened by moisture and is unable to support, without damage, the construction plant required to perform the works.

Spreading: Spread material in uniform layers without segregation.

Moisture content: Maintain wet mixed materials at the required moisture content before and during spreading. Add water to dry mixed materials through fine sprays to the entire surface of the layer after spreading, to bring the material to the required moisture content.

Compacted layer thickness: 200 mm maximum and 100 mm minimum. Provide layers of equal thickness in multilayer courses.

Joints

General: Plan spreading and delivery to minimise the number of joints. Offset joints in successive layers by a minimum of 300 mm.

Start of shift: Remix last 2 m of previous days' work for continuity of compaction.

Final trimming

General: Trim and grade the base course to produce a tight even surface with no loose stones or slurry of fines.

3.3 TOLERANCES

Surface level

General: Provide a finished surface level which is free draining and evenly graded between level points.

Subbase: + 10 mm, - 25 mm.

Base: + 10 mm, - 5 mm.

Base abutting gutters: ± 5 mm from the level of the lip of the gutter, minus the design thickness of the wearing course.

Surface deviation

Base: ≤ 5 mm from a 3 m straightedge laid on the surface.

3.4 BASE AND SUBBASE COMPACTION

General

Construction operation: Compact each layer of fill to the required depth and density, as a systematic construction operation.

Unstable areas: If unstable areas develop during rolling or are identified by proof rolling, open up, dry back and recompact, to the requirements of this worksection. If dry back is not possible, remove for the full depth of layer, dispose of and replace with fresh material.

Minimum relative compaction table

Item description	Minimum dry density ratio (modified compaction) to AS 1289.5.2.1
Subbase	95%
Base	98%

Compaction requirements

General: Apply uniform compactive effort over the whole area to be compacted, until the required density is achieved or until failure is acknowledged. If failure is acknowledged, conform to **Rectification**.

Equipment: Use rollers appropriate to the materials and compaction requirements documented.

Moisture content

General: During spreading and compaction, maintain material moisture content within the range of -2% to +1% from the optimum moisture content (modified compaction).

Spraying: Use water spraying equipment to distribute water uniformly, in controlled quantities, over uniform lane widths.

Dry back: Allow materials to dry to 60 to 80% of the optimum moisture content before applying the seal or wearing course.

Rectification

General: If a section of the pavement material fails to meet the required density or moisture content after compaction, remove the non-conforming material, dispose of off-site or rectify for re-use, replace with fresh material, and re-compact.

Level corrections

General: Rectify incorrect levels as follows:

- High areas: If the area can be rectified by further trimming to produce a uniform, hard surface by cutting without filling, trim so that the rectified area conforms to **TOLERANCES**.
- Low areas and high areas not rectifiable by further trimming: Remove layers to a minimum depth of 75 mm, lightly tyne and replace with new material and recompact.

3.5 TESTING

Site tests

Compaction control tests: To AS 1289.5.4.1 and AS 1289.5.4.2.

Frequency of compaction control tests: Not less than the following (whichever requires the most tests):

- 1 test per layer per 100 lineal metres for two-lane roads.
- 1 test per layer per 2000 m^2 for carparks.
- 3 tests per layer.
- 3 tests per visit.

0310 CONCRETE – COMBINED

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide cast concrete, as documented.

Performance

Requirements:

- Conforming to the design details and performance criteria.
- Satisfying quality and inspection requirements.
- Compatible with documented finishes.

1.2 DESIGN

Requirements

Formwork: The design of formwork is the contractor's responsibility. Allow for dimensional changes, deflections and cambers resulting from the following:

- Imposed actions.
- Concrete shrinkage and creep.
- Temperature changes.
- The application of prestressing forces (if any).

Structural design: To AS 3600.

Post-tensioning: To AS 3600.

Requirements in addition to AS 3600: Refer to Structural documentation.

1.3 CROSS REFERENCES

General

Requirement: Conform to the following:

- *0171 General requirements.*

1.4 STANDARDS

General

Formwork design and construction, formed surfaces: To AS 3610 and AS 3610.1.

Plywood formwork: To AS 6669.

Profiled steel sheeting, including shear connectors: To AS 2327.1.

Specification and supply of concrete: To AS 1379.

Reinforced concrete construction: To AS 3600.

Strand, bar and wire: To AS/NZS 4672.1.

Design, installation and testing of post-installed and cast-in fastenings: To SA TS 101.

Slip resistance

Classification: To AS 4586.

1.5 INTERPRETATION

Definitions

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

- Ambient temperature: The air temperature at the time of mixing and placing of concrete.

- Anti-burst reinforcement: Reinforcement cage surrounding anchorages to control the tensile bursting stresses.
- Average ambient temperature: Average value of the daily maximum and minimum ambient temperatures over the relevant period at a site.
- Batch: A quantity of concrete containing a fixed quantity of ingredients and produced in a discrete operation.
- Concrete class – normal: Concrete which is specified primarily by a standard compressive strength grade and otherwise in conformance with AS 1379 clause 1.5.3.
- Concrete class – special: Concrete which is specified to have certain properties or characteristics different from, or additional to, those of normal-class concrete and otherwise in conformance with AS 1379 clause 1.5.4.
- Early age strength: A mean compressive strength at 7 days exceeding the values shown in AS 1379 Table 1.2.
- Formwork: Formwork: The surface, supports and framing used to define the shape of concrete until it is all self-supporting. Formwork types include:
  - Jump formwork: Incrementally moved formwork.
  - Lost formwork: Sacrificial formwork left in place.
  - Slip formwork: Continuously slipped or moving formwork.
  - Table forms: Prefabricated and re-usable formwork systems for slabs and beams.
- Green concrete: Concrete which has set but not appreciably hardened.
- Production assessment: An assessment procedure for concrete specified by strength grade, carried out by the supplier on concrete produced by a specific supplying plant and based on the statistical assessment of standard compressive strength tests on concrete.
- Project assessment: An assessment procedure for concrete specified by strength grade, specified at the customer's option, which provides additional test data for the statistical assessment of concrete supplied to a specific project.
- Sample: A physical example that illustrates workmanship, materials or equipment, and establishes standards by which the work will be judged. It includes samples, prototypes and sample panels.
- Specimen: A portion of a sample which is submitted for testing.
- Weather – cold: Ambient shade temperature less than 10°C.
- Weather – hot: Ambient shade temperature greater than 30°C.

1.6 TOLERANCES

Formwork

Plumb of elements > 8 m high: 1:1000.

Plumb of elements ≤ 8 m high: To AS 3610.1.

Position: Construct formwork so that finished concrete conforms to AS 3600 clause 17.5 and as documented in the **Formwork dimensional deviation schedule**.

Reinforcement

Fabrication and fixing: To AS 3600 clause 17.2.

Reinforcement and tendon position: To AS 3600 clause 17.5.3.

Finishes

Formed surfaces finish quality: To AS 3610.1 Table 3.3.2.

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

Class	Measurement	Maximum deviation (mm)
C	600 mm straightedge	6

1.7 SUBMISSIONS

Certification

Formwork design certification: For other than profiled steel sheeting composite formwork, submit certification by a professional engineer experienced in formwork design verifying conformance of the design.

Formwork execution certification: Submit certification by a professional engineer experienced in formwork design and construction verifying conformance of the completed formwork, including the suitability of the formwork for the documented surface finish class.

Post-tensioned concrete certification: Submit independent certification by professional engineer of the design and erected framing.

Design documentation

Formwork calculations: Submit calculations by a professional engineer experienced in formwork design to show that allowable concrete stresses will not be exceeded and formwork capability will be maintained for the following:

- Proposed formwork procedures or loadings which differ from those documented.
- Props above a floor that do not coincide with the props below.
- Undocumented formwork shoring or stripping procedures or allowable loadings from stacked materials.

Execution details

Moveable formwork: Provide the following details on the formwork drawings:

- Table, slip and jump forms: Proposed method and sequence of moving the formwork to provide concrete of the documented quality and surface finish.
- Slip forms: The average rate of movement.

Loading: Submit details of proposed construction systems, loads and procedures, including propping and re-shoring.

Re-shoring: Submit details of any proposed re-shoring.

Surface repair method: Submit details of any proposed surface repair method before starting repairs.

Concrete: Submit proposals for mixing, placing, finishing and curing concrete including the following:

- Changes to the concrete mix.
- Curing and protection methods.
- Curing period for low-pressure steam curing.
- Cutting or displacing reinforcement, or cutting or coring hardened concrete.
- Handling, placing, compaction and finishing methods and equipment, including pumping.
- Placing under water.
- Sequence and times for concrete placement, and construction joint locations and relocations.
- Site storage, mixing and transport methods and equipment, if applicable.
- Temperature control methods.
- Sawn joints: Submit details of proposed methods, timing and sequence of sawing joints.

Reinforcement: Submit the following:

- General: Details of any proposed changes to documented reinforcement.
- Damaged galvanizing: Details of proposed repair to AS/NZS 4680 Section 8.
- Mechanical bar splices Details and test certificates for each size and type of bar to be spliced.
- Provision for concrete placement: Details of spacing or cover to reinforcement that does not conform to AS 3600.

- Splicing: Details of any proposed changes to documented requirements.
- Welding: Details of any proposed welding of reinforcement.

Pre-mixed supply delivery dockets: For each batch, submit a docket listing the information required by AS 1379, and the following:

- For special class performance concrete: Documented performance and type of cement binder.
- For special class prescription concrete: Details of mix, additives, and type of cement binder.
- Method of placement and climate conditions during pour.
- Name of concrete delivery supervisor.
- Project assessment carried out each day.
- The concrete element or part of the works for which the concrete was ordered, and where it was placed.
- The total amount of water added at the plant and the maximum amount permitted to be added at the site.

Products and materials

Curing compounds: Submit details of any proposed liquid membrane-forming curing compound, including the following:

- Certified test results for water retention to AS 3799 Appendix B.
- Evidence of compatibility with concrete, and with applied finishes including toppings and render, if any, including methods of obtaining the required adhesion.
- For visually important surfaces, evidence that an acceptable final surface colour will be obtained.

Admixtures: Submit details of any proposed admixtures, including the following:

- Brand name.
- Place of manufacture.
- Basic chemical composition.

Tests

Requirement: Submit test results, as follows:

- Slip resistance test of completed installation.
- Concrete compressive strength test results to AS 1012.9.

1.8 INSPECTION

Notice

Inspection: Give notice so that inspection may be made of the following:

- Base or subgrade before covering.
- Membrane or film underlay installed on the base or subgrade.
- Concealed surfaces or elements before covering.
- Commencement of concrete placing.

2 PRODUCTS

2.1 CONCRETE

Properties

Concrete mix and supply: Conform to the following:

- Normal-class: To AS 1379 clause 1.5.3.
  - Properties: As documented in the **Concrete properties schedule - performance**.
- Special-class: To AS 1379 clause 1.5.4.
  - Properties: As documented in the **Concrete properties schedule - performance**.

General

Stockpile: If uniform, consistent colour is documented, stockpile sand, cement and aggregates.

Aggregates
Standard: To AS 2758.1.

Cement
Standard: To AS 3972.

Age: Less than 6 months old.

Storage: Store cement bags under cover and above ground.

Water
Standard: To AS 1379 clause 2.4.

Requirement: Clean, free from oil, acid, alkali, organic or vegetable matter and including not more than 500 mg/l of chloride ions.

Coloured concrete
Standard: To AS 3610.1.

Chemical admixtures
Standard: To AS 1478.1, used to the manufacturer's recommendations.

2.2 FORMWORK

General
Form linings, facings and release agents: Compatible with finishes applied to concrete.

Lost formwork: Free of timber or chlorides, and not to impair the structural performance of the concrete members.

Void formers: Material capable of maintaining rigidity and shape until the concrete has set, capable of withstanding construction loads and non-collapsible on absorption of moisture.

Accessories: Adopt material and corrosion protection to match the profiled steel sheeting.

Plywood formwork
Material: To AS 6669.

Grade: Use appropriate grade for the documented design dimensions, loading and surface quality.

Joints: Seal the joints consistent with the documented surface finish class.

Tolerances: To AS 3610.1 Section 3.

2.3 REINFORCEMENT

Steel reinforcement
Standard: To AS/NZS 4671.

Surface condition: Free of loose mill scale, rust, oil, grease, mud or other material which would reduce the bond between the reinforcement and concrete.

Protective coating
Standard: To AS 3600 clause 17.2.1.2.

Requirement: For concrete containing protective coated reinforcement, provide the same coating type to all that element's reinforcement and embedded ferrous metal items, including tie wires, stools, spacers, stirrups, plates and ferrules, and protect other embedded metals with a suitable coating.

Epoxy coating: High build, high solids, chemically resistant coating to AS/NZS 3750.14.

- Thickness: 200 µm minimum.

Galvanizing: To AS/NZS 4680, as follows:

- Sequence: If fabricating after galvanizing, repair damaged galvanising and coat cut ends.
- Zinc-coating (minimum): 600 g/m^2.

Tie wire
General: Annealed steel 1.25 mm diameter (minimum).

External and corrosive applications: Galvanized.

2.4 MISCELLANEOUS

Surface modifiers

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

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

Polymeric film underlay

Vapour barriers and damp-proofing membranes: To AS 2870 clause 5.3.3.

Curing compounds

Standard: To AS 3799.

3 EXECUTION

3.1 POLYMERIC FILM UNDERLAY

Location

General: Under slabs on ground, including integral ground beams and footings, provide a vapour barrier or, in areas prone to rising damp or salt attack, a damp-proofing membrane.

Base preparation

General: Conforming to base type, as follows:

- Concrete working base: Remove projections above the plane surface, and loose material.
- Graded prepared subgrade: Blind with sufficient sand to create a smooth surface free from hard projections. Lightly wet the sand just before laying the underlay.

Installation

Standard: To AS 2870 clause 5.3.3.

Requirement: Lay underlay over the base as follows:

- Seal the laps and penetrations with waterproof adhesive tape.
- Face the laps away from the direction of concrete pour.
- Continue up vertical faces past the damp-proof course where applicable, and tape fix at the top.
- Patch or seal punctures or tears before placing concrete.
- Cut back as required after concrete has gained strength and formwork has been removed.

3.2 FORMWORK

General

Requirement: As documented in the **Formed surface finishes schedule.**

Preparation

Cleaning: Before placing concrete, remove free water, dust, debris and stains from the formwork and the formed space.

Bolt holes

Formwork tie bolts left in the concrete: Position more than 50 mm from the finished surface.

Corners

Work above ground: Chamfer at re-entrant angles, and fillet at corners.

Face of bevel 25 mm.

Embedments

Fixing: Fix embedments through formwork to prevent movement, or loss of slurry or concrete, during concrete placement.

Openings

Inspection: In vertical formwork provide openings or removable panels for inspection and cleaning, at the base of columns, walls and deep beams.

Access: For thin walls and columns, provide access panels for placing concrete.

Release agents

Application: Before placing reinforcement, apply a release agent to linings and facings.

Slip formwork

Provision for inspection: Provide access below the moveable formwork for surface treatment and inspection.

Profiled steel sheeting composite formwork

Fixing: If sheeting cannot be fixed to structural steel supports with puddle welds, or with welded shear studs in composite construction, provide details of proposed fixings.

Steel linings

Rust: Clean off any rust and apply rust inhibiting agent before re-use.

Visually important surfaces

Surface finish classes 1, 2 or 3: Set out the formwork to give a regular arrangement of panels, joints, bolt holes, and similar visible elements in the formed surface.

Void formers

Protection: Keep void formers dry until use, install on a firm level surface and place reinforcement and concrete with minimum delay.

3.3 REINFORCEMENT

Dowels

Fixing: If a dowel has an unpainted half, embed in the concrete placed first.

Tolerances:

- Alignment: 1:150.
- Location: ± half the diameter of the dowel.

Grade: 250 N.

Cover

Concrete cover generally: To AS 3600 clause 4.10.

Concrete cover for structures for retaining liquids: To AS 3735.

Concrete cover for residential ground slabs and footings: To AS 2870.

Supports

Proprietary concrete, metal or plastic supports: To AS/NZS 2425 and as follows:

- Able to withstand construction and traffic loads.
- With a protective coating if they are ferrous metal, located within the concrete cover zone, or are used with galvanized or zinc-coated reinforcement.

Spacing:

- Bars: ≤ 60 diameters.
- Mesh: ≤ 600 mm.

Supports over membranes: Prevent damage to waterproofing membranes or vapour barriers. If appropriate, place a metal or plastic plate under each support.

Projecting reinforcement

Protection: If starter or other bars extend beyond reinforcement mats or cages, through formwork or from cast concrete, provide a plastic protective cap to each bar until it is cast into later work.

Tying

Requirement: Secure the reinforcement against displacement at intersections with either wire ties, or clips. Bend the ends of wire ties away from nearby faces of formwork or unformed faces to prevent the ties projecting into the concrete cover.

Beams: Tie stirrups to bars in each corner of each stirrup. Fix other longitudinal bars to stirrups at 1 m maximum intervals.

Bundled bars: Tie bundled bars in closest possible contact. Provide tie wire of at least 2.5 mm diameter and spaced not more than 24 times the diameter of the smallest bar in the bundle.

Columns: Secure longitudinal column reinforcement to all ties at every intersection.

Mats: For bar reinforcement in the form of a mat, secure each bar at alternate intersections.

3.4 CONCRETE

General

Conformance: As documented in the **Concrete properties schedule – performance**.

Elapsed delivery time

General: Make sure that the elapsed time between the wetting of the mix and the discharge of the mix at the site is in conformance with the **Elapsed delivery time table**. Do not discharge at ambient temperature below 10°C or above 30°C unless approved heating or cooling measures are taken to deliver concrete within the range 5°C to 35°C.

Elapsed delivery time table

Concrete temperature at time of discharge (°C)	Maximum elapsed time (minutes)
5 – 24	120
24 – 27	90
27 – 30	60
30 – 35	45

Pre-mixed supply

Addition of water: To AS 1379 clause 4.2.3.

Transport method: Select to prevent segregation, loss of material and contamination of the environment, and not to adversely affect placing or compaction.

Site mixed supply

Emergencies: If mixing by hand, provide details.

Plant: Mix concrete in a plant located on the construction site.

3.5 TESTING

General

Test authority: Concrete supplier or registered testing authority.

Reports and records of test results: To the relevant parts of the AS 1012 series. Keep results on site.

Assessment process of test results

Standard: To AS 1379.

Method of assessment: Project assessment.

Making and curing of specimens

General: To AS 1012.8.1 and AS 1012.8.2.

Specimens for compressive strength tests: Make and cure at least two specimens from the sample of each grade.

Specimen size:

- Aggregate size ≤ 20 mm: Nominally 200 x 100 mm diameter.
- Aggregate size > 20 mm: Nominally 300 x 150 mm diameter.

Test methods

General : To the relevant parts of the AS 1012 series.

Slump tests: Assess slump for every batch. Perform slump test on each strength sample.

Drying shrinkage at 56 days: To AS 1012.8.4 and AS 1012.13.

Embedded pressure pipes

General: Complete leak tests before embedding pipes.

3.6 CORES, FIXINGS AND EMBEDDED ITEMS

Adjoining elements

Fixings: Provide fixings for adjoining elements. If required, provide temporary support to the adjoining elements during concreting, to prevent movement.

Protection

General: Grease threads. Protect embedded items against damage.

Compatibility: Provide inserts, fixings and embedded items that are compatible with each other, with the reinforcement and with the documented concrete mix and the documented surface finish .

Corrosion: In external or exposed locations, galvanize anchor bolts and embedded fixings .

Structural integrity

Position: Fix cores and embedded items to prevent movement during concrete placing. In locating cores, fixings and embedded items, displace but do not cut reinforcement, and maintain cover to reinforcement.

Isolation: Isolate embedded items to prevent water tracking to concrete providing minimum cover to reinforcement.

Tolerances

General: Maximum deviation from correct positions:

- Anchor bolt groups for structural steel: To AS/NZS 5131.
- Cores and embedded items generally: 10 mm.
- Other fixing bolts: 3 mm.

3.7 CONCRETE WORKING BASE

Finish

Membrane support: Wood float finish or equivalent.

Installation

General: Lay over the base or subgrade and screed to the required level.

Surface tolerance

Deviation: Flatness tolerance Class B.

3.8 PLACING AND COMPACTION

Placing

Horizontal transport: Use suitable conveyors, clean chutes, troughs, hoppers or pipes.

Methods: Avoid segregation and loss of concrete, and minimise plastic settlement. Maintain a nominally vertical and plastic concrete edge during placement.

Horizontal elements: Place concrete in layers not more than 300 mm thick. Compact the following layer into previous layer before previous layer has taken initial set.

Compaction

Methods: Use immersion and screed vibrators accompanied by hand methods as appropriate to remove entrapped air and to fully compact the mix.

Vibrators: Do not allow vibrators to contact set concrete, reinforcement or items including pipes and conduits embedded in concrete. Do not use vibrators to move concrete along the formwork. Avoid causing segregation by over-vibration.

Placing records

Log book: Keep on site and make available for inspection a log book recording each placement of concrete, including the following:

- Date.
- Specified grade and source of concrete.

- Slump measurements.
- The portion of work.
- Volume placed.

Rain

Protection: During placement and before setting, protect the surface from damage.

Time between adjacent placements

General: As documented in the **Minimum time delay schedule.**

Vertical elements

Placement: Limit the free fall of concrete to maximum of 2000 mm.

Placing in cold weather

Cement: Do not use high alumina cement.

Temperature limits: Maintain the following:

- Freshly mixed concrete: ≥ 5°C.
- Formwork and reinforcement before and during placing: ≥ 5°C.
- Water: Maximum 60°C when placed in the mixer.

High early strength cement: If deteriorating weather conditions are predicted, use high early strength cement.

Temperature control: Heat the concrete materials, other than cement, to the minimum temperature necessary so that the temperature of the placed concrete is ≥ 5°C.

Admixtures: Do not use calcium chloride, salts, chemicals or other material in the mix to lower the freezing point of the concrete.

Frozen materials: Do not allow frozen materials or materials containing ice to enter the mixer, and keep free of frost and ice any formwork, materials, and equipment coming in contact with the concrete.

Freezing: Prevent concrete from freezing.

Placing in hot weather

Handling: Prevent premature stiffening of the fresh mix and reduce water absorption and evaporation losses.

Temperature limits: Maintain the following:

- Normal concrete in footings, beams, columns, walls and slabs: ≤ 35°C.
- For concrete strength grade less than 40 MPa with section thickness ≥ 1 m in all dimensions: ≤ 27°C.
- For concrete strength grade 40 MPa or greater with section thickness ≥ 600 mm in all dimensions: ≤ 27°C.
- Formwork and reinforcement before and during placing: ≤ 35°C.

Evaporation control barriers: Erect barriers to protect freshly placed concrete from drying winds.

Temperature control: Select one or more of the following methods of maintaining the temperature of the placed concrete at 35°C or less:

- Cool the concrete using liquid nitrogen injection before placing.
- Cover horizontal transport containers.
- Spray the coarse aggregate using cold water before mixing.
- Use chilled mixing water or ice.

Placing under water

General: Do not place under water unless conditions prevent dewatering.

Minimum cement content for the mix: Increase by 25%.

3.9 CURING

General

Requirements: Taking into account the average ambient temperature at site over the relevant period affecting the curing, adopt procedures to make sure of the following:

- Curing: Cure continuously from completion of finishing, when the concrete has set sufficiently not to be damaged by the curing process, until the total cumulative number of days or fractions of days, during which the air temperature in contact with the concrete is above 10°C, conforms to the following, unless accelerated curing is adopted:
  - Fully enclosed internal surfaces/Early age concrete: 3 days.
  - Other concrete surfaces: 7 days.
- End of curing period: Prevent rapid drying out at the end of the curing period.

Curing method: Refer to Structural documentation.

Curing compounds

Application: Provide a uniform continuous flexible coating without visible breaks or pinholes, which remains unbroken for at least the required curing period after application.

Substrates: Do not use wax-based or chlorinated rubber-based curing compounds on surfaces forming substrates to applied finishes, concrete toppings and cement-based render.

Self-levelling toppings: If used also as curing compounds, conform to AS 3799.

Visually important surfaces: Apply curing compounds to produce uniform colour on adjacent surfaces.

Cold weather curing

Temperature: Maintain concrete surface temperatures above 5°C for the duration of the curing period.

Hot weather curing

Requirement: If the concrete temperature exceeds 25°C, or the ambient shade temperature exceeds 30°C, protect from drying winds and sun by using an evaporative retarder until curing is commenced.

Water curing

Method: Select a method of ponding or continuously sprinkling to prevent damage to the concrete surface during the required curing period.

3.10 JOINTS

Construction joints

Location: Do not relocate or eliminate construction joints, or form undocumented construction joints . If emergency construction joints are made necessary by unforeseen interruptions to the concrete pour, submit a report on the action taken.

Finish: Butt join the surfaces of adjoining pours. In visually important surfaces make the joint straight and true, and free from blemishes impermissible for its surface finish class.

Preparation: Roughen and clean the hardened concrete joint surface. Remove loose or soft material, free water, foreign matter and laitance. Dampen the surface just before placing the fresh concrete and coat with a neat cement slurry.

Expansion joints

Joint filling: Fill with jointing materials as documented. Finish visible jointing material neatly flush with adjoining surfaces.

Preparation: Before filling, dry and clean the joint surfaces, and prime.

Watertightness: Apply the jointing material so that joints subject to ingress of water are made watertight.

Jointing materials: Provide jointing materials compatible with each other, and non-staining to concrete in visible locations.

Bond breaking: Provide back-up materials for sealants, including backing rods, which do not adhere to the sealant.

Foamed materials (in compressible fillers): Closed-cell or impregnated, not water absorbing.

Slip joints

Requirement: If concrete slabs are supported on masonry, provide proprietary slip joints.

3.11 SURFACE MODIFIERS

General

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

3.12 FORMED SURFACES

General

Surface finish: Provide formed concrete finishes as documented in the **Formed surface finishes schedule.**

Evaluation of formed surfaces

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

Surface repairs

Method: If surface repairs are required, submit proposals.

Finishing methods

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

Blasted finishes:

- Abrasive: Blast the cured surface using hard, sharp graded abrasive particles until the coarse aggregate is in uniform relief.
- Light abrasive: Blast the cured surface using hard, sharp graded abrasive particles to provide a uniform matt finish without exposing the coarse aggregate.

Bush hammered finish: Remove the minimum matrix using bush hammering to expose the coarse aggregate, recessing the matrix no deeper than half the aggregate size, to give a uniform texture.

Exposed aggregate finish: Remove the vertical face formwork while the concrete is green. Wet the surface and scrub with stiff fibre or wire brushes, flushing continuously with clean water, until the aggregate is uniformly exposed. Do not use acid etching. Rinse the surface with water.

Floated finishes:

- Sand floated finish: Remove the vertical face formwork while the concrete is green. Wet the surface and rub using a wood float. Rub fine sand into the surface until a uniform colour and texture are produced.
- Grout floated finish: Remove the vertical face formwork while the concrete is green. Dampen the surface and spread a slurry, using hessian pads or sponge rubber floats. Remove surplus slurry and work until a uniform colour and texture are produced.

Smooth rubbed finish: Remove the vertical face forms while the concrete is green. Wet the surface and rub using a carborundum or similar abrasive brick until a uniform colour and texture are produced.

3.13 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.

Surface repairs

Method: If surface repairs are required, submit proposals.

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 faux paved or cobblestone finish: Provide a proprietary finishing system.

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

3.14 TESTING

Completion tests

Slip resistance of completion installation: To AS 4663.

3.15 COMPLETION

Formwork removal

Extent: Remove formwork, other than profiled steel sheeting composite formwork and lost formwork, including formwork in concealed locations.

Timing: Do not disturb formwork until concrete is hardened enough to withstand formwork movements and removal without damage.

Stripping:

- General: To AS 3600 where it is more stringent than AS 3610.1.
- Vertical formwork: To AS 3610.1 Appendix B Table B1.

Removable bolts: Remove tie bolts without damaging the concrete.

Bolt hole filling: Provide material with durabilty and colour matching concrete.

Recessed filling: Fill or plug the hole to 6 mm below the finished surface.

Curing: 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.

Protection

General: Protect the concrete from damage due to construction loads, physical and thermal shocks, and excessive vibrations, particularly during the curing period.

Surface protection: Protect finished concrete surfaces and applied finishes from damage.

0331 BRICK CONSTRUCTION

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide brick 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 INTERPRETATION

Definitions

General: For the purposes of this worksection the definitions in AS 3700 clause 1.5.2, AS/NZS 4455.1 clause 1.4 and the following apply:

- Facework: Masonry intended to be exposed in a wall.

1.5 TOLERANCES

General

Requirement: To AS 3700 Table 12.1.

1.6 INSPECTION

Notice

Inspection: Give notice so that inspection may be made of the following:

- Set-out.
- Unit type, colour and texture.
- Bottoms of cavities, after cleaning out.
- Bottoms of core holes, before grouting.
- Reinforcement type and diameter.
- Positioning of reinforcing before grouting.
- Control joints, ready for insertion of joint filler.
- Damp-proof courses, in position.
- Flashings, in position.
- Lintels, in position.
- Structural steelwork, including bolts and shelf angles, in position.

2 PRODUCTS

2.1 GENERAL

Fire-resistance of building elements

Fire-resistance level: To AS 1530.4.

2.2 DURABILITY

General

Exposure locations: To AS 3700 clause 5.4.

2.3 MATERIALS

Brick units

Selections: As documented in the Finishes Schedule

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

Salt attack resistance grade: To AS 3700 Table 5.1.

Minimum age of clay bricks: 7 days.

Mortar materials

Mortar class: To AS 3700 Table 5.1.

Cement: To AS 3972.

Cement type: As documented in the Finishes Schedule

White cement: With ≤ 1% iron salts content.

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: ≤ 10% by weight of cement.

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

Mortar class to AS 3700	Clay	Concrete	Calcium silicate	Water thickener
M3	1:0:4	1:0:4	n/a	Yes
M4	1:0:3	n/a	n/a	Yes

Cement (GP/GB) mortar mix proportions table (cement:lime:sand), by volume

Mortar class to AS 3700	Clay	Concrete	Calcium silicate	Water thickener
M2	1:2:9	n/a	n/a	No
M3	1:1:6	1:1:6	n/a	Optional
M3	1:0:5	1:0:5	1:0:5	Yes
M4	1:0.5:4.5	1:0.5:4.5	n/a	Optional
M4	1:0:4	1:0:4	1:0:4	Yes
M4	1:0-0.25:3	1:0-0.25:3	n/a	Optional

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.

Steel lintels

Angles and flats: To AS/NZS 3679.1.

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

Corrosion protection: To AS/NZS 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/NZS 2699.1.

Type: A

Corrosion protection: To AS/NZS 2699.1.

Duty classification rating:

Masonry veneer: Medium duty

Normal cavity construction and at abutments: Medium duty

Cavities > 60 mm and < 200 mm wide: Heavy Duty

Cavities > 200 mm wide: Heavy Duty

Connectors and accessories

Standard: To AS/NZS 2699.2.

Corrosion protection: To AS/NZS 2699.2.

Flashings and damp-proof courses

Standard: To AS/NZS 2904.

Slip joints

Standard: To AS 3700 clause 4.13.

3 EXECUTION

3.1 GENERAL

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 brickwork 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 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 brick 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.

Joining to existing

General: Provide a control joint where joining to existing structures. Do not tooth new masonry into existing work unless approved by a professional engineer.

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:

- 75 mm high units: 7 courses to 600 mm.
- 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 brickwork 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 face brickwork at least 2 full courses for brickwork below adjacent finished surface level.

Double face walls

Selection: Select face units for uniform width and double-face qualities.

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 CAVITY WORK

Cavity clearance

General: Keep cavities clear at all times.

Cavity fill

General: Fill the cavity with mortar to 1 course above adjacent finished (ground) level. Fall the top surface towards the outer leaf.

Cavity width

General: Construct minimum cavity widths in conformance with the following:

- Masonry walls: 50 mm.
- Masonry veneer walls: 40 mm between the masonry leaf and the load bearing frame and 25 mm minimum between the masonry leaf and sheet bracing.

Openings

Jambs of external openings: Do not close the cavity.

Wall ties, connectors and accessories

Protection: Install to prevent water passing across the cavity.

3.4 DAMP-PROOF COURSES

Location

General: Locate damp-proof courses, as follows:

- Cavity walls built off slabs on ground: In the bottom course of the outer leaf, continuous horizontally across the cavity and up the inner face bedded in mortar, turned 30 mm into the inner leaf 1 course above.
- 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 2 courses per step for brickwork. 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.

3.5 FLASHINGS

Location

General: Locate flashings, as follows:

- Floors: Full width of outer leaf immediately above slab or shelf angle, continuous across cavity and up the inner face bedded in mortar, turned 30 mm into the inner leaf 2 courses above for brick. If the slab supports the outer skin and is not rebated, bed the flashing in a suitable sealant.

- Under sills: 30 mm into the outer leaf bed joint 1 course below the sill, extending up across the cavity and under the sill in the inner leaf or the frame for masonry veneer. Extend at least 150 mm beyond the reveals or each side of the opening.
- Over lintels to openings: Full width of outer leaf immediately above the lintel, continuous across cavity, turned 30 mm into the inner leaf 2 courses above for brick or turned up against the inner frame and fasten to it. Extend at least 150 mm beyond the lintels.
- At abutments with structural frames or supports: Vertical flash in the cavity using 150 mm wide material, wedged and grouted into a groove in the frame opposite the cavity.
- At jambs: Vertically flash jamb, extending 75 mm into the cavity, interleaved with the sill and head flashing at each end. Fix to jambs.
- At roof abutments with cavity walls: Cavity flash 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 2 courses per step for brickwork.

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

Pointing: Point up joints around flashings, filling voids.

Weepholes

Requirement: Locate weepholes to external leaves of cavity walls in the course immediately above flashings, and cavity fill, and at the bottoms of unfilled cavities.

Form: Open perpends.

Maximum spacing: 1200 mm.

3.6 WALL TIES

Location

General: Space wall ties in conformance with AS 3700 clause 4.10 and at the following locations:

- Not more than 600 mm in each direction.
- Adjacent to vertical lateral supports.
- Adjacent to control joints.
- Around openings.

Installation

Fixing of masonry veneer ties:

- To timber frames: Screw fix to outer face of timber frames with fixings to AS 3566.1.
- To concrete: Masonry anchors.
- To steel frames: Screw fix to outer face of steel studs with fixings to AS 3566.1.

3.7 CONTROL JOINTS

General

Location and spacing: Provide contraction joints, expansion joints or articulation 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 brickwork. 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.

3.8 BRICKWORK BED JOINT REINFORCEMENT

Location

General: Locate as follows:

- In 2 bed joints below and above head and sill flashings to openings.
- In 2 bed joints below and above openings.
- In third bed joint above bottom of wall.
- In second bed joint below top of wall.

Maximum vertical intervals: 500 mm.

Installation

General: Lap 450 mm at splices. Fold and bend at corners so that the longitudinal wires are continuous. Stop 50 mm short of control joints. Extend 450 mm beyond each side of openings.

Reinforcement

Material: Galvanized welded wire mesh.

Width: Equal to the width of the leaf, less 15 mm cover from each exposed surface of the mortar joint.

3.9 LINTELS

Location

General: Install one lintel to each wall leaf as documented in the **Lintel schedule**.

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 vertical.

Minimum bearing each end:

- Span ≤ 1000 mm: 100 mm.
- Span > 1000 mm ≤ 3000 mm: 150 mm.
- Span > 3000 mm: To structural drawings.

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

- Minimum propping period: 7 days.

3.10 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.

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.
- In conformance with the documented performance criteria.
- Independently designed and documented.
- Independently certified by a professional engineer for the design and the erected framing.

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

Design documentation

General: Where the structural drawings define performance criteria, submit independent design, documentation and certification from a professional engineer including certification for the erected work.

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 requirements for span, spacings and loadings.

2 PRODUCTS

2.1 GENERAL

Storage and handling

Requirement: Transport all components to site and store if required in a manner so as not to damage or distort the components.

2.2 COMPONENTS

Cold-formed steel framing

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

Corrosion protection: To BCA 3.4.2.2.

Framing members

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

Fascias and barge boards

Refer to *0423p COLORBOND steel and ZINCALUME steel in roofing*

3 EXECUTION

3.1 GENERAL

Fabrication

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

Service holes: Form holes by drilling or punching.

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

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

Fastening

Type: Select from the following:

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

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.

Metal separation

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

Unseasoned or CCA treated timber

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

Earthing

Permanent earthing: Required.

Temporary earthing: 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.

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

3.2 WALL FRAMING

Wall studs

General: Provide studs in single lengths without splices. Place a stud 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.

Flashings
Location: Provide flashings to external openings sufficient to prevent the entry of moisture. Form trays at the ends of sill flashings.

Masonry veneer construction: Extend across cavities and build into brickwork.

3.3 ROOF FRAMING

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

Additional support
General: Provide additional frame members at fibre cement or plasterboard sheeting or lining joint locations.

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

Anti-ponding boards
Standard: To AS 4200.2.

3.4 ROOF TRIM

Fascia, valley gutter and barge boards
Requirement: Supply and fix fascia, valley gutter and barge boards in conformance with the manufacturer's requirements.

3.5 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.

0381 STRUCTURAL TIMBER

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide structural timber, as documented. Refer to Structural documentation.

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- *0171 General requirements.*
- *0181 Adhesives, sealants and fasteners.*
- *0184 Termite management*
- *0185 Timber products, finishes and treatment.*

1.3 STANDARDS

General

Design: To AS 1720.1.

1.4 INTERPRETATION

Definitions

General: For the purposes of this worksection the definitions given in AS 1720.1 apply.

1.5 SUBMISSIONS

Certification

Design: If design by the contractor is required, submit independent certification by a professional engineer of the design and documentation, and of the erected work for conformance with AS 1720.1 and project performance criteria.

Preservative treatment: Submit a test certificate from an independent testing authority confirming that the required preservative retention has been achieved for every member.

- Treatment record: Submit a certified copy of the charge sheet.

Products and materials

Identification:

- Certification: Submit a supplier's certificate (which may be included on an invoice or delivery docket) verifying that the timber conforms to the specification, including moisture content.
- Inspection: Submit the inspection authority's certificate verifying that the timber conforms to the specification.

Moisture content: Submit records of moisture content.

CCA treated timber: If proposed, provide details of treatment.

Shop drawings

General: Submit shop drawings showing the following:

- Marking plans.
- Arrangement of members.
- Location of the members in the building.
- Loading parameters and bracing lengths assumed in the design.
- Species, stress grade, strength group and joint group of timber.

- Size of each member.
- Tolerances on member sizes.
- Joint details including connector plates.
- Lifting points.
- Method of fixing and bracing.
- Preservative treatment, if any.
- Long term deflection.
- Moisture content at time of manufacture.
- Method of fabrication.
- Precamber.
- For pole construction: Pole footing hole diameter and pole embedment length.

Drawing format: 2D and 3D CAD drawings.

Timber portal frames: Show the following additional information:

- Size and specification of gussets.
- Gusset fastenings (nail size and arrangement).
- Base plate details.
- Fixings for purlins, girts and bracing.
- Method of handling and erection, including temporary bracing required, if any.

Glued laminated timber: Show the following additional information:

- Design stresses.
- Appearance grade.
- Service class.
- Strength grade.
- Precamber.

Contractor design: For items designed by the contractor, submit independent certification of shop details by a professional engineer for conformance to AS 1720.1 and the project performance criteria.

Subcontractors

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

Prefabricated items: Submit name and contact details of proposed prefabricator.

1.6 INSPECTION

Notice

Inspection: Give notice so that inspection may be made of the following:

- Prefabricated items before priming or water-repellent treatment.
- Structural timberwork after erection but before being concealed.
- On site preservative treated members before being concealed.
- Post holes/foundations before placing concrete.
- Bolts after final tightening.

2 PRODUCTS

2.1 GENERAL

Marking

Identification: 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 TIMBER

Structural timber

Conformance: As documented in the **Solid timber schedule**.

Timber grading methods:

- Hardwood: To AS 1720.1 Table H2.3 strength group classification.
- Softwood: To AS 1720.1 Table H2.4 strength group classification.
- F-grades: To AS 1720.1 Table H2.1.
- MGP grade: To AS 1720.1 Table H3.1.
- Visually graded F-grade: To AS 2082 or AS 2858.

Preservative treatment: To the *0185 Timber products, finishes and treatment* worksection.

Termite treatment: To the *0184 Termite management* worksection.

Recycled timber

Grit blasted or re-machined: Remove all nails and screws.

Identification

Method: Identify timber using branding, certification or both.

Branding: Brand structural timber, under the authority of a recognised product certification scheme to *0185 Timber products, finishes and treatment* as applicable to the product. Locate the brand mark on faces or edges which will be concealed in the works. Include the following data for timbers not covered by branding provisions in Australian standards or regulations for which branding is required:

- Stress grade.
- Method of grading.
- If seasoned, the word, SEASONED or DRY, or an abbreviation of seasoned, such as SEAS or S.
- The certification mark of the product certification scheme.
- The applicable standard.

Certification: Forest certification, chain of custody and product labelling to *0185 Timber products, finishes and treatment*.

2.3 FASTENERS

Joint

Type: Refer to Structural documentation.

Materials

Type: Refer to Structural documentation.

Conformance: To the fasteners requirements in the *0181 Adhesives, sealants and fasteners* worksection.

Fastener type

Metal fasteners: Select fastener as appropriate for the documented atmospheric category and the life of the structure.

Fastener configuration: If timber elements experience tension perpendicular to the grain, use the appropriate fastener configuration.

Nails and screws

Nail diameter: Refer to Structural documentation.

Nail spacings and edge and end spacing: Refer to Structural documentation.

Bolts

Thread: Provide thread length at least four times the bolt diameter.

Holes: Drill bolt holes 2 mm larger than the bolt diameter.

Washers

Standard: To AS 1720.1 Table 4.11.

3 EXECUTION

3.1 TRANSPORT AND DELIVERY

General

Handling and protection: Do not distort or damage timber or timber products.

Moisture content: Maintain the equilibrium moisture content of seasoned timber.

Appearance products: Store under cover.

3.2 STRUCTURAL TIMBER

General

Preservative treatment: If holes are drilled in treated timber, apply a saturation coating of preservative to the sides of the holes before inserting fixings.

Outdoor structures

Sealing: Seal the ends of members with wax emulsion or petroleum jelly immediately after sawing.

Anti splitting plates: Plate the ends of members 250 x 75 mm or larger with pressed or hammer-on galvanized nail plates equal to 50% of the cross-sectional area.

Bolt holes: Treat bolt holes with a protective treatment before inserting the bolt.

Coating: After completion of fabrication, notching and machining, coat joints, holes and notches with a protective coating.

Heart: Place the heart side of bracing members on the inside of joints. Place the heart side of other members on the downside wherever possible.

Minimum bolts size: M20.

Minimum washer size: 5 mm thick and 65 mm square or 75 mm diameter.

Bolt protection: Coat bolts with a bituminous coating before insertion in the bolt hole.

Recessed fixing: For fixings punched or sunk below the surface, fill the recess with a suitable wood filler or mastic.

Finishing: If a protective or decorative finish is required apply one coat of primer and one finishing coat all around before fixing.

3.3 COMPLETION

Tightening

Initial: Tighten bolts, screws and other fixings so that joints and anchorages are secure at the date for practical completion.

Subsequent: If unseasoned timber is used, retighten after 6 months all bolts, screws and other fixings.

0382 LIGHT TIMBER FRAMING

1 GENERAL

1.1 RESPONSIBILITIES

General

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

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- *0171 General requirements.*
- *0181 Adhesives, sealants and fasteners.*
- *0185 Timber products, finishes and treatment.*

1.3 STANDARDS

General

Framing: To AS 1684.2, AS 1684.3 or AS 1684.4, as appropriate.

Design: To AS 1720.1.

1.4 INTERPRETATION

Definitions

General: For the purposes of this worksection the definitions given in the AS 1684 series apply.

1.5 TOLERANCES

Floors

Maximum deviation from a 3 m straightedge laid in any direction on the floor framing: 5 mm.

Walls tolerances table

Property	Permitted deviation
Generally: Verticality in 2 m	1:500
Generally: Flatness[1] in 2 m	3 mm
Features[2]: Verticality in 2 m	1:1000
Features[2]: Horizontality in 2 m	1:1000
1. Flatness: Measured under a straightedge laid in any direction on a surface. 2. Features: Conspicuous horizontal or vertical lines including external corners, parapets, reveals, heads, sills.	

1.6 SUBMISSIONS

Certification

Requirement: Submit certification by a professional engineer of the design, documentation and erected work to AS 1684 and AS 1720.1. Include the following:

- Reactions: Provide location and magnitude of reactions to be accommodated by the support structure.
- Floor, wall and roof frame member sizes: A schedule of proposed member sizes, certified as meeting stated project requirements for spans, spacings, loadings and deflections.
- Species and stress grade.

Products and materials

Identification: Submit a supplier's certificate (which may be included on an invoice or delivery docket) verifying that the timber conforms to the documented requirements.

Inspection: Submit the inspection authority's certificate verifying that the timber conforms to the documented requirements.

Moisture content: Submit records of moisture content.

CCA treated timber: If proposed to be used, provide details.

1.7 INSPECTION

Notice

Inspection: Give notice so that inspection may be made of the following:

- Prefabricated units before installation.
- Fabricated items before priming or water-repellent treatment.
- Bolts after final tightening.
- Timber work after erection but before it is covered.

2 PRODUCTS

2.1 GENERAL

Storage and handling

General: Do not distort or damage timber or timber products.

Moisture content: Maintain the equilibrium moisture content of seasoned timber.

Protection from weather: Provide temporary protection for members until permanent covering is in place.

Marking

Branding: Brand structural timber, under the authority of a recognised product certification scheme to *0185 Timber products, finishes and treatment* as applicable to the product. Locate the brand mark on faces or edges which will be concealed in the works. Include the following data for timbers not covered by branding provisions in Australian standards or regulations for which branding is required:

- Stress grade.
- Method of grading.
- If seasoned, the word, SEASONED or DRY, or an abbreviation of seasoned, such as SEAS or S.
- The certification mark of the product certification scheme.
- The applicable standard.

Trusses: Permanently mark each truss to show:

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

2.2 COMPONENTS

Fasteners

General: Conform to the *0181 Adhesives, sealants and fasteners* worksection.

Installation: Do not split or otherwise damage the timber.

Coating: Before placing bolts in contact with CCA treated timber, coat the shank of the bolt in a grease or bituminous coating.

Damp-proof course

Material: To AS/NZS 2904.

Flashings

Material: To AS/NZS 2904.

2.3 FINGER JOINTED STRUCTURAL TIMBER

General

Performance: To AS/NZS 8008 (Int).

Production: To AS 5068.

3 EXECUTION

3.1 ROOF AND CEILING FRAMING

Wall plates

Fixing: Fix timber wall plates to masonry, with straps, bolts or both.

Fixing plates

Requirement: Provide 45 mm minimum thick timber fixing plates to transfer the design loads where timber joists, rafters or purlins bear on or into steel members. Bolt to the steel member at maximum 500 mm centres and at maximum 100 mm from the end of the fixing plate.

Beam framing

Ridge straps: Butt ends of rafters together at ridge, and strap each pair together with 900 mm long steel strap passing over the ridge, triple nail to each rafter.

Ridge strap material: Refer to Structural documentation.

Water tank or heater in roof space: Provide a support platform to AS/NZS 3500.4 clause 5.5.

Additional support: Provide a frame member behind every joint in fibre cement sheeting or lining.

3.2 COMPLETION

Fasteners

Requirement: Make sure all bolts, screws and other fixings have been tightened so that joints and anchorages are secure at the date of practical completion.

0423P COLORBOND® STEEL AND ZINCALUME® STEEL IN ROOFING

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide and install roof cladding made from COLORBOND® steel and ZINCALUME® steel and associated work, as documented.

Ambient climatic conditions

Design rainfall intensity (mm/h) to AS/NZS 3500.3: Refer to Hydraulic documentation.

Location exposure severity

Exposure severity category: Benign

Roof access

Type: Normal roof maintenance

1.2 COMPANY CONTACTS

BlueScope technical contacts

Website: www.steel.com.au/support

1.3 CROSS REFERENCES

General

Requirement: Conform to the following:

- *0171 General requirements*.

1.4 MANUFACTURER'S DOCUMENTS

Technical manuals

Website: www.steel.com.au/library.

1.5 TOLERANCES

Sheet metal roofing

Supporting members: To AS 1562.1 clause 4.2.

1.6 SUBMISSIONS

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

Type tests: As appropriate for the project, submit evidence of conformance 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

Requirement: Submit the following:

- Warranties for all roofing products

Roofing materials: Submit the manufacturer's published product warranties.

Roofing materials: Submit the manufacturer’s published product warranties.

1.7 INSPECTION

Notice

Inspection: Give notice so that inspection may be made of the following:

- Roof supports.
- Parts of the roofing, sarking, vapour barrier, insulation and roof plumbing installation before covering up or concealing.

2 PRODUCTS

2.1 GENERAL

Product substitution

Other products: Conform to **PRODUCTS**, **GENERAL**, **Substitutions** in *0171 General requirements*.

Storage and handling

Storage: Store metal roofing materials, as follows:

- 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: Handle 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 SHEET METAL ROOFING

Standards

Design and materials: To AS 1562.1.

Stainless steel: To ASTM A240/A240M.

Fasteners

Prefinished exposed fasteners: Finish with an oven baked polymer coating to match the roofing material.

Fastenings to timber battens: Fastenings long enough to penetrate the thickness of the batten without piercing the underside.

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.

2.3 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.

Matching fascia/barge capping: If the selected eaves gutter is a proprietary high front pattern forming part of a combined system of gutter, fascia and barge, provide matching proprietary fascias and barge cappings to roof verges and edges.

Materials

Metal rainwater goods: To AS/NZS 2179.1 or CodeMark certified (GM CM30033 Rev A).
Metal: Colorbond steel to match roof sheeting.
PVC-U rainwater goods and accessories: To AS/NZS 3500.3.

Flashings and cappings
Standard: To AS/NZS 2904.
Product: Colorbond steel
Material and colour: Match roof sheeting
Rib notching: Match roof sheeting.
Profiles: Ensure that cappings are formed to the profiles drawn particularly with the 45 degree splay end to all cappings.

Ridge and barge cappings
Product: Colorbond Steel
Material and colour: Match roof sheeting

Eaves gutters
Product: Colorbond Steel
Type: Half-round. Refer to Hydraulic documentation for size.
Material and colour: Refer to Finishes Schedule
Matching fascia/barge: Provide the matching fascias and barge cappings to roof verges and edges.

Downpipes
Product: Bluescope Lysaght
Material: 0.75mm BMT zinc coated steel
Colour: Match roof sheeting
Profile: Round
Size: Refer to Hydraulic documentation

Rainheads
Product: Refer to Hydraulic documentation

Vents
Product: Refer to Hydraulic documentation
Material: Refer to Hydraulic documentation
Colour: Where exposed, colour to be provided by architect. Where concealed, no colour required

Gratings
Requirement: Removable gratings over rainwater heads and sumps.
Type: Refer to Hydraulic documentation.

2.4 ROOF WALKWAY GRATING

The grating panels shall be fabricated using Ullrich Aluminium Grating series Series 40 and designed to comply with Australian Standard AS1657 – 1992. Fabricate/install according to Ullrich recommendation.

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 COLORBOND® STEEL AND ZINCALUME® STEEL SHEET METAL ROOFING

Roof sheet 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.

3.3 BUILDING ELEMENTS

Ridges and eaves

Sheet ends: Treat as follows, if appropriate:

- Sheet ends: Treat as follows, if appropriate:
- 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.
- Pre-cut notched eaves flashing and birdproofing, 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.

End laps

General: If end laps are unavoidable, and the sheet profile is not suitable for interlocking or contact end laps, construct a stepped type lap.
Length of lap (mm): 250mm minimum

3.4 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.

Jointing system: Aluminium blind rivets

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 overflashing 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: Proprietary metallic-coated adjustable strap and channel system

Box gutter: Prefabricate box gutters to the required section and shape. Form stop ends, downpipe nozzles, bends and returns. Dress downpipe nozzles into outlets. Provide overflows to prevent back-flooding.

- Hail guards: Install grating over the whole of the profile.

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.

Expansion joints in guttering longer than 30 m: Provide as follows:

- Type: Proprietary elastic expanding adhesive fixed type.

Gratings: Install removable gratings over rainheads and sumps.

Leaf screen location: All gutter outlets.

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.

Rainwater disposal

System: Refer to Hydraulic documentation.

3.5 TESTING

Site tests

Internal downpipes: Test each stack hydrostatically in stages. Run each test over two storeys high for two hours. Remedy defects and retest if necessary.

3.6 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.

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 oxidisation.

Roof plumbing: Clean out spoutings, gutters and rainwater pipes after completion of roof installation.

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.

0431 CLADDING – COMBINED

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide lightweight external wall cladding and associated work, as documented.

Location exposure severity

Exposure severity category: Benign

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:

- AAC: Autoclaved aerated concrete.
- CCA: Copper chrome arsenate.
- CFC: Compressed fibre cement.
- EIFS: External insulated finishing system.
- FC: Fibre cement.
- LOSP: Light organic solvent preservative.

1.4 TOLERANCES

Permitted deviations

Profiled metal sheet cladding: To AS 1562.1 clause 4.2.

Flat sheet and panel cladding: To the manufacturer's recommendations.

Plank and weatherboard cladding: 5 mm from a 1.8 m straightedge or to the manufacturer’s recommendations.

1.5 SUBMISSIONS

Combustibility

Requirement: Submit evidence of conformance to PRODUCTS, **FIRE PERFORMANCE**, **Combustibility**.

Fire hazard properties

Requirement: Submit evidence of conformance to PRODUCTS, **FIRE PERFORMANCE**, **Fire hazard properties**.

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 evidence of conformance to the following:

- Metal cladding generally: Cladding and fastenings to AS 1562.1 clause 5.5 for resistance to wind pressures.
- Metal cladding in cyclonic regions to AS/NZS 1170.2: Cladding and fastenings to AS 1562.1 clause 5.6.
- Plastic cladding: Cladding and fastenings to AS 1562.3 Section 5 for resistance to wind forces and resistance to impact.

Warranties

Cladding materials: Submit the manufacturer's published product warranties.

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.
- Store metal materials away from uncured concrete and masonry on a level base.
- Do not store metal materials in contact with other materials which may cause staining, denting or other surface damage.
- Use gloves when handling precoated metal cladding material.

Components

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

External combustible linings: Group number to BCA Spec C1.10 and AS 5637.1.

External combustible attachments: Fire hazard indices tested to AS/NZS 1530.3, 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: To AS 1530.4.

2.3 COMPRESSED FIBRE CEMENT (CFC) SHEETS

General

Requirement: Proprietary compressed fibre cement sheets.

Standard: To AS/NZS 2908.2 and the following:

- Type A Category 5.

Selection: To the **CFC sheet cladding schedule**.

Quality: Smooth and even with factory sealed edges, free of imperfections such as chips.

Edge profile: Square.

Arrangement: Set out in even panels with joints coinciding with framing or as documented.

Sealant and bond breaking tape: To the manufacturer's recommendations.

2.4 FIBRE CEMENT SHEETS

General

Requirement: Proprietary single faced fibre cement sheets.

Standard: To AS/NZS 2908.2 and the following:

- Type A Category 3.

Selection: To the **FC sheet cladding schedule**.

Arrangement: Set out in even panels with joints coinciding with framing or as documented.

Sealant and bond breaking tape: To the manufacturer's recommendations.

2.5 PROFILED SHEET METAL

General

Requirement: Proprietary profiled sheet metal cladding.

Design and installation: To AS 1562.1.

Stainless steel: To ASTM A240/A240M.

Selection: Refer to Finishes Schedule

3 EXECUTION

3.1 PREPARATION

Substrates or framing

Requirement: Before fixing cladding, check the alignment of substrates or framing and adjust if required.

Flexible underlay: Check that the underlay is restrained.

3.2 INSTALLATION

General

Fixing method: As documented or to one of the following fixing methods to the manufacturer's recommendations:

- Steel framing: Screw.
- Timber framing: Nail or screw.
- Minimum penetration for profiled metal sheets: 30 mm for timber framing.

Horizontal cladding surface:

- Minimum slope: 1:15.
- Staining: Slope away from visible vertical facade areas to prevent staining.

Defective components: Do not install component parts which are defective, including warped, bowed, dented, abraded or broken members.

Damaged parts: Remove and replace damaged members during installation.

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.

Proprietary systems or products

Product fixing: Fix proprietary systems to the manufacturer's recommendations.

3.3 CFC SHEET CLADDING

Preparation

Requirement: Cut sheets to suit the layout as documented, allowing a joint gap of 10 mm between panels.

Joints

Control joint:

- 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.

Prefinished metal backing/jointing strip: Fix proprietary backing strip to the rear face of the panel with proprietary closed cell self-adhering foam and horizontal gasket.

- Seal the joint with a 3 mm epoxy fillet.

Vertical joints: Vertical gasket or prefinished jointing strip to framing member.

Fixing

General: Screw fix to proprietary framing supports at centres to the manufacturer's recommendations.

Concealed fixings:

- Predrill oversized holes.
- Countersink so that the top of the screw is 2 to 3 mm below the surface.
- Finish: Stop screw heads with epoxy filler. Smooth and level upon application and sand flush after curing.

3.4 FC SHEET CLADDING

Preparation

Requirement: Cut sheets to suit the layout as documented.

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.

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.

3.5 PROFILED SHEET METAL CLADDING

Installation

Swarf: Remove swarf and other debris as soon as it is deposited.

Ground clearance: Maintain documented clearance.

Cutting sheets: Wherever possible, factory cut to length. Do not use an abrasion disc.

Accessories: Provide material with the same finish as cladding sheets.

Expansion joints: To Manufacturer's requirements.

3.6 COMPLETION

Cleaning

Protection: Remove protective coatings using methods required by the manufacturer after completion.

Composite 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.

0451P CAPRAL ALUMINIUM WINDOWS AND DOORS

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide Capral Aluminium windows and glazed doors, as documented.

1.2 COMPANY CONTACTS

Capral Aluminium technical contacts

Website: http://www.capral.com.au/Contacts-Locations.

1.3 CROSS REFERENCES

General

Requirement: Conform to the following:

- *0171 General requirements*.

1.4 STANDARDS

General

Selection and installation: To AS 2047.

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.

Terminology for work on glass: To AS/NZS 4668.

1.5 MANUFACTURER'S DOCUMENTS

Technical manuals

Website: www.capral.com.au/Technical-Manuals

1.6 INTERPRETATION

Abbreviations

General: For the purposes of this worksection the abbreviations given in AS 4145.1 Appendix D and the following abbreviations apply:

- AWA: Australian Window Association.

Definitions

General: For the purposes of this worksection the definitions given inAS 4145.1 Section 2 and the following apply:

- Total system SHGC: Solar heat gain coefficient as defined by BCA and tested in conformance with NFRC 200.
- Total system U-Value: Thermal transmittance as defined by BCA and tested in conformance with NFRC 100.

1.7 SUBMISSIONS

Certification

Windows: 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.

Ceramic-coated spandrel glass: Submit a report, from the manufacturer, certifying that the glass meets the Fallout Resistance Test requirements of ASTM C1048.

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.

Protection of openable windows: Submit a certificate of on-site fall prevention testing to AS 5203.

Operation and maintenance manuals

Capral Aluminium care and maintenance manual: Submit on completion.

Products and materials

Type tests: Submit results, as follows:

- Weighted sound reduction index (R_w): To AS/NZS ISO 717.1.
- Protection of openable windows: To AS 5203.

Security screen doors: To AS 5039.

Shop drawings

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.

Warranties

General: Submit Capral Aluminium warranty for finishing and hardware.

1.8 INSPECTION

Notice

Inspection: Give notice so that inspection may be made of the following:

- Openings prepared to receive windows (where windows are to be installed in prepared openings).
- Fabricated window assemblies at the factory ready for delivery to the site.
- Fabricated window assemblies delivered to the site, before installation.
- Commencement of window installation.

2 PRODUCTS

2.1 GENERAL

Product substitution

Other products: Conform to **PRODUCTS**, **GENERAL**, **Substitutions** in *0171 General requirements*.

Protection of openable windows

Fall prevention: To BCA D2.24 and BCA 3.9.2.5.

Testing: To AS 5203.

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 square.
- Do not remove any bands and corner bracing until after installation.

Marking

Identification: 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 CAPRAL ALUMINIUM GENESIS RESIDENTIAL WINDOWS

Genesis Folding Window

Description: Single or double glazed folding window with a range of configurations.

Framing section (depth): 80 mm.

Maximum panel size and weight:

- Height: 1600 mm.
- Width: 900 mm.
- Weight: 20 kg.

2.3 GLASS

Glass and glazing materials

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 glasses

Standard: To AS/NZS 2208.

Certification: Required.

Certification provider: An organisation accredited by the Joint Accreditation System of Australia and New Zealand (JAS-ANZ).

Type: Grade A to AS 1288.

Opacified glass

Description: Glass with an opacifier permanently bonded to the inner face.

Unacceptable blemishes in heat-treated flat glass (including tinted and coated glass)

Standard: ToAS/NZS 4667.

2.4 GLAZING MATERIALS

General

Glazing materials: Provide 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 the required performance.

Jointing materials

Requirement: Provide jointing and pointing materials to manufacturer's recommendations 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.

Elastomeric sealants

Sealing compound (polyurethane, polysulfide, acrylic): ToASTM C920 or ISO 11600.

Sealing compound (silicone): To ASTM C920 or ISO 11600.

Sealing compound (butyl): To ASTM C1311.

Priming

Application: Apply 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 which do not absorb water.

Bond breaking: Provide backing rods, and other back-up materials for sealants, which do not adhere to the sealant.

2.5 GLASS IDENTIFICATION

Safety glazing materials

Identification: To AS 1288.

Noise reducing glazed assemblies

Labelling: Label each panel with a legible non-permanent mark, stating and certifying the R_w rating, and identifying the testing authority. Remove when directed.

Bullet-resistant panels

Marking: To AS/NZS 2343.

2.6 INTEGRAL BLINDS

General

Requirement: Provide integral blinds as documented in the **Integral blind schedule**.

2.7 ALUMINIUM FRAME FINISHES

Powder coatings

Standard: To AS 3715. Refer to Finishes Schedule.

Anodised

Standard: To AS 1231.

Thickness: ≥ 15 microns to 20 microns.

2.8 OTHER MATERIAL FRAME FINISHES

Finish

Standard: To AS 2047 clause 3.4.1.4.

2.9 ANCILLARY MATERIALS

Glazing adaptors

Glazing adaptor glazing capacity:

- St Kilda plant-on adaptor: 6 mm to 36 mm.
- St Lucia plant-on adaptor: 4 mm to 28 mm.
- Frameless glazing channels:
  - 24 mm: 4 mm to 12 mm.
  - 33 mm: 6 mm to 12 mm.

- General adaptors:
  - 31 mm: 6 mm to 11 mm.
  - 35 mm: 4 mm to 26 mm.
  - 50 mm: 6 mm to 41 mm.

Trims

Timber: Solid timber at least 19 mm thick, mitred at corners.

Extruded gaskets and seals

General: Provide seals as documented in the **Window and door seal schedule**.

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): ToBS 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 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.

Weather bars

General: Provide a weather bar under hinged external doors; locate under the centres of closed doors.

2.10 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.

Locks and latches

Standard: To AS 4145.3.

Window catches: Provide 2 catches per sash to manually latched awning or hopper sashes over 1000 mm wide.

Sash balances

Requirement: Match the spring strength of the balances to the sash weight they support.

Sash operators

Requirement: As documented.

2.11 KEYING

Contractor's keys

Master key systems: Do not use any key under a master key system. Council to provide lock cylinders.

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

Pin tumbler locks: Nickel alloy, not brass.

Lever locks: Malleable cast iron or mild steel.

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, 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.

- External timber framed glazing: Glaze with putty.

Windows and glazed doors

General: Install windows and glazed doors frames, to the manufacturers recommendations, 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, caulking and pointing so that water is prevented from 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.

Fasteners: Conceal fasteners.

Packing: Pack behind fixing points with durable full width packing.

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.

Repair of finish

Polyester or fluoropolymer coatings: Contact supplier for approval to apply touch up products, otherwise replace damaged material.

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 HARDWARE

Fasteners

Materials: Use materials compatible with the item being fixed and of sufficient strength, size and quality to perform their function.

- Concealed fixings: Provide a corrosion-resistant finish.
- Exposed fixings: Match exposed fixings to the material being fixed.

Support: Provide appropriate back support (for example lock stiles, blocking, wall noggings and backing plates) for hardware fixings.

- 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.

3.4 COMPLETION

Hardware

Adjustment: Leave the hardware with working parts in working order, and clean, undamaged, properly adjusted, and lubricated where appropriate.

Keys

Contractor's keys: Immediately before the date for practical completion, replace cylinders to which the contractor has had key access during construction with new cylinders which exclude the contractor's keys.

Keys: For locks keyed to differ and locks keyed alike, verify quantities against key records, and deliver to the contract administrator at practical completion.

Key codes: 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.

Trade clean

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: Submit the manufacturer's published product warranties.

Hardware: Submit the manufacturer's published product warranties.

0453 DOORS AND ACCESS PANELS

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide doors, frames and doorsets as documented.

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- *0171 General requirements*.
- *0455 Door hardware*.

1.3 INTERPRETATION

Definitions

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

- Balanced construction: Flush door construction where the facings on one side of the core are nominally equal in thickness, grain direction, properties and arrangement to those on the other side of the core, such that uniformly distributed changes in moisture content will not cause warpage.
- Door frame: Includes jamb linings.
- Doorset: An assembly comprising a door or doors and supporting frame, guides and tracks including the hardware and accessories necessary for operation.
- Flush door: A door leaf with two plane faces which entirely cover and conceal its structure. It includes doors with intermediate rail, cellular, blockboard, medium density fibreboard (MDF) and particleboard cores.
  - Solid core door: A flush door with a solid core continuous between stiles and rails or edge strips and fully bonded to the faces.

1.4 SUBMISSIONS

Operation and maintenance manuals

Recommendations: Submit the manufacturer's published recommendations for service use.

2 PRODUCTS

2.1 FRAMES

Aluminium frames

General: Assembled from aluminium sections, including accessories such as buffers, pile strips, strike plates, fixing ties or brackets and cavity flashing, with provision for fixing documented hardware.

Threshold: If the frame includes a threshold member, provide a self-draining section with anti-skid surface.

Steel frames

General: 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:

- General: Minimum 1.1 mm.
- Fire-resisting doorsets: Minimum 1.5 mm.
- Security doorsets: Minimum 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 processed fibreboard (including hardboard): To AS/NZS 1859.4.
- Dry processed 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.

Certification

Panel doors: Provide panels branded under the authority of a recognised certification scheme to *0185 Timber products, finishes and treatment*, as applicable to the product. Locate the brand on faces or edges which will be concealed in the works.

Flush doors

General: Provide flush doors of balanced construction.

Solid core: Solid flush doors as follows:

- Flush door with blockboard: Core plate of timber strips laid edge to edge, fully bonded to each other and to facings each side of no less than two sheets of timber veneer.
- Flush doors with particleboard: Core plate of particleboard fully bonded to facings each side of no less than two sheets of timber veneer.

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.

Construction

Adhesives:

- Internal: To AS/NZS 2270.
- External: To AS/NZS 2271.

Door thickness:

- General: 35 mm.
- External doors and doors over 900 mm wide: 40 mm.

Cut-outs: If openings are required in flush 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.

Louvre grilles: Construct by inserting the louvre blades into a louvre frame, and fix the frame into the door.

Tolerance

Squareness: The difference between the lengths of diagonals of a door: Maximum 3 mm.

Twist: The difference between perpendicular measurements taken from diagonal corners: Maximum 3 mm.

Door panel nominal size (mm):

- Height: ± 2.
- Width: + 2, - 0.

2.3 ANCILLARY MATERIALS

Trims

Timber: Solid timber at least 19 mm thick, mitred at corners.

Extruded gaskets and seals

General: As documented in the **Door seal schedule**.

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.

Weather bars

General: Provide a weather bar under hinged external doors, locate under the centres of closed doors.

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.

0455 DOOR HARDWARE

1 GENERAL

1.1 RESPONSIBILITIES

General
Requirement: Provide door hardware, as documented and as listed on the Annexure attached to this specification.

1.2 CROSS REFERENCES

General
Requirement: Conform to the following worksection(s):
- *0171 General Requirements.*
- *0451p CAPRAL Aluminium Windows & Doors*
- *0453 Doors & Access Panels*
- *Door Hardware Schedule*

1.3 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 apply.
Lock function: For the purposes of this worksection, the general definitions given in AS 4145.1 Appendix E apply.

2 PRODUCTS

2.1 GENERAL

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, fixings and fixing instructions.

Hardware specified generically: Provide hardware of sufficient 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.

2.2 LOCKS AND LATCHES

Standard
General: To AS 4145.2.

Lock and latch classification
Rating systems: To AS 4145.1 Section 3.
Performance requirements: To AS 4145.2 Section 3.

2.3 HINGES
Refer to *Door Hardware Schedule* for selections.

2.4 ANCILLARIES
Refer to *Door Hardware Schedule* for selections.

2.5 DOOR CONTROLLERS

Standard
General: To AS 4145.5.

General
Performance: Provide door controllers, pivots, floor or overhead door closers, and automatic door operators, which are suitable for the door type, size, weight and swings required and the operating conditions, including wind and air conditioning pressure.

Closers
Hinged and pivot doors:
- Fire-resisting doors: Provide closers tested and certified for use as components of fire-resisting door assemblies:
  . Standard: To AS 1905.1.

2.6 KEYING

Temporary construction keys and cylinders
Requirement: Provide one of the following:
- Loan cylinder: 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 the manufacturer or supplier to deliver direct to the principal.

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.

3 EXECUTION

3.1 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 AFFL

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. Allow to fit door stops to all doors not fitted with door closers.

Fasteners
Materials: Provide materials compatible with the item being fixed, and of sufficient strength, size and quality to perform their function.
- Concealed fixings: Provide a corrosion resistant finish to concealed fixings.
- Exposed fixings: Match exposed fixings to the material being fixed.

Security: Locate exposed fixings 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 fixings.
- 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 blind rivets.

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.

3.2 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.

Product warranties
Warranty: Cover materials and workmanship in the form of interlocking warranties from the manufacturer or distributor and the installer.

4 SELECTIONS

Refer to *Door Hardware Schedule* in Annexure.

0461B GLAZING

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide glazing, as documented.

Performance

Thermal qualities: U-Value and Solar heat gain coefficient as documented.

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- *0171 General requirements*.

1.3 STANDARDS

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.

Roof glazing: To AS 1288 Section 6.

Terminology for work on glass: To AS/NZS 4668.

1.4 SUBMISSIONS

Certification

Design: Submit an engineers' certificate confirming conformance to AS 1288.

Installation

Glazing: Submit certification from the fabricator that the method of glazing, the selection of sealant systems and conditions next to the glass conform to the following:

- Compatible with the edge seal of insulating glass units (IGUs) and self cleaning glass.
- Will not be detrimental to the long term structural performance, weathering capabilities and visual qualities of the glass.

Glazier's data: Submit the glazing subcontractor's statement certifying the following:

- A satisfactory thermal safety assessment.
- The assembled frame provides the required glazing clearances and tolerances, and maximum and minimum joint configurations, based on the bow, warp and kink characteristics of the required glass types, and is ready for glazing.

Site glazing: If site glazing is intended, submit proposals.

Operation and maintenance manuals

Requirement: Submit manufacturers' published recommendations for service use.

Shop drawings

Requirement: Submit shop drawings showing the following:

- Method of glazing
- Rebate depth.
- Edge restraint.
- Clearances and tolerances.

- Glazing gaskets and sealant beads.

Warranties

Requirement: Submit the following:

- Manufacturer's warranty

2 PRODUCTS

2.1 GENERAL

Heat soaking

Requirement: All toughened and heat strengthened glass products.

Standard: To EN 14179-1.

Heat strengthening

Requirement: Heat strengthen all glass that requires extra strength and thermal resistance.

2.2 GLASS

Glass and glazing materials

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.

Certification: Required.

Certification provider: An organisation accredited by the Joint Accreditation System of Australia and New Zealand (JAS-ANZ).

Type: Grade A to AS 1288.

2.3 GLAZING MATERIALS

General

Glazing materials: Provide putty, glazing compounds, sealants, gaskets, glazing tapes, spacing strips, spacing tapes, spacers, setting blocks and compression wedges appropriate for the conditions of application and the required performance.

Priming

Compatibility: Apply the manufacturer's recommended primer to the surfaces in contact with sealant materials.

2.4 GLASS IDENTIFICATION

Safety glazing materials

Identification: Identify each piece or panel, to AS 1288.

Noise reducing glazed assemblies

Identification: Label each panel with a legible non-permanent mark, stating and certifying the R_w rating, and identifying the testing authority. Remove when directed.

2.5 ANCILLARY MATERIALS

Extruded gaskets and seals

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.

Pile weather strips

Standard: To AAMA 701/702.

Material: 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.

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 glazing.

Temporary marking: Use a method which does not harm the glass. Remove marking on completion.

Toughened glass: Do not cut, 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.

Curtain walls: Supply inclusive of glazing, shop preglazed.

External timber framed glazing: Glaze with putty.

3.3 COMPLETION

Replacement

Requirement: After replacing damaged glass, leave the work clean, polished, free from defects, and in good condition.

Trade clean

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

Glazing subcontractor's warranty: Provide an undertaking conditional only on compliance with the manufacturers' recommendations for maintenance, to repair or replace glass and glazing materials that become defective or prove unsuitable for the nominated application; during the warranty period.

Glass manufacturer's warranty: Provide an undertaking, conditional only on compliance with the manufacturer's recommendation for installation and maintenance, to supply replacement glass units to the site for replacement of defective units defined as follows:

- IGU units: Units in which the hermetic seal has failed as evidenced by intrusion of foreign matter, or internal condensation at temperature above 2°C.

- Coated glass units (including coated super insulating glass units): Units in which the metallic coating shows evidence of manufacturing defects, including but not necessarily limited to cracking or peeling, as determined in conformance with ASTM C1048.

Toughened glass warranty: Provide a manufacturer's warranty certifying that toughened glass supplied for use in curtain walls has been subjected to a heat soaking process that has converted at least 95% of the nickel sulfide content to the stable beta-phase.

0471P CSR BRADFORD IN THERMAL INSULATION AND PLIABLE MEMBRANES

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide CSR BRADFORD insulation and pliable building membrane systems, as documented.

Performance

Requirement:

- Complete for their function.
- Conforming to the detail and location drawings.
- Firmly fixed in position.

1.2 COMPANY CONTACTS

CSR BRADFORD technical contacts

Website: www.bradfordinsulation.com.au

1.3 CROSS REFERENCES

General

Requirement: Conform to the following:

- *0171 General requirements*.

1.4 MANUFACTURER'S DOCUMENTS

Technical manuals

Design guides, product data sheets and safety data sheets: www.bradfordinsulation.com.au

1.5 INTERPRETATION

Definitions

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

- FBS-1 (fibre-bio-soluble) mineral wool: Insulation composed of bio-soluble glass or rock fibres.
- Fibre batts: Flexible insulation supplied as factory cut pieces and composed of mineral wool (glass and rock fibre) or polyester fibre.
- Fibre blankets: Flexible insulation supplied as factory cut rolls and composed of mineral wool (glass and rock fibre) or polyester fibre, and may be combined with reflective facings.
- Fire hazard properties: Terminology to BCA A2.4.
- Pliable building membrane: To AS/NZS 4200.1 and equivalent to sarking-type materials as defined in the BCA.
- Thermal insulation terminology: To AS/NZS 4859.1.
- Vapour permeable (breathable) membrane: A flexible membrane material, normally used for secondary waterproofing that allows for the transmission of water vapour.

1.6 SUBMISSIONS

Certification

Requirement: Submit evidence of conformance to PRODUCTS, **INSULATION AND PLIABLE MEMBRANE**, **Insulation**.

Certification provider: An organisation accredited by the Joint Accreditation System of Australia and New Zealand (JAS-ANZ).

Execution details

Requirement: Submit the following:

- Handling and installation instructions: All glass wool insulation only, excludes Ashgrid and construction fabrics.
- Safety data sheets: Available by request or can be downloaded from website.

Fire hazard properties

General: Submit evidence of conformance to PRODUCTS**, GENERAL**, **Fire hazard properties**.

Products and materials

Thermal insulation properties: Submit evidence of conformance to AS/NZS 4859.1.

Technical data sheets: Submit data sheets covering material composition and characteristics such as volatility, flash point, light fastness, colour and pattern. These are available by request or can be downloaded from website.

Warranties

Manufacturer's published product warranties: Submit on completion.

1.7 INSPECTION

Notice

Inspection: Give notice so that inspection may be made of the pliable membrane and insulation before they are covered up or concealed.

2 PRODUCTS

2.1 GENERAL

Fire hazard properties

Insulation fire hazard indices: Conform to the following for all materials, tested to AS/NZS 1530.3:

- Spread-of-Flame Index: ≤ 9.
- Smoke-Developed Index: ≤ 8 if Spread-of-Flame Index > 5.

Materials with reflective facing: Test to AS/NZS 1530.3 and the recommendations of Appendix A6.

Pliable membranes Flammability Index tested to AS 1530.2: ≤ 5.

Product substitution

Other products: Conform to **PRODUCTS**, **GENERAL**, **Substitutions** in *0171 General requirements*.

Marking

Identification: Mark to show the following:

- Manufacturer’s identification.
- Product brand name.
- Product type.
- Quantity.
- Product reference code.
- Batch number: All glass wool insulation only, excludes Ashgrid.
- Date of manufacture: All glass wool insulation only, excludes Ashgrid and construction fabrics.

Mineral wool products: Deliver mineral wool products to site in packaging labelled FBS-1 BIO-SOLUBLE INSULATION.

2.2 INSULATION AND PLIABLE MEMBRANE MATERIALS

Insulation

Cellulosic fibre (loose fill): To AS/NZS 4859.1 Section 5.

Mineral wool blankets and cut pieces: To AS/NZS 4859.1 Section 8.

Polyester: To AS/NZS 4859.1 Section 7.

Polyisocyanurate (rigid cellular RC/PIR): To AS 1366.2.

Polystyrene (extruded rigid cellular RC/PS-E): To AS 1366.4.

Polystyrene (moulded rigid cellular RC/PS-M): To AS 1366.3.

Polyurethane (rigid cellular RC/PUR): To AS 1366.1.

Polyurethane (sprayed): To AS 1366.1 Table 2.

Wet processed fibreboard (including softboard): To AS/NZS 1859.4.

Wool: To AS/NZS 4859.1 Section 6.

Reflective thermal insulation: To AS/NZS 4859.1 Section 9.

Pliable membranes

Standard: To AS/NZS 4200.1.

Fasteners and supports

General: Metallic-coated steel.

CSR BRADFORD fasteners and supports: In conformance with CSR BRADFORD recommendations.

Mesh support to roof insulation

Welded safety mesh: To AS/NZS 4389.

Product: Safebridge® Safety Mesh to AS/NZS 4389, cut to widths to suit Safebridge® purlin spacing.

2.3 CSR BRADFORD INSULATION PRODUCTS

BRADFORD™ Anticon™

Description: Glass fibre thermal and acoustic insulation blanket laminated to an impermeable reinforced reflective foil facing.

2.4 CSR BRADFORD VAPOUR BARRIER CONSTRUCTION FABRICS

BRADFORD™ Thermoseal™ residential and commercial roof sarking products

- Thermoseal™ 733MD: Medium-duty paper laminate, single sided low emissivity metal roof sarking with antiglare coating.

3 EXECUTION

3.1 GENERAL

Bulk insulation

Installation: To AS 3999 and BCA J1.2.

General: Firmly butt together fibre blankets or batts, with no gaps except as follows:

- Access openings and vents: Do not obstruct.
- Light fittings: To AS/NZS 3000 clause 4.5.
- Electrical cables: To AS 3999 clause 2.6.

Glass Wool and Rock Wool insulation: Conform to the
ICANZ Industry code of practice for the safe use of glass wool and rock wool insulation*Industry Code of Practice for safe use of Glass Wool and Rock Wool insulation*.

Pliable membrane

Installation: To AS 4200.2 and BCA J1.2 or BCA 3.12.1.1, as applicable.

General:

- Lap joins 150 mm and cascade so that water flows to gutter or building cavity.
- Continuously seal all penetrations, discontinuities and joints to achieve a vapour barrier.

3.2 ROOFS

General

Location: New metal roofs. Refer to Architectural documentation.

Mesh support to roof insulation

Locations: Provide support to the following:

- Sarking, reflective thermal vapour barrier and vapour permeable pliable building membrane laid over roof framing members, as required by AS 4200.2 and the application, and the BCA.
- Blanket type thermal insulation laid over roof framing members and blanket type thermal insulation laid as sound insulation to metal roofing.

Wire safety mesh: Lay over the roof framing allowing only natural mesh sag between members to suit the application. Staple to timber frame, wire to steel frame.

Welded safety mesh: To AS/NZS 4389.

Metal roofs - pliable building membrane

Product: Thermoseal™ reflective foil vapour barrier pliable building membrane.

Installation: Lay sarking vertically over battens, perpendicular to the gutters with the reflective foil facing inwards toward the attic space (or green face outwards for vapour permeable building membranes), starting at one of the fascia boards and make sure 25 mm is draped into the gutter to facilitate drainage. Lay the sarking sagged slightly between battens to keep it away from the underside of the roof sheet, but no more than 40 mm or what is required to facilitate drainage. Locate the sarking in position with staples and then install the roof sheet directly over the sarking. Tape overlaps between adjoining runs of sarking to prevent spillage of any water captured due to condensation or rain.

Metal roofs – bulk insulation

Product: BRADFORD™ Anticon™.

Installation: As follows:

- Fascia and gutter: Trim Anticon blanket flush at the edge of the external side of fascia where the gutter's back wall starts. Do not allow the blanket to drape into the gutter. This location is where the cladding will pinch the Anticon down onto the fascia top edge and close off the corrugated profile openings.
- Ridges: Install an Anticon blanket from opposing sizes over ridge. Extend the Anticon blanket over the ridge and abut an existing Anticon blanket on the other side. Make sure the foil portion of the blanket extends 150 mm crossing over a support member. Peel 150 mm of bulk insulation from existing blanket and trim off. Flap foil end to end laps in a cascading manner whilst ensuring bulk insulation abuts.
- Tears and penetrations: Seal with a contact pressure sensitive adhesive tape (such as PPC 493 72 mm wide tape) applied using a "squeegee" applicator tool to the underside of the foil. Provide additional cleaning of the foil membrane surface if sealing the tape from above when access is limited from below
- Hot flue penetrations: Provide 25 mm clearance between the Anticon blanket and any hot surface. Do not adhere tapes around a hot flue.

3.3 COMPLETION

Warranties

Insulation and pliable membranes: Submit the CSR BRADFORD published product warranties.

Warranty: Provide the following warranties:

- Anticon: Bradford Commercial Class 2 to 9 Product Warranty v2.
- Form of warranty: Manufacturer's warranty

0511 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*.
- *0182 Fire-stopping*.

List the worksections cross referenced by this...

1.3 INTERPRETATION

Definitions

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

- Decorative overlaid wood panels: Particleboard or fibreboard with a bonded decorative finishing surface such as thermosetting resin (low pressure melamine), PVC film, paper foils or wood veneer.
- Dry processed fibreboard (MDF): A panel manufactured by bonding lignocellulosic fibres (derived from wood or other materials) with a synthetic resin adhesive and curing under heat and/or pressure. The panels are manufactured with a forming moisture content of less than 20%.
- Fibre cement sheet linings: Treated cellulose fibre in a matrix of cement and sand autoclaved sheet, sealed on one side.
- High pressure decorative laminates (HPDL):
  - Panels consisting of core layers impregnated with phenolic and/or aminoplastic resins and a surface layer(s) impregnated with aminoplastic resins (mainly melamine resins).
  - Sheets consisting of a decorative face and layers of fibrous sheet material (e.g. paper) impregnated with thermosetting resins and bonded together under heat and pressure of at least 5 MPa.
- 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 processed 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%.

1.4 TOLERANCES

Permitted deviations

Gypsum lining: To AS/NZS 2589 clause 4.2.2.

Other lining: 4 mm from a 1.8 m straightedge.

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.

1.5 SUBMISSIONS

Fire hazard properties

Requirement: Submit evidence of conformance to PRODUCTS, **GENERAL, Fire hazard properties**.

Samples

Prefinished panels: Minimum 300 x 600 (wide) mm panel for each finish with associated trim.

Shop drawings

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

- Decorative panels: Showing panel set-out, large scale panel fixing details, attachment devices and other components.

Lining materials: Submit the manufacturer's published product warranties.

2 PRODUCTS

2.1 GENERAL

Fire hazard properties

Group number: To BCA Spec C1.10 and AS 5637.1.

Storage and handling

Requirement: Dry and undamaged lining stacked in pallets horizontally on a smooth, level surface. Prevent distortion or moisture ingress.

Timber or fibreboard panels: Store off the ground in a well-ventilated area.

Handling: Do not drag sheets across each other or across other materials. Protect edges, corners and surface from damage.

Acclimatisation

Timber panels: Store on-site in final interior conditions for 2 to 3 weeks before installing. Do not install until the air conditioning system of the installation area is operating.

Marking

Identification: Marked to show the following:

- Manufacturer's identification.
- Product brand name.
- Product type.
- Quantity.
- Product reference code and batch number.
- Date of manufacture.
- Material composition and characteristics such as volatility, flash point, light fastness, colour and pattern.

Certification

Timber based products: Label panels under the authority of a recognised certification scheme to *0185 Timber products, finishes and treatment*, as applicable to the product. Locate the label on faces or edges which will be concealed in the works.

2.2 PLASTERBOARD

General

Standard: To AS/NZS 2588.

Location: Refer to Architectural drawings.

Grade: EC08 Impact

Thickness (mm): 13

Sheet width (mm): 1200

Sheet length (mm): 2700

Edge finish: Set flush butt joint

2.3 FIBRE CEMENT

General

Standard: To AS/NZS 2908.2.

Wall and ceiling linings: Type B category 2.

Minimum thickness: 9 mm.

2.4 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-resistance rated 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 commence lining work until the building or installation area is enclosed and weathertight, and all wet trades have been completed.

Substrates or framing

General: 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 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.

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.

Joints

Joint width:

- Butt joints: 1 to 2 mm.
- Expressed joints: 10 mm maximum.

Joint backing for expressed 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 x 7.2 m.
- Soffit linings: To divide into bays not larger than 4.2 x 4.2 m or 5.6 x 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.

Exposed surfaces: Touch up shop applied finishes and restore damaged or marked areas.

Timber panels: If appearance is not uniform, replace panels.

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.

0553 STAINLESS STEEL BENCHING

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide stainless steel fixtures, as documented.

Performance

Requirements:

- Free of surface defects or distortions.
- Installed to conform to Heath authorities having jurisdiction over the installation.

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- *0171 General requirements.*

1.3 SUBMISSIONS

Execution details

Site welding: If proposed, submit details indicating location and process.

Operation and maintenance manuals

Requirement: Submit maintenance manuals.

Shop drawings

General: Submit shop drawings showing the following:

- Bench/bench junctions.
- Welded joints.
- Material, grade and finish.
- Standard drawings for proprietary 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.
- Installation details required by Health Authorities.

Warranties

Requirement: Submit the installer's warranty of the workmanship and application.

1.4 INSPECTION

Notice

Inspection: Give notice so that inspection may be made of the following:

- Fabrication complete, before delivery.
- Installation complete.

2 PRODUCTS

2.1 MATERIALS

Stainless steel

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

Bar: To ASTM A276/A276M.

Tube: To ASTM A554.

- Type: 304.

Stainless steel sheet

Surface finish: No. 4, not including to underside of shelves, and door and drawer backs.

Thickness: 1.2 mm minimum.

Particleboard

Standard: To AS/NZS 1859.1.

Classification: Moisture resistant (MR).

Plywood

Standard: To AS/NZS 2271.

Visible surface with a clear finish: Veneer quality A.

Other surfaces: Veneer quality C or D.

Bond: Type A.

Certification

Timber based products: Brand panels under the authority of a recognised certification scheme to *0185 Timber products, finishes and treatment,* as applicable to the product. Locate the brand on faces or edges which will be concealed in the works.

2.2 COMPONENTS

Fasteners

Material: Stainless steel.

Dimensional system: Metric.

Bolt and screw heads: Polished, pan type or countersunk.

Hardware

Material: Stainless steel.

Sealants

Type: Neutral cure one-part silicone.

Performance:

- Flexible.
- Resistant to physical and chemical damage characteristic of installed environment.
- Resistant to growth of mould, bacteria and fungi.
- Colourfast.

Curing period: Less than 4 days to a depth of 10 mm.

Peel strength (minimum): 100 kPa.

Colour: White to match wall tiles grey for metal to metal sealing

Adhesive

Type: Spray contact adhesive.

3 EXECUTION

3.1 FABRICATION GENERALLY

Stainless steel welding

Process: Gas tungsten arc welding.

Weld type: Butt.

Internal weld category: Category 2 to AS/NZS 1554.6 Appendix B.

External weld category: Class B to AS/NZS 1554.6 Appendix B.

Surface finish: Grade I, 120 grit.

Welding materials: Compatible with metal being welded.

Weld quality: Free from imperfections such as cracks and pits. Grind and polish to give required surface finish. Continuous exposed welds.

Joints: Strength at least that of parent metal. Free from crevices and folds.

Joint position: At corners and edges as far as possible. Minimise joints in flat panels.

Protection

General: Provide temporary self-adhesive plastic film to stainless steel surfaces.

Hardware fixing

General: Drill and tap, or weld fix.

Linishing grain direction

Benches and shelves: Lengthwise.

Bowls: Horizontal to sides, parallel to bench grain to bottom. Mitre at bottom corners.

Abutting surfaces: Parallel where possible.

3.2 BENCHTOP FABRICATION

Benchtops

Material: Stainless steel sheet.

Thickness: 2 mm.

Overall bench width: Generally 600mm or to suit equipment. Benchtop width at servery to be 500mm.

Bench height: 900mm

Bench lengths: Maximum, to minimise number of bench/bench junctions.

Exposed corners: Radius exposed corners at least 5 mm, including back vertical corners of upstands.

Internal back vertical corners: Fuse only from behind.

Wet bench perimeter: Except at wall flashing, provide a raised bead, with a fascia.

Dry bench perimeter: Except at wall flashing, provide a fascia.

Fascia

Fascia height: 50mm

Drainer

Drainer falls to sinks: 1:50, 450 mm long.

Drainer surface: Plain.

Falls:

- To dishwashing machine: Between 1:100 and 1:72, 1800 mm maximum length.
- Fascia: Fall to match.

Wall splashback

Type: Integral and fixed to 18mm marine ply.

Height above bench: 150mm min and to suit tile coursing.

Ends: Return.

Return to tiled wall: 45 degree splay fixed and sealed to wall.

Fixing to support frame

Type: Spot weld threaded stainless steel M5 studs to underside of bench top, centred over framing members, and 2 studs per front-to-back framing member. Make sure stud fixing does not indent the bench top. Provide star washers and nuts.

Sound deadening

Type: Bostik 1318 Body/Sound Deadener (or similar approved) applied as per manufacturer's instructions.

3.3 BOWL FABRICATION

Bowls

Type: Deep drawn stainless steel.

Configuration: Double bowl

Thickness:

- Capacity < 75 L: 1.6 mm.
- Capacity ≥ 75 L: 2 mm.

Internal radii: 25 mm minimum.

Minimum bowl size (each): 450x300x300mm deep

Wastes:

- Size (minimum): DN 50 to AS 2887.
- Nut and washer: To AS 1589 or AS 2887 Locate with the washer to the underside of the bowl.
- Position: Centred in single bowls, adjacent in double bowls.
- Plug: Heavy-duty commercial.
- Pot sinks: Extended lever handle type, with 50 mm ball valve.

Falls: In the long dimension.

Fall to waste (minimum):

- Capacity < 75 L: 10 mm.
- Capacity ≥ 75 L: 25 mm.

3.4 FRAME FABRICATION

Benchtop support frame

Support: Provide sufficient support so that no load is placed on the waste pipe or water connections.

- Design deflection (maximum): 3 mm.

Members: 31.8 x 31.8 x 1.6 mm stainless steel tube. Seal ends.

Extent: Perimeter and at sides of bowls, with additional members spaced as follows:

- 1.6 mm sheet: 350 mm maximum centres.
- 2 mm sheet: 500 mm maximum centres.

Maximum unsupported area: 0.3 m^2.

Connections: Welded.

Fixing to benchtop: Pre-drill for studs.

Bench legs

Members: 31.8 x 31.8 x 1.6 mm stainless steel tube. Seal ends.

Fixing to benchtop support frame: Weld all around at junctions.

Spacing: 1200 mm maximum.

Fixing to walls: Pre-drilled 100 x 50 x 2 mm stainless steel plate welded to legs at 600 mm high.

Adjacent to walls: 50 to 150 mm clear of wall.

Feet: Nylon or chrome-plated aluminium, adjustable vertically ± 25 mm. Threaded section must not protrude from leg.

3.5 SHELVING FABRICATION

Under bench shelving

Material: Stainless steel.

Thickness: 1.6 mm.

Width: 475 mm

Exposed edges: Turn down 35 mm

Back edges: Turn up 25 mm

Height to underside of shelf edge: 150mm

Shelf support: 30 x 30 x 5 mm stainless steel angles.

- Extent: Perimeter, with additional angles spaced to give a maximum unsupported area of 0.3 m^2.
- Connections: Welded.

Fixing of support to legs: Welded or threaded.

Fixing of shelf to support: Stainless steel pop rivets

Over bench shelving

Material: Stainless steel.

Thickness: 1.6 mm.

Width: 300 mm

Exposed edges: Turn down 35mm

Back edges: Turn up 25 mm

Height to underside of shelf edge: 1450 mm

Shelf support: 25.4 x 25.4 x 1.6 mm stainless steel L-shaped brackets. Seal ends.

- Spacing: 900 mm maximum.
- Fixing to wall: At least two M8 hexagon head bolts

Fixing of shelf to support: Threaded M5 studs through tube with nuts on underside. Seal between shelf and support.

3.6 DRAWERS FABRICATION

Drawers

Material: Stainless steel.

Thickness: 1.2 mm.

Construction: Welded.

Frames: Removable, and interchangeable with other drawer frames. Provide extension-type drawer slide mechanism and front panel. Open top and bottom, for insert liner. Provide rubber stops at rear.

Front panel: 20 mm thick double pan construction.

Drawer liners: Removable.

Housing: Back and 2 sides, of a neat external appearance.

Housing dimensions (external): 450 mm wide, 550 mm deep, 200 mm high

Runners: Incline to rear so drawers roll closed. Provide stop so drawer cannot be pulled out accidentally.

3.7 INSTALLATION GENERALLY

Welding

General: Do not site weld.

Sealing

Gaps < 5 mm wide: Apply sealant at the following locations:

- Butt joints between benches.
- Between benches, including flashings, and walls.
- Spaces and gaps under benches.

Gaps ≥ 5 mm wide: Close with stainless steel infill panels.

Floor fixing

Steel dowels: 8 mm diameter stainless steel dowels, sealed to floor with silicone sealant.

- Adjustable fixings: Provide for height adjustment, as appropriate.

3.8 COMPLETION

Protection

General: Temporary self-adhesive plastic film: Remove from stainless steel surfaces.

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.

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 ± 10% over the length of the arris.

2 PRODUCTS

2.1 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/m^2 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%, and free from efflorescing salts.

Sand grading for base coat plaster table

Sieve size	Percent passing	
	Minimum	Maximum
4.75 mm	100	100
2.36 mm	90	100
1.18 mm	60	90
600 µm	35	70
300 µm	10	30
150 µm	0	5

Sieve size	Percent passing	
	Minimum	Maximum
75 µm	0	3

Plaster for autoclaved aerated concrete

General: Proprietary product manufactured for use with the wall system.

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.

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 Stainless 316	CRW
	Powder coated aluminium	CRM
C3	Stainless 316 Powder coated aluminium	CRM
C4 and T[1]	Stainless 316 Powder coated aluminium	CRS
[1] Avoid organic coating in Category T zones.		

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 1	0 0.5	3 4.5
	CRM	Regular clay or concrete masonry	1 1	0.5 1	4.5 6
	CRW	Lightweight concrete masonry and other weak substrates	1 1	1 2	6 9
Second coat - Internal	CRF	Cement render base coats	1 1	1 2	6 9
Second coat - External	CRF	Cement render base coats	1 1	1 2	5 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	- -	1.5 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 < 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.
- 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 m^2 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.

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:

- 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.

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.

0631 CERAMIC TILING

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide tiling systems to walls, floors and other substrates as documented.

Performance

Requirements:

- 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 documented recommendations of those parts of AS 3958.1 which are referenced in this worksection.

Slip resistance

Classification: To AS 4586.

1.4 INTERPRETATION

Definitions

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

- Adhesives - cementitious (C): Adhesive in which the binders are hydraulic, e.g. General purpose cement, with aggregates and organic additives.
- Adhesives - dispersion (D): Adhesives in which the binders are in the form of aqueous polymer dispersion with mineral fillers and organic additives.
- Adhesives - reaction resin (R): Adhesives in which in the binders are synthetic resins with mineral fillers and organic additives. The curing occurs by chemical reaction.
- Bedding: Mixtures of materials which are applied to substrates in a plastic state and which dry, cure and adhere tiles to substrates:
  - Adhesive bedding: Paving/tiling adhered by adhesives.
  - Mortar bedding: Paving/tiling adhered in a cementitious mortar bed.
- Lippage: Height deviation between adjacent units.
- Stepping: The relative surface level of adjacent paving elements within the expanse of the main pavement.
- Substrate: The surface to which a material or product is applied.
- Tiles: Thin slab made from clay and/or other inorganic raw materials used generally as coverings for floors and walls and adhered to continuous supporting substrates.
- Tiles – cementitious: Cement based prefinished tiles.

- Tiles – dry-pressed: Tiles made from a finely milled body mixture and shaped in moulds at high pressure. Also known as Type B.
- Tiles – extruded: Tiles whose body is shaped in the plastic state in an extruder then cut to size. Also known as Type A.
- Underlay: A non-structural layer of sheet material or in situ levelling material on the substrate to provide a smooth and level surface.
- Wet area: An area within a building supplied with a floor waste.

1.5 TOLERANCES

Completed tiling

Requirement: To the recommendations of AS 3958.1 clause 5.4.6.

1.6 SUBMISSIONS

Execution details

Grouting: Submit proposals for grouting methods and materials.

Margins: If it appears that variations in joint widths or overall dimensions will avoid cut tiles, submit a proposal.

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.

Products 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 m^2.
- 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.

1.7 INSPECTION

Notice

Inspection: Give notice so that inspection may be made of the following:

- Substrate immediately before tiling.
- Trial set-outs before execution.
- Control joints before sealing and grouting.
- Grout and sealant colours before application.

2 PRODUCTS

2.1 GENERAL

Marking

Identification: 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 TILES AND ACCESSORIES

Tiles

Standard: To AS ISO 13006.

Coves 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.

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 in the **Wall tiling schedule** and the **Floor tiling schedule.**

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 not more than 1%.
- Off-white cement: Iron salts content not more than 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.

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

General: At joints shown on Structural documentation.

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 on swimming pool shell: A further 21 days minimum.

3.2 PREPARATION

Standard

Preparation: To 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.

Trial set-out

General: Prepare a trial tile set-out of each area as follows to:

- Maximise the size of equal margins of cut tiles.
- Locate control joints.
- Note minor variations in joint widths to eliminate cut tiles at margins.
- Mark location of fittings on walls.

3.3 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.

3.4 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.

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 that fixtures interrupting the tile surfaces are accurately positioned in their designed or optimum locations relative to the tile layout.

3.5 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.

Change of finish: Maintain finished floor level across changes of floor finish.

3.6 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.

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.

3.7 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.
- 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.

3.8 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.

Sealant joints

General: Provide joints filled with sealant and finished flush with the tile surface as follows:

- 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.

3.9 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.

Material: Ribbed hard anodised aluminium

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.

3.10 TESTING

Completion tests

Slip resistance of completed installation: To AS 4663.

3.11 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.

Storage location: To be confirmed by the Owner

0671P DULUX PAINTING

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide DuluxGroup/Dulux coating systems to substrates, as documented.

Performance

Requirement: Provide coating systems as follows:

- 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/product/product-selector

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 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: Between 50 and 85 gloss units.
  - Semi-gloss: Between 20 and 50 gloss units.
  - Low gloss (low sheen): Between 5 and 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

Paint

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.

Wet samples

General: Submit two clearly labelled 500 mL samples of each type of paint to be tested.

Warranties

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.
- 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.

1.8 INSPECTION

Notice

Inspection: Give notice so that inspection may be made of the following:

- Painting stages:
  - Completion of surface preparation.
  - After application of final coat.
- Clear finishing stages:
  - Before surface preparation of timber.
  - Completion of surface preparation.
  - After application of final coat.

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.

Marking

Identification: Marked to show the following:

- Manufacturer's identification.
- Product brand name.
- Product type.
- Quantity.
- Product reference code and batch number.
- Date of manufacture.
- Material composition and characteristics such as volatility, flash point, light fastness, colour and pattern.

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 June 2017 (including SUSMP 17)* 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.**	**AS/NZS 2311PRN (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 solvent-borne: interior	Dulux Super Enamel Full Gloss	DD0026	B5b	AS 3730.6
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)	DD1403	B6a	AS 3730.1
Flat latex: interior ceilings (tinted colours)	Dulux Professional EnvirO2 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) Dulux Wash&Wear +Plus Kitchen & Bathroom Low Sheen (low VOC)	DD02070 DD02074	B7a	AS 3730.3
Low gloss latex: interior	Dulux Professional Steriguard Acrylic Low Sheen	DD01990	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)	DD02071	B8a	AS 3730.2

Paint type	DuluxGroup/Dulux material description	Dulux PDS No.	AS/NZS 2311PRN (Table 4.2)	Standard
	Dulux Wash&Wear +Plus Kitchen & Bathroom Semi Gloss (low VOC)	DD02075		
Semi-gloss waterborne latex: interior	Dulux Professional Steriguard Water Based Enamel Semi Gloss	DD01993	B42	AS 3730.2
Gloss latex: exterior	Dulux Weathershield Gloss	DD0054	B9b	AS 3730.10
Gloss latex: interior	Dulux Wash&Wear Gloss	DD02072	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	DD01992	B42	AS 3730.1
Wood primer, solvent-borne	Dulux 1 Step Oil Based Primer Sealer Undercoat	DD1227	B10	AS 3730.13
Wood primer, latex	Dulux 1 Step Acrylic Primer Sealer Undercoat	DD1192	B10a	AS 3730.17
Metal primer for steel – solvent-borne	Dulux Metalshield All Surface Primer	DI1640	B11	AS 3730.21
Metal primer, latex	Dulux Prepcoat All Metal Primer (water based, low VOC)	DD01891	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	Dulux Prepcoat All Metal Primer (water based, low VOC)	DD01891	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	DD0074 DA0442 DD0217	B15	AS 3730.22
Clear low viscosity paint for concrete	Dulux AquaTread Concrete Sealer (low VOC) Dulux DureSeal Acrylic Dust Sealer	DD1187 DI1118	B15a	NE

Paint type	DuluxGroup/Dulux material description	Dulux PDS No.	AS/NZS 2311PRN (Table 4.2)	Standard
Moisture resistant plasterboard sealer binder	Dulux EnvirO2 Water Based Sealer Binder (low VOC)	DD1449	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 DD1192	B16	AS 3730.18
Undercoat, solvent-borne	Dulux 1 Step Oil Based Primer Sealer Undercoat	DD1227	B17	AS 3730.14
Undercoat, latex: exterior	Dulux 1 Step Acrylic Primer Sealer Undercoat (low VOC) Dulux Acratex Water Based 501/1	DD1192 DD0441	B17a	AS 3730.18
Undercoat, latex: interior	Dulux 1 Step Acrylic Primer Sealer Undercoat (low VOC) Dulux Acrylic Sealer Undercoat (low VOC)	DD1192 DD1402	B17a	AS 3730.18
Wood Stain - spirit	Feast Watson Prooftint	DW0729	B18	NE
Wood Stain - oil	Feast Watson Liming White Cabot's Interior Stain Oil Based	DW0749 DW0661	B18	
Wood Stain - latex	Intergrain NaturalStain (interior/exterior) (low VOC) Cabot's Interior Stain Water Based	DW0758 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 DW1248 DW01804 DW01805	B19	AS 3730.25 or AS 3730.27 (for floors)
Interior clear latex varnish, water-based, one-pack	Intergrain Ultraclear Interior – Satin, Gloss (low VOC) – not suitable for floors Feast Watson Liming White Floor Finish	DW0762 DW0761 DW01800	B19a	NE or AS 3730.27 (for floors)

Paint type	DuluxGroup/Dulux material description	Dulux PDS No.	AS/NZS 2311PRN (Table 4.2)	Standard
	Cabot's Stain & Varnish Water Based – not suitable for floors	DW1634 DW1635		
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)	DW1420 DW1419 DW1418	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 NaturalStain (low VOC)	DW0758	B22	AS 3730.16
Fence stain, latex paints, opaque	Dulux Weathershield Garden Shades Cabot's Timbercolour	DD0055 DW0660	B22b	AS 3730.16
Exterior stain, solvent-borne, opaque	Cabot's Deck & Exterior Stain	DW1579	B23#	AS 3730.28
Exterior stain, solvent-borne, semi-transparent	Feast Watson Timber & Deck Stain Cabot's Deck & Exterior Stain	DW01894 DW1579	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		N/A	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

Paint type	DuluxGroup/Dulux material description	Dulux PDS No.	AS/NZS 2311PRN (Table 4.2)	Standard
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	
Chalk sealer, surface conditioner	Dulux Sealer Binder Dulux Acraprime Solvent Based Primer	DD0074 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)		B38a	NE
Clear or colourless coatings (waterborne) for timber, exterior	Intergrain UltraClear Exterior – Gloss, Satin Note: not suitable for decking.	DW1401 DW1400	B39	NE

Paint type	DuluxGroup/Dulux material description	Dulux PDS No.	AS/NZS 2311PRN (Table 4.2)	Standard
Clear coatings (waterborne) for timber, interior	Intergrain Ultraclear Interior - Gloss, Satin (low VOC)	DW0762 DW0761	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 latex, interior trim (alt B8b)	Dulux Aquanamel Semi-Gloss (low VOC)	DD1281	B41	NE
Gloss or full gloss latex, interior trim	Dulux Aquanamel Gloss (low VOC)	DD1282	B42	NE
Penetrating tung oil type varnish for timber floors: interior	Feast Watson Floorseal Oil Feast Watson Tung Oil	DW0734 DW0733	B43	NE
Penetrating tung oil type varnish for timber floors: exterior	Intergrain Nature's Timber Oil Feast Watson Traditional Timber Oil	DW0769 DW01795	B43	NE
Gloss pigmented polyurethane	Dulux Luxathane R Dulux Luxathane HPX Dulux Weathermax HBR	DD1137 DC02059DI1156	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 Professional Enviro2 Interior Semi-Gloss	2
Walls and ceilings - interior semi-gloss	16	Dulux Wash&Wear Semi Gloss Dulux Wash&Wear +Plus Kitchen&Bathroom Semi Gloss	5 5

Green Star Interiors	VOC Limits MAX g/litre	DULUX Products compared to the GBCA specification	VOC g/litre Untinted
Walls and ceilings - interior low sheen	16	Dulux Professional Enviro2 Interior Low Sheen	5
Walls and ceilings - interior low sheen	16	Dulux Wash&Wear Low Sheen Dulux Wash&Wear +Plus Kitchen& Bathroom Low Sheen	16 15
Walls and ceilings - interior flat-washable	16	Dulux Professional Enviro2 Interior Flat	1
Ceilings - interior flat	14	Dulux Professional Enviro2 Interior Flat	1
Ceilings - interior flat	14	Dulux White Ceiling Paint	14
Trim - interior gloss	75	Dulux Aquanamel Gloss Dulux Professional Steriguard Water Based Enamel Gloss	74
Trim - interior semi-gloss	75	Dulux Aquanamel Semi Gloss Dulux Professional Steriguard Water Based Enamel Semi Gloss	<74
Timber primer	30	Dulux Professional Enviro2 Acrylic Sealer Undercoat (ASU)	1
Timber primer	30	Dulux Acrylic Sealer Undercoat Dulux Professional Enviro2 Acrylic Sealer Undercoat (ASU)	2 1
Binding primer	30	Dulux Professional EnvirO2 Water Based Sealer Binder	3
Latex primer for galvanized iron and zincalume	60	Dulux Galvanised Iron Primer	< 40
Latex primer for galvanized iron and zincalume	60	Dulux Professional Galvanised Iron Primer	< 60
Interior latex undercoat	65	Dulux Professional Enviro2 Acrylic Sealer Undercoat (ASU)	1
Interior latex undercoat	65	Dulux Acrylic Sealer Undercoat	45
Exterior latex undercoat	65	Dulux One Step Acrylic Primer Sealer Undercoat (PSU)	<60

Green Star Interiors	VOC Limits MAX g/litre	DULUX Products compared to the GBCA specification	VOC g/litre Untinted
Interior sealer	65	Dulux Professional Enviro2 Acrylic Sealer Undercoat (ASU)	1
Interior sealer	65	Dulux Luxafloor Eco2 (clear) Dulux Luxafloor WB (Clear)	10 10
One and two pack performance coatings for floors	140	Dulux Luxafloor Eco2 Dulux Luxafloor WB Intergrain Enviropro Endure One Pack Intergrain Enviropro Endure Two Pack	10 10 <75 <105

3 EXECUTION

3.1 PREPARATION

Standards

General: To AS/NZS 2311 Sections 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.

Wet paint warning

Notices: Place in a conspicuous location and do not remove until the paint is dry.

Substrate preparation – generally

General: Prepare substrates to receive the painting systems in conformance with AS/NZS 2311 and the paint manufacturer's recommendations.

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 coating 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%.

3.2 PAINTING

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 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 4114.1 and AS/NZS 4114.2.

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.

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.

3.3 COMPLETION

General

Protection and masking: Remove masking and protection coverings before paint has dried.

Cleaning: On completion of painting, 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 decorative paintwork or misses only with the paint batch used in the original application.

Removed fixtures: Refix 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.

4 SELECTIONS

4.1 PAINTING SCHEDULES GENERALLY

Paint system schedules

Requirement: Apply paint systems as documented in the Finishes 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 Appendix D.

4.2 INTERIOR PAINTING SCHEDULE

Flat and matt latex - Interior

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Plasterboard (low VOC system)	Dulux Acrylic Sealer Undercoat	Dulux Wash&Wear Matt	Dulux Wash&Wear Matt	SD05662
Plasterboard (ceilings) (low VOC system)	Dulux Acrylic Sealer Undercoat	Dulux White Ceiling Paint	Dulux White Ceiling Paint	SD 0010
Fibrous/set plaster	Dulux Sealer Binder (solvent based)	Dulux Wash&Wear Matt	Dulux Wash&Wear Matt	SD 05883
Fibrous/set plaster (with glancing light issues)	Dulux Sealer Binder (solvent based)	Dulux Wash&Wear Matt	Dulux Wash&Wear Matt	SD 05883
Fibre cement products (low VOC system)	Dulux Acrylic Sealer Undercoat	Dulux Wash&Wear Matt	Dulux Wash&Wear Matt	SD06059
Timber and veneers	Dulux 1 Step Acrylic Primer Sealer Undercoat	Dulux Wash&Wear Matt	Dulux Wash&Wear Matt	SD 08119
Cement render (low VOC system)	Dulux Prepcoat Acrylic Sealer Undercoat	Dulux Wash&Wear Matt	Dulux Wash&Wear Matt	SD 06062
Vermiculite	Dulux Sealer Binder (solvent based)	Dulux White Ceiling Paint	Dulux White Ceiling Paint	SD 3505

Low gloss latex - Interior

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Plasterboard (low VOC system)	Dulux Acrylic Sealer Undercoat	Dulux Wash&Wear Low Sheen	Dulux Wash&Wear Low Sheen	SD 0002
Fibrous/set plaster	Dulux Professional Enviro2 Water Based Sealer Binder	Dulux Wash&Wear Low Sheen	Dulux Wash&Wear Low Sheen	SD 0813
Fibre cement products (low VOC system)	Dulux Acrylic Sealer Undercoat	Dulux Wash&Wear Low Sheen	Dulux Wash&Wear Low Sheen	SD 2971
Timber and veneers	Dulux 1 Step Acrylic Primer Sealer Undercoat	Dulux Wash&Wear Low Sheen	Dulux Wash&Wear Low Sheen	SD 1528
Concrete (low VOC system)	Dulux Acrylic Sealer Undercoat	Dulux Wash&Wear Low Sheen	Dulux Wash&Wear Low Sheen	SD 0901

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Cement render (low VOC system)	Dulux 1 Step Acrylic Primer Sealer Undercoat	Dulux Wash&Wear Low Sheen	Dulux Wash&Wear Low Sheen	SD 1128
MDF	Dulux 1 Step Acrylic Primer Sealer Undercoat	Dulux Wash&Wear Low Sheen	Dulux Wash&Wear Low Sheen	SD 1041
Brick and masonry (low VOC system)	Dulux Acrylic Sealer Undercoat	Dulux Wash&Wear Low Sheen	Dulux Wash&Wear Low Sheen	SD 3284
Concrete blockwork (low VOC system)	Berger Gold Label Acrylic Block Filler	Dulux Wash&Wear Low Sheen	Dulux Wash&Wear Low Sheen	SD 07827

Low gloss latex (mould resistant) – Interior

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Plasterboard (low VOC system)	Dulux Acrylic Sealer Undercoat	Dulux Wash&Wear +Plus Kitchen & Bathroom Low Sheen	Dulux Wash&Wear +Plus Kitchen & Bathroom Low Sheen	SD 4511
Plasterboard (MR grade) (low VOC system)	Dulux Professional EnvirO2 Water Based Sealer Binder	Dulux Wash&Wear +Plus Kitchen & Bathroom Low Sheen	Dulux Wash&Wear +Plus Kitchen & Bathroom Low Sheen	SD 4611
Fibrous/set plaster	Dulux Sealer Binder (solvent based)	Dulux Wash&Wear +Plus Kitchen & Bathroom Low Sheen	Dulux Wash&Wear +Plus Kitchen & Bathroom Low Sheen	SD 5008
Fibre cement products (low VOC system)	Dulux Acrylic Sealer Undercoat	Dulux Wash&Wear +Plus Kitchen & Bathroom Low Sheen	Dulux Wash&Wear +Plus Kitchen & Bathroom Low Sheen	SD 4543
Concrete	Dulux Acrylic Sealer Undercoat	Dulux Wash&Wear +Plus Kitchen & Bathroom Low Sheen	Dulux Wash&Wear +Plus Kitchen & Bathroom Low Sheen	SD 5009
Cement render (low VOC system)	Dulux 1 Step Acrylic Primer Sealer Undercoat	Dulux Wash&Wear +Plus Kitchen & Bathroom Low Sheen	Dulux Wash&Wear +Plus Kitchen & Bathroom Low Sheen	SD 5010
MDF	Dulux 1 Step Acrylic Primer Sealer Undercoat	Dulux Wash&Wear +Plus Kitchen & Bathroom Low Sheen	Dulux Wash&Wear +Plus Kitchen & Bathroom Low Sheen	SD 3430
Brick and masonry (low VOC system)	Dulux Acrylic Sealer Undercoat	Dulux Wash&Wear +Plus Kitchen & Bathroom Low Sheen	Dulux Wash&Wear +Plus Kitchen & Bathroom Low Sheen	SD 5018

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Concrete blockwork (low VOC system)	Berger Gold Label Acrylic Block Filler	Dulux Wash&Wear +Plus Kitchen & Bathroom Low Sheen	Dulux Wash&Wear +Plus Kitchen & Bathroom Low Sheen	SD 2741

Low gloss latex (mould and bacteria resistant) - Interior

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Plasterboard (low VOC system)	Dulux Acrylic Sealer Undercoat	Dulux Professional Steriguard Acrylic Low Sheen	Dulux Professional Steriguard Acrylic Low Sheen	SD11373
Plasterboard (MR grade) (low VOC system)	Dulux Professional EnvirO2 Water Based Sealer Binder	Dulux Professional Steriguard Acrylic Low Sheen	Dulux Professional Steriguard Acrylic Low Sheen	SD09837
Fibrous/set plaster	Dulux Sealer Binder (solvent based)	Dulux Professional Steriguard Acrylic Low Sheen	Dulux Professional Steriguard Acrylic Low Sheen	SD09836
Timber and veneers	Dulux 1 Step Acrylic Primer Sealer Undercoat	Dulux Professional Steriguard Acrylic Low Sheen	Dulux Professional Steriguard Acrylic Low Sheen	SD11374
Concrete	Dulux Acrylic Sealer Undercoat	Dulux Professional Steriguard Acrylic Low Sheen	Dulux Professional Steriguard Acrylic Low Sheen	SD11376
MDF	Dulux 1 Step Acrylic Primer Sealer Undercoat	Dulux Professional Steriguard Acrylic Low Sheen	Dulux Professional Steriguard Acrylic Low Sheen	SD09757
Brick and masonry (low VOC system)	Dulux Acrylic Sealer Undercoat	Dulux Professional Steriguard Acrylic Low Sheen	Dulux Professional Steriguard Acrylic Low Sheen	SD11375
Concrete blockwork (low VOC system)	Berger Gold Label Acrylic Block Filler	Dulux Professional Steriguard Acrylic Low Sheen	Dulux Professional Steriguard Acrylic Low Sheen	SD10165

Semi-gloss latex - Interior

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Plasterboard (low VOC system)	Dulux Acrylic Sealer Undercoat	Dulux Wash&Wear Semi Gloss	Dulux Wash&Wear Semi Gloss	SD 0003
Fibrous/set plaster	Dulux Sealer Binder (solvent based)	Dulux Wash&Wear Semi Gloss	Dulux Wash&Wear Semi Gloss	SD 0815
Fibre cement products (low VOC system)	Dulux Acrylic Sealer Undercoat	Dulux Wash&Wear Semi Gloss	Dulux Wash&Wear Semi Gloss	SD 0903
Timber and veneers	Dulux 1 Step Acrylic Primer Sealer Undercoat	Dulux Wash&Wear Semi Gloss	Dulux Wash&Wear Semi Gloss	SD 3410

Concrete (low VOC system)	Dulux Acrylic Sealer Undercoat	Dulux Wash&Wear Semi Gloss	Dulux Wash&Wear Semi Gloss	SD 1065
Cement render (low VOC system)	Dulux Total Prep	Dulux Wash&Wear Semi Gloss	Dulux Wash&Wear Semi Gloss	SD 1066
MDF (low VOC system)	Dulux 1 Step Acrylic Primer Sealer Undercoat	Dulux Wash&Wear Semi Gloss	Dulux Wash&Wear Semi Gloss	SD 3615
Brick and masonry (low VOC system)	Dulux Acrylic Sealer Undercoat	Dulux Wash&Wear Semi Gloss	Dulux Wash&Wear Semi Gloss	SD 0678
Concrete blockwork (low VOC system)	Berger Gold Label Acrylic Block Filler	Dulux Wash&Wear Semi Gloss	Dulux Wash&Wear Semi Gloss	SD 2797

Semi-gloss latex (mould resistant) - Interior

Substrate	**1st coat**	**2nd coat**	**3rd coat**	**Manufacturer's Spec Sheet Ref**
Plasterboard (low VOC system)	Dulux Acrylic Sealer Undercoat	Dulux Wash&Wear +Plus Kitchen & Bathroom Semi Gloss	Dulux Wash&Wear +Plus Kitchen & Bathroom Semi Gloss	SD 4523
Plasterboard (MR grade) (low VOC system)	Dulux Professional EnvirO2 Water Based Sealer Binder	Dulux Wash&Wear +Plus Kitchen & Bathroom Semi Gloss	Dulux Wash&Wear +Plus Kitchen & Bathroom Semi Gloss	SD 4581
Fibrous/set plaster	Dulux Sealer Binder (solvent based)	Dulux Wash&Wear +Plus Kitchen & Bathroom Semi Gloss	Dulux Wash&Wear +Plus Kitchen & Bathroom Semi Gloss	SD 5014
Fibre cement products (low VOC system)	Dulux Acrylic Sealer Undercoat	Dulux Wash&Wear +Plus Kitchen & Bathroom Semi Gloss	Dulux Wash&Wear +Plus Kitchen & Bathroom Semi Gloss	SD 4512
Concrete (low VOC system)	Dulux Acrylic Sealer Undercoat	Dulux Wash&Wear +Plus Kitchen & Bathroom Semi Gloss	Dulux Wash&Wear +Plus Kitchen & Bathroom Semi Gloss	SD 4522
Cement render (low VOC system)	Dulux 1 Step Acrylic Primer Sealer Undercoat	Dulux Wash&Wear +Plus Kitchen & Bathroom Semi Gloss	Dulux Wash&Wear +Plus Kitchen & Bathroom Semi Gloss	SD 5015
MDF	Dulux 1 Step Acrylic Primer Sealer Undercoat	Dulux Wash&Wear +Plus Kitchen & Bathroom Semi Gloss	Dulux Wash&Wear +Plus Kitchen & Bathroom Semi Gloss	SD 5016
Brick and masonry (low VOC system)	Dulux Acrylic Sealer Undercoat	Dulux Wash&Wear +Plus Kitchen & Bathroom Semi Gloss	Dulux Wash&Wear +Plus Kitchen & Bathroom Semi Gloss	SD 5017
Concrete blockwork (low VOC system)	Berger Gold Label Acrylic Block Filler	Dulux Wash&Wear +Plus Kitchen &	Dulux Wash&Wear +Plus Kitchen &	SD 3333

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
		Bathroom Semi Gloss	Bathroom Semi Gloss	

Semi-gloss water based enamel: Interior

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Plasterboard	Dulux Acrylic Sealer Undercoat	Dulux Aquanamel Semi Gloss	Dulux Aquanamel Semi Gloss	SD 2591
Plasterboard (MR grade)	Dulux Professional EnvirO2 Water Based Sealer Binder	Dulux Aquanamel Semi Gloss	Dulux Aquanamel Semi Gloss	SD 4672
Fibrous/set plaster	Dulux Sealer Binder (solvent based)	Dulux Aquanamel Semi Gloss	Dulux Aquanamel Semi Gloss	SD 3058
Fibre cement products	Dulux Acrylic Sealer Undercoat	Dulux Aquanamel Semi Gloss	Dulux Aquanamel Semi Gloss	SW 5020
Timber and veneers (low VOC system)	Dulux 1 Step Acrylic Primer Sealer Undercoat	Dulux Aquanamel Semi Gloss	Dulux Aquanamel Semi Gloss	SD 2199
Concrete	Dulux Acrylic Sealer Undercoat	Dulux Aquanamel Semi Gloss	Dulux Aquanamel Semi Gloss	SD 5021
Cement render	Dulux Professional Acrylic Primer	Dulux Aquanamel Semi Gloss	Dulux Aquanamel Semi Gloss	SD 07495
MDF (low VOC system)	Dulux Acrylic Sealer Undercoat	Dulux Aquanamel Semi Gloss	Dulux Aquanamel Semi Gloss	SD 2294
Brick and masonry	Dulux Acrylic Sealer Undercoat	Dulux Aquanamel Semi Gloss	Dulux Aquanamel Semi Gloss	SD 5026
Concrete blockwork	Berger Gold Label Acrylic Block Filler	Dulux Aquanamel Semi Gloss	Dulux Aquanamel Semi Gloss	SD 5045
Zinc-coated metals (zincalume, Galvabond, zincanneal, zincseal, zinc-primed steel) (low VOC system)	Dulux Galvanised Iron Primer (water based)	Dulux Aquanamel Semi Gloss	Dulux Aquanamel Semi Gloss	SD 2523
Shop primed or red oxide primed (ROZP) ferrous metal (low VOC system)	Dulux Metalshield All Surface Primer (water based)	Dulux Aquanamel Semi Gloss Acrylic	Dulux Aquanamel Semi Gloss Acrylic	SD 2279
Non-ferrous metals (incl. aluminium, brass, copper, tin plate) (low VOC system)	Dulux Precision Maximum Strength Adhesion Primer	Dulux Aquanamel Semi Gloss	Dulux Aquanamel Semi Gloss	SD 09798

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Plastics (solvent resistant types e.g. FRP, PVC-U) (low VOC system)	Dulux Precision Maximum Strength Adhesion Primer	Dulux Aquanamel Semi Gloss	Dulux Aquanamel Semi Gloss	SD 3960

Semi-gloss water based enamel (mould and bacteria resistant) - Interior

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Plasterboard	Dulux Acrylic Sealer Undercoat	Dulux Professional SteriGuard Water Based Enamel Semi Gloss	Dulux Professional SteriGuard Water Based Enamel Semi Gloss	SA11377
Fibrous/set plaster	Dulux Sealer Binder (solvent based)	Dulux Professional SteriGuard Water Based Enamel Semi Gloss	Dulux Professional SteriGuard Water Based Enamel Semi Gloss	SD10021
Fibre cement products	Dulux Acrylic Sealer Undercoat	Dulux Professional SteriGuard Water Based Enamel Semi Gloss	Dulux Professional SteriGuard Water Based Enamel Semi Gloss	SD11379
Timber and veneers (low VOC system)	Dulux 1 Step Acrylic Primer Sealer Undercoat	Dulux Professional SteriGuard Water Based Enamel Semi Gloss	Dulux Professional SteriGuard Water Based Enamel Semi Gloss	SD11380
Concrete	Dulux Acrylic Sealer Undercoat	Dulux Professional SteriGuard Water Based Enamel Semi Gloss	Dulux Professional SteriGuard Water Based Enamel Semi Gloss	SD11381
MDF (low VOC system)	Dulux Acrylic Sealer Undercoat	Dulux Professional SteriGuard Water Based Enamel Semi Gloss	Dulux Professional SteriGuard Water Based Enamel Semi Gloss	D11382
Concrete blockwork	Berger Gold Label Acrylic Block Filler	Dulux Professional SteriGuard Water Based Enamel Semi Gloss	Dulux Professional SteriGuard Water Based Enamel Semi Gloss	SD11384
Zinc-coated metals (zincalume, Galvabond, zincanneal, zincseal, zinc-primed steel) (low VOC system)	Dulux Galvanised Iron Primer (water based)	Dulux Professional SteriGuard Water Based Enamel Semi Gloss	Dulux Professional SteriGuard Water Based Enamel Semi Gloss	SD11385
Shop primed or red oxide primed (ROZP) ferrous metal (low VOC system)	Dulux Metalshield All Surface Primer (water based)	Dulux Professional SteriGuard Water Based Enamel Semi Gloss	Dulux Professional SteriGuard Water Based Enamel Semi Gloss	SD11386

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Non-ferrous metals (incl. aluminium, brass, copper, tin plate) (low VOC system)	Dulux Precision Maximum Strength Adhesion Primer	Dulux Professional SteriGuard Water Based Enamel Semi Gloss	Dulux Professional SteriGuard Water Based Enamel Semi Gloss	SD11387
Plastics (solvent resistant types e.g. FRP, PVC-U) (low VOC system)	Dulux Precision Maximum Strength Adhesion Primer	Dulux Professional SteriGuard Water Based Enamel Semi Gloss	Dulux Professional SteriGuard Water Based Enamel Semi Gloss	SD11388

Semi-gloss, solvent-borne - Interior

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Timber and primed hardboard veneers	Dulux 1 Step Oil Based Primer Sealer Undercoat (solvent based)	Dulux Super Enamel Semi Gloss	Dulux Super Enamel Semi Gloss	SD 0041
MDF	Dulux 1 Step Acrylic Primer Sealer Undercoat	Dulux Super Enamel Semi Gloss	Dulux Super Enamel Semi Gloss	SD 1169
Zinc-coated metals (zincalume, Galvabond, zincanneal, zincseal, zinc-primed steel)	Dulux Galvanised Iron Primer (water based)	Dulux Super Enamel Semi Gloss	Dulux Super Enamel Semi Gloss	SD 09093
Shop primed or red oxide primed (ROZP) ferrous metal.	Dulux Metalshield All Surface Primer (water based)	Dulux Super Enamel Semi Gloss	Dulux Super Enamel Semi Gloss	SD 08446
Non-ferrous metals (incl. aluminium, brass, copper, tin plate)	Dulux Precision Maximum Strength Adhesion Primer	Dulux Super Enamel Semi Gloss	Dulux Super Enamel Semi Gloss	SD 3452
Plastics (solvent resistant types e.g. FRP, PVC-U)	Dulux Precision Maximum Strength Adhesion Primer	Dulux Super Enamel Semi Gloss	Dulux Super Enamel Semi Gloss	SD 3340
Plastics (solvent sensitive types e.g. polystyrene)	Dulux Precision Maximum Strength Adhesion Primer	Dulux Aquanamel Semi Gloss	Dulux Aquanamel Semi Gloss	SD 3340

Full gloss water based enamel - Interior

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Plasterboard	Dulux Acrylic Sealer Undercoat	Dulux Aquanamel Gloss	Dulux Aquanamel Gloss	SD 0990
Plasterboard (MR grade)	Dulux Professional EnvirO2 Water Based Sealer Binder	Dulux Aquanamel Gloss Acrylic	Dulux Aquanamel Gloss	SD 11227

Fibrous/set plaster	Dulux Sealer Binder (solvent based)	Dulux Aquanamel Gloss	Dulux Aquanamel Gloss	SD 3849
Fibre cement products	Dulux Acrylic Sealer Undercoat	Dulux Aquanamel Gloss	Dulux Aquanamel Gloss	SD 5027
Timber and veneers (low VOC system)	Dulux 1 Step Acrylic Primer Sealer Undercoat	Dulux Aquanamel Gloss	Dulux Aquanamel Gloss	SD 0458
Concrete	Dulux Acrylic Sealer Undercoat	Dulux Aquanamel Gloss	Dulux Aquanamel Gloss	SD 5028
Cement render	Dulux 1 Step Acrylic Primer Sealer Undercoat	Dulux Aquanamel Gloss	Dulux Aquanamel Gloss	SD 2263
MDF (low VOC system)	Dulux 1 Step Acrylic Primer Sealer Undercoat	Dulux Aquanamel Gloss	Dulux Aquanamel Gloss	SD 3298
Brick and masonry	Dulux Acrylic Sealer Undercoat	Dulux Aquanamel Gloss	Dulux Aquanamel Gloss	SD 5046
Concrete blockwork	Berger Gold Label Acrylic Block Filler	Dulux Aquanamel Gloss	Dulux Aquanamel Gloss	SD 1522
Zinc-coated metals (zincalume, Galvabond, zincanneal, zincseal, zinc-primed steel) (low VOC system)	Dulux Galvanised Iron Primer (water based)	Dulux Aquanamel Gloss	Dulux Aquanamel Gloss	SD08559
Shop primed or red oxide primed (ROZP) ferrous metal (low VOC system)	Dulux Metalshield All Surface Primer (water based)	Dulux Aquanamel Gloss	Dulux Aquanamel Gloss	SD 2279
Non-ferrous metals (incl. aluminium, brass, copper, tin plate) (low VOC system)	Dulux Precision Maximum Strength Adhesion Primer	Dulux Aquanamel Gloss	Dulux Aquanamel Gloss	SD 3455
Plastics (solvent resistant types e.g. FRP, PVC-U) (low VOC system)	Dulux Precision Maximum Strength Adhesion Primer	Dulux Aquanamel Gloss	Dulux Aquanamel Gloss	SD 11228

Gloss water based enamel (mould and bacteria resistant) - Interior

Substrate	**1st coat**	**2nd coat**	**3rd coat**	**Manufacturer's Spec Sheet Ref**
Plasterboard	Dulux Acrylic Sealer Undercoat	Dulux Professional SteriGuard Water Based Enamel Gloss	Dulux Professional SteriGuard Water Based Enamel Gloss	SD11389
Fibrous/set plaster	Dulux Sealer Binder (solvent based)	Dulux Professional SteriGuard Water Based Enamel Gloss	Dulux Professional SteriGuard Water Based Enamel Gloss	SD10018

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Fibre cement products	Dulux Acrylic Sealer Undercoat	Dulux Professional SteriGuard Water Based Enamel Gloss	Dulux Professional SteriGuard Water Based Enamel Gloss	SD11391
Timber and veneers (low VOC system)	Dulux 1 Step Acrylic Primer Sealer Undercoat	Dulux Professional SteriGuard Water Based Enamel Gloss	Dulux Professional SteriGuard Water Based Enamel Gloss	SD11392
Concrete	Dulux Acrylic Sealer Undercoat	Dulux Professional SteriGuard Water Based Enamel Gloss	Dulux Professional SteriGuard Water Based Enamel Gloss	SD11393
MDF (low VOC system)	Dulux Acrylic Sealer Undercoat	Dulux Professional SteriGuard Water Based Enamel Gloss	Dulux Professional SteriGuard Water Based Enamel Gloss	SD11394
Concrete blockwork	Berger Gold Label Acrylic Block Filler	Dulux Professional SteriGuard Water Based Enamel Gloss	Dulux Professional SteriGuard Water Based Enamel Gloss	SD11395
Zinc-coated metals (zincalume, Galvabond, zincanneal, zincseal, zinc-primed steel) (low VOC system)	Dulux Galvanised Iron Primer (water based)	Dulux Professional SteriGuard Water Based Enamel Gloss	Dulux Professional SteriGuard Water Based Enamel Gloss	SD11396
Shop primed or red oxide primed (ROZP) ferrous metal (low VOC system)	Dulux Metalshield All Surface Primer (water based)	Dulux Professional SteriGuard Water Based Enamel Gloss	Dulux Professional SteriGuard Water Based Enamel Gloss	SD11399
Non-ferrous metals (incl. aluminium, brass, copper, tin plate) (low VOC system)	Dulux Precision Maximum Strength Adhesion Primer	Dulux Professional SteriGuard Water Based Enamel Gloss	Dulux Professional SteriGuard Water Based Enamel Gloss	SD11397
Plastics (solvent resistant types e.g. FRP, PVC-U) (low VOC system)	Dulux Precision Maximum Strength Adhesion Primer	Dulux Professional SteriGuard Water Based Enamel Gloss	Dulux Professional SteriGuard Water Based Enamel Gloss	SD11398

Full gloss, solvent-borne – Interior

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Timber and primed hardboard veneers	Dulux 1 Step Oil Based Primer Sealer Undercoat	Dulux Super Enamel High Gloss	Dulux Super Enamel High Gloss	SD 0039
MDF (interior only)	Dulux 1 Step Acrylic Primer Undercoat	Dulux Super Enamel High Gloss	Dulux Super Enamel High Gloss	SD 1168

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Zinc-coated metals (zincalume, Galvabond, zincanneal, zincseal, zinc-primed steel)	Dulux Galvanised Iron Primer (water based)	Dulux Super Enamel High Gloss	Dulux Super Enamel High Gloss	SD 09093
Shop primed or red oxide primed (ROZP) ferrous metal.	Dulux Metalshield All Surface Primer (water based)	Dulux Super Enamel High Gloss	Dulux Super Enamel High Gloss	SD 08446
Non-ferrous metals (incl. aluminium, brass, copper, tin plate)	Dulux Precision Maximum Strength Adhesion Primer	Dulux Super Enamel High Gloss	Dulux Super Enamel High Gloss	SD 3451
Plastics (solvent resistant types e.g. FRP, PVC-U)	Dulux Precision Maximum Strength Adhesion Primer	Dulux Super Enamel High Gloss	Dulux Super Enamel High Gloss	SD 0385
Plastics (solvent sensitive types e.g. polystyrene)	Dulux Precision Maximum Strength Adhesion Primer	Use water based paints, not solvent based.	Use water based paints, not solvent based.	N/A

Full gloss, epoxy primed enamel - Interior

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Zinc-coated metals (zincalume, Galvabond, zincanneal, zincseal, zinc-primed steel)	Dulux Durebild STEto 100 microns DFT	Dulux Metalshield Prem UV Resistant Enamel Topcoat Gloss	Dulux Metalshield Prem UV Resistant Enamel Topcoat Gloss	D11407

Full gloss, epoxy primed two-pack polyurethane - Interior

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Zinc-coated metals (incl. HD Galvanized steel, zincalume, Galvabond, zincanneal, zincseal, zinc-primed steel)	Dulux Duremax GPE Zinc Phosphate to 125 microns DFT	Dulux Duremax GPE to 100 microns DFT	Dulux Weathermax HBR to 75 microns DFT	SI 3359

Clear over stain on timber or veneers - Interior

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Timber and timber veneer (solvent based system)	Cabot's Cabothane (solvent based) Gloss or Satin	Cabot's Cabothane (solvent based) Gloss or Satin	Cabot's Cabothane (solvent based) Gloss or Satin	SW 07479 (gloss) or SW 1202 (satin)
Timber and timber veneer (low VOC water based system)	Intergrain Ultraclear Gloss or Satin Apply 10.8 m2/litre	Intergrain Ultraclear Gloss or Satin Apply 10.8 m2/litre		SW 3925 (gloss) or SW 3927 (satin)

Clear coat two-pack polyurethane - Interior

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Timber (low VOC water based system)	Intergrain Enviropro Timberseal	Intergrain Enviropro Endure 2 Pack Matt	Intergrain Enviropro Endure 2 Pack Matt	SW 4050
Timber (low VOC water based system)	Intergrain Enviropro Timberseal	Intergrain Enviropro Endure 2 Pack Satin (B20b	Intergrain Enviropro Endure 2 Pack Satin	SW 4243
Timber (low VOC water based system)	Intergrain Enviropro Timberseal	Intergrain Enviropro Endure 2 Pack Gloss	Intergrain Enviropro Endure 2 Pack Gloss	SW 3991

Clear coat single pack polyurethane - Interior

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Timber and timber veneer (low VOC water based system)	Intergrain Ultraclear Gloss or Satin Apply 10.8 m^2/litre	Intergrain Ultraclear Gloss or Satin Apply 10.8 m^2/litre		SW 3925(gloss) or SW 3927(satin)
Timber and timber veneer (solvent based system)	Feast Watson Satinproof (solvent based)	Feast Watson Satinproof (solvent based)	(Optional) Feast Watson Satinproof (solvent based)	SW 1244

Two pack gloss pigmented polyurethane - Interior joinery

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Timber (all shop applied)	Dulux Luxepoxy 4 White Primer to 50 microns DFT.	Dulux Luxathane R to 60 microns DFT.	Dulux Luxathane R to 60 microns DFT.	SD 1751

Clear finishing oils for timber - Interior

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Timber	Feast Watson Scandinavian Oil Apply at 16 m^2/litre	Feast Watson Scandinavian Oil Apply at 16 m^2/litre		SW 1257
Timber	Feast Watson Tung Oil Apply 12-14 m^2/litre	Feast Watson Tung Oil Apply 12-14 m^2/litre		SW 1258

Tung oil (Semi-gloss finish) - Interior (timber floors)

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Timber (soft wood)	Feast Watson Proofseal	Feast Watson Tung Oil (Commercial)	Feast Watson Tung Oil (Commercial)	SW 1313
Timber (hardwood)	Feast Watson Proofseal	Feast Watson Tung Oil (Commercial)	Feast Watson Tung Oil (Commercial)	SW 1313

Clear single pack polyurethane - Interior (timber floors)

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Timber (floors) (low VOC water based system)	Intergrain Enviropro Endure 1 Gloss, Satin or Matt	Intergrain Enviropro Endure 1 Gloss, Satin or Matt	Intergrain Enviropro Endure 1 Gloss, Satin or Matt	SW4012 (gloss) or SW4014 (satin) or SW4016 (matt)
Timber (floors)	Feast Watson Floorproof (solvent based) Gloss or Satin	Feast Watson Floorproof (solvent based) Gloss or Satin	Feast Watson Floorproof (solvent based) Gloss or Satin	SW 1332

Paving paint for concrete – Interior or exterior

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Concrete (solvent based system)	Berger Jet Dry Non-Slip Paving Paint	Berger Jet Dry Non-Slip Paving Paint	Berger Jet Dry Non-Slip Paving Paint	SD 0643
Concrete (low VOC, water based system)	Berger Jet Dry Aqua Tread Satin	Berger Jet Dry Aqua Tread Satin		SD 1145

Clear sealer for concrete – Interior or exterior

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Concrete (Domestic) (low VOC, water based system)	Berger Jet Dry Aqua Tread Satin	Berger Jet Dry Aqua Tread Satin	Berger Jet Dry Aqua Tread Satin	SD 1145
Concrete (commercial) (low VOC, water based system)	Dulux Luxafloor WB	Dulux Luxafloor WB		SC 11138
Concrete (commercial) (water based system)	Dulux 956/1 Acraglaze (Interior only)	Dulux 956/1 Acraglaze (Interior only)	(Optional) Dulux 956/1 Acraglaze (Interior only)	SA 2589
Concrete (commercial) (solvent based system)	Dulux Luxafloor ACS	Dulux Luxafloor ACS		SI 1574

Previously painted surfaces - Interior

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
e.g. Painted Plasterboard	Dulux ASU	Dulux Wash&Wear Low Sheen	Dulux Wash&Wear Low Sheen	SD0007

4.3 EXTERIOR PAINTING SCHEDULES

Low gloss latex – Exterior

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Weatherboard - hardboard cladding (Weathertex)	Dulux Professional Acrylic Primer	Dulux Weathershield Low Sheen	Dulux Weathershield Low Sheen	SD 9246

Weatherboard -fibre cement board cladding (Hardiboard)	Dulux Weathershield Low Sheen	Dulux Weathershield Low Sheen	Dulux Weathershield Low Sheen	SD 2539
Fibre cement products	Dulux Weathershield Low Sheen	Dulux Weathershield Low Sheen	Dulux Weathershield Low Sheen	SD 1333
Timber and veneers	Dulux Professional Acrylic Primer	Dulux Weathershield Low Sheen	Dulux Weathershield Low Sheen	SD 9246
Concrete (OFC, tilt slab or precast)	Dulux AcraPrime 501/1 Water Based Primer	Dulux Weathershield Low Sheen	Dulux Weathershield Low Sheen	SD 1620
Concrete (OFC, tilt slab or precast) (High-build performance coating system)	Dulux AcraPrime 501/1 Water Based Primer	Dulux AcraTex AcraShield 955 Low Gloss RollerRoller Finish	Dulux AcraTex AcraShield 955 Low Gloss RollerRoller Finish	SA 0770
Cement render (High-build performance coating system)	Dulux AcraPrime 501/1 Water Based Primer	Dulux AcraTex AcraShield 955 Low Gloss Roller Finish	Dulux AcraTex AcraShield 955 Low Gloss Roller Finish	SA 4029
Clay brick and masonry	Dulux Professional Acrylic Primer	Dulux Weathershield Low Sheen	Dulux Weathershield Low Sheen	SD 7507
Concrete blockwork	Berger Gold Label Acrylic Blockfiller	Dulux Weathershield Low Sheen Acrylic	Dulux Weathershield Low Sheen Acrylic	SD 1555
Concrete blockwork (High-build performance coating system)	Dulux AcraPrime 501/1 Water Based Primer	Dulux AcraTex AcraShield 955 Low Gloss Roller Finish	Dulux AcraTex AcraShield 955 Low Gloss Roller Finish	SA 2957
Zinc coated metals (incl. Zincalume, Galvabond, Zincanneal, zincseal, zinc-primed steel)	Dulux Weathershield Low Sheen	Dulux Weathershield Low Sheen	Dulux Weathershield Low Sheen	SD 3275
HD Galvanized steel or zinc-primed steel (Domestic)	Dulux Durebuild STE Two Pack Epoxy	Dulux Weathershield Low Sheen	Dulux Weathershield Low Sheen	SD 11541
Shop primed or red oxide primed (ROZP) ferrous metal.	Dulux Luxaprime Zinc Phosphate Primer	Dulux Weathershield Low Sheen	Dulux Weathershield Low Sheen	SD 07815
Plastics (solvent resistant types e.g. FRP, PVC-U) (low VOC)	Dulux Precision Maximum Strength Adhesion Primer	Dulux Weathershield Low Sheen	Dulux Weathershield Low Sheen	SD 3006

Semi-gloss latex – Exterior

Substrate	**1st coat**	**2nd coat**	**3rd coat**	**Manufacturer's Spec Sheet Ref**
Weatherboard - hardboard cladding (Weathertex)	Dulux Professional Acrylic Primer	Dulux Weathershield Low Sheen	Dulux Weathershield Low Sheen	SD 9246

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Weatherboard -fibre cement board cladding (Hardiboard)	Dulux Weathershield Low Sheen	Dulux Weathershield Low Sheen	Dulux Weathershield Low Sheen	SD 2539
Fibre cement products	Dulux Weathershield Low Sheen	Dulux Weathershield Low Sheen	Dulux Weathershield Low Sheen	SD 1333
Timber and veneers	Dulux Professional Acrylic Primer	Dulux Weathershield Low Sheen	Dulux Weathershield Low Sheen	SD 9246
Concrete (OFC, tilt slab or precast)	Dulux AcraPrime 501/1 Water Based Primer	Dulux Weathershield Low Sheen	Dulux Weathershield Low Sheen	SD 1620
Concrete (OFC, tilt slab or precast) (High-build performance coating system)	Dulux AcraPrime 501/1 Water Based Primer	Dulux AcraTex AcraShield 955 Low Gloss RollerRoller Finish	Dulux AcraTex AcraShield 955 Low Gloss RollerRoller Finish	SA 0770
Cement render (High-build performance coating system)	Dulux AcraPrime 501/1 Water Based Primer	Dulux AcraTex AcraShield 955 Low Gloss Roller Finish	Dulux AcraTex AcraShield 955 Low Gloss Roller Finish	SA 4029
Clay brick and masonry	Dulux Professional Acrylic Primer	Dulux Weathershield Low Sheen	Dulux Weathershield Low Sheen	SD 7507
Concrete blockwork	Berger Gold Label Acrylic Blockfiller	Dulux Weathershield Low Sheen Acrylic	Dulux Weathershield Low Sheen Acrylic	SD 1555
Concrete blockwork (High-build performance coating system)	Dulux AcraPrime 501/1 Water Based Primer	Dulux AcraTex AcraShield 955 Low Gloss Roller Finish	Dulux AcraTex AcraShield 955 Low Gloss Roller Finish	SA 2957
Zinc coated metals (incl. Zincalume, Galvabond, Zincanneal, zincseal, zinc-primed steel)	Dulux Weathershield Low Sheen	Dulux Weathershield Low Sheen	Dulux Weathershield Low Sheen	SD 3275
HD Galvanized steel or zinc-primed steel (Domestic)	Dulux Durebuild TE Two Pack Epoxy	Dulux Weathershield Low Sheen	Dulux Weathershield Low Sheen	SD 11541
Shop primed or red oxide primed (ROZP) ferrous metal.	Dulux Luxaprime Zinc Phosphate Primer	Dulux Weathershield Low Sheen	Dulux Weathershield Low Sheen	SD 07815
Plastics (solvent resistant types e.g. FRP, PVC-U) (low VOC)	Dulux Precision Maximum Strength Adhesion Primer	Dulux Weathershield Low Sheen	Dulux Weathershield Low Sheen	SD 3006

Gloss latex – Exterior

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Fibre cement products	Dulux Weathershield Gloss	Dulux Weathershield Gloss	Dulux Weathershield Gloss	SD 2938
Timber and veneers	Dulux Professional Acrylic Primer	Dulux Weathershield Gloss	Dulux Weathershield Gloss	SD 09362
Concrete (OFC, tilt slab or precast)	Dulux AcraPrime 501/1 Water Based Primer	Dulux Weathershield Gloss	Dulux Weathershield Gloss	SD 4653
Concrete (OFC, tilt slab or precast) (High-build performance coating system)	Dulux AcraPrime 501/1 Water Based Primer	Dulux AcraTex AcraShield 955 Low Gloss Roller Finish	Dulux AcraTex AcraShield 955 Low Gloss Roller Finish	SA 0770
Cement render (High-build performance coating system)	Dulux AcraPrime 501/1 Water Based Primer	Dulux AcraTex AcraShield 955 Low Gloss Roller Finish	Dulux AcraTex AcraShield 955 Low Gloss Roller Finish	SA 4029
Clay brick and masonry	Dulux Professional Acrylic Primer	Dulux Weathershield Gloss	Dulux Weathershield Gloss	SD 7512
Concrete blockwork	Berger Gold Label Acrylic Blockfiller	Dulux Weathershield Gloss	Dulux Weathershield Gloss	SD 5050
Concrete blockwork (High-build performance coating system)	Dulux AcraPrime 501/1 Water Based Primer	Dulux AcraTex AcraShield 955 Low Gloss Roller Finish	Dulux AcraTex AcraShield 955 Low Gloss Roller Finish	SA 2957
Zinc coated metals (incl. Zincalume, Galvabond, Zincanneal, zincseal, zinc-primed steel)	Dulux Professional Galvanised Iron Primer	Dulux Weathershield Gloss	Dulux Weathershield Gloss	SD 07813
HD galvanized steel or zinc-primed steel (Domestic)	Dulux Durebuild STE Two Pack Epoxy	Dulux Weathershield Gloss	Dulux Weathershield Gloss	SI 3762
Shop primed or red oxide primed (ROZP) ferrous metal.	Dulux Luxaprime Zinc Phosphate Primer (solvent based)	Dulux Weathershield Gloss	Dulux Weathershield Gloss	SD 07817
Plastics (solvent resistant types e.g. FRP, PVC-U) (low VOC system)	Dulux Precision Maximum Strength Adhesion Primer	Dulux Weathershield Gloss	Dulux Weathershield Gloss	SD 11231

Acrylic paint system for bagged masonry – Exterior

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Brickwork and concrete – flush finish (bagged or sponged) – no texture	Berger Gold Label Block Filler	Dulux Weathershield Low Sheen	Dulux Weathershield Low Sheen	SD 1555

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Brickwork and concrete – flush finish (bagged or sponged) – slight texture	Dulux AcraPrime 501/1 Water Based Primer	Dulux Acratex AcraSand Acrylic (2nd coat Optional)	Dulux Acratex Acrashield	SA 0754
Brickwork and concrete – flush finish – medium texture	Dulux AcraTex Mediterranean Classique	Dulux AcraTex Mediterranean Classique	Dulux AcraTex AcraShield	SA 09533

Textured acrylic paint system – Exterior

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Concrete, blockwork and cement render	Dulux Acraprime 501/1 Water Based Primer	Dulux Acratex Contempo 959 Advance Base Coat	Dulux Acratex Contempo 959 Advance Finish Coat	SA 1868
Concrete, blockwork and cement render	Dulux Acraprime 501/1 Water Based Primer (B15)	Dulux Acratex Roll On 950-00 Low Profile Texture	Dulux Acratex Acrashield 955 Finish	SA 0696
Concrete, masonry, blockwork and cement render	Dulux Acraprime 501/1 Water Based Primer	Dulux Acratex Acrashield 955 Low Gloss Rolana Finish	Dulux Acratex Acrashield 955 Low Gloss Rolana Finish	SA 0770

Semi-gloss, water based enamel – Exterior

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Fibre cement products	Dulux Professional Acrylic Primer	Dulux Aquanamel Semi Gloss	Dulux Aquanamel Semi Gloss	SD 7549
Timber and veneers	Dulux Professional Acrylic Primer	Dulux Aquanamel Semi Gloss	Dulux Aquanamel Semi Gloss	SD 07476
Concrete	Dulux Professional Acrylic Primer	Dulux Aquanamel Semi Gloss	Dulux Aquanamel Semi Gloss	SD 11234
Cement render	Dulux Professional Acrylic Primer	Dulux Aquanamel Semi Gloss	Dulux Aquanamel Semi Gloss	SD 07495
Brick and masonry	Berger Gold Label Acrylic Block Filler	Dulux Aquanamel Semi Gloss	Dulux Aquanamel Semi Gloss	SD 5041
Concrete blockwork	Berger Gold Label Acrylic Block Filler	Dulux Aquanamel Semi Gloss	Dulux Aquanamel Semi Gloss	SD 5041
Zinc coated metals Zincalume, Galvabond, Zincanneal, zincseal, zinc-primed steel) (low VOC system)	Dulux Professional Galvanised Iron Primer	Dulux Aquanamel Semi Gloss	Dulux Aquanamel Semi Gloss	SD 11235

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Shop primed or red oxide primed (ROZP) ferrous metal (low VOC system)	Dulux Metalshield All Surface Primer (water based)	Dulux Aquanamel Semi Gloss	Dulux Aquanamel Semi Gloss	SD 07789
Non-ferrous metals (incl. aluminium, brass, copper, tin plate) (low VOC system)	Dulux Precision Maximum Strength Adhesion Primer	Dulux Aquanamel Semi Gloss	Dulux Aquanamel Semi Gloss	SD 09798
Plastics (solvent resistant types e.g. FRP, PVC-U) (low VOC system)	Dulux Precision Maximum Strength Adhesion Primer	Dulux Aquanamel Semi Gloss	Dulux Aquanamel Semi Gloss	SD 7494

Gloss, water based enamel – Exterior

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Fibre cement products	Dulux Professional Acrylic Primer	Dulux Aquanamel Gloss	Dulux Aquanamel Gloss	SD 7548
Timber and veneers	Dulux Professional Acrylic Primer	Dulux Aquanamel Gloss	Dulux Aquanamel Gloss	SD 08475
Concrete	Dulux Professional Acrylic Primer	Dulux Aquanamel Gloss	Dulux Aquanamel Gloss	SD 11236
Cement render	Dulux Professional Acrylic Primer	Dulux Aquanamel Gloss	Dulux Aquanamel Gloss	SD 07496
Brick and masonry	Berger Gold Label Acrylic Blockfiller	Dulux Aquanamel Gloss	Dulux Aquanamel Gloss	SD 11237
Concrete blockwork	Berger Gold Label Acrylic Blockfiller	Dulux Aquanamel Gloss	Dulux Aquanamel Gloss	SD 11238
Zinc-coated metals (Zincalume, Galvabond, Zincanneal, zincseal, & zinc-primed steel)	Dulux Professional Galvanised Iron Primer	Dulux Aquanamel Gloss	Dulux Aquanamel Gloss	SD 11239
Shop primed or red oxide primed (ROZP) ferrous metal.	Dulux Luxaprime Zinc Phosphate Primer (solvent based)	Dulux Aquanamel Gloss	Dulux Aquanamel Gloss	SD 07570
Non-ferrous metals (incl. aluminium, brass, copper, tin plate)	Dulux Precision Maximum Strength Adhesion Primer	Dulux Aquanamel Gloss	Dulux Aquanamel Gloss	SD 11240
Plastics (solvent resistant types e.g. FRP, PVC-U)	Dulux Precision Maximum Strength Adhesion Primer	Dulux Aquanamel Gloss	Dulux Aquanamel Gloss	SD 11241

Full gloss, solvent borne – Exterior

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Timber and primed hardboard veneers	Dulux 1 Step Oil Based PSU (solvent based)	Dulux Super Enamel High Gloss	Dulux Super Enamel High Gloss	SD 0039
Zinc-coated metals (zincalume, Galvabond, zincanneal, zincseal, zinc-primed steel)	Dulux Professional Galvanised Iron Primer	Dulux Super Enamel High Gloss	Dulux Super Enamel High Gloss	SD 07814
Shop primed or red oxide primed (ROZP) ferrous metal.	Dulux Luxaprime Zinc Phosphate Primer (solvent based)	Dulux Super Enamel High Gloss	Dulux Super Enamel High Gloss	SD 07818
Non-ferrous metals (incl. aluminium, brass, copper, tin plate)	Dulux Precision Maximum Strength Adhesion Primer	Dulux Super Enamel High Gloss	Dulux Super Enamel High Gloss	SD 3451
Plastics (solvent resistant types e.g. FRP, PVC-U)	Dulux Precision Maximum Strength Adhesion Primer	Dulux Super Enamel High Gloss	Dulux Super Enamel High Gloss	SD 0385
Plastics (solvent sensitive types, e.g. polystyrene)	Dulux Precision Maximum Strength Adhesion Primer	Don't use Solvent Based, Use Water Based Paints	Don't use Solvent Based, Use Water Based Paints	N/A

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.

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 coat: 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.
- Maintenance recommendations.

Warranties

General: Submit the coating manufacturer's warranties, as documented.

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.

3 SELECTIONS

3.1 ALUMINIUM FOR ARCHITECTURAL APPLICATIONS

Coating details

Application: Window Framing

Location: All internal and external window and operable wall frames.

Service condition category to AS 3715: Category 3

Coating type: Thermoset polyester powdercoating

Product: Duralloy

Colour: Refer to Finishes Schedule.

Gloss level: Satin

0902 ELECTRICAL DESIGN AND INSTALL

1 ELECTRICAL SYSTEMS

1.1 RESPONSIBILITIES

General

Requirement: Provide the electrical services, as documented.

Summary: The electrical services are summarised as follows: [complete/delete]

1.2 DESIGN

Design for durability and maintainability

Design for durability: Develop the design so the systems achieve the documented performance, reliability, service life, energy efficiency and safety requirements, and are easily maintainable.

Access for maintenance: Develop the design so the systems conform to **ACCESS FOR MAINTENANCE** in the *0171 General requirements* worksection.

Electrical system design

General: Design and provide systems, as documented.

Designer qualifications: Use only appropriately experienced and qualified persons to undertake design work. If requested, provide documents verifying the qualification and experience.

Design parameters: As documented.

Fault protection: Automatic disconnection to AS/NZS 3000 clause 2.4.

Maximum demand: Calculation method to AS/NZS 3000 Appendix C.

1.3 CROSS REFERENCES

General

Requirement: Conform to the following:

- *0171 General requirements*.

1.4 STANDARDS

Electrical services

Requirement: To AS/NZS 3000, unless otherwise documented.

Electrical installations

Electrical design: To AS/NZS 3000 and SAA HB 301.

Selection of cables: To AS/NZS 3008.1.1.

Degrees of protection (IP code): To AS 60529.

Electromagnetic compatibility (EMC): To AS/NZS 61000.

Communications systems: To AS/CA S008, AS/CA S009, AS/NZS 3008 and AS/NZS ISO/IEC 14763.2.

1.5 CONTRACT DOCUMENTS

General

Requirement: Conform to the *0171 General requirements* worksection.

1.6 SUBMISSIONS

General

Requirement: Conform to the *0171 General requirements* worksection.

Certification

General: Submit the following:

- Certification of conformance with AS/NZS 3000, for electrical services.

- Telecommunications cabling: Submit product and installation certification for the installation.

Products and materials

Data: Submit technical data for all items of plant and equipment, including the following:

- Assumptions.
- Calculations.
- Model name, designation and number.
- Capacity of all system elements.
- Country of origin and manufacture.
- Materials used in the construction.
- Size, including required clearances for installation.
- Certification of compliance with the applicable code or standard.
- Technical data schedules corresponding to the equipment schedules in the contract documents. If there is a discrepancy between the two, substantiate the change.
- Manufacturers' technical literature.
- Type-test reports.
- Single line diagram(s), including fault levels at switchboards, cable size and type.
- Switchboard layouts.

Lighting: Submit technical data on the following:

- Luminaires.
- Lamps.
- Ballasts.
- Power factor correction equipment.
- Lighting control systems.
- All accessories.

Telecommunications cabling: Submit technical data including the following:

- System design parameters: Performance.
- Voice and/or data transfer rate.
- Cable type and characteristics.
- Segregation requirements for EMI/EMR.
- Maximum length of cables.
- Cross-connect type and characteristics.
- Cross-connect block.
- Patch cords.
- Fibre optic terminations.
- Patch panel module.
- Cable management for racks.
- Rack.
- Fly leads.

Emergency evacuation lighting: Submit technical data for each type of luminaire and exit sign including the following:

- Maximum luminaire spacing for a given mounting height.
- Luminaire classification to AS 2293.3.

1.7 WORK ON EXISTING SYSTEMS

Demolition

General: Decommission, isolate, demolish and remove from the site all existing redundant equipment including minor associated components that become redundant as a result of the demolition.

Breaking down: Disassemble or cut up equipment where necessary to allow removal.

Recovered materials: Recover all components associated with the listed items. Minimise damage during removal and deliver to the locations documented.

Existing electrical systems

Condition of existing systems:

- If the existing condition does not conform to the requirements in the contract documents, submit proposals to rectify the deficiencies with related costing, time and other impacts.
- Subject to the rectification works on existing systems, achieve the performance in the contract documents.

2 LOW VOLTAGE POWER SYSTEMS

2.1 RESPONSIBILITIES

General

Requirement: Provide low voltage power systems, as documented.

2.2 WIRING SYSTEMS

General

Requirement: Provide wiring and site cable reticulation systems appropriate to the installation conditions and the function of the load. Include the following:

- Underground services.
- Above-ground services.
- In-building services.

Type: Re-wireable system.

Neutral conductors: Same size as the corresponding active conductors. Rate the neutral conductor size for the maximum harmonic currents.

2.3 POWER CABLES

Standards

Polymeric insulated cables: To AS/NZS 5000.1.

Aerial cables:

- Copper conductors: To AS 1746.
- Aluminium conductors: To AS 3607 or AS 1531.

Cable

Requirement: Select multi-stranded copper cables.

Default insulation: V-75.

Default sheathing: 4V-75.

Minimum size: Conform to the following:

- Lighting subcircuits: 1.5 mm^2.
- Power subcircuits: 2.5 mm^2.
- Submains: 6 mm^2.

Voltage drop: Select final subcircuit cables within the voltage drop parameters dictated by the route length and load.

Fault loop impedance: Provide final subcircuit cables to satisfy the requirements for automatic disconnection under short circuit and earth fault/touch voltage conditions.

Underground residential distribution (URD) systems: Cables to AS/NZS 4026.

Distribution cables: To AS/NZS 4961.

Colours

Conductor colours: For fixed wiring cables, provide coloured conductor insulation or at least 150 mm of close fitting coloured sleeving at the termination points of each conductor.

Active conductors in single phase circuits: Red.

Active conductors in polyphase circuits:

- A phase: Red.
- B phase: White.
- C phase: Blue.

Sheath: White.

Cable installation

Classifications: To AS/NZS 3013.

Handling cables: Report damage to cable insulation, serving or sheathing.

Stress: Do not use installation methods that exceed the cable's pulling tension. Use cable rollers for cable installed on tray/ladders or in underground enclosures.

Straight-through joints: Unless unavoidable due to length or difficult installation conditions, run cables without intermediate straight-through joints.

Cable joints: Locate in accessible positions in junction boxes and/or in pits.

Individual wiring of extra-low voltage circuits: Tie together at regular intervals.

Tagging

General: Identify multicore cables and trefoil groups at each end with stamped non-ferrous tags clipped around each cable or trefoil group.

Marking

General: Identify the origin of all wiring by legible indelible marking.

Submains and final sub-circuits

Installation: Provide the following:

- Cables with diameter less than 13 mm: Run in conduit, cable ducts or support on cable trays or ladders.
- Single core cables of 3 phase circuits of diameter greater than 13 mm: Install unenclosed single core cables laid on cable tray or support systems in trefoil (RWBN) groups.
- Cables for lighting systems: Run in conduit, cable ducts, suspend on catenary systems or support on cable trays or ladders.
- Accessible concealed spaces: Install thermoplastic insulated and sheathed cables.
- Inaccessible concealed spaces: Install cable in PVC-U conduit.
- Roof spaces: Install cable below heat insulation and sarking. If not protected from high ambient roof space temperatures by thermal insulation, derate the cables, to AS/NZS 3008.1.1 Table 27, for an assumed ambient temperature of 55°C.
- Accessible ceiling voids: Support and enclose cables on ceiling surfaces or ceiling suspension systems.
- Plastered or rendered masonry: Install cable in PVC-U conduit.
- Double sided face brick partition: Install cable in PVC-U conduit installed within the brick wall by slotting bricks or using any pathways provided in the brick.
- Stud framed walls with bulk insulation: Install cables in PVC-U conduit.
- Stud framed walls without bulk insulation: Thermoplastic insulated and sheathed cables allowing rewirability.
- Horizontal cable trays or ladders: Fix cables using proprietary nylon cable ties or straps, cable saddles or clips at 2000 mm intervals.
- Vertical cable risers: Fix cables using proprietary nylon cable ties or straps, cable saddles or clips at 1000 mm intervals.

- Plant rooms: Install cable in heavy duty PVC-U conduit or on tray or in duct.

2.4 EARTHING

Earthing systems

Protective earthing system with a multiple earth neutral (MEN) connection: To AS/NZS 3000 Section 5 and as documented.

Earth electrodes

General: Provide electrodes to AS/NZS 3000 clause 5.3.6.

Bonding

General: Provide equipotential bonding to AS/NZS 3000 clause 5.6.

Earth and bonding clamps

General: Provide proprietary earthing and bonding clamps.

Standard: To AS 1882.

2.5 ELECTRICAL ACCESSORIES

General

Style: Provide accessories of the same style and from the same manufacturer, as documented.

Socket outlets - generally

Standards:

- General: To AS/NZS 3112.
- Industrial: To AS/NZS 3123.

Socket outlet properties: Provide sockets conforming to the following or as documented:

- Type: Integral switched socket outlet.
- Material: High impact plastic.
- Size: Standard single gang.
- Current rating: 10 A.
- Pin arrangement: Mount outlets with the earth pins at the 6 o'clock position.

Plastic switched socket outlets

Colour: White electrical.

Mounting configuration: Horizontal.

Ironclad socket outlets

Type: Integral switched socket outlet.

Material: Diecast metal or cast iron.

Colour: Grey.

Combined RCD switched socket outlets

Type: Integral RCD unit with double switched socket outlet.

Colour: White electrical.

RCD trip current: Conform to the following:

- General light and power: 30 mA Type II to AS/NZS 3190.
- Patient treatment areas: 10 mA Type I to AS/NZS 3190, as documented.

Multi-switch socket outlets on grid mounted panels

Type: Separate switch and socket outlets grid mounted on propriety or custom designed panels.

Material: As documented.

Colour: As documented.

Panel finishes: As documented.

Plugs – 230 volt

Requirement: Insulated type to AS/NZS 3112 with integral pins.

230 volt combination switch and permanently connected cord outlet

Type: Three terminal flush mounted switch and flex-lock insert assembly.

Colour: White electrical.

Neon Indicator: Provide neon indicator to match existing.

Flex-lock assembly: Match and securely grip the size and type of flexible cable used.

Mounting configuration: Horizontal.

Permanently connected equipment

General: Provide final subcircuit to permanently connected equipment, as documented.

Isolating switch: Locate adjacent to equipment.

Mounting:

- Internal installations: Flush mount.
- External installations: Weatherproof surface mounted.

Coordination: Coordinate with equipment supplier.

Wall/ceiling mounted equipment: Conceal final cable connection to equipment.

Isolating switches

Standard: To AS/NZS 3133.

3-phase outlets

Standard: To AS/NZS 3123.

Type: Surface mounted Integral switched socket outlet with flap lid on the outlet.

Material: High impact plastic.

IP rating: IP56.

Size: To suit current rating and pin configuration nominated in the project documents.

Colour: Grey.

Current rating: 5 pin, 20 A, 400 V a.c.

Switch mechanism: Rotating type.

Pin arrangement: Five round pins mounted with earth pins at the 6 o'clock position, neutral pins in the centre and the red, white and blue phases in a clockwise sequence when viewed from the front of the outlet.

Plug: Provide a matching plug top for each outlet.

Installation

General: Install accessories and conceal cabling in walls in conformance with the following:

- Rendered masonry partition: Flush wall box, with conduit chased into wall.
- Double sided face brick partition: Vertically mounted flush wall box, with conduit concealed in cut bricks.
- Face brick external cavity wall: Flush wall box, with thermoplastic insulated cables in conduit run in cavity and tied against inner brick surface, or thermoplastic sheathed cables run in cavity.
- Stud partition: Flush plate secured to proprietary support bracket or wall box.
- Fire walls: Flush wall box, with conduit built into wall. Provide additional fire protection around wall boxes, where necessary to maintain fire-resistance rating.

Location: Confirm final location of all outlets and equipment on site, before installation.

Spacing from adjacent horizontal surface: ≥ 75 mm to the centre of accessory socket.

Default mounting heights to centre of accessory plate:

- Outlets: 300 mm.
- Switches and controls: 1100 mm.

Accessories: Flush mounted, except in plant rooms.

Common face plates: Mount adjacent flush mounted accessories under a common faceplate.

Restricted location: Do not install wall boxes across junctions of wall finishes.

Surface mounting: Proprietary mounting blocks.

Installation of ceiling mounted accessories

Connections for appliances: Flush mounted outlets on the ceiling next to support brackets.

Mounting: Mount appliances independent of ceiling tiles and suspended ceiling suspension system. Fix directly to concrete slab or to roof structure above ceiling.

Connections for fixed equipment: Provide concealed permanent connections.

Fixing: For equipment and appliances heavier than 30 kg, provide support through the suspended ceiling to the building structure. Brace appliances that have excessive bending moments, are heavy or vibrate, to prevent horizontal movement, e.g. operating theatre shadowless lights.

3 SWITCHBOARDS – PROPRIETARY

3.1 RESPONSIBILITIES

General

Requirement: Provide proprietary switchboards for the following, as documented:

- Main switchboard.
- Distribution boards.

3.2 STANDARDS

General

Standards: To AS/NZS 3000, and AS/NZS 3439.3 or AS/NZS 61439.3.

3.3 PRODUCTS

Switchboard connectors

Type: Front connected.

Enclosure

Default material: Metallic-coated sheet steel.

Separation

Default: Form 1.

Metering

Retail: Provide metering to the requirements of the electricity retailer, the electricity distributor and as documented.

Private: Provide private metering, as documented.

Photovoltaic metering: As documented.

Main switchboard main switches

Spare capacity: Provide at least 25% spare capacity in the ratings main switch/isolators.

Busbars

General: Incorporate proprietary insulated busbar systems for the interconnection of isolators, circuit breakers and other circuit protective devices.

Busbar fault rating: Rated to meet the prospective fault current for 1 second or a minimum rating of ≥ 18kA/second, whichever is the greater.

Spare capacity

Default spare poles: ≥ 20%.

Main switchboard incoming busbar: ≥ 25%.

Earthing

General: Make provision for the connection of the communications earth terminal (CET) at switchboard earth bar to AS/CA S009.

Doors

General: Provide lockable doors with a circuit card holder unless enclosed in cupboards or in an area which is not readily accessible to the public.

IP rating

Default rating: IP42 minimum.

Weatherproof: IP56 minimum.

Finishes

External and interior: To the manufacturer's standard colour.

Supporting structure

Assemblies:

- Wall mounted: ≤ 2 m^2.
- Floor mounted: > 2 m^2.

Ventilation

General: Required to maintain design operating temperatures at full load.

Cable entries

General: Neatly adapt one or more cable entry plates, if fitted, to accept incoming cable enclosure. Provide the minimum number of entry plates to leave spare capacity for future cable entries. Do not run cables into the top of weatherproof assemblies.

Single core cables: Pass separately through non-ferrous gland plates. Do not provide ferrous metal saddles.

Cable enclosures

Requirement: Continue cable enclosures to or into assemblies and fit cable entry plates so that the IP rating of the assembly and the fire-resistance level of the cable are maintained.

Cable supports

Requirement: Support or tie mains and submains cables within 200 mm of terminations. Provide cable supports suitable for stresses resulting from short circuit conditions.

4 SWITCHBOARD COMPONENTS

4.1 RESPONSIBILITIES

General

Requirement: Provide switchboard components, as documented.

4.2 DESIGN

Statutory authority's equipment

General: Liaise with the electricity distributor about the installation and coordinate with their protective and control equipment.

4.3 REQUIREMENTS

General

Selection: To AS/NZS 3000 clause 1.7 and Section 2.

Rated duty: Uninterrupted.

Rated making capacity (peak): ≥ 2.1 x fault level (r.m.s.) at assembly incoming terminals.

Utilization category: To AS/NZS IEC 60947.1 clause 4.4 and the recommendations of Annex A.

- Circuits consisting of motors or other highly inductive loads: At least AC-23.
- Other circuits: At least AC-22.

Coordination: Select and adjust protective devices to discriminate under overload, fault current, and earth fault conditions.

Enclosure: IP4X minimum.

4.4 SWITCH-ISOLATOR AND COMBINATION FUSE-SWITCH UNITS

General

Standard: To AS/NZS IEC 60947.1 and AS/NZS IEC 60947.3.

Operation: Independent manual operation including positive ON/OFF indicator.

Shrouding: Effective over range of switch positions.

Fault make/fault break switch-isolators

Rated breaking capacity: To AS/NZS IEC 60947.3 Table 3.

Rated short-time withstand current: As defined in AS/NZS IEC 60947.1 clause 4.3.6.1 and the manufacturer's recommendation for the prospective fault current conditions.

Rated short-circuit making capacity: As defined in AS/NZS IEC 60947.1 clause 4.3.6.2, to conform to the manufacturer's recommendation for the prospective fault current conditions.

Rated short-circuit breaking capacity: To AS/NZS IEC 60947.1 clause 4.3.6.3 and the manufacturer's recommendation for the prospective fault current conditions.

Load make/load break switch-isolators

Rated making and breaking capacity: As defined in AS/NZS IEC 60947.1 clause 4.3.5 to conform to AS/NZS IEC 60947.3 Table 3 and the manufacturer's recommendations for the prospective fault current conditions.

Rated short-time withstand current: As defined in AS/NZS IEC 60947.1 clause 4.3.5, to conform to the manufacturer's recommendation for the current conditions.

4.5 OVERLOAD AND FAULT PROTECTION GENERALLY

General

Requirement: Provide overload and fault protection devices, including full discrimination and cascade protection, and grade with the electricity distributor's incoming supply protection system and the downstream site protection devices.

4.6 FUSE SWITCH UNITS

Fuse links

Requirement: Isolate when switch contacts are open. Provide 3 phase sets of high rupturing capacity (HRC) fuse links.

4.7 MOULDED CASE AND MINIATURE CIRCUIT BREAKERS

General

Moulded case breakers: To AS/NZS IEC 60947.1 and AS/NZS IEC 60947.2.

Miniature circuit breakers: Interrupting capacity classification to AS/NZS 60898.1 or AS/NZS 3111.

- For general building services: Type C.
- For motor protection: Type D.

Operation: Independent manual operation including positive ON/OFF indicator.

Trip type: Conform to the following:

- Moulded case breakers: Adjustable thermal, fixed magnetic.
- Miniature circuit breakers: Fixed thermal and fixed magnetic.

Mounting: Mount circuit breakers so that the ON/OFF and current rating indications are clearly visible with covers or escutcheons in position. Align operating toggles of each circuit breaker in the same plane.

Clip tray chassis: For miniature overcurrent circuit breakers, provide clip tray assemblies capable of accepting single, double or triple circuit breakers and related busbars. Provide moulded clip-on pole fillers for unused portions.

Trip settings: Set as documented, seal, and label.

Interchangeable trip units: Connect trip units so that trip units are not live when circuit breaker contacts are open.

Fault current limiting circuit breakers: Select breaker frame sizes from one manufacturer's tested range of breakers to give cascade and discrimination protection within the switchboard and downstream switchboards as required.

4.8 ELECTRICITY DISTRIBUTOR'S SERVICE PROTECTIVE DEVICES

General

Low voltage service protective devices: To AS/NZS 3000, the electricity distributor's requirements and the Service and Installation Rules.

Service protective devices > 100 A: Provide fault current limiting circuit breakers with adjustable overload and short circuit current facilities with full discrimination and cascade protection between the incoming supply protection systems and the downstream protection systems.

4.9 RESIDUAL CURRENT OPERATED CIRCUIT BREAKERS (RCBO)

General

Standard: To AS/NZS 3190.

Integral non-overload protection type: To AS/NZS 61008.1.

Integral overload protection type: To AS/NZS 61009.1.

Modular type: To AS/NZS IEC 60947.2.

- Type I for patient treatment areas.
  - . Default tripping current: 10 mA.
  - . Switched neutral: Required.
- Type II.
  - . Default tripping current: 30 mA.

4.10 FUSES WITH ENCLOSED FUSE LINKS

General

Standards: To IEC 60269-1.

Fuses with fuse links for the protection of semiconductor devices: To IEC 60269-4.

Fuses with fuse links used as fault current limiters: Coordinate fuse type and rating with the protection switchgear manufacturer's recommendation if used downstream of the fault current limiters. Provide labels adjacent to the fuse holder stating FAULT CURRENT LIMITER and fuse size.

Fuse links: Enclosed, high rupturing capacity type mounted in a fuse carrier.

Breaking range and utilisation category:

- Distribution/general purpose: gG.
- Motors: gM.

4.11 CONTACTORS

General

Standard: To AS/NZS IEC 60947.4.1.

Type: Enclosed, block type, air break, electromagnetic.

Poles: 3.

Rated operational current: The greater of:

- Full load current of the load controlled.
- ≥ 16 A.

Mechanical durability: 10 million cycles to AS/NZS IEC 60947.4.1.

Electric durability: ≥ 1 million operations at AC-22 to AS/NZS IEC 60947.4.1.

Mounting: Mount with sufficient clearance to allow full access for maintenance, removal and replacement of coils and contacts, without the need to disconnect wiring or remove other equipment.

Auxiliary contacts: Provide auxiliary contacts with at least one normally-open and one normally-closed separate contacts with rating of 6 A at 230 V a.c., utilization category AC-1.

5 LIGHTING

5.1 RESPONSIBILITIES

General

Requirement: Provide lighting and control systems, as documented.

5.2 STANDARDS

General

Energy efficiency for ballasts and lamps: To AS/NZS 4783.2.

Minimum energy performance standards (MEPS)

General: To AS/NZS 4782.2, AS/NZS 4783.2, AS 4934.2.

Self-ballasted lamps: To AS/NZS 4847.2.

5.3 PROPRIETARY LUMINAIRES

General

Requirement: Provide proprietary luminaires complete with lamps, luminaire control equipment, lighting control equipment, and accessories as documented. Provide lamps of the same type from the same brand and country of manufacture.

Self-ballasted lamps: To AS/NZS 60968 and AS/NZS 60969.

5.4 FLUORESCENT LAMPS

Standards

Fluorescent lamps: To AS/NZS 4782.1 and AS/NZS 4782.2.

Compact fluorescent lamps: To AS/NZS 4847.1 and AS/NZS 4847.2.

Single capped fluorescent lamps: To AS/NZS 60901.

Properties

CCT: 4000 K.

Colour rendering: Group 1B to AS/NZS 1680.1.

Linear and circular lamp type: T8 (26 mm diameter) or T5 (16 mm diameter), linear lamps, triphosphor, TL84, as documented.

Compact fluorescent lamps types: Four-pin, non-integrated type.

5.5 FLUORESCENT LAMP BALLASTS

Linear and circular lamp types

General: Provide electronic fluorescent lamp ballasts for fluorescent lamp lighting systems selected for compatibility with the lamp and control method.

Electronic fluorescent lamp ballasts: Conform to the following:

- To AS/NZS 61347.2.3 and AS/NZS 60929.
- Current total harmonic distortion: < 15%.
- Soft start.
- Number of ballasts: Provide separate ballasts for each lamp or integral dual ballasts as an alternative for dual lamp fittings.

Ballast performance measurement – fluorescent lamps: To AS/NZS 4783.1.

CFL lamp types

General: Provide electronic fluorescent lamp ballasts for CFL lighting systems selected for compatibility with the lamp and control method.

Electronic fluorescent lamp ballasts: To AS/NZS 61347.2.3and AS/NZS 60929.

Current total harmonic distortion: < 15%.

Number of ballasts: Provide separate ballasts for each lamp or integral dual ballasts as an alternative for dual lamp fittings.

Ballast performance measurement – fluorescent lamps: To AS/NZS 4783.1.

Fluorescent lamp power factor correction

General: Provide power factor correction on all luminaires to a minimum power factor of 0.9 lagging.

5.6 TUNGSTEN HALOGEN LAMPS

Standards

Tungsten halogen: To AS 2325, IEC 60357, AS/NZS 60432.2 and AS/NZS 60432.3.

Types

Tungsten halogen lamps enclosed behind glass: Single and doubled ended types for domestic and general use, rated up to 250 V.

5.7 ELV VOLTAGE TRANSFORMERS OR ELV SWITCH POWER SUPPLIES

General

Requirement: Provide separate ELV transformers for each ELV lamp.

Standard: To AS/NZS 4879.1, AS/NZS 4879.2 and AS/NZS 61558.1.

5.8 LIGHT-EMITTING DIODES (LEDS) LUMINAIRES

General

Requirement: Provide light emitting diode (LED) luminaires, as documented.

Light-emitting diode

Colour: CRI > 80.

CCT: 3000K.

5.9 CONTROL GEAR ENCLOSURE

General

Requirement: Provide controlgear support enclosure within the body of the luminaire, except where remotely mounted controlgear is documented or required by the manufacturer.

Enclosures and controlgear mounting assemblies: Provide heat dissipation facilities to dissipate heat from the luminaire.

Controlgear enclosure: Form a barrier against direct contact with live parts of the controlgear and the area of the luminaire containing the lamp and lamp support holders.

Separate controlgear enclosures: If separate controlgear enclosures external to the luminaire are required, conform to the above requirements.

Fixing: Screw fixed.

5.10 WIRING

External flexible cords

Recessed luminaires: Provide flexible cord in conformance with the following:

- Length: ≥ 1.5 m.
- Cross sectional area: 0.75 mm^2.
- Type: 3-core V75 (minimum) PVC/PVC, connected to a 10 A 3-pin moulded plug to AS/NZS 3112 or multi-pin plug, as documented.

5.11 LIGHTING CONTROL

General

Requirement: Provide the following as documented:

- Lighting switches.
- Dimmers.
- Automatic control systems.

Digital control system

General: Provide a proprietary, microprocessor-based system to control lighting under automatic and user interface control, as documented.

5.12 SUPPORTS

General

Requirement: Install luminaires on proprietary supports by means of battens, trims, noggings, roses and packing material.

Suspended luminaires

Rods: Steel pipe suspension rods fitted with gimbal joints.

Chains: Electroplated welded link chain.

Levelling wire: Stainless steel.

Levelling: Adjust the suspension system length so that the lighting system is level and even.

Horizontal tolerance: ± 3 mm between luminaires within the same area.

Surface mounted luminaires

General: Fit packing pieces to level luminaires and prevent distortion of luminaire bodies. Provide packing strips to align end to end luminaires.

Fixing: Conform to the following:

- Generally: Provide 2 fixings at each end of fluorescent luminaires.
- Luminaires less than 150 mm: A single fixing at each end in conjunction with 1.6 mm backing plates may be used.
- Provide battens and support for the fitting.
- Do not direct fix into plasterboard.

Recessed luminaires

General: Install recessed luminaires in trimmed openings in the suspended ceiling.

5.13 COMPLETION

General

Requirement: Before the date of practical completion carry out the following:

- Verify the operation of all luminaires.
- Adjust aiming and controls for all luminaires under night time conditions.
- Replace lamps which have been in service for a period greater than 50% of the lamp life as published by the lamp manufacturer.

6 FIRE DETECTION AND ALARMS

6.1 RESPONSIBILITIES

General

Requirement: Provide fire detection and alarm systems to comply with BCA.

6.2 STANDARDS

General

Standard: To AS 1670.1, AS 4428.1, AS 4428.16, AS 7240.2 and AS 7240.13.

6.3 DETECTORS

Detectors

Type

Areas generally: Optical beam smoke detectors.

Hot areas: Fixed temperature integral heat detector/alarm unit type.

Standards

Smoke alarms: To BCA Spec E2.2a.

Carbon monoxide (CO) fire detectors: To AS 7240.6.

Duct sampling units (DSUs): To AS 1603.13.

Heat detectors: To AS 7240.5.

Point type smoke detectors: To AS 7240.7 and AS 1603.2.

Integral heat detector/alarm units: To AS 1603.3.

Integral smoke detector/alarm units: To AS 3786.

Multi-sensor fire detectors: To AS 7240.15.

Multi-point aspirated smoke detectors: To AS 1603.8.

Optical beam smoke detectors: To AS 1603.7.

Remote indicators: To AS 1603.15.

Visual warning devices: To AS 1603.11.

Self-indicating detectors

General: Provide a light emitting diode mounted in a clearly visible position, which illuminates whenever detector operation causes an alarm condition to register on the FDCIE. Provide self-indicating devices which, if faulty, will not render the detector inoperative under fire conditions.

Mounting positions of light emitting diodes: Conform to the following:

- Visible detectors: On the outside of the detector or its base.
- Detectors concealed above ceilings: On the underside of the ceiling immediately below the detector.
- Detectors in other concealed spaces: On a visible panel close to the entry to the concealed space housing the detector.
- Remote indicators: To AS 1603.15.

Installation

General: Install detectors so they can be easily inspected and tested in situ, and readily withdrawn from service.

Integral smoke detector/alarm units: To AS 1670.6.

ANNEXURE 1 - DOOR HARDWARE SCHEDULE

PROJECT: **Penrith Regional Art Gallery**
88 River Road – Emu Plains

ARCHITECT: Alleanza Architecture (NSW)
Level 1, 695-699 George Street
Haymarket NSW 2000

JOB NUMBER: **NDM18048A**

DATE: 25-05-2018
CONSULTANT: Darren McGuire

All aspects of this Door Hardware Schedule should be checked and confirmed with all the current documentation available for this project by the hardware distributor prior to the ordering of any hardware.

- For pricing of this door hardware schedule, please contact your regular architectural hardware distributor or contact **dormakaba** for a list of distributors in your area. Alternatively, product and pricing assistance can be obtained through the following:

DORMA Branded products	info.au@dorma.com
KABA Branded Products	kabasales.au@dormakaba.com
Madinoz Branded Products	info.au@dorma.com

- Project pricing is valid for 12 months from the date of issue, and based on the product mix and volumes nominated being ordered in full. Dormakaba reserves the right to update and amend pricing outside of these conditions.

- Refer to door by door hardware schedule and bill of quantities for proprietary doors or products not allowed for in this specification.

- Door and frame details (including sizes) shown in this door hardware schedule are indicative only and only used as a guide to hardware requirements. All door and frame details should be confirmed from the Architect's most recent documentation.

- Master keyed cylinders are to be provided to match the clients' existing master key system. Final master key requirements are to be provided by the client at a later date. Cut key quantities and subsequent costs will need to be determined in conjunction with the relevant supplier.

- Temporary construction keyed cylinders are to be allowed for on all key lockable doors for the duration of the construction period. The hardware distributor should allow for 4 construction keys. The builder should liaise with the hardware distributor regarding the supply of non-standard construction cylinder. The builder should organise and allow for the cost of the change over from temporary construction cylinders to the final master keyed cylinders.

- All non **dormakaba** hardware specified in this door hardware schedule must be checked with the relevant manufacturer for suitability and availability by the hardware distributor prior to ordering of the hardware.

- The hardware distributor will need to confirm all handing of all products from the latest floor plans prior to the ordering of any hardware. This includes, but is not limited to, all handed locks, furniture, offset pivots, lift-off hinges, etc.

- Where surface mounted door closers have been scheduled they should generally be installed to the less visible side of the door. The door closers scheduled require a ***minimum nib room of 60mm*** when mounted to the pull side of the door.

- Where kickplates have been specified, the builder should organise and allow for the cost of providing final kickplate measurements to the hardware distributor prior to ordering.

- Where door seals have been specified, the hardware distributor will need to confirm the seal sizes and types are compatible with the actual door type, door widths and heights prior to ordering.

- Door Grilles have not been included in this door hardware schedule.

- Signage has not been included in this door hardware schedule.

Reference Documentation for this Door Hardware Schedule

- 17140 – A100 Revision A (14/05/2018) – Floor Plan
- 17140 – A400 Revision A (14/05/2018) – Door & Window Schedule

NDM18048A: Penrith Regional Art Gallery - Cafe Kitchen

Consultant: Darren McGuire

Project legend

Inventory Items

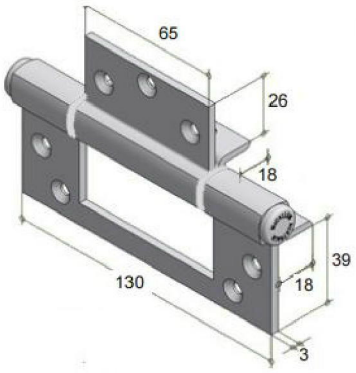
Code	Description	Brand	Finish
TCC-OVAL	Temp Construction 130 Cylinder	Other	
OVAL GMK	Grand Master Keyed Security Cylinder	N/A	SC
MS78SSS	MS Emergency Classroom Lock SSS	KABA	SSS
			
MS51SSS	MS Entrance Lock SSS	KABA	SSS
			
MS303	Mortice Lock Fabricator Kit Complete	KABA	SSS
6700/30 SSS	Noosa Lever on Ext Oval Plate - Cylinder Hole	DORMA	316SSS
			
6706/30 SSS	Noosa Lever on Int Oval Plate	DORMA	316SSS
6707/30R SSS	Noosa Lever on Int Oval Plate - Access Turn - RH	DORMA	316SSS

NDM18048A: Penrith Regional Art Gallery - Cafe Kitchen

Consultant: Darren McGuire

Project legend

Inventory Items

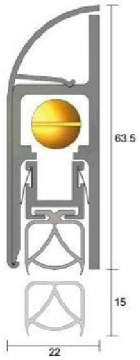
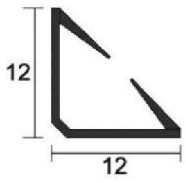
Code	Description	Brand	Finish
TS93G15GNAB SIL	EN1-5 Cam Action Slide Rail Door Closer & Angle Bracket	DORMA	Sil
			
2350 SNP	Wall Mounted Door Stop - 75mm	DORMA	SNP
			
DKH100/75BB SSS	100x75x2.5mm Ball Bearing Broad Butt Hinge	dormakaba	SSS
A104 SNA	Heavy Duty Aluminium Fast Fix Hinge	McCallum	SN
			
KP0920*0200*1.2MM SSS	Full Door Width Kickplate	N/A	SSS

NDM18048A: Penrith Regional Art Gallery - Cafe Kitchen

Consultant: Darren McGuire

Project legend

Inventory Items

Code	Description	Brand	Finish
SS092	CF Security Strike Shield - suits plate furniture	KABA	SSS
IS8091SI-0820 SA	Door Bottom Automatic Seal - 820mm	Kilargo	SA
			
IS1212-SDS BLK	Perimeter Batwing Door Seal - 2100mm Single Door Set	Kilargo	BLK
			

Inventory Finishes

Code	Description
316SSS	316SSS
BLK	Black
SA	Silver Anodised
SC	Satin Chrome
Sil	Silver
SN	Satin Natural
SNP	Satin Nickel Plate
SSS	Satin Stainless Steel

NDM18048A: Penrith Regional Art Gallery - Cafe Kitchen

Consultant: Darren McGuire

Project legend

Handings	
Code	**Description**
LH	Left Hand
RH%	Right Hand Open Out

Door Types	
Code	**Description**
40SC	40mm Solid Core Door
AFG	Aluminium Framed Glass

Frame Types	
Code	**Description**
AF	Aluminium Frame
SF	Steel Frame

NDM18048A: Penrith Regional Art Gallery - Cafe Kitchen

Consultant: Darren McGuire

Doors with hardware

Quote: NDM18048A.DHS (25-May-2018, Entering, Main Contract), Quantities as at variation

Door	Description	Handing	Dr type
D01	New Kitchen	Right Hand Open Out	40mm Solid Core Door

2040 x 820mm
Door width is not AS1428.1 compliant

Code	Quantity Product	Description	Brand	Finish
TCC-OVAL	1	Temp Construction 130 Cylinder	Other	
OVAL GMK	1	Grand Master Keyed Security Cylinder	N/A	SC
MS51SSS	1	MS Entrance Lock SSS	KABA	SSS
6700/30 SSS	1	Noosa Lever on Ext Oval Plate - Cylinder Hole	DORMA	316SSS
6707/30R SSS	1	Noosa Lever on Int Oval Plate - Access Turn - RH	DORMA	316SSS
TS93G15GNAB SIL	1	EN1-5 Cam Action Slide Rail Door Closer & Angle Bracket	DORMA	Sil
2350 SNP	1	Wall Mounted Door Stop - 75mm	DORMA	SNP
DKH100/75BB SSS	3	100x75x2.5mm Ball Bearing Broad Butt Hinge	dormakaba	SSS
KP0920*0200*1.2MM SSS	2	Full Door Width Kickplate	N/A	SSS
SS092	1	CF Security Strike Shield - suits plate furniture	KABA	SSS
IS8091SI-0820 SA	1	Door Bottom Automatic Seal - 820mm	Kilargo	SA
IS1212-SDS BLK	1	Perimeter Batwing Door Seal - 2100mm Single Door Set	Kilargo	BLK

Door	Description	Handing	Dr type
D02	Stores	Left Hand	Aluminium Framed Glass

2040 x 820mm
Lock stile to be approximately 114mm to suit specified hardware
Door width is not AS1428.1 compliant

Code	Quantity Product	Description	Brand	Finish
TCC-OVAL	1	Temp Construction 130 Cylinder	Other	
OVAL GMK	1	Grand Master Keyed Security Cylinder	N/A	SC
MS78SSS	1	MS Emergency Classroom Lock SSS	KABA	SSS
MS303	1	Mortice Lock Fabricator Kit Complete	KABA	SSS
6700/30 SSS	1	Noosa Lever on Ext Oval Plate - Cylinder Hole	DORMA	316SSS
6706/30 SSS	1	Noosa Lever on Int Oval Plate	DORMA	316SSS
2350 SNP	1	Wall Mounted Door Stop - 75mm	DORMA	SNP
A104 SNA	3	Heavy Duty Aluminium Fast Fix Hinge	McCallum	SN