



ARCHITECTURAL SPECIFICATIONS

for the construction of

GOODWOOD APARTMENTS

at

134-138 Goodwood Road GOODWOOD SA 5034

for

Prepared by

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Revision history			
Revision	Date	Status	Comment
T00	6/05/2019	Tender	

Revisions: Specification Work Sections bearing this note, show amendments (if any) throughout the Section in the following manner:

- Revisions are highlighted yellow in the Specifications and deletions are struck through.
- Adjustments of format, spelling, or punctuation are not identified, unless likely to affect the sense.
- The whole of the currently revised Section is reissued.

- The full scope and extent of revisions should be comprehended by comparison with previous editions.
- Signing of the Quality Record above to Approval for Construction Status is evidence that this been verified as conforming to the requirements of the Project Managers Plan.

END OF SECTION

0160 QUALITY

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T00	06/05/2019	Tender	

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1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide a project Quality Management System, as documented.

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- 0171 General requirements.

1.3 STANDARDS

General

Standard: To AS/NZS ISO 9001.

1.4 INTERPRETATION

Definitions

General: For the purposes of this worksection the definitions given in AS/NZS ISO 9000 and the following apply:

- Quality package: A designated part of the works, which may include the whole works, for which an individual quality system is required.
- Service: After sales' service, repairs, maintenance.

1.5 SUBMISSIONS

Quality Plan

Quality package: Submit a Quality Plan for each quality package, at least 10 working days before work on that package commences. Keep on site a copy of each approved quality plan.

Calculations

Statistical techniques: Provide the methodology for statistical evaluation.

Execution details

Requirement: Provide the procedure for sign-off and audit.

1.6 INSPECTION

Notice

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

- Refer to each work section specifications

2 PROJECT QUALITY MANAGEMENT SYSTEM REQUIREMENTS

2.1 DOCUMENTATION REQUIREMENTS

Quality plan

Standard: Conform to the recommendations of AS/NZS ISO 10005. Include inspection and test plans.

Documented procedures

Review: Provide evidence of revision(s) (including dates), approval and status of each procedure.

Register: Maintain a register of documented procedures including the title, identifier and revision status.

2.2 DESIGN AND DEVELOPMENT OF PRODUCTS AND SERVICES

General

Plan and control of product design and development: As documented in the **Design and development schedule**.

2.3 CONTROL OF EXTERNALLY PROVIDED PROCESSES, PRODUCTS AND SERVICES

General

External audits: Perform pre-tender surveys of subcontractors and suppliers and audit subcontractors and suppliers, as necessary by an approved auditor. Include audit and surveillance proposals in the quality package Quality Plan along with results of pre-tender surveys.

Verification: The contract administrator may verify at source, or upon receipt, that purchased product conforms to requirements.

2.4 PRODUCTION AND SERVICE PROVISION

Product identification and traceability

General: As documented in the **Product identification and traceability schedule**.

Identification: Identify by lot / number / barcode all items of work, samples and site records.

Traceability: Provide and maintain records of components for audit.

Service

General: As documented in the **Service schedule**.

3 MONITORING AND MEASUREMENT

3.1 DOCUMENT CONTROL

Changes to documents

Revision: Review and approve changes to documents using the same functions or organisations that performed the original review and approval of the documents, except as described in the **Document control schedule**.

Retention: As documented in the **Quality records retention schedule**.

Evaluation: Make quality records available to the contract administrator for evaluation, within 2 days of the initial request.

Period of evaluation: Agree for each request, but at least 5 working days.

3.2 INSPECTION AND TEST PLANS

Content

Plan: Include the following:

- Detail all inspections and tests required including Hold points.
- Identify acceptance criteria, sampling and testing and frequency of sampling/testing.
- Identify responsibilities for inspection and testing and product/service approval.

Control of non-conforming product

Acceptance of concession: Before the provision or repair of a non-conforming product, obtain permission to use the product.

Hold points

Stages: Hold points during the construction/manufacturing process require release by the contract administrator.

Release: Requirements for release of a Hold point may include the following:

- Provision of information required by the technical specifications.
- Certification of design/construction or installation.
- Submission of any checklists or non-conformance forms as required.
- Inspection/demonstration of works.

Frequency of testing

Schedule: Conform to the **Frequency of testing schedule** for test requirements specific to the appropriate worksection and the relevant standards.

3.3 AUDITING

General

Audit plan: Conform to the recommendations of AS/NZS ISO 19011 clauses 6.4 and 6.5.

Initial systems audit: Carry out before date of site possession.

Compliance audits frequency: To the auditor's requirements

Compliance activities: Compliance audits of particular activities will be carried out by the auditor at times to be agreed.

Testing services

Testing authority: Refer to each work section specifications

External audits

Nominated auditor: To be identified by the Superintendent / Project Manager

3.4 CORRECTIVE ACTION

General

Review: Provide procedure to review the various control methods to minimise non-conformance.
Record amendments to the project Quality Management System resulting from corrective action.

Non-conforming works: Include in the Quality Plan the procedure for reporting any non-conforming works to the contract administrator and any corrective action requests.

4 SELECTIONS

4.1 SCHEDULES

Project Quality Management System schedule

Quality package	Activities included	Standard	Options
The whole of the works	All	AS/NZS ISO 9001	

Quality records retention schedule

Quality package	Retention period	Location during retention period	Form for retention	Content of documents
The whole of the works	7 years from the Date of Final Completion	Superintendent's office	Digitised	Completed pro-formas evidencing compliance with the system, including audit reports.

END OF SECTION

0171 GENERAL REQUIREMENTS

Revision history (Revisions are highlighted yellow and deletions are struck through)			
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T00	06/05/2019	Tender	

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1 GENERAL

1.1 CONDITIONS OF TENDERING

General

Conditions of tendering should be read in conjunction with all of the issued tender documents including all referenced information mentioned therein.

Code of practice

Tendering procedure will be in accordance with the Australian Standard "Code of Tendering" AS 4120 – 1994, and the principles of Code of Practice for the Building and Construction Industry.

Contract details

Particular provisions applicable to the propose contract include:

- General conditions of contract: AS 2124
- Cost adjustment: The work is not subject to cost adjustment for labour and materials
- Separable parts: The work is not divided in to separate parts
- Contract period: The contract period as stated on the schedule of the Contract
- Liquidated damages: As stated on the schedule of the Contract

1.2 RESPONSIBILITIES

General

This specification provides General Requirements applicable to all architectural worksection specifications or elements of the Works and is prepared for the purposes of tender.

Noise levels: Install systems within the limits of the contract design and documented equipment performance and as documented in the **Noise level schedule**.

Performance

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

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

1.3 DESIGN

Location of the Site

Goodwood Apartments are situated at 136 Goodwood Road, GOODWOOD, SA, 5034.

Scope of Works

The Works to be carried out by the Contractor is for the construction of a new Three Level Apartment & Retail Building. The works covered by the architectural specifications, drawings, schedules, appendixes and supported documents prepared by consultant engineers, indicate the function, visual requirements, performance of the Superintendent which the Contractor must comply when undertaking and executing the work under the Contract.

Specific requirements are to construct a new Three Level Apartment & Retail Building, which:

- Is weatherproof and watertight
- Is complete in terms of function

- Is complete in terms of finish and trim
- Complies with all statutory and Local Authority requirements and conditions.
- Complies with applicable standards and statutory regulations
- Is constructed and finished to the standards implicit in the Documents notwithstanding that not all items in work under the Contract may be drawn, specified or detailed.
- The exterior treatment of the building(s) including all exterior decoration, materials, finishes and colours must be to the satisfaction of the Responsible Authority. Refer to Planning Permit Conditions of Planning Application No. 090/732/2018/C2, approved by the City of Unley.

Design by contractor: If the contractor provides design, use only appropriately qualified persons and conform to all statutory requirements.

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

Existing services

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

Exclusion

This specification does NOT cover the work of the following elements of the building which are documented by the following Consultants:

- **Structure: STRUCTURAL CONSULTANT**
- **Civil: CIVIL CONSULTANT**
- **Services: SERVICES CONSULTANT (Electrical, Communication, Hydraulic, Mechanical, Fire)**
- **Landscape: LANDSCAPE CONSULTANT**

1.4 PRECEDENCE

General

Order of precedence:

- 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.

Statutory requirements

If it is detected that a conflict may exist between statutory requirements and the documents, NOTIFY immediately and provide a proposal for resolution of the conflict.

Services specifications

The General Requirements sections of Services specifications, if any are included, take precedence over this specification in any matter where they both discuss the same subject with respect to their application to the work covered by that Services specification.

1.5 CROSS REFERENCES

General

Requirement: Conform to the following worksection(s):

- *0160 Quality*
- *0181 Adhesives, sealants and fasteners.*
- *0182 Fire-stopping.*
- *0183 Metals and prefinishes.*
- *0184 Termite management.*
- *0185 Timber products, finishes and treatment.*
- *0193 Building access safety systems*

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.

1.6 REFERENCED DOCUMENTS

Contractual relationships

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

Current editions

General: 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, such as the applicable version of the NCC/BCA.

Where a more recent version has been clearly identified by reference in the Specifications or other Contractual document.

Obsolete documents: Documents deemed "Obsolete" by their publishers shall be deemed the current editions as at their last date of publication.

1.7 DESIGN REQUIREMENTS REPORTS

References

Design requirements reports included in the contract documents include but are not necessarily limited to following reports:

- Building Quality Standards Handbook – May 2018, Published by the Victorian School Building Authority
- Planning Permit Conditions of Planning Application No. WYP10338/17, approved by the Wyndham City Council.
- Waste management plan prepared by Impact
- BCA Preliminary Assessment prepared by MBS
- Feature & Level Survey prepared by Bosco Jonson Pty Ltd

Versions: VERIFY and use the latest current version of each Report.

1.8 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.
- 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.
- Approved/Approval: The words "approved/approval" "directed" "endorsed" mean approved in writing from the Project Manager or Authorities concerned.
- 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.
- Concrete Plinth: "Concrete Plinth" also means concrete bunds, concrete hobs.
- 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: 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.
- Hold point: The activity cannot proceed without the approval of the Contract Administrator.
- 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.
- Make good: "Make good" work shall match existing adjacent construction in both construction and appearance, including substrate, materials, finishes, profiles and colours. Where not practicable to blend in seamlessly, the junction between new and existing shall be along a neat, even and consistent line (e.g. saw cut).
- 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 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.
- Reinstatement: The words "reinstate" "reposition" mean reinstate building materials/elements, substrate, surfaces and finishes to a condition compatible with original state (or replacement with new if it is beyond reinstatement) which have been removed as a result of the execution of the Works. All to the approval of the Project Manager or Construction Manager.
- 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.
- Superintendent: 'Superintendent' has the same meaning as 'Contract Administrator' or 'architect' and is the person appointed by the 'owner' or 'principal' under the contract.
- 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.

1.9 CONTRACT DOCUMENTS

Services diagrammatic layouts

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

Before commencing work:

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

Levels

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

Drawings and manuals for existing services

Subsurface services: Information shown on the drawings relating to underground or submerged services is accurate to the following quality level:

- Quality level to AS 5488: Level A

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

1.10 SUBMISSIONS

Requirement

General: Submit the following::

- Authority approvals: Notes of meetings with authorities whose requirements apply to the work and evidence that notices, fees and permits have been sought and paid, that authority connections are complete and that statutory approvals by the authorities whose requirements apply to the work have been received.
- Building penetrations: Details of the methods to maintain the required structural, fire and other properties to **EXECUTION, BUILDING PENETRATIONS**.
- Certification: Certification of conformance to documented requirements, including certification that the plant and equipment submitted meets all requirements of the contract documents and that each installation is operating correctly.
- Design documentation: Design data and certification of proposed work, if required and as documented.
- Electronic facility and asset management information: For the whole of the work to **EXECUTION, ELECTRONIC FACILITY AND ASSET MANAGEMENT INFORMATION**.
- Execution details: Execution programs, schedules and details of proposed methods and equipment. For building services include the following:

- . Embedded services: Proposed method for embedding services in concrete walls or floors or chasing into concrete or masonry walls.
- . Fixing of services: Typical details of locations, types and methods of fixing services to the building structure.
- . Inaccessible services: If services will be enclosed and not accessible after completion, submit proposals for location of service runs and fittings.
- Fire performance: Evidence of conformity to requirement for combustibility, fire hazard properties and fire-resistance of building elements
- Marking and labelling: Samples and schedules of proposed marking and labels to **EXECUTION, MARKING AND LABELLING**.
- Operation and maintenance manuals: For the whole of the work to **EXECUTION, OPERATION AND MAINTENANCE MANUALS**.
- Products: Products and materials data, including manufacturer's technical specifications and drawing, evidence of conformance to product certification schemes, performance and rating tables and installation and maintenance recommendations.
- Prototypes: Prototypes of components, systems or elements.
- Records: As-built documents, photographs, system diagrams, schedules and logbooks to **EXECUTION, RECORD DRAWINGS**.
- Samples: Representative of proposed products and materials and including proposals to incorporate samples into the works, if any to **EXECUTION, SAMPLES**.
- Shop drawings: To **EXECUTION, SHOP DRAWINGS**.
- Substitutions: To **PRODUCTS, GENERAL, Substitutions**.
- Tests:
 - . Inspection and testing plan consistent with the construction program including details of test stages and procedures.
 - . Test reports for testing performed under the contract.
- Warranties: To **EXECUTION, WARRANTIES**.

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

Submission times

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

Submission response times: Allow not less than the DEFAULT TIMING in the construction program for response to the following:

- Shop drawings
- Samples and prototypes
- Manufacturers' or suppliers' recommendations
- Product data
- Product/design substitution or modification

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: Generally PDF format

Quantity: As requested by the Project Manager or Architect

Transmission medium: Secure electronic data interchange, USB

Where requested: CAD format as requested (suitable DWG and IFC versions)

Where permitted: DXF or other accepted file formats

Hard copy submissions

Hard copy quantity: As requested by the Project Manager or Architect

Standard contract drawing size: As requested by the Project Manager or Architect

1.11 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.

Product identification

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

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

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

Sources policy

General: preference for Australian or New Zealand goods.

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.
- Use of Polyethylene core aluminium composite panels.
- Combustible or Non-combustible Materials / Products failed when tested to AS 1530.1:1994 (R2016) - Methods for fire tests on building materials, components and structures combustibility test for materials and AS 5113:2016 - Fire propagation testing and classification of external walls of buildings.

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.

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).

Bushfire resistance

Bushfire Attack Level (BAL) to AS 3959

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.

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

Unincorporated samples: Remove on completion.

Mock-Ups

Provide full-sized mock-ups for inspection by the Superintendent. Mock-ups are used to assist in the final selection of elements and details and shall be constructed to confirm the general visual intent including: colours, joint widths and configuration, materials selections, sections, services configurations, coordination and the like..

Mock-ups may be built up from various materials and sections, but in all cases the finished product shall represent the actual finished dimensions of the proposed design.

Mock-ups shall be prepared prior to the erection of the building at a suitable location.

Prototypes

Prior to manufacture of elements of work, construct off Site (or on Site if specifically requested by the Superintendent) full scale three-dimensional prototype sections where described in the Specification(s) or shown on the Drawings using final specified materials but not necessarily final production techniques.

Prototypes shall consist of all elements and details in their finished state including: colours, joint widths and configuration, materials selections, sections, services configurations and the like.

A Prototype is a not a Mock-up.

Prototypes may be incorporated into the final works, if so placed and agreed by the Superintendent.

Any final adjustments to a Prototypes must be built into that prototype before final approval is given.

Once all elements of a Prototype have been inspected and approved by the Superintendent this will form the benchmark the work represented by the Prototype.

All subsequent installations shall conform to this benchmark.

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.

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

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

Building work drawings for building services: On dimensioned drawings show all:

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

Checking: Make sure that the drawings have been checked before submission.

Timing: Submit and obtain review response prior to fabrication of the relevant work. Consultant to have the following period in which to return comments on Shop Drawings from time of receipt.

- Period: 5 working days minimum, for each review.

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.
- Sealing: Seal between pipes or conduits and sleeves to prevent the entry of vermin.
- 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 shown on drawings and under all equipment located on concrete floor slabs as follows:

- Height: 75 mm or greater or unless otherwise noted on drawings.
- 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: P3 Slip resistance classification to AS 4586, Appendix A - table 2 .

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 mm 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.

Standard

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

Speeds

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

Connections

General: Provide flexible connections to rotating machinery and assemblies containing rotating machinery. Isolate pipes by incorporating sufficient flexibility into the pipework or by use of proprietary flexible pipe connections installed so that no stress is placed on pipes due to end reaction.

Inertia bases

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

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

Vibration isolation mountings

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

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

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

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

Spring mountings: Provide freestanding laterally stable springs as follows:

- Clearances: ≥ 12 mm between springs and other members such as bolts and housing.
- High frequency isolation: 5 mm neoprene acoustic isolation pads between baseplate and support.
- Levelling: Provide bolts and lock nuts.
- Minimum travel to solid: ≥ 150% of the designated minimum static deflection.
- Ratio of mean coil diameter to compressed length at the designated minimum static deflection: ≥ 0.8:1.
- Snubbing: Snub the springs to prevent bounce at start-up.
- Vertical resilient limit stops: To prevent spring extension when unloaded, to serve as blocking during erection and which remain out of contact during normal operation.

3.15 SEISMIC RESTRAINT OF NON-STRUCTURAL COMPONENTS

General

Requirement: Seismic restraint to AS 1170.4: Securely fix all plant and equipment to the building structure. Do not rely on gravity and/or friction to resist seismic forces.

Earthquake design category: Structures must be designed to resist seismic forces

3.16 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.

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

Painting systems

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

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

Paint application

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

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

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

Underground metal piping

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.

Aggressive soils : If metallic piping or components are installed in chemically aggressive soil, provide the following in addition to the corrosion protection above:

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

Low VOC emitting paints

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

Repairs to finishes

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

3.17 MARKING AND LABELLING

General

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

- Locations exposed to weather: Provide durable materials.
- Pipes, conduits and ducts: To AS 1345 throughout its length, including in concealed spaces.

- Cables: Label to indicate the origin and destination of the cable.

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

Label samples and schedules

Submission timing: Before marking or labelling.

Schedule: For each item or type of item include the following:

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

Electrical accessories

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

Operable devices

Requirement: Mark to identify the following:

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

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.

Points lists

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

Pressure vessels

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

Valves and pumps

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

Underground services

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

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

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

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

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

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

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

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

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

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

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

Labels and notices

Materials: Select from the following:

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

Emergency functions: To AS 1319.

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

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

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

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

Lettering heights:

- Danger, warning and caution notices: Minimum 10 mm for main heading, minimum 5 mm for remainder.
- Equipment labels within cabinets: Minimum 3.5 mm.
- Equipment nameplates: Minimum 40 mm.
- Identifying labels on outside of cabinets: Minimum 5 mm.
- Isolating switches: Minimum 5 mm.
- Switchboards, main assembly designation: Minimum 25 mm.
- Switchboards, outgoing functional units: Minimum 8 mm.
- Switchboards, sub assembly designations: Minimum 15 mm.
- Valves: Minimum 20 mm.
- Self-adhesive flexible plastic labels:
 - . Labels less than 2000 mm above floor: 3 mm on 6 mm wide tape.
 - . Labels minimum 2000 mm above floor: 8 mm on 12 mm wide tape.
 - . Other locations: Minimum 3 mm.

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

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

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

Vapour barriers: Do not penetrate vapour barriers.

3.18 SOFTWARE

General

Requirement: Provide the software required for the operation and management of building services systems and equipment.

3.19 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.

3.20 TACTICAL FIRE DRAWINGS

General

Requirement: Supply sets of colour coded tactical fire drawings, showing all items and systems relevant in a fire.

Scale: 1:200 or larger if necessary to be easily read under emergency conditions.

Location: Provide one set of the laminated drawings fixed to the wall or supplied in a vertical plan hanger in the area as directed by the Fire Authority .

Loose set: Provide a second set of identical drawings.

Operation and maintenance manuals: Provide a set of colour coded tactical fire drawings in each copy of the operating and maintenance manual.

Coordination

Requirement: Agree the format, colour coding and contents of the tactical fire plans with the Local Fire Authority before beginning documentation

3.21 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:

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

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

- Controls.
- Piping including all valves and valve identification tags.
- Principal items of equipment.
- Single line wiring diagrams.
- Acoustic and thermal insulation.
- Access provisions and space allowances.
- 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.

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

Subsurface services recording quality level: A

3.22 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.

3.23 ELECTRONIC FACILITY AND ASSET MANAGEMENT INFORMATION

Data

Submission of the following:

Facility and asset data

Data exchange schema

Software compatibility requirements

File format

3.24 TOOLS AND SPARE PARTS

Spare parts

General: Provide spare parts listed in the appropriate worksections.

Replacement: Replace spare parts used during the maintenance period.

Tools and spare parts schedule

Submission timing: At least 8 weeks before the date for practical completion.

Requirement: Prepare a schedule of tools, portable instruments and spare parts necessary for maintenance of the installation. For each item state the recommended quantity and the manufacturer's current price. Include the following in the prices:

- Checking receipt, marking and numbering in conformance with the spare parts schedule.
- Packaging and delivery to site.
- Painting, greasing and packing to prevent deterioration during storage.

- Referencing equipment schedules in the operation and maintenance manuals.
- Suitable means of identifying, storing and securing the tools and instruments. Include instructions for use.

Replacement: Replace spare parts used during the maintenance period.

3.25 TESTING

Attendance

General: Provide attendance on tests.

Testing authorities

General: Except for site tests, have tests carried out by a Registered testing authority.

Test instruments: Use instruments calibrated by a Registered testing authority.

Test reports

General: Indicate observations and results of tests and conformance or non-conformance with requirements.

Notice

Inspection: Give sufficient notice for inspection to be made of the commissioning and completion testing of the installation.

Controls

General: Calibrate, set and adjust control instruments, control systems and safety controls.

Circuit protection

General: Confirm that circuit protective devices are sized and adjusted to protect installed circuits.

Completion tests

General: Test the works under the contract to demonstrate conformance with the documented performance requirements of the installation.

Functional checks: Carry out functional and operational checks on energised equipment and circuits and make final adjustments for the correct operation of safety devices and control functions.

Type test reports: Required, as evidence of conformance of proprietary equipment.

Sound pressure level measurements: Conform to the following:

- Correction for background noise: To AS/NZS 2107 Table B1.
- External: To AS 1055.1.
- Internal: To AS/NZS 2107.
- Measurement positions: If a test position is designated only by reference to a room or space, do not take measurements less than 1 m from the floor, ground or walls.
- Sound pressure level analysis: Measure the sound pressure level and the background sound pressure level over the full range of octave band centre frequencies from 31.5 Hz to 8 kHz at the designated positions.
- Sound pressure levels: Measure the A-weighted sound pressure levels and the A-weighted background sound pressure levels at the designated positions.

Fire system test - hot smoke

Requirement: Before Practical completion conduct a hot smoke test.

Notice: Give notice of the test.

Systems: Test the following:

- Fire alarm system.
- Emergency warning system.
- Fire sprinkler system.
- Hydrant system.
- Access control system
- Security system.
- Mechanical services systems
- Building management systems.

Restoration: Demonstrate that the systems return to normal operation after the tests.

Report: Submit a report detailing the tests and results.

Fire system test - integrated fire modes

Requirement: Before Practical completion conduct tests to verify that the independent fire systems operate together in integrated manner.

Notice: Give notice of the test.

Systems: Test the following:

- Fire alarm system.
- Emergency warning system.
- Fire sprinkler system.
- Hydrant system.
- Access control system
- Security system.
- Mechanical services systems
- Building management systems.

Restoration: Demonstrate that the systems return to normal operation after the tests.

Report: Submit a report detailing the tests and results.

Certification

General: On satisfactory completion of the installation and before the date of practical completion, certify that each installation is operating correctly.

3.26 TRAINING

General

Duration: Instruction to be available for the whole of the commissioning and running-in periods.

Format: Conduct training at agreed times, at system or equipment location. Also provide seminar instruction to cover all major components.

Operation and maintenance manuals: Use items and procedures listed in the final draft operation and maintenance manuals as the basis for instruction. Review contents in detail with the principal's staff.

Certification: Provide written certification of attendance and participation in training for each attendee. Provide register of certificates issued.

Demonstrators

General: Use only qualified manufacturer's representatives who are knowledgeable about the installations.

Maintenance

General: Explain and demonstrate to the principal's staff the purpose, function and maintenance of the installations.

Operation

General: Explain and demonstrate to the principal's staff the purpose, function and operation of the installations.

Seasonal operation

General: For equipment requiring seasonal operation, demonstrate during the appropriate season and within 6 months.

3.27 CLEANING

Final cleaning

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

Labels: Remove all labels not required for maintenance.

3.28 PERIODIC MAINTENANCE OF SERVICES

General

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

Emergencies: Attend emergency calls promptly.

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

Maintenance period: The greater of the defects liability period and the period documented in the **Maintenance requirements schedule**.

Maintenance program

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

Maintenance records

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

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

Certificates: Include test and approval certificates.

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

Site control

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

3.29 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.

4 SELECTIONS

4.1 SCHEDULES

Noise level schedule

Property	
Upper limit of noise caused by services	Refer to the Acoustic Report

Warranty schedule

Warranty	Worksections	Period
ADHESIVES, SEALANTS AND FASTENERS	0181	10 Years
METALS AND PREFINISHES	0183	7 Years
TERMITE MANAGEMENT	0184	Installer to confirm – min.1 Year
BUILDING ACCESS SAFETY SYSTEMS	0193	10 Years
PAVING	0275	10 Years
CONCRETE FINISHES	0315	15 Years
ROOFING - PROFILED SHEET METAL	0423	20 Years
CLADDING	0431	20 Years
WINDOWS AND GLAZED DOORS	0451	7 Years
DOORS AND ACCESS PANELS	0453	5 Years
GLAZING	0461	10 Years
LININGS	0511	5 Years

Warranty	Worksections	Period
SUSPENDED CEILINGS	0531	10 Years
JOINERY	0551	5 Years
IDENTIFICATION SIGNAGE	0581	10 Years
CEMENTITIOUS TOPPINGS	0612	15 Years
WATERPROOFING - WET AREAS	0621	10 Years
CERAMIC TILING	0631	5 Years
CARPETS	0652	7 Years
PAINTING (including anti-graffiti coating protection)	0671	7 Years
POWDER COATINGS	0673	20 Years

Notices schedule

Item	Minimum notice
On-site tests 2 working days	On-site tests 2 working days
Off-site tests 3 working days	Off-site tests 3 working days

4.2 MAINTENANCE

General

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

Emergencies: Attend emergency calls promptly.

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

Maintenance program

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

END OF SECTION

0181 ADHESIVES, SEALANTS AND FASTENERS

Revision history (Revisions are highlighted yellow and deletions are struck through)			
Revision	Date	Status	Comment
T00	06/05/2019	Tender	

1	General	1
1.1	Responsibilities	1
1.2	Precedence	2
1.3	Cross references	2
1.4	Submissions	2
1.5	Inspection	2
1.6	Certification of sealant installation in rated construction	3
2	Products	3
2.1	Adhesives	3
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3	Execution.....	6
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3.3	Sealant to joints in sound rated elements	7
3.4	Flooring adhesives	7
3.5	Testing	8
3.6	Fasteners.....	8
4	Selections.....	8
4.1	Adhesives	8
4.2	Anchors.....	9
4.3	Sealing, pointing and bedding	9
4.4	Sealing structurally designed control joints	9
4.5	Fire-resisting sealants	9

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide adhesives and sealants with fasteners, appropriate to their location, and in such locations so as to ensure the performance of the elements being attached and as required for the completion of the works. The fixings shall be suitable and used solely for the purposes intended by the manufacturer in order to satisfy the requirements of the Specification.

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:

- *0160 Quality*
- *0171 General requirements.*
- *0182 Fire-Stopping*
- *0183 Metal and Prefinishes*
- *0431 Cladding*
- *0451 Windows and Glazed Doors*
- *0457 External Screens and Louvres*
- *0511 Lining*
- *0531 Suspended Ceilings*
- *0551 Joinery*
- *0621 Waterproofing - wet areas*
- *0631 Ceramic tiling*
- *0652 Carpets*
- *Sustainability Management Report*

1.4 SUBMISSIONS

Samples

Visible joint sealants: Submit colour samples.

Products and materials

Sealants: Submit technical data sheets.

Tests

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

Warranties

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

1.5 INSPECTION

Notice

Inspection: Give notice so that inspection may be made of prepared joints and penetrations for each sealant application.

1.6 CERTIFICATION OF SEALANT INSTALLATION IN RATED CONSTRUCTION

Requirement

Provide certification that joints in rated construction have been sealed to match the required:

- Sound ratings (Rw)
- Fire ratings (FRL)

Extent: All joints and for each type of joint.

Progressive: Provide progressive certification if so required

2 PRODUCTS

2.1 ADHESIVES

Total VOC limits

Requirement: Conform to the following:

- Refer to Sustainability Management Plan Report.
- Low VOC compliance with Green Star Design & As Built v3: submit Material Data Sheets and certification on completion.
- Use products recognised by Green Building Council of Australia.

Adhesives: VOC content of Adhesives used in the works shall meet the following criteria.

Total VOC limits

Product Type	Maximum VOC content (grams per litre)
Indoor Carpet Adhesive	50
Carpet Pad Adhesives	50
Outdoor Carpet Adhesive	150
Wood Flooring Adhesive	100
Laminate Adhesive	100
Rubber Flooring Adhesive	60
Subfloor Adhesive	50
Ceramic Tile Adhesive	65
Cove Base Adhesive	50
Dry Wall and Panel Adhesive	50
Top and Trim Adhesive	250
Multipurpose Construction Adhesive	70
Structural Glazing Adhesive	100
Fire Retardant Adhesive	250

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.

Total VOC limits

Requirement: Conform to the following:

- Refer to Sustainability Management Plan Report.
- VOC content for architectural sealants shall not exceed 250 g/l.
- Low VOC compliance with Green Star Design & As Built v3: submit Material Data Sheets and certification on completion.
- Use products recognised by Green Building Council of Australia.

2.3 FASTENERS

General

Masonry anchors: To the manufacturer's recommendations.

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 SEALANT TO JOINTS IN SOUND RATED ELEMENTS

References

Locations: Wherever installations are required to be sound rated, provide sealant to all perimeters, penetrations, interruptions and the like to match and achieve the required ratings.

Ratings

Selection: Select sealant materials, joint design and installation to achieve the performance requirement applicable to each element.

Sound rated joint sealant

Proprietary item: Bostik Fireban One, one part fire rated polyurethane sealant.

- www.bostik.com.au
- VOC emissions: 64 g/Lt.
- Proprietary item: Gyprock Fire Mastic by CSR Gyprock
- www.gyprock.com.au
- VOC emissions: 42 g/Lt.
- Data sheet ref: GYP046

Colour: White or grey, unless otherwise specified.

Installation

Install in accordance with manufacturer's published instructions.

3.4 FLOORING ADHESIVES

Description

Standard: To AS/NZS 2455.1.

Selection: Select adhesives for suitability to the flooring product and application location in accordance with the adhesive manufacturer's published recommendations.

Adhesives shall be:

- Acrylic and water based
- Odourless
- Release only acceptable low levels of Volatile Organic Compounds (VOC) or other adverse emissions
- Compatible with the floor covering material, and suitable for bonding it to the subfloor.

3.5 TESTING

Installed sealant tests

Sampling: For each sealant test, take 3 samples of installed and cured sealant, each at least 50 mm long, from completed joints.

Reinstatement: Repair-as-new the joints from which the samples were taken.

3.6 FASTENERS

General

Requirement: Install to the manufacturer's recommendations.

Fastening to wood and steel

Timber substrates: To AS 1720.1 Section 4.

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

Masonry anchors

Installation: To the manufacturer's recommendations.

4 SELECTIONS

4.1 ADHESIVES

Application schedule

Application	Product	Relevant worksections
Adhesive fixed timber strip flooring and parquetry systems	Bostik Ultraset SF Bostik Ultraset HP Bostik Ultraset Greenforce Bostik Ultraset Singlestep2	0655 Timber flooring
Colourback glass faced wall panels or splashbacks	Bostik Xtreme High Tack Bostik V60	0551 Joinery, 0641 Applied wall finishes
Drywall lining/wall panels	Bostik UltraGrip Bostik Xtreme High Tack	0511 Lining, 0522 Partitions – framed and lined
Engineered panel floors	Bostik Ultraset DX Bostik Ultraset S Bostik Ultraset SF Bostik Ultraset HP Bostik Ultraset Greenforce Bostik Ultraset Singlestep2	0654 Engineered panel flooring
Joinery doors		0453 Doors and access panels
Mirrors	Bostik V60 Bostik Xtreme High Tack	0467 Glass components
Stainless steel faced wall panels or splashbacks	Bostik V60	0551 Joinery, 0553 Stainless steel benching
Timber joinery fitments	Bostik Xtreme High Tack	0551 Joinery

4.2 ANCHORS

General

Select all anchors for suitability to the materials, application and exposure conditions as part of general construction requirements and completion of the Work.

4.3 SEALING, POINTING AND BEDDING

Application schedule

Application	Product	Relevant worksections
Metal flashings and rainwater goods	Bostik Roof & Gutter Bostik Xtreme Flex	0429 Rainwater Goods
Metal flashings and sealing non-porous substrates	Bostik 5CLM Bostik Xtreme Flex	0431 Cladding – combined
Window and external doors	Bostik V60 Bostik Xtreme Flex	0451 Windows and glazed doors, 0453 Doors and access panels
Mechanical services	Bostik Fireban One Bostik Firecaulk Bostik Xtreme Fire Seal	Refer to Mechanical Engineer's Documents
Hydraulic services	Bostik 6S	Refer to Hydraulic Engineer's Documents

4.4 SEALING STRUCTURALLY DESIGNED CONTROL JOINTS

Application schedule

Application	Sealant type	Sealant colour	Relevant worksection
Internal masonry control joints	Bostik Seal N Flex 1 Bostik Seal N Flex FC	12 colours available Black/Grey/White	0321 Precast concrete, 0334 Block construction
External masonry control joints	Bostik Seal N Flex 1 Bostik Seal N Flex FC	12 colours available Black/Grey/White	0321 Precast concrete, 0334 Block construction
Trafficable masonry control joints	Bostik 5CLM Bostik Seal N Flex FC Bostik Seal N Flex 1	White/Charcoal/Grey/Beige Black/Grey/White 12 colours available	0275 Paving – mortar and adhesive bed

4.5 FIRE-RESISTING SEALANTS

Application schedule

Application	Sealant	Sealant colour	Fire-resistance level to AS 1530.4 (FRL)	Relevant worksection
Masonry control joints	Bostik Fireban One Bostik Xtreme Fire Seal	Limestone White	Up to -/240/240	0321 Precast concrete, 0334 Block construction
Internal pointing and stopping (including acoustic applications)	Bostik Firecaulk		Up to -/240/240	0182 Fire-stopping, 0472 Acoustic insulation

END OF SECTION

0182 FIRE-STOPPING

Revision history (Revisions are highlighted yellow and deletions are struck through)			
Revision	Date	Status	Comment
T00	06/05/2019	Tender	

1	General	1
1.1	Cross references	1
1.2	Precedence.....	1
1.3	Standards	1
1.4	Submissions	2
1.5	Prototype	2
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1.7	Inspection	3
1.8	Fire stopping design	3
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2	Products	3
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3	Execution.....	5
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1 GENERAL

1.1 CROSS REFERENCES

General

Requirement: Conform to the following:

- 0160 Quality
- 0171 General requirements.
- BCA compliance report

1.2 PRECEDENCE

General

Order of precedence:

- 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.

1.3 STANDARDS

General

Fire Resistance: To BCA Section C1 – Table C1.1 – Type A Construction.

Control joint fire-stopping systems: To AS 4072.1.

1.4 SUBMISSIONS

Certification

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

Provide certification that joints in fire rated construction have been sealed to match the respective fire ratings.

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

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

Certifier: Certification shall be by the following, jointly if more than one:

- Fire sealing installer
- Fire sealant manufacturer
- Fire sealant supplier

Progressive: Provide progressive certification if so required

Execution details

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

Operation and maintenance manuals

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

Products and materials

General: If fire-stopping is documented without reference to brand, submit the following:

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

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

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

Low VOC fire-rated sealants

General: Low VOC compliance with Green Star Office Design v3: submit Material Data Sheets

Notice

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

Samples

Sample panels: Supply a sample panel of each fire-stopping assembly, on representative substrates. If built into the works, identify by marking it as a control sample.

Size: 500 mm run for junction seals and 500 x 500 mm area for penetration seals.

Subcontractors

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

1.5 PROTOTYPE

General

Locate the first of each type of Fire-stopping in an agreed location, treat as a Prototype and schedule as such in the project Quality Assurance plan.

On completion of each Prototype, give Notice so that an inspection/review may be undertaken.

When approved, the prototype may be incorporated into the works. Otherwise remove all traces.

1.6 TESTING

Provide full test documentation to prove that the work under the Contract complies with the specified performance requirements together with a written statement of compliance to each aspect with cross reference to specific test data.

Provide full test reports from an independent accredited NATA certified testing laboratory demonstrating that the proposed fire stopping systems have been tested using an

appropriate testing prototype and that the systems will provide an FRL (fire resistance level) equal to the element within which they are being installed.

1.7 INSPECTION

Notice

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

- Service penetrations completed and ready for fire-stopping.
- Finished fire-stopping, before being concealed.

1.8 FIRE STOPPING DESIGN

Requirement

Fire ratings of construction are noted on the drawings and wall types schedule. If not so noted, FRLs shall be not less than that required by the NCC/BCA for each element of the building and/or as required by the Fire Engineer.

The fire stopping design shown on the drawings, if any, is indicative.

Complete the design of the fire stopping of the work to ensure that it meets the fire ratings.

Provide certification that the proposed fire stopping design meets the performance criteria.

1.9 FIRE SEALING OF PENETRATIONS AND JOINTS

Requirement

All penetrations and joints in Elements required to be Fire Rated by the NCC/BCA shall be protected in accordance with so as to maintain the integrity of the construction in conformance with the NCC/BCA, including compliance with the following:

- NCC/BCA and the Standards referenced therein:
 - BCA Clause C3.15,
 - BCA Specification C3.15
- Standards
 - AS 4072.1
 - AS 1530.4
 - AS/NZS 1668.1

These shall include but not be limited to the following:

- Fire collars to pipe penetrations through fire rated elements
- Fire sealants to joints and gaps in fire rated elements such as those for movement joints or construction joints.
- Back filling oversized penetrations with materials as required to match the fire rated performance of the building element, such as concrete backfilling of oversized slab penetrations.

Fire sealing materials and devices shall be selected and installed in accordance with the manufacturer's instruction for achieving the required protection.

Provide Certification that installed materials and devices do so comply

2 PRODUCTS

2.1 MATERIALS

General

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

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

Toxicity in fire: Non-toxic.

Fire-stop mortars

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

Insoluble in water, after setting.

Formulated compound of incombustible fibres

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

Fibre stuffing

Not for joints. Alkaline water contamination of the backer or filler materials may cause corrosion of metallic penetrating items.

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

Standard: AS/NZS 4859.1 Section 8.

Mineral wool insulation.

Sealant: Lightweight, low density, PVC based, non-asbestos setting compound formulated to mix easily with water.

Intumescent fire pillows

Product: Approved equivalent to PAS -12 Pyropanel

Fire-stop composite sheets

Product: Approved equivalent to 3M™ Fire Barrier Composite Sheet CS-195+

Fire-stop sealants

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

Fire-stop foams

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

Fire-stop putty

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

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

Product certification

Certification scheme: Fully certified in accordance with Australian Standards AS1530.4 and AS4072.1 and approved equivalent to ActivFire Scheme

Conformance: Address the following:

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

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

2.2 COMPONENTS

Fire-stop collars

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

Fire-stop pillows

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

Accessories

Primer: As recommended by the manufacturer to conform with the certified fire test.

Permanent dam material: Non-combustible.

Permanent dam material type: Non-combustible

Metal lath: As recommended by the manufacturer to conform with the certified fire test

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

Product certification

Certification scheme: : Fully certified in accordance with Australian Standards AS1530.4 and AS4072.1 and approved equivalent to ActivFire Scheme.

3 EXECUTION

3.1 INSTALLATION

General

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

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

Installer qualifications: Experienced (minimum 5 years documented) in the installation of fire-stopping that is similar in material, design, and extent to that specified. 'Contractor's certification that the installer has the specified experience may also be required, as might evidence of the manufacturers' approval, licensing and supervision of the installer(s).

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

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

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

Cable separation: Maintain cable separation.

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

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

Penetrations by pipes and ducts: Allow for thermal movement of the pipes and ducts. Service pipes, ducts and cable trays shall be sealed all round where they pass through floors and walls, with an accepted material made for the purpose and tested. The space shall be completely filled leaving no gaps. Finish neatly. The manufacturer shall provide certification of suitability of all materials used.

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

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

Environmental management: Intumescent, fire-stop mortar and fire-stop silicone require special handling - refer to material safety data sheets for OH&S

Ambient conditions: Consult manufacturer's data. Generally do not apply materials when temperature of substrate material and ambient air is below 5°C. Cold-temperature products are available.

Large openings: Provide fire-stopping capable of supporting the same loads as the surrounding element or provide similar structural support around the opening.

Preparation

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

Primer: Clean and dry substrates for primers and sealants.

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

3.2 SYSTEMS

Fire-stop mortars

Ambient conditions: Do not install below 5°C.

Formulated compound of incombustible fibres

Installation: Adapt manufacturer's instructions to project requirements to completely close openings

Fibre stuffing

Installation: Compress to 40% of its uncompressed volume.

Fire-stop composite sheets

Installation: Strictly in accordance with the successful fire test for the particular required Fire Resistance Level.

Fire-stop sealants

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

Fire-stop foams

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

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

Fire-stop putty

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

Installation: Adapt manufacturer's instructions to project requirements to completely close openings

Fire-stop collars

Installation: Adapt manufacturer's instructions to project requirements to completely close openings.

Fire-stop pillows

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

Labelling

Standard: To the recommendations of AS 4072.1 Appendix B.

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

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

3.3 COMPLETION

Certification

General: Submit evidence of compliance, in accordance with the recommendations of AS 4072.1 Appendix B.

Certification: Submit a completed certification document for installed fire-stopped penetrations and control joints.

- Form: To Figure B1 of AS 4072.1.
- Low VOC compliance with Sustainability Management Plan Report and Green Star Office Design Schedule: Submit a schedule of installed fire-stopped penetrations and control joints.
- Form: To Figure B2 of AS 4072.1.

User manual

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

Cleaning

Requirement: Remove spilled and excess fire-stopping materials without damaging other work.

END OF SECTION

0183 METALS AND PREFINISHES

Revision history (Revisions are highlighted yellow and deletions are struck through)			
Revision	Date	Status	Comment
T00	06/05/2019	Tender	

1	General	1
1.1	Responsibilities	1
1.2	Precedence	1
1.3	Cross references	1
1.4	Submissions	2
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1 GENERAL

1.1 RESPONSIBILITIES

General

Requirements: Provide metal and prefinishes, as noted on the:

- Drawings
- Schedules for specific applications
- Other relevant documents provided for the purposes of completion of the Works

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 the 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

- 0160 Quality
- 0451 Windows, glazed doors
- 0552 Metalwork & miscellaneous fixtures
- 0555 Fixtures, Fittings & Equipment
- 0581 Signage
- 0671 Paintings
- 0673 Powder Coatings

1.4 SUBMISSIONS

Submit prior to ordering and commencement

Submit request for detail selections that are required. Submit in the form of a list of the selections decisions required and the dates by which each is required. (E.g. colours.)

Submission updates

Maintain all submissions current through all stages of the work. Resubmit submissions incorporating any changes or updates when they occur, or at next submissions stage

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.
- Samples shall be not less than 100 x 100mm and of the same gloss level as the scheduled colour.
- Colour samples for all approved finishing materials. Provide samples identified with :
 - Manufacturer's colour code and colour name.
 - Match to schedule of finishes colour(s), code and name.

2 PRODUCTS

2.1 METALS

Aluminium and aluminium alloys

Drawn pipe: To AS/NZS 1867.

Drawn rod, bar and strip: To AS/NZS 1865.

Extrusions: To AS/NZS 1866.

Plate and sheets: To AS/NZS 1734.

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.

Copper and copper alloys

Casting: To AS 1565.

Plate, sheet and strip: To AS 1566.

Rods, bars and sections: To AS/NZS 1567.

Composition and designations: To AS 2738.

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.

Steel

Sheet: To AS/NZS 1595.

Structural bars and sections: To AS/NZS 3679.1.

Structural hollow sections: To AS/NZS 1163.

Steel for prefinishes

Cold rolled bar: To AS 1443 - Bright.

Cold rolled sheet: To AS/NZS 1595.

- Designation: CA2S-E.

Electric resistance welded tube: To AS 1450.

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.

Finish Grade

Selection: Where manufacturer makes more than one grade of any material specified, use the grade selected in accordance with the manufacturer's recommendations for suitability to the application, installation and exposure conditions.

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.

Application

General: Apply finishes and execute the work in compliance with:

- the manufacturer's recommendations.
- the provisions of the Australian Standards.

In the event of conflict between manufacturer's recommendations for a proprietary system and the provisions of the Australian Standards, manufacturer's recommendations govern.

Visible joints

General: 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, galvanising or electroplating. Ensure self-finished metals are without surface colour variations after jointing

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:

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

Post-assembly pre-treatment

Heat discolouration: Remove by pickling.

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

Post-assembly finish

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

Brushed electropolish finish: Conform to the following:

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

Mirror electropolish finish:

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

Completion

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

Protection: Secure packaging or strippable plastic sheet.

3.3 NON-FERROUS FINISHING

Mechanical finishes

Bright finished copper alloy surfaces: For indoor applications, apply a clear lacquer protective coating.

3.4 ELECTROPLATING

Electroplated coatings

Chromium on metals: To AS 1192.

- Service condition number: At least 2.

Nickel on metals: To AS 1192.

- Service condition number: At least 2.

Zinc on iron or steel: To AS 1789.

3.5 ANODISING

General

Standard: To AS 1231.

Thickness grade: To AS 1231 Table H1.

Application:

- Internal applications: Not less than AA15.
- Internal applications around indoor swimming pools: Not less than AA25
- External applications: Not less than AA25.

Sample

General: Provide a finish to match the sample in terms of colour and finishing options.

Colours and texture

Surface texture : Refer to Drawings and Schedules.

3.6 METAL SPRAYING

Metal spray

Standard: To ISO 2063.2.

Minimum thicknesses:

- Indoor applications: 125 µm.
- Outdoor applications: 175 µm.

Process: Electric arc.

Seal coat: Cover the metal spray finish with two coats of vinyl seal to a total dry film thickness of 80 µm.

3.7 POWDERCOATING

General

Provide powder coating systems to substrates, as indicated on Drawings and described in the Schedule of Finishes. Refer to work section *0673 Powder Coatings*.

Standards

Application to aluminium and aluminium alloy substrates: AS 3715.

Application to substrates other than aluminium: AS 4506.

Finish

Gloss level: As noted on the DRAWINGS or SCHEDULES.

- IF not so noted, ALLOW for the following and VERIFY before proceeding:
- Satin

Colours: As noted on the DRAWINGS or SCHEDULES.

Certification

Certification: In all cases, provide manufacturer's certification to verify application of proprietary powder coatings.

Notification: Ensure manufacturer of powder is notified to allow certification inspections and the like as required for certification of the coating.

Preparation

General: Use chemical pre-treatments. If recommended, provide conversion coatings.

Aluminium: Pretreat to AS 3715 Appendix G.

Galvanized and metallic-coated steel: Clean by immersing in a suitable alkaline or acidic solution, apply a zinc phosphate chemical conversion coating, rinse and degas.

Unprotected steel: Remove rust to the recommendations of AS 1627.4 to grade Sa 2½ of AS 1627.9.

Clean by immersing in trichloroethylene or an alkaline solution, and apply a coat of iron phosphate.

Thermoset powder coating generally

Pre-clean: If surface contamination has occurred or is suspected, clean surface with a proprietary precleaning solvent/detergent prior to powder application.

Thermoset fluoropolymer coating: Provide chemical conversion of the surface to amorphous chromium phosphate to ASTM 1730D Type B, Method 5 (Amorphous chromium phosphate treatment). Delete if fluoropolymer is not applicable.

Application: Use an electrostatic spray gun or fluidised bed and ensure no dust particles or other impurities blemish the final product.

Baking: After application, bake the film in an oven accurately controlled to the temperature and for the period recommended by the coating system manufacturer. Check for correct paint cure by solvent testing. Adjust pre-heat and line speed to ensure full cure.

Damage: Protect the coatings from damage during coating operations, fabrication shipping, storage and installation.

Minor damage: Touch up as recommended by coating system manufacturer.

Thermoset polyester powder coating

Standards:

Aluminium and aluminium alloy substrates: To AS 3715.

Metal substrates other than aluminium: To AS 4506.

Thermoset fluoropolymer coating

Description: Factory applied spray coatings on aluminium products, including PVF2 and PFTE coatings.

Standard: To AS 3715.

3.8 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 finish: refer to schedule of finishes

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

Stoving enamel

Application: Spray or dip.

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.

3.9 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 electro galvanizing on inline galvanized steel products, clean the affected area and apply a two-pack organic primer to AS/NZS 3750.9.

END OF SECTION

0184 TERMITE MANAGEMENT

Revision history (Revisions are highlighted yellow and deletions are struck through)			
Issue	Date	Status	Comment
T00	06/05/2019	Tender	

1	General	1
1.1	Responsibilities	1
1.2	Cross references	1
1.3	Standard	1
1.4	Submissions	1
1.5	Inspection	2
2	Products	2
2.1	Physical systems	2
2.2	Chemical systems.....	3
3	Execution.....	3
3.1	Physical systems	3
3.2	Chemical systems.....	3
3.3	Completion.....	3
4	Selections.....	3
4.1	Schedule.....	3

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide a complete integrated system of termite control installation, maintenance and inspection methods that are suited to the School Building.

Performance

Objective: To achieve building protection.

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- 0171 General requirements.
- 0185 Timber products, Finishes and Treatment

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 for chemical termite management systems.

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 cap and 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.

Spray application

Apply and install materials in accordance with the respective manufacturer's published instructions.

Reticulation systems

Apply and install materials in accordance with the respective manufacturer's published instructions.

3 EXECUTION

3.1 PHYSICAL SYSTEMS

Concrete slab

Standard: To AS 3660.1 Section 4.

Termite cap and sheeting

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 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.

Certificate of installation

General: To AS 3660.1 Appendix A.

Provide certification that the design meets the requirements.

Completion inspection

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

4 SELECTIONS

4.1 SCHEDULE

Termite management systems schedule

When requested, Contractor to provide an approved and tested termite management materials and systems to AS 3660.1.

The selection of termite systems shall suit the site, building design and construction method that facilitate an effective system.

Property	TB1	TB2	TB3
Location			
Under slabs			
Slab penetrations			
Slab control joints and footing/slab joints			
Building perimeters			
Under suspended floors			
Timber poles and posts			

END OF SECTION

0185 TIMBER PRODUCTS, FINISHES AND TREATMENT

Revision history (Revisions are highlighted yellow and deletions are struck through)			
Revision	Date	Status	Comment
T00	06/05/2019	Tender	

1	General	1
1.1	Responsibilities	1
1.2	Precedence	1
1.3	Cross references	2
1.4	Standards	2
1.5	Interpretation	2
1.6	Submissions	3
2	Products	3
2.1	General	3
2.2	Certification	3
2.3	Fire-resistance	4
2.4	Durability	4
2.5	Finishing	4
2.6	Shiplap	5
2.7	Recycled timber	5
3	Execution.....	5
3.1	Joints	5
3.2	Shrinkage restraint.....	5
3.3	Finishing	5
4	Selections	6
4.1	Product schedules	6

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Requirement: Provide timber products with finishes and treatments including components and assemblies as show drawings and described in the schedules.

Performance

Requirements:

- Appropriate for durability and fire-resistance.
- Carrying 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 the 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.
- 0382 Light timber framing
- 0511 Lining
- 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.

Preservative treatment: To the AS 1604 series.

1.5 INTERPRETATION

Abbreviations

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

- EWPA: 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.

Product identification

Preservative treated timber: Marking to include the following:

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

2.2 CERTIFICATION

Timber source certification

Requirement: Provide forest certification, chain of custody certification and corresponding product labelling for all timber applications documented as requiring source certification

Timber product application: refer to Drawings and Schedules

Timber source: provide timber or products certified by the Forest Stewardship Council (FSC), Program for the Endorsement of Forest Certification (PEFC) or the Australian Forestry Standard (AFS).

Recognised product certification programs:

- Pine framing: Plantation Timber Certification.
- Hardwoods: Australian Timber Industry Certification (ATIC) Quality Scheme.
- Glued-laminated timber: Glued Laminated Timber Association of Australia (GLTAA) Product Certification System.
- Laminated veneer lumber: Engineered Wood Products Association of Australasia (EWPA) Quality Control and Product Certification Scheme.
- Finger jointed structural timber: Plantation Timber Association of Australia (PTAA) Plantation Timber Certification Scheme.
- Class 1 Flame Retardant panel certified MDF in accordance with ASTM E84-07 and CAN/ULC-S102 to a Flame Spread of 20 and Smoke Developed of 100.

Inspection: If neither branding nor certification is adopted, have an independent inspecting authority inspect the timber.

Inspection authority: Endorsement of Forest Certification (PEFC)

Laminated veneer lumber

Formaldehyde emission class to AS/NZS 4357.0

Timber panel products

Certification program: Brand panels under the authority of a recognised certification program applicable to the product. Locate the brand on faces or edges which will be concealed in the works.

Certification programs:

- Plywood and block board: Engineered Wood Products Association of Australia (EWPA) Quality Control and Product Certification Scheme.
- Wet processed fibreboard, dry processed fibreboard, particle board and decorative overlay wood panels: Engineered Wood Products Association of Australia (EWPA) Quality Control and Product Certification Scheme.

Plywood formaldehyde emission class to AS/NZS 2270 and AS/NZS 2271

Reconstituted wood-based panel formaldehyde emission class to AS/NZS 1859 series.

2.3 FIRE-RESISTANCE

General

Standard: To AS 1720.4.

Fire-resistance level (FRL) required: comply with Fire Engineering Report, BCA Compliance Report and Fire Hazard Properties stipulated under Specification C1.10 of the BCA.

Submit Manufacturer's Fire Test Reports conforming with Specification C1.10 of the BCA, AS 1530.1 and AS 5113

Bushfire prone areas

Standard: To AS 3959 Appendix F.

2.4 DURABILITY

General

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

Natural durability class: To AS 5604.

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

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

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

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

Preservative treatment

Sawn and round timbers: To AS 1604.1.

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

Plywood: To AS/NZS 1604.3.

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

Glued laminated timber products: To AS/NZS 1604.5.

Moisture content

Test: Methods as follows:

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

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

Subfloor ventilation: To BCA F1.12 or BCA 3.4.1.2 as applicable.

Termite management

Requirement: To *0184 Termite management*. Provide a complete integrated system of termite control installation, maintenance and inspection methods that are suited to the building design.

2.5 FINISHING

Production finish

Hardwood: To AS 2796.1 Table B1.

Softwood: To AS 4785.1 Table B1.

Surface finish: refer to finishes schedule

Edge detail: refer to drawings

Surface coating

Painting: To *0671 Painting* and as follows:

- Coating system: refer to finishes schedule

Application: To the manufacturer's specification.

Water-repellent treatment: water-based silicone sealer for waterproof timber. No peeling after the treatment.

2.6 SHIPLAP

Standards

Timber – Natural Durability Ratings: To AS 5604

Specification for preservative treatment: to AS 1604 and As 1604.1

Fire Hazard Properties: To NCC Specification C1.10.

Certification

Certified to the Australian Forestry Standard (AFS) Chain of Custody (CoC) Standard

2.7 RECYCLED TIMBER

General

Type of species: refer to finishes schedule

Application: refer to finishes schedule

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

Classification: Visually graded.

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.

Fastener selection

Hardwood cladding: Bullet head and plain shank nails, if the cladding is painted and nails are punched and stopped.

Softwood cladding: Flat head and plain shank nails, if cladding is painted.

CCA treated softwood cladding: Galvanized, deformed shank (ring or annular) flat head nails.

Unpainted cladding/framing joints: Do not use machine driven T head nails.

3.2 SHRINKAGE RESTRAINT

General

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

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

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

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

Unseasoned timber: Provide as follows:

- Drill holes 10% oversize.
- Use species with similar shrinkage values to reduce movement and shrinkage.
- For framing provide adequate clearance at the top of masonry veneer and face fixed members to reduce vertical movement.

3.3 FINISHING

Ploughing

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

Painting

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

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

Working with treated timber

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

4 SELECTIONS

4.1 PRODUCT SCHEDULES

Preservative treatment schedule

Timber product application	Hazard class	Species	Natural durability class	Preservative treatment
To AS 1604.1 - Table D1	To AS 1604.1 - Table 1.1	Wood Solutions - timber species and materials. https://www.woodsolutions.com.au/Wood-Species/	AS 5604 - Table 1 & 2 and Appendix A Wood Solutions- <i>Design guide for durability</i>	To AS 1604.1 – Appendix B & E AS/NZS 1605

END OF SECTION

0193 BUILDING ACCESS SAFETY SYSTEMS

Revision history (Revisions are highlighted yellow and deletions are struck through)			
Revision	Date	Status	Comment
T00	05/05/2019	Tender	

1	General	1
1.1	Responsibilities	1
1.2	Design	1
1.3	Cross references	2
1.4	Standards	2
1.5	Interpretation	2
1.6	Submissions	2
1.7	Inspection	2
2	Products	3
2.1	General	3
2.2	Fall protection systems	3
3	Execution	3
3.1	Installation and testing	3
3.2	Maintenance	4
4	Selections	4
4.1	Fall protection systems	4

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide a complete building access safety system for the regular maintenance of the building and its services, including but not limited to:

- Anchor points, harness gear and equipment, static line, access to roof areas, barriers and associated safety signs, plant and equipment .

Performance

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

1.2 DESIGN

General

The Contractor is to supply system design, manufacture, installation and certification of Access Safety Systems to comply AS1657:2018, AS/NZS1891, AS/NZS 5532:2013 and Occupational Health and Welfare Act and Regulations. The building access safety system must be designed and manufactured by an Accredited Height Safety Specialists - Consultant / Manufacturer/ Installer.

Requirements

Responsibility: design a safe workplace for the building and associated structures that is safe and without putting risks to the workers and occupiers health.

Performance requirements: To AS/NZS 1891.2 Section 4, and S28 of Victoria's OHS Act.

Authority requirements: Victoria WorkCover Authority

Access: Provide a system to access the following:

- Full extent of gutters.
- Roof equipment and services.

- Roof areas within 2.5 m of fall hazards not otherwise protected by parapets or guard rails.
- External façade access for cleaning and maintenance

Documentation

Specialists/ Consultant / Manufacturers and Suppliers: Provide design report and drawings, advantages & disadvantages of building access safety system, technical manuals and recommendations related to this worksection.

1.3 CROSS REFERENCES

General

Requirement: Conform to the following:

- *0171 General requirements.*
- *S28 of Victoria's OHS Act.*
- *WorkSafe's publication.*

1.4 STANDARDS

General

Industrial fall-arrest system: To AS/NZS 1891.1, AS/NZS 1891.2, AS/NZS 1891.3 and AS/NZS 1891.4.

Industrial rope access system: To AS/NZS 4488.1 and AS/NZS 4488.2.

1.5 INTERPRETATION

Definitions

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

1.6 SUBMISSIONS

Certification

General: Submit certification of installed system.

Documentation

Submit the following documentation:

Risk assessment report as a basis for the design of the proposed installations, drawings schedule, plans/elevations/sections showing and noting locations of proposed components, installations and assemblies, engineer's report, user instructions, testing information, method of rescue, safe work method statement (SWMS) for the designed system, requirements for public protection, maintenance requirements.

Instruction manual

General: Submit the manufacturer's instruction manuals.

Samples

Provide samples of specified components when requested.

Tests

Type tests: Submit results, as follows:

- Endurance test:
- Strength test:
- Dynamic performance
- Static strength

Site tests: Submit results, as follows:

- Proof load

Training

Additional training: when requested

Warranties

Requirement: Submit the manufacturer's published product warranties for each type of building access safety system.

1.7 INSPECTION

Notice

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

- Shop fabricated or assembled items ready for delivery to the site.

- Commencement of shop or site welding.
- All equipment attachments with concealed fixings, before they are covered.
- Site erected assemblies on completion of erection, before applying finishes.
- Steel surfaces prepared for, and immediately before, site applied finishes.

Installation inspector: Registered height safety inspector or engineer.

2 PRODUCTS

2.1 GENERAL

Marking

Identification: Mark to show the following:

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

2.2 FALL PROTECTION SYSTEMS

Access safety system

System: as recommended by the Accredited Height Safety Specialists/Consultant

Anchors

Single point anchors: To AS/NZS 5532.

Vertical lifeline and ladder systems

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

Personal protective equipment (PPE)

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

Storage: PPE storage holdall supplied by the manufacturer.

Tests

Production tests: Complete the following tests:

- Endurance test:
- Strength test
- Dynamic test
- Static test

Warranties

Warranty terms: as agreed with the Accredited Height Safety Specialists/Consultant

3 EXECUTION

3.1 INSTALLATION AND TESTING

General

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

Standards

Industrial fall arrest systems: To AS/NZS 1891.2.

Industrial rope access systems: to AS/NZS 4488.1.

Contractor

Installer: Registered Installer, approved by the Project Manager.

Labels and signage

General: To AS/NZS 1891.4 clause 2.2.9.

Proof load test for anchors

Standard: To AS/NZS 4488.2 clause 5.3.

Proof load test for horizontal lifeline and rail systems

Standard: To AS/NZS 1891.3 clause 3.1.

3.2 MAINTENANCE

General

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

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

The installer/competent person: To AS/NZS 1891.2 clause 1.2.1.

Periodic inspections

Standard: To AS/NZS 1891.2 clause 9.2.

Completion certificate:

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

Inspection after a fall or other event

Standard: To AS/NZS 1891.2 Supp 1 clause 9.3.

Proof testing of drilled-in anchorages

Standard: To AS/NZS 1891.2 Supp 1 clause 9.4.

On-going maintenance

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

4 SELECTIONS

4.1 FALL PROTECTION SYSTEMS

General

Types: as recommended by the Accredited Height Safety Specialists/Consultant

END OF SECTION

0275 PAVING – MORTAR AND ADHESIVE BED

Revision history (Revisions are highlighted yellow and deletions are struck through)			
Revision	Date	Status	Comment
T00	06/05/2019	Tender	

1	General	2
1.1	Responsibilities	2
1.2	Cross references	2
1.3	Standards	2
1.4	Interpretation.....	2
1.5	Tolerances	3
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1.7	Inspection	4
2	Products	4
2.1	General	4
2.2	Stone selections	4
2.3	Adhesives	4
2.4	Mortar	4
2.5	Grout.....	5
2.6	Pavers.....	5
2.7	Other materials	5
3	Execution.....	6
3.1	Preparation	6
3.2	Paving generally	6
3.3	Mortar bedding.....	7
3.4	Adhesive bedding	7
3.5	Movement joints.....	7
3.6	Grouted joints	8
3.7	Smooth transitions at terminations	8
3.8	Terminations and junctions.....	8
3.9	Falls and levels	8
3.10	Testing	9
3.11	Completion.....	9
4	Selections.....	9
4.1	Schedules	9

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide paving to areas as indicated on the drawings and described in the schedule of finishes.

Design responsibility

This specification and the drawings show paving for the sole purpose of setting the performance requirements, prescribing the design intent, and providing schematic designs.

Take responsibility for the design, system design detailing, shop drawings, material installation, cleaning, protection, guarantees and certification.

Provide samples, prepare shop-drawings, and install prototype where and as directed. On approval of the prototype, undertake the installation.

Obtain and consult the paving 'Product Data Sheets', determine the expansion and contraction requirements in the plane of the paving, ensure that the requirements for compatibility of systems components, install the systems strictly in accordance with approved installation instructions, and finish, seal and protect the works to the satisfaction of the Superintendent.

Performance

General: Coordinate with drainage, adjacent structures and trees.

Conformance: Conform to local authority requirements for levels, grades and paving details (including shape, colour and laying pattern) for paving to courtyards, footpaths and driveways.

Requirements:

- Consistent in colour and finish.
- Firmly bonded to substrates for the expected life of the installation.
- Resistant to expected impacts in use.
- Set out with joints accurately aligned in both directions.
- To direct all water flowing from supply points to drainage outlets without leakage to the substrate or adjacent areas.

Coordination

Design completion and verification shall include:

- Achievement of the documented design within the design dimensions.
- Coordination with and provision of adequate grounds for following trades.

Discrepancies

Submit for resolution any discrepancies between this specification and the selections.

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- 0160 Quality
- 0171 General requirements
- 0181 Adhesives, sealants and fasteners
- 0310 Concrete (refer to Structural Engineer's drawings)
- 0315 Concrete finishes
- 0612 Cementitious toppings

1.3 STANDARDS

Slip resistance

Classification: To AS 4586 and SA HB 198:2014.

1.4 INTERPRETATION

Definitions

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

- Absolute level tolerance: Maximum deviation from design levels.
- Adhesives - cementitious (C): Adhesive in which the binders are hydraulic, e.g. Portland cement, with aggregates and organic additives.
- 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.
- Pavers: Units made from clay, stone, precast concrete, ceramic, terrazzo and/or other inorganic raw materials, generally over 20 mm thick, used as coverings for horizontal surfaces. Larger pavers are often referred to as flags.
- Relative level tolerance: Maximum deviation from a 3 m straightedge laid on the surface.
- Substrate: The surface to which a material or product is applied.

1.5 TOLERANCES

Completed paving

Lippage:

- Unpolished pavers: Less than 2 mm.
- Polished pavers 300 x 300 mm or less: 1 mm, with 5% not exceeding 1.5 mm.
- Polished pavers over 300 x 300 mm: 1.5 mm, with 5% not exceeding 2 mm.

Paving surface level tolerances table

Item	Level tolerance	
	Absolute	Relative
Vehicular pavements	± 5 mm	5 mm
Pedestrian pavements	± 10 mm	10 mm

1.6 SUBMISSIONS

Execution details

Grouting: Submit proposals for grouting methods and materials.

Margins: If it appears that minor variations in joint widths or overall dimensions will avoid cut pavers, submit a proposal.

Operation and maintenance manuals

General: Submit a manual describing care and maintenance of the paving, including procedures for maintaining the slip-resistance grading stating the expected life of the slip-resistance grade.

Products and materials

Product conformity: Submit current assessments of conformity as follows:

- Marking and classification of adhesive to AS ISO 13007.1.

Type tests: Submit results, as follows:

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

Samples

General: Submit labelled samples of pavers, grout and sealants, illustrating the range of variation in colour and finish.

Sample panel: Prepare a sample panel of each type of finish as follows:

- Size: $\geq 2 \text{ m}^2$.
- Include samples of junction details and trim.
- Preserve each panel until related work is complete.

Tests

Site tests: Submit results, as follows:

- Slip resistance of completed installation.
- Stone paver properties tests.

- Salt efflorescence of paver prototype testing.
- Test certificates to tests in AS 4586 for samples of all proposed stone paving and flooring finishes.

1.7 INSPECTION

Notice

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

- Substrate immediately before paving.
- Trial set-outs before execution.
- Control joints before sealing and grouting.
- Any inspections notified as required.

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 STONE SELECTIONS

Selections

Stone material selections, finishes, sizes and set-out shall be as nominated in the finishes schedules and as shown on drawings.

2.3 ADHESIVES

General

Standard: To AS ISO 13007.1.

Type

General: Provide adhesives compatible with the materials and surfaces to be adhered.

Prohibited uses: Do not provide the following combinations:

- 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: To AS 3972.

- Type: GP.
- Iron salt content:
 - . White cement: $\leq 1\%$.
 - . Off-white cement: $\leq 2.5\%$.

Lime: To AS 1672.1.

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

Water: Clean and free from any deleterious matter.

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): Select from the range 1:3 to 1:4 to obtain satisfactory adhesion. Provide minimum water.

Mixing: To AS 3958.1 clause 2.15.

Gauging: Site gauged by volume.

2.5 GROUT

Type

Portland cement based grout: Mix with fine sand. Provide minimum water to achieve workability.

- Mix proportion (cement:sand): 1:3.

Pigments

Pigments for coloured grout: Provide colourfast pigments compatible with the grout material. For cement-based grouts, provide inorganic mineral pigments or lime-proof synthetic metallic oxides compatible with cement.

Water

General: Clean and free from any deleterious matter.

2.6 PAVERS

Concrete and clay pavers

Standard: To AS/NZS 4455.2.

Application to AS/NZS 4455.2 Table 2.8

Properties: To AS/NZS 4455.2 Table 2.8.

Salt attack resistance grade to AS/NZS 4455.2 Table 2.7: [complete/delete]

Stone pavers

Description: Provide sound stone pavers of uniform quality. Reject stone pavers with any of the following defects liable to affect strength and durability:

- Vents.
- Cracks.
- Fissures.
- Seams.
- Porous inclusions.
- Foreign material.
- Loose surface material.
- Discolouration.

Matching: Select for optimum matching of colour and pattern.

Split flagging thickness: Minimum 50 mm, maximum 75 mm.

Face size: Use smaller sizes for pathways and larger sizes for open areas and maintain traditional stone flagging appearance.

Stone setts

Description: Igneous stone, cubed, cobble-style setts.

Tests

Stone paver properties tests

Accelerated wear test

2.7 OTHER MATERIALS

Tactile ground surface indicators

Standard: To AS/NZS 1428.4.1.

Control joint types

Divider strip: A proprietary expansion joint consisting of a neoprene filler sandwiched between 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: Two-pack self-levelling flexible mould resistant, one-part silicone or polyurethane sealant applied over a backing rod. Finish flush with the paver surface.

- Floors: Trafficable, shore hardness more than 35.

Backing rod: Compressible closed cell polyethylene foam with a bond-breaking surface.

Sealer

Non-wetting penetrating sealer selected for suitability for the application and installation conditions, including the following:

- protects the stone from disfigurement and deterioration of appearance due to penetration of adverse materials
- is not subject to degradation when subject to the conditions in the installation location, such as by UV light degradation.

Select sealers that are suited for each stone to their respective:

- applications and exposure conditions;
- surface properties.

3 EXECUTION

3.1 PREPARATION

Trial set-out

General: Prepare a trial paving set-out to each area as follows to:

- Maximise the size of equal margins of cut pavers.
- Locate control joints.
- Note minor variations in joint widths to eliminate cut pavers at margins.

Ambient temperature

General: If the ambient temperature is less than 5°C or more than 35°C, do not lay pavers.

Substrates

General: Make sure substrates are as follows:

- Clean and free of any deposit or finish which may impair adhesion or location of pavers.
- Projections are hacked off and voids and hollows are filled with a cement:sand mix not stronger than the substrate nor weaker than the bedding.

Drying and shrinkage: Before paving, allow at least the following times to elapse (for curing and initial shrinkage) for these substrates:

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

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.

Fixtures

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

3.2 PAVING GENERALLY

Variations

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

Paving joints

Joint widths: Set out pavers to give uniform joint widths of 6 to 12 mm.

Margins

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

Protection

Traffic: Keep pedestrian and vehicular traffic off paving until the bedding has set and attained its working strength.

Cleaning: Keep the work clean as it proceeds and protect finished work from damage.

3.3 MORTAR BEDDING

Preparation of pavers

Suction: Soak porous pavers 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 paver, the substrate, the conditions of service, and which leave the paver firmly and solidly bedded in the bedding material and adhered to the substrate. Form falls integral with the substrate.

Mortar beds

Substrate preparation: 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, on to the paver back. Do not provide mortar after initial set has occurred.

Sandstone flagging

Mortar bed thickness: Minimum 50 mm to maximum 60 mm.

Laying pattern: Random, with smaller stones filling the gaps to produce roughly uniform joint widths. Lay flags and fill joints in one operation.

Stone setts dry bed

Description: Lay and tamp setts on to a dry sand and cement mix, compact and moisten as follows:

- Mortar bed mix proportion (cement:sand): 1:3 screeded to the level required to allow setts to be firmly tamped.
- Select the top side of the sett for surface uniformity and tap into the mix to the pre-compaction position.
- Compact with a hand ram or mechanical compactor.
- Water spray the surface and allow the bedding to harden.
- Grout joints.

3.4 ADHESIVE BEDDING

Preparation of pavers

Adhesive bedding: Fix pavers dry.

Bedding

General: Use bedding methods and materials which are appropriate to the paver, the substrate, the conditions of service, and which leave the paver firmly and solidly bedded in the bedding material and adhered to the substrate. Form falls integral with the substrate.

Thick adhesive beds

General: Provide on substrates with deviations up to 6 mm when tested with a 2 m straight edge, and with pavers having deep keys or frogs.

Nominal thickness: 6 mm.

Adhesive bedding application

General: Apply adhesive by notched trowel to substrates and direct to pavers if required, to provide evenly distributed coverage of more than 90% after laying.

Pattern of distribution of adhesive: Conform to AS 3958.1. Verify by examining one paver in ten as work proceeds.

These values are more strict than in AS 3958.1.

Grouting: Allow the adhesive to cure for the period recommended by the manufacturer before grouting.

3.5 MOVEMENT JOINTS

General

Requirement: Provide control joints as follows:

- Location:
 - . Over structural control joints.
 - . At internal corners.
 - . Close to external corners in large paved areas.
 - . Around the perimeter at abutments.
 - . At junctions between different substrates.
 - . To divide large paved areas into bays, maximum 5 m wide, maximum area 16 m².
 - . At abutments with the building structural frame and over supporting walls or beams where flexing of the substrate is anticipated.
- 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.

3.6 GROUTED JOINTS

Grouting

General: Commence grouting as soon as practicable after bedding has set and hardened sufficiently. Clean out joints as necessary before grouting.

Face grouting: Fill the joints solid and tool flush. Clean off surplus grout and wash down as the grouting proceeds.

3.7 SMOOTH TRANSITIONS AT TERMINATIONS

Description

Provide smooth transitions at the terminations of the work abutting with other floor finishes.

Profile the thickness of the base or bedding as necessary to achieve the required smooth transition.

Requirement

All flooring transitions shall meet the requirements of AS 1428.1

3.8 TERMINATIONS AND JUNCTIONS

Details

Finish terminations and junctions as shown on the detail drawings, where applicable.

Ensure all terminations and junctions are complete and provide adequate protection to the tile edge, and a smooth transition to adjacent floor surfaces.

Provide for finishing bars at all doorways and junctions with other materials.

Provide tile edge strips as required to any edges not otherwise finished.

Floor finish dividers

General: Finish tiled floors at junctions with differing floor finishes with a non-corrosive metal dividing strip suitably fixed to the substrate, with top edge flush with the finished floor. Where changes of floor finish occur at doorways make the junction directly below the closed door.

3.9 FALLS AND LEVELS

Level floors

Level floors: Where falls are not required, lay stone paving level.

Falls

Grade paving to even and correct falls to floor wastes and elsewhere as required. Make level junctions with walls.

Fall, general: 1:100 minimum, where falls are required.

Installation tolerances

Deviation: Maximum deviation of the finished floor level between points of contact under a 2 m straight edge laid in any direction on an area of uniform grade to be 1:300 or 3 mm, whichever is the lesser.

Change of finish: Maintain finished floor level across changes of floor finish including carpet.

Maintain tolerances by preventing concavity or convexity of the unit caused by inaccuracies in the manner in which the surface is formed or finished.

3.10 TESTING

Site tests

Provide test report of cementitious tiles for salt efflorescence.

Completion tests

Slip resistance of completed installation: To AS 4663.

3.11 COMPLETION

Spares

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

Quantity: At least 1% of the quantity installed.

Storage location: as directed by the Project Manager

Cleaning

Completion: Clean progressively and leave pavements clean on completion.

Protection

Stone paving panels: Keep traffic off stone paving until the bedding has set and attained its working strength.

Adjacent surfaces: Protect adjacent finished surfaces liable to damage from stone paving operations.

4 SELECTIONS

4.1 SCHEDULES

Conform to the Finishes Schedule.

END OF SECTION

0315 CONCRETE FINISHES

Revision history (Revisions are highlighted yellow and deletions are struck through)			
Revision	Date	Status	Comment
T00	06/05/2019	Tender	

1	General	1
1.1	Responsibilities	1
1.2	Cross references	1
1.3	Standards	2
1.4	Interpretation	2
1.5	Tolerances	2
1.6	Submissions	2
1.7	Inspection	2
2	Products	3
2.1	Materials	3
3	Execution.....	3
3.1	Surface modifiers.....	3
3.2	Laying to falls and levels	3
3.3	Floor grading for level transitions	3
3.4	Formed surfaces.....	3
3.5	Unformed surfaces	4
3.6	Filletts	5
3.7	Testing	5
4	Selections.....	5
4.1	Schedules	5

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide finishes to formed and unformed concrete surfaces as shown on drawings and schedules.

All pedestrian traffic-able areas shall be stable, safe and minimise risk of slipping or tripping due to slippery surfaces or misaligned joints. Slip resistance shall comply with AS 4586. Slip resistance test certificates shall be provided in accordance with the relevant codes (AS/ 4586, AS 4663 and HB 198).

Performance

Requirement: Compatible with schedule of finishes. Refer to Civil Engineer's drawings also

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- 0160 Quality
- 0171 General requirements.
- 0310 Concrete
- 0612 Cementitious Toppings

1.3 STANDARDS

General

Formed surfaces: To AS 3610.1 and as scheduled.

Slip resistance

Classification: To AS 4586.

1.4 INTERPRETATION

Definitions

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

- Green concrete: Concrete which has set but not appreciably hardened.

1.5 TOLERANCES

Formed surfaces

Quality of the surface finish: To AS 3610.1 Table 3.3.2.

Unformed surfaces

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

Flatness tolerance class table

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

1.6 SUBMISSIONS

Prototypes

Test panels: Provide test panels to AS 3610.1.

Prior commencement, submit request for detail selections that are required. Submit in the form of a list of the selections decisions required and the dates by which each is required. (E.g. finishes.)

Manufacture: Cast the panels using the formwork, concrete, compaction equipment, form release agents, curing and formwork removal methods which are to be used in the final work.

Storage: Once accepted, maintain the panels on site undamaged and protected from the weather, as reference prototypes for evaluation of completed work.

Surface treatment: Do not proceed with the related work until the acceptable range of surface treatments has been determined.

Tests

Site tests: Submit test results, as follows:

- Slip resistance test of completed installations.

Sample panels

Requirement: Prepare sample panels for each Concrete finish, including the following:

- Any Integral Concrete Finishes, as noted on the Finishes Schedule;
- Unformed Concrete Finishes.

Purpose: For verification of appearance and finish.

Number: 1 of each, with repeats if required for verification.

Size: Not less than 1.0 x 1.0m, unless agreed otherwise .

Location: Available for inspection onsite.

Mix: Sample mix shall be from the same concrete batching plant supplying mix for installed work.

Finish: Finish samples as for finished locations.

1.7 INSPECTION

Notice

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

- Completed surfaces before covering or concealing.
- Evaluation of the off-form finishes.

- Evaluation of surface finish.

2 PRODUCTS

2.1 MATERIALS

Surface modifiers / concrete sealers

Provide sealer to surfaces that are suitable for the conditions including background surface, exposure and traffic. Hardeners, sealants and protectors: proprietary products conforming to the manufacturer's recommendations.

Acceptable manufactures approved equivalent to: CCS Concrete Sealers by Concrete Colour Systems and Durafloor HD Floor Hardener / Densifier by Parchem.

Slip resistance treatment: proprietary products conforming to manufacturer's recommendations to achieve the required level of slip resistance.

3 EXECUTION

3.1 SURFACE MODIFIERS

General

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

3.2 LAYING TO FALLS AND LEVELS

Requirements

Lay to falls and levels as required for the location.

Levels: Lay to the levels required including:

- Finished surfaces: At required finish levels.
- Set down surfaces: As required for the work over to achieve the required finish levels.

Level work

Where work is required to finish level:

- Lay without fall or change in level and to the scheduled Tolerance Class.
- Lay so as to prevent the occurrence of ponding due to uneven falls.

Work to falls

Locations : Where indicated on the drawings or where required for water shedding.

Where work is required to finish to falls:

- Lay concrete surfaces to true and even falls to outlets, edges and the like.
- Do not allow ponding to occur due to uneven falls.

Falls for waterproofing

Locations: Where waterproofing is laid directly over slab surfaces.

Provide falls to slab surface so as to provide falls in the waterproofing.

3.3 FLOOR GRADING FOR LEVEL TRANSITIONS

Description

Provide floor grading so as to result in level transitions between adjacent flooring surfaces. Where required to achieve this, provide grading to the background floor surface (concrete slabs).

Grading materials: Shall be selected for suitability to the application and installation conditions.

Proprietary item: Suitable products may selected from the following products by Ardex Australia Pty Ltd.

Installation

Mix and install the materials in accordance with the manufacturer's published instructions.

3.4 FORMED SURFACES

General

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

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

Curing

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

Evaluation of formed surfaces

General: If evaluation of formed surface 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 of concrete elements or faces of concrete columns are to have a finish other than an off-form finish, provide finishes as scheduled.

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 formwork 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.

3.5 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.

3.6 FILLETS

General

Fillets are provided in formwork to clean consistent profiles.

Allow as follows - unless noted or specified otherwise on the DRAWINGS.

Fillets

Locations: To all exposed edges of the formed concrete structure

Profile: Fillet

Dimensions (nominal): 17 x 17 mm

3.7 TESTING

Completion tests

Slip resistance of completed installation: To AS 4663 and HB 198.

4 SELECTIONS

4.1 SCHEDULES

Formed surface finishes schedule

Property	This Schedule is cross-referenced to Drawings and Finishes Schedule
Location	Refer to Drawings
Surface finish class to AS 3610.1	High Quality Class 2 finish to the Architect's approval to exterior exposed form-faced concrete and edges. Produce a smooth, uniform concrete surface finish free of irregularities, potholes, blemishes, formwork board and screed/trowel marks.
Formwork lining type	The types of formwork required throughout the project shall be determined by the Contractor to achieve the surface finishes and the shapes, lines, levels and dimensions of the concrete work required by the drawings, finishes schedule and this specification; unless otherwise shown on the drawings, forms shall be chamfered for re-entrant angles and filleted for corner. Select the form lining or facing necessary to produce the required quality of finished concrete surface as scheduled.
Colour control	Type A – Uniform Colour Throughout

Unformed surface finishes schedule

Property	This Schedule is cross-referenced Drawings and Finishes Schedule			
Location	pedestrian ramps (exposed concrete) and external concrete path	Exposed kerbs, hobs and the like	Tiled & Paved Areas	Floor areas where carpet and vinyl flooring is to be laid
Flatness tolerance class	B	B	C	A
Primary finish	Broom finish	Steel Trowelled	Scored	Machine Float
Slip resistance classification	All pedestrian traffic-able areas shall be stable, safe and minimise risk of slipping or tripping due to slippery surfaces or misaligned joints. Slip resistance shall comply with AS 4586 and HB 198			
Surface modifier	<ul style="list-style-type: none"> - Slab to fall to floor wastes - For tiled areas: to also suit wet area waterproof membrane manufacturer's requirements - Self-levelling compound to suit carpet laying requirements 			

END OF SECTION

0316 PRECAST CONCRETE

Revision history (Revisions are highlighted yellow and deletions are struck through)			
Revision	Date	Status	Comment
T00	06/05/2019	Tender Issue	

1	General	1
1.1	Responsibilities	1
1.2	Cross references	2
1.3	Standards	2
1.4	Interpretation.....	2
1.5	Tolerances	2
1.6	Submissions	2
1.7	Inspection	5
1.8	Rejection – precast concrete panels	5
2	Products	5
2.1	Materials	5
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2.7	Precast concrete panel finishes.....	7
3	Execution.....	9
3.1	Precast elements	9
3.2	Installation.....	10
3.3	Completion.....	10

1 GENERAL

1.1 RESPONSIBILITIES

General

Responsibility: Provide precast concrete elements, as shown on drawings and schedules.

Performance

Requirement: Conform to the following:

- Architectural precast concrete wall panels fabricated from purpose- built moulds to be consistent with the shapes/profiles, textures, fine rendered finish, brick facing inlay into precast concrete, finishes and colours as shown on drawings and finishes schedule.
- Detail of precast panel rebates, corbel and haunches to accommodate adjoining window frames and seals to ensure a complete airtightness weathertight system.
- Precast concrete wall panel break up to ensure alignments and the aesthetic intent is achieved.
- Fabricated in conformance with the shop drawings.
- Designed and certified by a professional engineer.
- Designed for handling, transport and erection by a professional engineer.
- Undamaged by handling and installation.
- Certified by a professional engineer after erection.

Conflict: Where there is a conflict of information between the architectural specifications/drawings and the structural engineering documentation, give notice to the Superintendent / Project Manager or Architect and seek instruction before proceeding.

Design

Structural performance requirements: Conform with architectural drawings and finishes schedule and Structural Engineer's Drawings

Structural design: To AS 3600 and BCA B1.1.

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- 0160 Quality.
- 0171 General requirements.
- 0181 Adhesives, sealants and fasteners.
- 0315 Concrete finishes
- 0331 Brick and block construction
- Structural Engineer's drawings
- Finishes Schedule

References to the manufacturer's products or recommendations shall be deemed to incorporate reference to their technical literature and recommendations applicable to the construction type.

1.3 STANDARDS

General

Precast elements: Conform to the recommendations of NP PCH (Precast Concrete Handbook).

Materials, components and equipment for manufacture: To AS 3850.1.

Planning, design, construction, casting, transportation, erection and installation: To AS 3850.2.

Structural design: To AS 3600 and the BCA B1.1 to BCA B1.4.

Precast flooring systems: To AS 3600.

Design, installation and testing of post-installed and cast-in fastenings: To AS 5216..

Formed faces, exposed surfaces: Finish class to AS 3610: Class 1CX and High quality Class 2CX (subject to the architect's approval).

CCAA Briefing 06 - Form Liners Achieving Surface Relief and Texture

SAA HB 161- Guide to plastering

1.4 INTERPRETATION

Definitions

General: For the purposes of this work section the definitions given in AS 3850.1 clause 1.4 and the following apply:

- Precast concrete: Concrete building elements, cast in moulds and cured away from the final structural position, and then transported, lifted and fixed into position.

1.5 TOLERANCES

General

Position of reinforcement and tendons: To AS 3600 clause 17.5.3.

Manufacturing, installation, fixings and embedded items tolerance for precast elements: To AS 3610.1 Table 3.3.6.2 and AS 3850.2 clause 2.11.

1.6 SUBMISSIONS

Certification

Design: Provide independent certification by a professional engineer of conformance of the design to project criteria.

Design documentation

Calculations: Submit structural performance calculations.

Execution details

Panel casting: Submit panel casting checklist.

Manufacturer's details: Submit name, contact details and credentials of proposed manufacturer of precast elements.

Safe work method statement: Prepare a safe work method statement specific to the project for the precast erection and submit on request.

Erection documentation: Submit lifting device locations and specification including marking plans and shop drawings.

Early lifting: If it is proposed to lift the precast elements by their designated lifting points before 28 day strength has been achieved, submit evidence to demonstrate that the element has adequate strength to carry its own weight without damage or residual cracking or deflection on removal of the lifting device.

Lifting and handling equipment: Submit details of proposed equipment along with qualifications and training of the operating personnel in the form of a qualification register.

Products and materials

Protective coating details: Submit proposals for protective coatings to exposed metallic components to AS/NZS 2312.1 or AS/NZS 2312.2 with regard to site-specific corrosivity zoning.

Colour: Provide details of method of achieving the selected colour including details of the type and colour of the cement, sand and aggregates as well as colouring oxide pigments or stain.

Proprietary inserts: Submit proprietary documentation for any lifting, bracing or fixing inserts. Include make, type and working load limit.

Non-proprietary inserts: Submit certificate from a professional engineer certifying the working load limit.

Concrete mix: Submit concrete mix details including the proportions and source of the constituents, admixtures, release agents and curing compounds.

Form-Liners: Product manufacturer's data sheets showing form-liner name and model number.

Brick facings: Product manufacturer's data sheets showing brick range, code, size and colour.

Prototypes

Requirement: Provide prototypes to conform with drawings and finishes schedule.

Manufacture: Cast the prototype elements using the formwork, concrete, compaction equipment, form release agents, curing and formwork removal methods which are to be used in the final work.

Prototype storage: Maintain prototypes on site, undamaged and protected from discolouration for comparison with manufactured precast elements.

Prototype use: Use prototypes in the works if they conform with the structural drawings.

On completion of the Prototype, give notice so that an inspection / review may be undertaken.

Included in the review:

- Trial set-out, for approval
- Tolerances
- Junction details
- Colour uniformity
- Proposed protection of works.

When approved, the prototype may be incorporated into the Works. Otherwise remove all traces

Samples

Surface finish: Submit samples for texture and colour.

Sample size: As close as possible to full size.

Do not proceed with remaining work until workmanship, colour, and detail are approved by the Architect. Modify mock-up/samples as required to produce acceptable work.

Prepare sample panels for each Architectural Concrete finish, including the following:

- Integrally coloured precast concrete panels
- Brick facings inlay into precast concrete panels
- Textured precast concrete panels
- Fine rendered finish on precast concrete panels
- Painted precast concrete panels
- High-quality Class 2 Off Form concrete finish to the approval of the Architect.
- Dummy joints and rebates

Purpose: For Verification of appearance and finish.

Number: 1 of each, with repeats if required for Verification.

Size: Not less than 2.0 x 2.0m, unless agreed otherwise

Location: Available for inspection onsite or at a local (Victorian) based pre-cast yard.

Mix: Sample mix shall be from the same concrete batching plant supplying mix for installed work.

Finish: Finish samples as for finished locations.

Shop drawings

Precast concrete drawings: Submit shop drawings of architectural and structural precast concrete elements showing the proposed details for their design, manufacture, assembly, transport and installation, including the following:

- Project title and manufacturer's name.
- Marking plans and elevations referenced to the building grids and floors to locate each precast element.
- Sections of Panels.
- Shape or profile drawings (submit these before fabrication of moulds and tooling).
- Methods of installation, including fixing, flashing and sealing.
- Concrete mix and type of cement if special-class concrete.
- Locations, sizes, details, materials, ductility and stress grades of tendons and reinforcement.
- Locations, sizes, details, materials, corrosion protection and grades of cast-in ferrules, locating plates and angles, cut outs and openings, bolts, anchors and lifting devices.
- Cast-in services.
- Site fitments.
- Details of all joints caulking, baffles and waterproofing.
- Provision for vertical and horizontal movement.
- Provision for drainage of joints to the building exterior.
- Form-liners
- Brick facings inlay
- Surface finish class and surface treatment.
- Curing and protection methods.
- Weight of precast elements.
- Calculated maximum loading on lifting and bracing inserts and attachments.
- Equipment and methods for handling, transport and installation, including lifting inserts and pick-up points.
- Evidence of load capacity of lifting and bracing inserts and attachments in the form of test reports or calculations.
- Specification of plugs for sealing recesses for cast-in fixings.
- Junctions to abutting elements and assemblies including abutting window assemblies.
- Junctions to adjoining surfaces.

Mock-up

A mock-up panel shall be constructed to demonstrate the texture and pattern of form-liners, brick facings inlay and other finishes selected/described in the Finishes Schedule, as well as the surface preparation techniques and craftsmanship of the installer and precast manufacturer.

Provide representative mock-up panel in area designated by the Project Manager and Architect. The Architect must approve the texture, pattern, colour, and workmanship of the mock-up panel prior to the beginning of concrete construction. Do not proceed with remaining work until workmanship, installation and operation are approved by Architect.

Mock-up panel must remain on-site for comparison during concrete construction or erection and be removed following completion of the project.

Tests

Lifting inserts and attachments for precast elements: Submit test results.

Structural performance: Submit test results of prior testing for static load tests.

Submission updates

Maintain all submissions current through all stages of the work. Resubmit submissions incorporating any changes or updates when they occur, or at next submissions stage.

1.7 INSPECTION

Notice

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

- Formwork dimensions and stability.
- Panel edge details and penetrations.
- Connection materials and inserts in place.
- Reinforcement and/or prestressing tendons in place.
- Concreting.
- First precast element of each type at the earliest possible time before and immediately after stripping.
- Stripping and storage.
- Site erection including fixings and any in situ topping.
- Installed temporary bracing.
- Final structure before removal of temporary bracing.

1.8 REJECTION – PRECAST CONCRETE PANELS

General

Rejection: The Superintendent or Architect or Project Design Engineer may reject any concrete after its placement because of unsatisfactory finish, incorrect positioning or other failure to conform to the requirements of the Drawings, Finishes Schedule and this Specification.

Signing of the Quality Record (*Revision history*) to Approval for Construction Status is evidence that this has been verified as conforming to the requirements of the Project Managers Plan.

2 PRODUCTS

2.1 MATERIALS

General

Standard: To AS 3850.1.

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.

Type: Do not use high alumina cement.

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.

Other

Chemical admixtures: To AS 1478.1.

Pigments: As follows:

- Chemically inert.
- Alkaline resistant.
- Insoluble.
- Light-fast.

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.

Structural welding: To AS/NZS 1554.3.

Corrosion: Protect from corrosion in conformance with AS 3600 clause 17.2.1.2.

Prestressing tendons

Standard: To AS/NZS 4672.1.

Type: 7 wire, stress relieved, high tensile steel and strand.

Prestressing hardware: To AS 3600.

Welding tendons: Do not weld prestressing tendons.

Post-tensioning bars/tendons

Requirements: Refer to the *Structural Engineer's Documentation*.

2.2 PRECAST CONCRETE

General

Concrete: To AS 3600 and AS 1379.

Testing: To the AS 1012 series.

Durability

Exposure classification: To AS 3600 clause 4.3 Exposure Classification, table 4.3. Refer to Structural Engineer's Documents also.

Concrete cover: To AS 3600 clause 4.10.

Fire-resistance level (FRL): Refer to Fire Engineer Report, Structural Drawings and Architectural Wall Types

Strength

Minimum compressive strength: Refer to Structural Engineer's Documents

Flexural strength required at lifting to AS 3850.2

Finishes

Requirement: As specified in Clause 2.7 PRECAST CONCRETE PANEL FINISHES of this specification.

2.3 GROUTS AND MORTARS

General

Grout duct size: Large enough to provide erection tolerance and clearance for grout flow.

Post-tensioning grout: Conform to the *0313 Concrete post-tensioned* worksection.

2.4 CAST-IN ITEMS

Fixings and embedded items

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

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

Structural steel

Materials, construction, fabrication and erection: To AS 4100.

Cold-formed steel: To AS/NZS 4600

Refer to the Structural Engineer's Documentation

2.5 DRIP GROOVES AND FILLETS

Requirement

Ensure that drip grooves and fillets are provided in FORMWORK to clean consistent profiles.

ALLOW as follows - unless noted or specified otherwise on the DRAWINGS.

Fillets

Locations: To all exposed edges of the formed concrete structure

Profile: Fillet

Size: 17 x 17 mm

Drip Grooves

Locations: To exposed soffit edges of concrete slabs and beams, set back from edge.

Profile: Vee groove, to APPROVED profile.

Size:

- Width: 25 mm
- Max. depth: 15 mm

2.6 MISCELLANEOUS

Bearing pads

Selections and testing: To AS 5100.4.

Flashings

Standard: To AS/NZS 2904.

Sealants

Compression-seals: Polyethylene or polyurethane foam strip.

2.7 PRECAST CONCRETE PANEL FINISHES

References

Standards:

- Manufacture: To AS 3850.1
- Finishes: To AS 3610.
- Methods of paint application: To AS/NZS 2311 Section 6

Description

Provide precast concrete panels as specified in the SCHEDULES and DRAWINGS with combinations of the following types of finishes, and in accordance with the respective specifications for those finishes:

- Off-form finish
- As-laid finish

Fine rendered finish

Supply and apply render work on new precast concrete wall surfaces as indicated on the Drawings and described in the Finishes Schedule.

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.

References to the manufacturer's products or recommendations shall be deemed to incorporate reference to their technical literature and recommendations applicable to the construction type.

Proprietary item: Approved equivalent to ROCKCOTE Finecote with a silicone-infused treatment "Rockcote Repel". www.rockcote.com.au

Finish: Steel trowelled for smooth render finish to wall surfaces as indicated on drawings and described in the Finishes Schedule.

Colour control: Required. Refer to Finishes Schedule.

Textured coating finish

Supply and apply complete high build performance textured coating finish system on new precast concrete wall surfaces as indicated on the Drawings and described in the Finishes Schedule

References to the manufacturer's products or recommendations shall be deemed to incorporate reference to their technical literature and recommendations applicable to the construction type

Preparation, priming and application shall be in accordance with manufacturer's published instructions.

Proprietary item: Approved equivalent to Dulux AcraTex 950 Roll On 3mm Medium Texture Roller Finish and in accordance with Dulux AcraTex 3-step coating system specification. Refer to Dulux DuSpec – Specification Sheet AU_SD05930

Brick facing inlay

Proprietary item: Approved equivalent to Robertson Façade Systems.

<https://www.robertsonfacades.com.au/>

Selections: As shown on drawings and described in the Finishes Schedule.

Flat formed faces

Exposed surfaces: Finish class to AS 3610.1: Class 1CX finish to the approval of the Architect or unless noted otherwise on the Drawings and Finishes Schedule.

Form material: Steel, clean surfaces free of scale/rust and surfaces deformity.

Forms shall be monolithic and without joints in the formed surfaces.

Ribbing and dummy joints

Provide ribbing and dummy joints to required profiles and set out. Refer to schedules and drawings.

Patching

Provide fill and patches, fully dressed, to exposed surfaces at indentations and the like formed for cast-in plates, props and the like.

Finish patches to match adjacent surface and so that there is no show through of the patch in applied finishes.

Off-form finish

Off-form surface finish class to AS 3610.1: Class 1CX finish to the approval of the Architect or unless noted otherwise on the Drawings and Schedule of Finishes.

Colour: A

Surface finish: High quality Class 1CX finish to the approval of the Architect.

Applied finishes: Refer to schedule of Finishes

As laid faces

Tolerance class: A

- In accordance with the clause TOLERANCE CLASSES.

Finish: Steel trowel

Finishing

Finish as described in the Finishes Schedules.

Alternative

Provide concrete that is integrally coloured by addition of pigment to the mix prior to delivery (at the batching plant).

Workmanship

Consistency: Use methods to provide consistency of colour throughout the works. Methods shall include:

- Sequencing of pours.
- Consistent batching of pigment quantities.
- Keeping records of batching.
- Calculation of mix quantities.

Finishing generally: Finish all coloured surfaces uniformly.

- Do not over-trowel.
- Curing: Do not cure with plastic sheeting, membrane paper or intermittent wetting and drying.

2.8 COLOURED CONCRETE

Description

Provide concrete that is integrally coloured by addition of pigment to the mix before placement.

Proprietary item: Pigment Concentrate by Concrete Colour Systems (CCS), or approved equivalent.

- www.concretecoloursystems.com.au

Colours: As selected from the range available from the manufacturer.

- Sample plugs: Obtain sample plugs of the required colours from the supplier for reference and confirmation before ordering materials.

Mix: Mix in accordance with the manufacturers published instructions.

Alternative

Provide concrete that is integrally coloured by addition of pigment to the mix prior to delivery (at the batching plant).

Workmanship

Consistency: Use methods to provide consistency of colour throughout the works. Methods shall include:

- Sequencing of pours.
- Consistent batching of pigment quantities.

- Keeping records of batching.
- Calculation of mix quantities.

Finishing generally: Finish all coloured surfaces uniformly.

- Do not over-trowel.
- Curing: Do not cure with plastic sheeting, membrane paper or intermittent wetting and drying.

3 EXECUTION

3.1 PRECAST ELEMENTS

Marking

Precast element identification: Include the following:

- Plank thickness (mm).
- Number of strands.
- Strand diameter (mm).
- Concrete cover (mm).
- Remain legible until after the element has been fixed in place.
- Not visible in the completed structure.
- Date of casting.
- Orientation of the element.
- On precast elements other than those manufactured as a standard product, indicate their location within the structure, in conformance with the marking plan.
- Weight of the element.

Attachments for structural or architectural fixings

Ferrules: Provide ferrules anchored behind the reinforcing as documented.

Dowel bars: Provide dowel bars loose, cast in or screwed into a ferrule or coupler and projecting from the precast element. Alternatively, where dowels are cast into and project from in situ concrete, provide a mating sleeve with grout tube.

Grout tube: Provide grout tubes as documented, made from thin wall galvanized duct or similar cast into either in situ concrete or the precast element into which a dowel bar will be grouted.

Cast in plates and bolts: Provide purpose made steel brackets with bars, bolts or studs welded to them.

Restraint brackets: Provide all restraint brackets for the precast elements as documented or as required.

Starter bars: Provide all starter bars as documented or as required.

Welding of connections: To AS/NZS 1554.1.

Requirement: Cast in all lifting, bracing and fixing inserts.

External walls: Wall panels and connections to BCA C1.11.

Curing

Curing compounds: To AS 3799.

Release agent: Provide a release agent that is compatible with the curing compound.

Rejection

Assessment: Set aside for inspection any element having damage such as cracking, deformation or spalling, or exhibiting lack of adequate concrete cover. Repair or recast, as instructed.

Lifting points

Standard: To AS 3850.2.

General: Provide proprietary lifting devices with published load data designed specifically for lifting concrete elements. Use face and edge lifters as required.

Cast in inserts: Provide hot-dipped galvanized finish with a minimum coating mass of 600 g/m² to all cast-in lifting and bracing devices.

Bracing inserts or strongbacks: Provide bracing inserts or strongbacks designed by a professional engineer.

Proprietary systems: Use in conformance with manufacturer's specifications and recommendations.

Lifting loops: Do not use deformed bars or stressing tendons as lifting loops.

Sealing: Recess lifting attachments such as bracing ferrules, or other types of cast-in fixings, and provide plugs for sealing.

Location: Do not place lifting attachments, holes and other temporary fixings for handling purposes on faces visible upon completion.

Marking: Clearly mark all lifting points and the positions for temporary bearing for storage and transport.

Welding: Do not site weld lifting, bracing or fixing inserts.

Requirement: Only lift or support members at specified points.

Lifting devices: Do not use the fixing devices for lifting or hoisting unless they have been designed to do so and confirmed by a professional engineer.

Precautions: Use handling methods which do not overstress, warp or damage the elements.

Completion: Remove, seal and rectify temporary attachments after erection.

Storage

Support points: Support elements at designated support points during storage.

Prevent damage: Store precast elements and protect to prevent warping, twisting, crushing, cracking, staining, discolouration and other damage until they are installed in their final location.

3.2 INSTALLATION

Lifting and handling

Requirement: Conform to the ASCC National code and AS 3850.2.

Site conditions: Make sure the wind and temperature conditions allow handling and fixing, and are consistent with the structural capability and geometry of the element.

Site Cranes: To AS 2550.1.

Temporary bracing and propping: To AS 3850.2 Section 5.

Fixing

Fixing: Fix the precast elements securely and accurately in their final position.

Ancillaries: Provide components and materials, including fasteners, braces, shims, jointing strips, sealant, flashings, grout and mortar, bearing pads or strips, ties and dowels, clips and fixings necessary for the installation of the elements.

Flooring systems

Shear keys: Grout with mix proportion (cement:sand) 3:1.

Preparation: Immediately before in situ topping, wet surface of plank without pooling.

Surfaces bonded to in situ concrete

Requirement: Fully scabble and roughen all surfaces required to bond with in situ concrete to achieve a shear plane surface coefficient in conformance with AS 3600 Table 8.4.3.

3.3 COMPLETION

Compliance

Tolerances: Check element compliance in conformance with AS 3610.1 Section 3.

Rejection: Reject any precast elements not conforming to the documented tolerances.

END OF SECTION

0334 BLOCK CONSTRUCTION

Revision history (Revisions are highlighted yellow and deletions are struck through)			
Revision	Date	Status	Comment
T00	06/05/2019	Tender	

1	General	2
1.1	Responsibilities	2
1.2	Cross references	2
1.3	Standard	2
1.4	Interpretation	2
1.5	Tolerances	2
1.6	Submissions	2
1.7	Inspection	3
1.8	Structural design of masonry	3
1.9	Certification of sealant installation	3
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1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide concrete block suitable for loadbearing and non-loadbearing applications to areas as shown on drawings and schedules of finishes.

Performance

Requirement:

- For structural design of masonry refer to Structural Engineer's documents.
- Appropriate for use in construction with required performance rating, including but not limited to: fire rating, sound rating and deemed to comply performance under the NCC/BCA.

Extent

Extent of this work is as shown and noted on the:

- Drawings
- Exterior and Interior Finishes Schedules, Wall Types and Legends

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- *0160 Quality.*
- *0171 General requirements.*
- *0181 Adhesive, Sealants and Fasteners*
- *0182 Fire Stopping*
- *0342 Light Steel Framing*
- *0453 Doors and Access Panels*
- *0511 Lining*
- *Manufacturer's Technical Publications*
- *Refer also to Structural Engineer's drawings*

1.3 STANDARD

General

Materials and construction: To AS 3700.

Regulatory standards: Local Authorities, Building Code of Australia.

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 those given below apply:

- Facework: Masonry intended to be exposed in a wall.
- Face units: Masonry units used in facework, including purpose-made units such as squints, sills and thresholds.

1.5 TOLERANCES

General

Requirement: To AS 3700 Table 12.1.

1.6 SUBMISSIONS

Products and materials

Type tests: Submit results as follows:

- Characteristic unconfined compressive strength of masonry unit: To AS/NZS 4456.4.
- Fire-resistance level.

Samples

Face units: Submit face units of each type illustrating the range of variation available, including colour, texture, surface irregularities, defective arrises, and shape.

- Number of each type: 6.

Facework sample panel: Submit a sample panel in a suitable position of each type of facework including face or pointing mortar and a finished vertical control joint.

- Minimum size (face of panel): 1200 mm high x 1190 mm or closest unit module long.

Sand: Submit a 2 kg sample of each type of sand required to be of a particular colour, grade or source.

Facework set-out: Provide a trial set-out of 2 courses for each panel of facework.

Wall ties: Submit manufacturer's names and product details including a designation of proposed.

Tests

Site tests: Submit results as follows:

- Mortar.
- Special masonry.

1.7 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.
- Any inspections notified as required.

1.8 STRUCTURAL DESIGN OF MASONRY

Reference

Structural design of the Masonry is as documented on the STRUCTURAL DOCUMENTS, including but not limited to the following related components:

- Wall Stiffeners, where required

1.9 CERTIFICATION OF SEALANT INSTALLATION

Reference

Specified in the specifications for:

- Adhesives, Sealants And Fasteners
- Fire Stopping

1.10 MASONRY WALL HEIGHTS

General

Masonry wall heights shall be as shown or noted on the drawings.

All masonry walls shall be floor to slab unless required otherwise.

1.11 MASONRY UNITS IN RATED CONSTRUCTION

Requirement

Application: This applies to the selection of masonry units for use in construction with a performance rating, including:

- Fire rating

- Sound rating
- Deemed to comply performance under the NCC/BCA.
- Locations: as noted on the DRAWINGS and WALL TYPES SCHEDULE

Construction: The construction relied on for the performance may be composite construction – in combination with other materials (e.g plasterboard) – or may be the masonry only (e.g. single skin wall).

Sourcing requirement: The masonry units that are sourced and used in the construction must be consistent with the units that:

- were used for any Testing that indicated that the construction achieves the required performance, or any Expert Opinions that rely on that Testing;
- are intended in the applicable “deemed to comply” requirements of the NCC/BCA.

Notice: Give NOTICE if there is any discrepancy between Units used, or indicated for use, or proposed for use, and the requirements of this clause.

1.12 WALL TYPES

Performance

Performance requirements: As noted for each WALL TYPE, including as applicable:

- Fire rating: FRL
- Acoustic rating: Rw
- Thermal rating: R-value

Complete installations

Provide complete and contiguous assemblies and installations for:

- the full height from slab to slab (unless specifically required otherwise)
- the full length of the lineal extent designated

Provide installations that are fully trimmed and fully integrated:

- at interruptions and openings
- at ends and terminations
- at junctions

Provide the assemblies and installations that at all points achieve and maintain the performance ratings required of each WALL TYPE.

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

Block units

General: Machine made pre-cast concrete units with sharp arises, free from distortion, cracks and other defects, uniform in colour and texture.

Strength grade: As specified on Structural Engineer’s documents. Refer to manufacturer’s technical manuals also.

Selections: As documented in the **Block construction schedule, Wall Type Drawings and Schedule of Finishes.**

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

Salt attack resistance grade: To AS 3700 Table 5.1.

Concrete blockwork walls

Concrete blocks in the standard range of dimensions and unit configurations.

- Unit height: 190mm standard, 90mm available
- Thicknesses: 90mm, 140mm, 190mm, 290mm as applicable
- Length: Typically 390mm

- Materials: Include Concrete, Basalt or Scoria blends as applicable

Proprietary item: Range of concrete and blended mix blocks approved equivalent to Boral Masonry.

- www.boral.com.au

Sound rated walls

Locations: Sound rated walls as noted on the DRAWINGS.

Blocks: Use H-blocks

- Non-porous blocks of a minimum density of 2,000 kg/m³.
- Hollow blocks and lightweight blocks shall not be used without written agreement.

Masonry units for impact performance walls

Location: If and where wall performance for Impact includes masonry units.

Masonry Units: Ensure that the masonry units that are selected or proposed for these walls:

- are suited to these applications, and
- that they have properties (e.g. density) that match the properties of the masonry
- units used by the manufacturer to demonstrate their suitability.

Wall thickness

Match nominal wall thickness dimensions shown on the DRAWINGS.

Fire ratings

Units shall match fire ratings shown on DRAWINGS.

Strength grade

Standard blocks: As specified on STRUCTURAL DOCUMENTS.

If not so specified ALLOW the following and VERIFY before commencement.

Standard blocks: 15 MPa.

Mortar materials

Mortar class: To AS 3700 Table 5.1.

Cement: To AS 3972.

White cement: With $\leq 1\%$ 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: $\leq 10\%$ by weight of cement.

Colours: Conform with the Schedule of Finishes.

Proprietary Item: Colour Through Concrete Pigments by Concrete Colour Systems (CCS)

www.concretecoloursystems.com.au

Mixing

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

Mortar class: M2, M3 or M4 to AS 3700 Table 5.1

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.

Corrosion protection: To AS/NZS 2699.1.

Selection: Ties shall be selected to suit application and installation conditions.

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 4.14.

Control joints

Locate as shown and noted on the STRUCTURAL DRAWINGS. If not shown, allow to provide as follows and verify prior to commencement.

- Maximum spacing generally: SIX metres.

Minimum width of control joint: 10 mm

Joint sealants

Provide sealants to joints in the following locations:

- Control joints and deflection gaps in fire rated walls
- Control joints and deflection gaps in sound rated walls
- Control joints in any wall functioning to contain air, smoke or the like.
- External leaf of cavity walls
- Deflection gaps, where exposed to view

To external walls, ALL joints shall be sealed against water ingress, including:

- Joints in the blockwork

- Joints between the blockwork and abutting structure.

2.5 REINFORCED MASONRY LINTELS

Description

Construct reinforced masonry lintels as detailed on the STRUCTURAL DRAWINGS.

Use purpose-made lintel blocks and extend the lintel 400 mm beyond the edges of the opening.

Build lintels on suitable shoring and fill with concrete before placing blocks above.

Keep propped for at least 28 days after placing concrete.

2.6 STEEL LINTELS

Materials

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.

Design

Locations: Use steel lintels only in work as follows:

- 140mm, 190 mm blockwork and other block works sizes as noted on drawings.
- 110mm brickwork

Lintel sizes: As stated on the STRUCTURAL DRAWINGS.

2.7 RENDERING

General

Requirement: Supply and installation of render work on new external wall surfaces as indicated on the Drawings and Finishes Schedule.

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.

Cross references

Requirements: References to the manufacturer's products or recommendations shall be deemed to incorporate reference to their technical literature and recommendations applicable to the construction type.

Standards

Requirements: To the recommendations of SAA HB 161.

Accessories

Beads: Provide metal proprietary sections manufactured for fixing to substrates and/or embedding in the plaster to form and protect plaster edges and junctions.

Metal lath: Provide a proprietary product manufactured from raised expanded metal for use with plaster:

- Mass/unit area: 1.84 kg/m² or greater.
- Material thickness: 0.70 mm or greater.
- Mesh size: 9.5 x 28.6 mm.

Metallic-coatings to AS 1397: For beads or lath in cement plaster: To the **Corrosion resistance and durability table**.

Admixtures

Plasticisers or workability agents: Do not use in cement plasters.

Aggregates

Sand: Fine, sharp, well-graded sand with a clay content between 1% and 5% when tested to AS 1141.12, 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
75 µm	0	3

Bonding products

General: Proprietary products manufactured for bonding cement-based plaster to solid substrates.

Cement

Standard: To AS 3972.

Type: GP.

Lime

Standard: To AS 1672.1.

Colouring products

General: Provide proprietary products manufactured for colouring cement plaster.

Integral pigment proportion: 5% maximum weight of cement. Refer to Drawings and Finishes Schedule.

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
- Designate the atmospheric corrosivity categories of the project in *0171 General requirements*. Edit the table to delete any categories that do not apply.

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.

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.

Render Finish

Requirements: Conform with the Schedule of Finishes.

3 EXECUTION

3.1 GENERAL

Mortar mixing

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

Protection from contamination

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

During construction: Cover the top surface of brickwork and blockwork 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 it is 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.

Clearance for timber frame shrinkage

General: In timber frame block veneer construction, leave clearances between window frames and block sill and between roof frames and the block veneer as follows:

- Single storey frames and ground floor windows (not for slab on ground): 10 mm.
- Two storey frames and upper floor windows: 20 mm.
- Additional clearance: To accommodate additional shrinkage of unseasoned floor timbers.

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 block header units to AS 3700 clause 4.11.2.

Spacing: 600 mm maximum.

Location: Place the 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.

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: 3 courses to 600 mm for 190 mm high units.

Temporary support

General: If the final stability of the masonry is dependent on construction of (structural) elements after the blockwork 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 use an acid solution. Do not erode joints if using pressure spraying.

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

Acid solution: Do not use.

Colour mixing

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

Below ground

Facework: Commence facework at least 1 full course, below adjacent finished surface level.

Double face walls

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

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

Perpends

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

Sills and thresholds

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

Minimum size of cut unit: Three quarters full width.

3.3 SUBFLOOR WORK

Access openings

General: In internal walls, leave door width openings beneath doorways to give access to underfloor areas.

Air vent locations

General: Provide air vents to give adequate cross ventilation to the space under suspended ground floors.

Cavity walls: Provide matching vents in the internal leaves located as near as practicable to the vents in the external leaves.

Location: Below damp-proof course to internal and external walls.

Air vent types

Concrete framed: Bronze wire mesh in concrete frame 390 x 190 mm.

Vent blocks: Purpose-made vent blocks.

Underpinning

Requirement: Install underpinning while maintaining the building undamaged.

Grouting: Pack dry mix M4 mortar between underpinning and existing structure at the completion of each panel of underpinning.

3.4 CAVITY WORK

Cavity clearance

General: Keep cavities clear at all times.

Cavity fill

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

Cavity width

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

- Block walls: 50 mm.
- Block 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.

3.5 DAMP-PROOF COURSES

Location

General: Locate damp-proof courses as follows:

- Timber floors: In the first course below the level of the underside of ground floor timbers in internal walls and inner leaves of cavity walls.
- 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.
- Masonry veneer construction: In the bottom course of the outer leaf, continuous horizontally across the cavity. Fasten to the inner frame 75 mm above floor level.
- Walls adjoining infill floor slabs on membranes: In the course above the underside of the slab in internal walls and inner leaves of cavity walls. Project 40 mm and dress down over the membrane turned up against the wall.

Height: Not less than:

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

Installation

General: Lay in long lengths. Lap full width at angles and intersections and at least 150 mm at joints. Step as necessary, but not exceeding 1 course each step. 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.

3.6 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 and 1 course above for block. 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 and 1 course above for block 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 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 1 course each step.

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 perpend.

Maximum spacing: 1200 mm.

3.7 WALL TIES

Location

General: Space wall ties in conformance with AS 3700 clause 4.10 or AS 4773.2, as appropriate, 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

Embedment: At least 50 mm into mortar making sure that mortar cover is 15 mm minimum to the outside face of the mortar.

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.

3.8 CONTROL OF JOINTS

General

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

Control joint filling

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

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

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

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

Fire-resistance rated control joints

For service penetrations, coordinate with the services worksections.

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

Fire-stopping: To AS 4072.1.

3.9 BLOCKWORK DUCT RISERS

General

Location: Build a one-piece corrosion resistant metal tray to the masonry duct risers at roof level.

Installation

General: Cut an opening for the riser. Turn tray edges up 25 mm around the opening 13 mm clear of the walls. Externally turn the tray up 100 mm under the stepped flashing and down 100 mm over the apron flashing. Lap and solder joints.

Weepholes

General: Provide 2 weepholes through the masonry duct riser walls on opposite sides immediately above the tray.

3.10 REINFORCED AND GROUTED BLOCKWORK

Cleaning core holes

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

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

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

Grouting

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

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

Compaction: Compact by vibration or by rodding.

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

3.11 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.

3.12 CONNECTORS AND ACCESSORIES

Slip joints

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

Locations and details: To structural drawings.

3.13 RENDERING

Preparation

General: Provide substrates as follows:

- Substrates must be installed strictly in accordance with manufacturer specifications.
- 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.

Curing: Keep continuously moist for 5 days or more and allow to dry before applying plaster coats.

Embedded items

General: 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.

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.

Damp-proof courses: Do not continue plaster across damp-proof courses.

Plastering on metal lath: Provide control joints to divide the plastering area into rectangular panels of 10 m² or less

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.

Finishing treatments

Render finishes shall be to match approved reference samples as noted in the exterior finishes schedule.

Specialist plaster finishes

Polymer modified render:

- Basecoat render: Proprietary polymer modified cementitious render supplied as a complete plastering system.
- Finish coats: Proprietary trowelled on coloured and textured polymer modified finish coats.

Polished plaster: In situ applied plaster system incorporating selected stone dust in a proprietary matrix producing a smooth polished surface with visual patterning

Glass bead coatings: Glass beads bound in a proprietary matrix.

- Product or applicator: approved equivalent to **Rockcote - Finecote**,

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.

3.14 TESTING

Mortar

Durability: Scratch index test to AS 3700 Appendix E.

Compressive strength: To AS 3700 Appendix C.

Flexural strength: To AS 3700 Appendix D.

Special masonry

Sampling and testing: To AS 3700 clause 12.7.

Performance: As documented in the **Block construction performance schedule for special masonry**.

4 SELECTIONS

4.1 SCHEDULES

Block construction schedule

Property	Refer to Drawings and Finishes Schedule for Location and Wall Types
Blocks: Name or type	range of concrete and blended mix blocks approved equivalent to Boral Masonry. www.boral.com.au
Blocks: Fire-resistance level (FRL)	Match fire ratings shown on the DRAWINGS or SCHEDULED. Refer to Fire Engineer Report also
Blocks: Work size (mm)	Unit height: 190mm standard Thicknesses: 90mm, 140mm, 190mm, 290mm as applicable. Length: Typically 390mm
Blocks: Category	Standard Grey Block, Refer to drawings and finishes schedule
Blocks: Salt attack resistance category	To AS 3700 Table 5.1 or AS 4773.2 Table 2.1, as appropriate.
Blocks: Characteristic unconfined compressive strength (MPa)	Minimum 12 MPa. Refer also to Structural Engineer's Drawings
Blocks: Coefficient of contraction	To AS/NZS4456.12
Built-in components: Durability class	To AS 3700 Table 5.1.

Property	Refer to Drawings and Finishes Schedule for Location and Wall Types
Control joints: Backing rod	<ul style="list-style-type: none"> - provide bond breakers at all wall/floor, hob/wall junctions and at control joints where the membrane is bonded to the substrate. - backing rod bond breakers: Retain in position with continuous length of tape pressed firmly in place against the surfaces on each side of the rod - closed Cell Polyethylene Foam Backing Rod to control depth of sealants
Control joints: Primer	If required by the membrane manufacturer, prime the substrates with a primer compatible with the membrane system.
Control joints: Sealant	<ul style="list-style-type: none"> - in fire rated walls, in sound rated walls, in any wall functioning to contain air, smoke or the like, external leaf of cavity walls, deflection gaps - where exposed to view and joints shall be sealed against water ingress. - refer to Worksection 0181 Adhesives, sealants and fasteners.
Control joints: Width (mm)	10mm for vertical control joints 20mm in reinforced masonry, unless otherwise shown on the drawings Install control joints in block walls in the locations and in accordance with the details shown on the Structural Engineer's Drawings.

Lintel schedule

Opening dimensions (mm)	Lintel type	Depth ¹ (mm)	Width (mm)	Thickness (mm)
Lintels and other steel in blockwork: refer to Structural Engineer's drawings				
Note: Lintel length required is equal to sum of (opening dimension + 2x bearing at each end).				

END OF SECTION

0346 STRUCTURAL FIRE PROTECTION SYSTEMS

Revision history			
Revision	Date	Status	Comment
T00	06/05/2019	Tender	

1	General	1
1.1	Responsibilities	1
1.2	Cross references	1
1.3	Standards	1
1.4	Interpretation.....	1
1.5	Submissions	2
1.6	Inspection	2
2	Products	2
2.1	General	2
2.2	Sprayed fire-resisting materials	2
2.3	Metal components	2
3	Execution.....	3
3.1	Sprayed fire-resisting products.....	3

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide structural fire protection system to structural elements including steel columns located within a tested fire rated intertenancy wall system (i.e. steel stud fire rated walls).

Steel columns to be painted with intumescent paint to achieve the required fire rating in accordance with NCC DTS requirements (i.e. 90 minutes), Fire Engineering Brief and Structural Engineering Documents.

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- 0171 General requirements.
- Fire Engineering Brief

Manufacturer's documents

References to the manufacturer's products or recommendations shall be deemed to incorporate reference to their technical literature and recommendations applicable to the construction type.

1.3 STANDARDS

Structural fire protection systems

Materials and components: To BCA Spec A2.3.

1.4 INTERPRETATION

Abbreviation

General: For the purpose of this worksection the following abbreviation applies:

- FRL: Fire-resistance level, in conformance with BCA A1.1.

1.5 SUBMISSIONS

Certification

Certificate of compliance: Submit evidence of compliance with the BCA requirements for suitability of the completed fire protection system for the designated FRL and conformance with the **Fire-resistance level schedule**.

Execution details

Substrate cleaning: Give notice of surface conditions which cannot be corrected by normal hand tool cleaning methods.

Products and materials

Manufacturer's documentation: For sprayed and board structural fire protection systems, submit manufacturers' product data of the following:

- Product technical data sheets.
- Safety data sheets (SDS).
- Preventive maintenance procedures.
- Instructions and procedures for the maintenance and/or repair of damage to parts of the system.

Samples

General: Submit samples of each system thickness, density, colour, texture and support type.

Subcontractors

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

Tests

Site tests for sprayed systems: Submit results of thickness and density measurements.

Warranties

Requirement: Submit the warranty for the installed protection system.

1.6 INSPECTION

Notice

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

- Substrate preparation.
- System support installation.
- Steel protective primer application.
- Completed application of protective system coating thickness.

2 PRODUCTS

2.1 GENERAL

Storage and handling

General: Handle, store, mix and apply all coatings in conformance with the manufacturer's recommendations.

Ambient temperature range for storage: Room temperature, 15°C to 25°C.

Use-by-date: Use products with limited shelf life before their use-by-date unless written authorisation is obtained from the coating manufacturer.

2.2 SPRAYED FIRE-RESISTING MATERIALS

Intumescent Coating

Requirement: Provide a proprietary fire protection system approved equivalent to "Permax" - Intumescent Coating Nullifire SC902 – FRL 90 minutes. Low VOC, high build formulation based on advanced hybrid technology.

<http://www.permax.com.au/>

2.3 METAL COMPONENTS

General

Atmospheric corrosion category: To 0171 *General requirements*.

Expanded metal lath

Reinforcement mesh: To BCA Spec A2.3 Annexure to Table 1 clause 1.6.

Keying mesh:

- Aperture: 6 to 20 mm.
- Self-furring expanded metal lath ribs: V-shaped at 100 to 150 mm intervals.

Welded steel wire mesh

Reinforcement mesh: To BCA Spec A2.3 Annexure to Table 1 clause 1.6.

Keying mesh:

- Wire diameter: 0.7 to 1.6 mm.

Twisted steel wire mesh

Conformance: To AS 2423.

Reinforcement mesh: To BCA Spec A2.3 Annexure to Table 1 clause 1.6.

Keying mesh aperture: Nominally 25 to 32 mm.

Fixings

Screws: Deep threaded self-tapping screws, preferably with ribbed heads.

Staples: Steel wire staples.

Adhesive cement: Fixing cement as recommended by the board manufacturer as being part of the tested complete protection system.

3 EXECUTION

3.1 SPRAYED FIRE-RESISTING PRODUCTS

Applicators

General: Approved by the coating manufacturer to install the coating.

Surface preparation

New steel shall require the removal of all oil and grease. Blast clean in dry atmospheric conditions using abrasive of suitable type and size, free from fines, moisture and oil. Continue blasting until finish complies with AS1627.4, preparation grade SA 2.5, with an average anchor profile of 50 microns. Remove abrasive residues and all traces of moisture by blowing with clean, dry, oil free air..

Galvanised Steel Preparation

For steel that is galvanized, a degrease and light mechanical abrasion or light whip blast is required. Galvanised steel does not require a primer coat unless adhesion is a concern, in which case a suitable primer must be specified.

Primer

Primer is not required for internal steel so long as Nullfire SC902 is applied within 2 weeks post blasting. If SC902 is to be applied after the 2-week period, then an approved epoxy primer coat must be applied.

Apply Nullfire approved 2 pack epoxy primer in accordance with the manufacturer's specifications to achieve a dry film thickness of 100-125 microns. Prime within 4 hours of abrasive blasting.

Contact the Manufacturer for instructions and recommendation.

Top Coat

Internal exposed steel, a minimum dry film thickness of 75 microns and a maximum dry film thickness of 150 microns. Refer to Manufacturer's technical manuals.

Protection of areas not to be coated

General: Prevent damage from spillage, overspray, contamination and fallout.

Sequence

General: Apply coatings after installation of supports, fixings and other attachments and before installation of items which may obstruct the application.

Fixing reinforcement and support

Support on walls, columns and beams: To BCA Spec A2.3 Annexure to Table 1 clause 7.

Encapsulated substrates: If support is not required, wrap and overlap reinforcement at joints and wire tie together.

Spraying

General: Provide full cohesion in the coating.

Application Conditions

Ensure adequate through ventilation during application.

Application temperature range 0° to 35+°, relative humidity <95% and steel surface temperature at least 2°C above dew point temperature.

Application Equipment

Airless Spray Unit – (Refer to Manufacturer for advice regarding appropriate equipment)

Coverage Rates

Theoretical coverage of 1,750 g/m² based on an applied 1.00mm dry film thickness.

END OF SECTION

0382 LIGHT TIMBER FRAMING

Revision history (Revisions are highlighted yellow and deletions are struck through)			
Revision	Date	Status	Comment
T00	06/05/2019	Tender	

1	General	1
1.1	Responsibilities	1
1.2	Cross references	1
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1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide light timber floor, wall and roof framing, as shown on drawings complete with all requisite fixing and additional members required to fix and/or support fixings, fixtures and the like.
General packing out fixing of additional members for wall lining

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- 0171 General requirements.
- 0181 Adhesives, sealants and fasteners.

- 0185 Timber products, finishes and treatment.
- 0431 Cladding – combined

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.

Shop drawings

General: Submit shop drawings, to a scale that best describes the detail, certified by a professional engineer stating that the design has been carried out to AS 1684 and AS 1720.1 requirements for the documented configurations and loadings. Include the following:

- Prefabricated roof trusses:
 - . Marking plans.
 - . Truss plan layout.

- . Elevations, with the arrangement of members allowing for the accommodation of in-roof services and the size and section type of each member.
- . Camber of all elements.
- . The method of assembly, connection, lifting, holding down and bracing.
- Prefabricated wall frames:
 - . Wall plan, showing all wall layouts.
 - . Elevations showing the arrangement of members, and the size and section type of each member.
 - . The method of assembly, connection, lifting, holding down and bracing.

Subcontractors

Prefabricated items: Submit the name and contact details of proposed manufacturers, suppliers and installers.

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 TIMBER

Certification

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

Fascias and barge boards

Hardwood: To AS 2796.1.

Seasoned cypress pine: To AS 1810.

Softwood: To AS 4785.1.

Preservation treatment including termite treatment: To *0185 Timber products, finishes and treatment*.

Trusses

Design: To AS 1720.1.

Nailplated roof trusses: To AS 1720.5.

Camber: Camber bottom chord upward.

Overhangs: Free from spring or splits.

2.3 LAMINATED VENEER LUMBER AND GLUED LAMINATED TIMBER

Laminated veneer lumber

Standard: To AS/NZS 4357.0.

Glued laminated timber

Standard: To AS/NZS 1328.1.

2.4 STRUCTURAL PLYWOOD

General

Standard: To AS/NZS 2269.0.

Bond: Type A to AS/NZS 2754.1.

Veneer

Veneer quality to visible surfaces: CD (minimum).

2.5 COMPONENTS

Nailplated joined beams

Standard: To AS 4446.

Type: Engineered beam made from stress-graded timber pieces joined together with nailplates

Mild steel post bases

Minimum dimensions: Conform to AS 1684.2 Table 9.20(p) and AS 1684.3 Table 9.20(p), as appropriate.

Location: To timber posts supported off concrete slabs or footings.

Finish: Galvanize after fabrication.

Fasteners

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

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.

2.6 FINGER JOINTED STRUCTURAL TIMBER

General

Performance: To AS/NZS 8008 (Int).

Production: To AS 5068.

2.7 RECONSTITUTED STRUCTURAL TIMBER PRODUCTS

Wet-processed fibreboard (including hardboard)

Standard: To AS/NZS 1859.4.

3 EXECUTION

3.1 FLOOR FRAMING

Bearers and joists

Levelling: Level bearers and joists by checking or by packing for the full width of the member with dense corrosion resistant material which is secured in place.

Maximum thickness of packing: 3 mm.

Spring: Lay bearers and joists to allow for straightening under loading.

Joints

Requirement: Locate joints only over supports:

- Minimum bearing of bearers: 50 mm.
- Minimum bearing of joists: 30 mm.

Fixing and restraint

Fixing: Secure bearers and joists to supports to provide restraint against lateral movement.

Deep joists: To AS 1684.2 clause 4.2.2.3.

Herringbone strutting dimensions: $\geq 38 \times 38$ mm.

Trimmers or blocking dimensions:

- Depth: Joist depth less 25 mm.
- Minimum thickness: ≥ 25 mm.

Engineered timber joists 200 mm deep or greater: Provide lateral restraint using blocking or seasoned rim board.

3.2 WALL FRAMING

Bracing

Bracing material: refer to Structural Engineer's drawings.

Additional support

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

Spacing of noggings: Maximum 1350 mm centres.

Vermin barriers

Requirement: Provide vermin barriers as follows:

- Brick veneer barrier: Close nail 10 mm galvanized steel wire mesh to the underside of the bottom plate of external stud walls, extending across the cavity for building into brickwork.

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 at least 75 mm on the inside and tack. 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 at least 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 at junctions of damp-proof courses, sarkings and waterproof membranes.

Flashings

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

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

3.3 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.

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.

Anti-ponding boards

Standard: To AS 4200.2.

Trusses

Nailplated prefabricated roof trusses: To AS 4440.

Support: Support trusses on bottom chord at two points only, unless designed for additional support.

Plumb: The lesser of $H/50$ or 50 mm, where H is the height of the truss at point where plumb is being measured.

Vertical movement: Provide minimum vertical clearance of 10 mm plus ceiling batten depth over internal non-load bearing walls. Use bracing methods which allow for the design vertical movements.

3.4 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.

END OF SECTION

0423 ROOFING – PROFILED SHEET METAL

Revision history (Revisions are highlighted yellow and deletions are struck through)			
Revision	Date	Status	Comment
T00	06/05/2019	Tender	

1	General	1
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1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide a LYSAGHT profiled sheet metal roofing system, or approved equivalent, and associated work which satisfies the product performance requirements, including but not limited to:

- Rainwater outlets, downpipes, gutters

- Flashings, cappings, trays and associated rainwater goods
- Penetrations and sealing
- Leaf guards over sumps/drainage outlets

Refer to Exterior Finishes Schedule for roof sheeting selection including type and finishes.

Refer to Architectural drawings roof sheeting extent and drainage layout.

The specification and the drawings show metal roofing systems for the purpose of setting the performance requirements, prescribing the design intent, and providing schematic design profiles.

The drawings are essentially schematic except for profiles of exposed surfaces and panel arrangement where indicated.

Conform to the profiles indicated on the drawings and install in accordance with the design constraints set out in this specification. The design and installation must meet the requirements of relevant codes and authorities having jurisdiction over the works.

Design, calculate wind loads, install materials, clean works, protect works, provide guarantees and provide certification.

Ambient climatic conditions

Design rainfall intensity (mm/h) to AS/NZS 3500.3

Location exposure severity

Exposure severity category: Benign

Roof access

Type: Refer to *worksection 0193 Building Access Safety Systems*

1.2 COMPANY CONTACTS

LYSAGHT technical contacts

Website: professionals.lysaght.com/contact-us

1.3 CROSS REFERENCES

General

Requirement: Conform to the following:

- *0160 Quality*
- *0171 General requirements*
- *0193 Building access safety systems*
- *0382 Light timber framing*
- *0431 Cladding*
- *0471 Thermal insulation and pliable membranes*

1.4 MANUFACTURER'S DOCUMENTS

Technical manuals

Website: professionals.lysaght.com/resources/manuals

1.5 TOLERANCES

Sheet metal roofing

Supporting members: To AS 1562.1 clause 4.2.3.

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.

Submit request for detail selections that are required. Submit in the form of a list of the selections decisions required and the dates by which each is required. (E.g. colours.)

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.

- Metal roofing in cyclonic regions to AS/NZS 1170.2: Roof sheeting and fastenings to AS 1562.1 clause 5.6.

Samples

Requirement: Submit samples of the following:

- Custom profiled flashings and cappings.
- Sheet metal finishes showing the range of variation available.
- Sealants.
- Trims and accessories with a colour finish.

Shop drawings

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

- Arrangement of roof, cladding and supports including the location of joints, connections, support and lifting points.
- Design loading and pressure level.
- Specification, grade and finish of materials and components.
- Fabrication tolerances.
- Fabricated components and fabricated joints.
- Method of erection.
- Custom-formed gutters, including connection to rain water outlets, leaf guard connection and gutter support details
- Water rain outlets layout and drainage layout
- Downpipes location, sizes, connections to drainage pipes
- Overflows layout

Test

Site tests: Submit results as follows:

- Metal roofing general tests: Roof sheeting and fastenings to AS 1562.1 for resistance to concentrated load and to wind pressure.

Water Test

Requirement: Water test the rainwater goods for water-tightness on completion. Where practicable, water test to the highest containment level of gutters and the like, including:

- Testing of overflows

Provide written report of each test and its results.

Rectify and coordinate with others to ensure any leaks or defects are permanently rectified.

Warranties

Requirement: Refer to Worksection *0171 General requirements* specification.

Roofing materials: Submit the manufacturer's product warranties.

1.7 INSPECTION

Notice

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

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

1.8 DESIGN DRAWINGS

General

The design drawings are indicative of the installations and details. They do not limit the requirement to install completely dressed and waterproof installation.

Services

Refer also to the services drawings for the location, number and extent of services penetrations, and the like.

1.9 WATERPROOF INSTALLATIONS

Complete installations

Supply all materials and perform all work to make each installation completely waterproof. Each complete waterproofing installation shall generally include, but not be limited to, the following components:

- Sheet roofing and cladding installations
- Flashing, capping, soakers, trays and associated rainwater goods
- Gutter, downpipes, outlets and leaf guard system to sumps/drainage outlets
- Penetrations
- Other items as shown on drawings.

Manufacturer's instructions and details

For each installation, all materials and work shall be part of an integrated installation, and shall conform in every detail with the material specifications and installation instructions.

Flashings, cappings and sealing

Provide to the following elements:

All flashings at walls, parapets, verges, gutters and the like.

Flashing, caulking and sealing to all vents, ducts, access anchors, pipes ,and the like penetrating the roofing.

2 PRODUCTS

2.1 GENERAL

References

Schedule: Exterior Finishes Schedule

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 metal roofing materials as follows:

- Use gloves when handling precoated metal roofing material.
- Use soft soled shoes when fixing or working on roofs.
- Protect edges and surfaces from damage. Do not drag sheets across each other or over other materials.

2.2 COMPONENTS

Fasteners

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

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

LYSAGHT fasteners

Type, size, corrosion resistance class and spacing: To LYSAGHT recommendations.

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.

Safety mesh

Standard: To AS/NZS 4389.

Insulation spacer

Product: approved equivalent to Bradford - Ashgrid Roof Spacer System.

2.3 LYSAGHT SHEET METAL ROOFING

Standards

Design and materials: To AS 1562.1.

Proprietary steel roofing

Product brand: LYSAGHT steel roofing.

Profile: Refer to Exterior Finishes Schedule

Product material type: : Refer to Exterior Finishes Schedule

Base Metal Thickness (BMT) (mm): 0.42

Finish and Colour: Refer to Exterior Finishes Schedule

Location: Refer to Drawings

2.4 ROOF PLUMBING

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/arge 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.

Standards

Roof drainage: To AS/NZS 3500.3.

Metal rainwater goods: To AS/NZS 2179.1.

PVC-U rainwater goods and accessories: To AS/NZS 3500.3

Flashings and cappings: To AS/NZS 2904.

2.5 ROOF ACCESS

Walkways

Description: A proprietary roof walkway system including fixings. Refer to *worksection 0193 Building Access Safety Systems*.

2.6 COLORBOND FINISH

Grade

Colorbond finish to all Colorbond materials shall be not less than the following grade:

- All materials: Colorbond: Solar Absorptance (unless noted otherwise).
- Refer to Schedule of Finishes

2.7 DOWNPIPES GENERALLY

Downpipes

General: Prefabricate downpipes to the required section and shape where possible.

Heads: Connect heads to outlets of gutters, sumps and rainwater heads, as applicable.

Discharge: Discharge shall be as shown on the DRAWINGS.

Grade

Colorbond finish to all Colorbond materials shall be not less than the following grade:

- All materials: Colorbond: Solar Absorptance (unless noted otherwise).
- Refer to Schedule of Finishes

2.8 CUSTOM PROFILE FLASHING, CAPPING AND TRIM

Requirement

Provide custom profile Flashing, Capping and Trim as shown and noted on the DRAWINGS and as SCHEDULED.

Material: As specified in the clause ACCESSORY MATERIALS GENERALLY. Provide as shown, noted and detailed on the DRAWINGS, including:

- Configurations
- Profiles
- Dimensions
- Materials
- Finishes

Lengths: Provide in long lengths with a minimum of joints.

Joints: Joints, where required, shall be:

- Neatly made and finished.
- Set out to even and regular patterns and spacing, and aligned as required.
- SUBMIT samples of proposed joints
- Purpose: For REVIEW and ACCEPTANCE of detailing.

Fixing: Fixings shall be concealed or on semi-concealed surfaces

2.9 ACCESSORY MATERIALS GENERALLY

Requirement

Provide a complete set of accessories to provide a fully dressed roof installation.

Accessories include: Cappings, cover and apron flashings, gutters, gutter flashing and the like.

Metal flashing materials

Material: To match adjacent surfaces. Refer to Schedule of Finishes.

Thickness: Not less than the following:

- Steel: 0.55 mm BMT

Coating: To match adjacent surfaces, as applicable at each location. Refer to Schedule of Finishes.

Penetration flashings

Locations: Pipe penetrations and the like.

Proprietary flashings: approved equivalent to Dektite roof flashings and accessory products by Deks.

- www.deks.com.au

Product selections: Select products to suit application and installation conditions, including but not limited to the following, as applicable:

- Dektite Original
- Dektite Square Base
- Dektite Ezi-Seal
- Dekstrip
- Dektite Soaker

Over flashing: Except where permitted otherwise, provide metal flashing over the Dektite, colour matched to the sheeting

2.10 GUTTERS GENERALLY

General

General: Prefabricate gutters to the required shape where possible. Form stop ends, downpipes, bends and returns. Dress downpipes into outlets. Provide overflows to prevent back-flooding.

Falls: Lay gutters with falls to outlets where shown and as follows:

- Box gutters: 1 in 200 minimum, refer to Hydraulic Engineer's Documents

Gutter and sump support: Provide framing and lining to support valley gutters, box gutters and sumps, as applicable.

Box gutter support: Provide as specified in the clause BOX GUTTERS and as shown on DRAWINGS.

Gratings and guards: Provide removable gratings over rainwater heads and sumps and leaf guards to outlets.

Expansion joints: Provide expansion joints in guttering in accordance with Table 4.1 of AS/NZS 3500.3.

- Spacing generally not less than: 20 metres

2.11 PROFILED COMPRESSIBLE SEALING STRIP

Description

Material: Closed cell foam plastic

Profiles:

- As required to provide a closed seal at the installation locations.
- Shall be in connected lengths, not separated fillers.

Installation location: Provide to the following locations:

- Eaves and discharge edges: Under the sheet to fill cavities
- Ridge capping and high edges: Over the sheet and under the capping.
- Lapped joints in roof sheeting, if any

2.12 FASTENERS

Fasteners

Self-drilling screws: Corrosion resistance Class FOUR. Colour matching: Required

- Finish: Prefinish exposed fasteners with an oven baked polymer coating to match the background sheet material.

Fasteners and fixings shall be selected and installed to accommodate the design thermal movements in the sheeting installations.

- If manufacturer's published installation instructions differ, SUBMIT for review

3 EXECUTION

3.1 INSTALLATION

Protection

General: Keep the roofing and rainwater system free of debris and loose material during construction, and leave them clean and unobstructed on completion. Repair damage to the roofing and rainwater system.

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

Thermal movement

Requirement: Allow for thermal movement in the roof installation and the structure, including movement in joints and fastenings.

Pan type sheets

Removal: Install sheets so that individual sheets can be removed without damage.

Curved corrugated sheet

General: Form by rolling from material recommended for curving or bullnosing. Minimise crimping or creasing across the face of the sheet. Trim off crimped or creased edges and ends.

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 SHEET METAL ROOFING

Roof sheet installation

Standard: To AS 1562.1.

LYSAGHT steel roofing: To the manufacturer's recommendations.

Set out point: Refer to Drawings

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.

Expansion joints: To the manufacturer's recommendations.

3.3 BUILDING ELEMENTS

Ridges and eaves

Sheet ends: Treat as follows:

- Project sheets 50 mm into gutters.
- Close off ribs at bottom of sheets using mechanical means or with purpose-made fillers or end caps.
- Turn pans of sheets up at tops and down into gutters by mechanical means.
- 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.

Sprung curved ridge

General: Lay the roofing sheets in single lengths from eaves to eaves by naturally curving the sheets over the ridge.

Ridge: Seal side laps at the ridge and extend the sealant to the point where the roof pitch equals the recommended pitch of the roofing profile.

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.

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.

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 flashing 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.

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

- Hail guards: Install grating over the whole of the box gutter, over all box gutter sumps and over the edges of roofing sheeting entering box gutters.

- Overflows: Provide overflows to prevent back-flooding. Size to pass 100% of the design rainfall. Discharge overflows in visible locations and so water does not enter the building or cause damage to the building..

- Sumps: Minimum 150 mm deep and the full width of the box gutter.

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

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.

3.5 SAFETY MESH

Requirement

Permanently fix safety mesh to all roofs.

Safety mesh must be permanently fixed over the entire area to be roofed (includes eaves).

Safety mesh must remain in place after completion of building.

Standards

General: To AS/NZS 4389

Code of Practice: Must be in accordance with WorkCover – Code of practice for Safe Work of Roofs –

Part 1 Commercial and Industrial buildings Cl. 3.2 Safety mesh

Other available methods as an alternative to safety mesh must not be used.

3.6 TESTING

Site tests

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

3.7 COMPLETION

Reinstatement

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

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

Cleaning

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

Exposed metal surfaces: Clean surfaces of substances that interfere with uniform weathering or oxidation.

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

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.

END OF SECTION

0431 CLADDING – COMBINED

Revision history (Revisions are highlighted yellow and deletions are struck through)			
Revision	Date	Status	Comment
T00	06/05/2019	Tender	

1	General	1
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1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide lightweight external wall cladding and associated work, which satisfies the product performance requirements, but not limited to the following:

- Fibre cement sheets
- Steel wall cladding system, colorbond finish
- Steel fencing and gates, colorbond finish
- Exterior hardboard cladding system
- Other metal sheets as shown on drawings and described in the schedules
- Comply with BCA fire hazard properties for materials – Appendix C1.10 of BCA.
- Comply with BCA Part F1 Damp and Weatherproofing clause FP1.4 and FV1.
- Use of non-combustible materials only which have been determined by testing to Australian Standard AS 1530.1. Refer to 0171 General requirements – Clause 2 PRODUCTS.

- Any combustible external cladding material will require a fire safety design assessment from a qualified Fire Engineer and approval for the Building Surveyor for Class 9 construction greater than single story.
- Refer to Exterior Finishes Schedule and Drawings

The specification and the drawings show cladding systems for the purpose of setting the performance requirements, prescribing the design intent, and providing schematic design profiles.

The drawings are essentially schematic except for profiles of exposed surfaces and panel arrangement where indicated.

Conform to the profiles indicated on the drawings and install in accordance with the design constraints set out in this specification, including but not limited to the following:

- Design, calculate wind loads and detailing verification of the panels installation
- System components, inserts, joins sealers and all accessories
- Structural Provisions
- Provide shop drawings
- Fire Resistance Performances
- Design for weather tightness
- Sound Transmission & Insulation. *Refer to Acoustic Engineer's Report*
- Certification of the installation and provision of warranties

Location exposure severity

Exposure severity category: Benign

Design and performance for weatherproofing

Requirement: The work shall be designed, fabricated and installed to deliver finished assemblies and junctions with the structure that are fully weather tight against the water penetration and in compliance with NCC/BCA performance requirements part F1 and clauses:

- FP1.4 for roof and external walls
- FV1 verification methods for weatherproofing

Non-conforming External Cladding

Prohibited Materials: Do not provide non-compliant combustible Aluminium Composite Panels (ACP) with polyethylene in its core and Expanded Polystyrene (EPS) products as part of an External Wall.

Refer to Worksection 0171 General requirements, clause 2 Products – 2.1 General.

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- 0160 Quality
- 0171 General requirements
- 0382 Light timber framing
- 0471 Thermal insulation and pliable membranes
- 0472 Acoustic insulation
- 0671 Painting
- 0673 Powder coatings

1.3 TOLERANCES

Permitted deviations

Profiled metal sheet cladding: To AS 1562.1 clause 4.2.3

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

1.4 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, technical specifications of products, schedule of recommended glazing gaskets, sealants and the like, 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
- Fibre cement cladding: Type test the wall sheeting and fixings to AS/NZS 1562.2 for resistance to wind forces.
- Exterior Hardboard to AS/NZS 1859.4 - Wet Processed Fibreboard
- Timber products with finishes and treatments: Appropriate for durability and fire-resistance and certification for the finishing applications. Provide forest certification, chain of custody certification and corresponding product labelling for all timber applications documented as requiring source certification.

Submit certificate test reports for elastomeric sealants on aged performance as specified, including hardness, stain resistance, adhesion, cohesion or tensile strength, elongation, low-temperature flexibility, compression set, modulus of elasticity, water absorption, and resistance (ageing, weight loss, deterioration) and heat and exposure to ozone and ultraviolet light.

Prototypes

General: Erect a prototype of each panel type, including at least one example of each component in the system to verify selections submitted as samples, to demonstrate aesthetic effects, to set quality standards for materials and execution and to verify performance, including wind loading.

Inclusions:

- Typical components, attachments to building structure and methods of installation.
- Perforated aluminium sheets
- Window opening with cladding panel, trim and returns.
- Sealant filled joint.

Approved prototype will be the standard for quality control of the completion of work of same type.

The approved prototype may be incorporated into the works. Otherwise remove all traces.

- Minimum surface area: 5 square metres.

Samples

Finish: Submit samples of the cladding material showing the range of variation available.

Sample size: At least 1 square metres, of the proprietary factory finished cladding panel sample, typical joint and associated proprietary fixing system, finishing, angles, colours, etc.

Shop drawings

Prepare and submit fully dimensioned to a scale that best describes the detail and co-ordinated, shop drawings showing details for fabrication and installation of the cladding systems. Show the following typical details:

- Set out details.
- Dimensioned elevations of all elements.
- Details of construction, connections and all support systems.
- Dimensions of all typical elements and of any special sizes and shapes.
- Provision for the exclusion and/or drainage of moisture.
- Wall joints and details of abutment to doors, windows, roof capping/flashings and walls.
- Jointing details and method of fixing between individual elements and between this installation and adjacent work, including adjustment.
- Sealant types and full size sections of all sealant-filled joints and backing rods.
- Methods of meeting performance requirements for thermal insulation, including the following:
 - . Closing off and sealing the assembly against other building elements such as soffits.
- Provision for thermal movement.
- Provision for movement under seismic and wind loads.
- Sequence of installation.

- Co-ordination requirements with other work.
- Schedule of materials, finishes, componentry, hardware and fittings.

Shop drawings must clearly show the method of construction, fixings, nominated materials and size of all members. They shall show overall sizes dimensions and fixings.

Subcontractors

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

Evidence of experience: 5 years minimum

Seamed sheet metal cladding: Submit evidence of experience with non-ferrous cladding installation.

Warranties

Requirement: Refer to Worksection *0171 General requirements* specification.

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

1.5 INSPECTION

Notice

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

- Workshop assemblies before delivery to the site.
- Framing, sarking, vapour barrier and insulation before covering up or concealing.
- Building substrates prepared and ready for the installation of the wall assemblies, with anchor brackets and other attachments fixed in place.
- Completion of a prototype.

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.
- Use gloves when handling precoated metal cladding material.

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.

Components

Requirement: Conform to the Cladding support as instructed by the manufacturer.

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.

Bushfire Protection

Construction of buildings in bushfire prone areas to AS 3959.

2.3 FIBRE CEMENT (FC) SHEETS

General

Requirement: Proprietary compressed fibre cement sheets.

Standard: To AS/NZS 2908.2 and the following:

- Type A Category 3.

Selection: Conform with Schedule of Finishes and Drawings.

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

Edge profile: Square.

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

2.4 PLYWOOD SHEETS

General

Requirement: Proprietary plywood sheets.

Standard: To AS/NZS 2271.

Bond: Type A.

Presealed plywood: Sides and edges presealed with a machine applied sealer.

Visible surfaces with a clear finish: Veneer quality A.

Other visible surfaces: Veneer quality B.

Hidden surfaces: Veneer quality C or D.

Formaldehyde emission class: E₁.

Identification: Sheets labelled under the authority of a recognised certification scheme to *0185 Timber products, finishes and treatment*.

Fasteners

LOSP treated timber and non-corrosive timber cladding: Hot-dip galvanized steel.

CCA treated timber and corrosive timber cladding (including western red cedar or redwood): Stainless steel type 316 or silicon bronze

2.5 PROFILED STEEL CLADDING

General

Requirement: Proprietary profiled steel cladding, approved equivalent to Lysaght.

Material & Finishes: To AS 1397:2011 and AS/NZS 2728:2013

Design and installation: To AS 1562.1:2018

Base metal thicknesses (BMT): 0.42mm or 0.48mm as recommended by manufacturer.

Selection: Refer to Exterior Finishes Schedule and Drawings.

2.6 EXTERIOR HARDBOARD CLADDING

General

Proprietary Item: approved equivalent to "EcoWall" by Weathertex Pty Ltd.

Hardboard: To AS/NZS 1859.4 - Wet Processed Fibreboard.

Profile: EcoWall Smooth

Thickness: 9.5mm

Structural Support: Timber stud framing direct fix to frame.

- Installation: Provide stud framing at maximum 600 mm centres.

Fasteners: In accordance with the manufacturer's recommendations and to satisfy the design wind conditions applicable to the site.

Accessories: Provide product specific joiners, corner treatments and flashings recommended by the Weathertex Installation Manual as necessary to complete the installation.

Vapour permeable sarking: Install a vapour permeable sarking to AS/NZS 4200.1. Install between the "Weathertex" and the framing structure.

Vapour Barrier:

- Generally: Low.
- Climate Zone 1 Areas: In accordance with the sarking manufacturer's recommendations.
- Water Barrier: High.

Finish: Paint the panels as specified following priming of all sawn edges with solvent-borne or latex tanning-resistant wood primer.

Fire resistance: To AS 1720.4.

Fire properties: To BCA Specification C1.10

Termite treatment: To *0184 Termite management*.

Dimensions: Conform with Drawings and Schedule of Finishes.

2.7 PREPAINTED STEEL FENCING

General

Requirement: Provide prepainted steel fences and barrier systems to services yards and site areas as shown on drawings.

Product: Approved equivalent to Lysaght Fencing, for type and colour refer to External finishes Schedule

Standard: To AS/NZS 2728 Type 4 and AS/NZS 1170.2

Finish: Colorbond, non-visual permeability

Durability class: High quality

Terrain Category: Exposed open terrain. Seek manufacturer's guidance for wind regions and fencing installation guide.

Concrete footing: To manufacturer's technical manuals and recommendations.

Steel Posts: 100x100x3.5 SHS with post caps including for corners and ends fence runs configuration and flat post stiffener as required. Finish: colorbond.

Fasteners: Refer to manufacturer's product guide.

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 FIBRE CEMENT SHEET CLADDING

Preparation

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

Joints

Control joints:

- Locate between the panel and fixing system and the supporting structure, as documented.
- Sheet edges: Square cut.
- Sealant: Do not apply finish coating over joint sealants.

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

Fixing

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

Eaves and soffit lining: Fix at 150 mm centres to soffit bearers at a maximum of 450 mm centres.

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 PROFILED STEEL CLADDING

Installation

Fixing start location: Refer to Drawings. Also, refer to the manufacturer's installation manuals.

<http://www.lysaght.com/installation/roofing-and-walling>

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: In accordance with the manufacturer's recommendations and technical manuals.

3.5 INSTALLATION OF HARDBOARD CLADDING

Installation

Install in accordance with the Manufacturer's current instructions and recommendations, Weathertex "ecowall architectural panels".

3.6 PREPAINTED STEEL FENCING

Installation

Install in accordance with the Manufacturer's Fencing installation manual.

<http://www.lysaght.com/installation/fencing>

3.7 COMPLETION

Reinstatement

Extent: Repair or replace damage to the cladding. If the work cannot be repaired satisfactorily, replace the whole area affected.

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

Cleaning

Requirement: Remove excess debris, metal swarf, solder, sealants and unused materials.

Exposed metal surfaces: Clean surfaces of substances that interfere with uniform weathering or oxidisation.

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

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.

END OF SECTION

0451 WINDOWS AND GLAZED DOORS

Revision history			
Revision	Date	Status	Comment
T00	06/05/2019	Tender	

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1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide windows and glazed doors system with all required glass and glazing accessories, framing and sub-framing, window shrouds, structural fixing, stiffening, anchorages, brackets, fasteners, flashing, trims, joints-sealants, hardware, operators and finishes, coordination with building services, and interfaces with adjacent work and the following :

- Location, extent and profiles refer to architectural drawings
- Finishes and colour selection refer to Exterior Finishes Schedules
- Thermal requirements refer to Preliminary Nathers Assessment Report and Preliminary FirstRate Information prepared by LUCID Consulting Australia.

Performance

Product design: Provide windows and glazed doors system to meet the architectural design intent, structural and environmental performance goals, including compliance with local authorities, Building Regulations and applicable Australian Standards.

Architectural drawings are to be considered essentially schematic except for profiles of exposed surfaces and panel arrangement where indicated.

The design must conform to the profiles indicated on the drawings, and the installation must perform in accordance with the design constraints set out in this specification and Consultants' documentation.

Responsibility must be taken for the design, structural calculations, glazing system design detailing inclusive of fabricated metalwork components, shop drawings, material installation, cleaning, protection, guarantees and certification.

Acceptable Manufacturers

Framing System: Approved equivalent to Capral Aluminium.

<http://www.capral.com.au/Technical-Manuals>

Glazing: Approved equivalent to Viridian Glass

<https://www.viridianglass.com/>

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- 0160 Quality.
- 0171 General requirements
- 0181 Adhesive, sealants and fasteners
- 0183 Metal and prefinishes
- 0461 Glazing and glazed balustrades
- 0552 Metalwork & miscellaneous fixtures
- 0673 Powder coatings

Manufacturer's documents

References to the manufacturer's products or recommendations shall be deemed to incorporate reference to their technical literature and recommendations applicable to the construction type.

1.3 STANDARDS

General

Selection and installation: To AS 2047.

Building classification: Refer to BCA Compliance Report.

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.

1.4 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 in AS 4145.1 Section 2 and the following definitions 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.

1.5 SUBMISSIONS

Certification

Conformance: Submit evidence that window and door assemblies conform to AS 2047.

Sealant compatibility: Submit statements from all parties to the installation certifying the compatibility of sealants and glazing systems to all substrates.

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 manual

Window and door assemblies: Submit the window and glazed door manufacturer's published instructions for operation, care and maintenance.

Hardware: Submit the manufacturer's published recommendations for use, care and maintenance.

Products and materials

Type tests: Submit results, as follows:

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

Prototypes

Sample installations: Install the designated typical window and door assemblies in their final position incorporating at least one example of each component in the system, including attachments to the structure, flashing, caulking, sealing, glazing, operating hardware, locks and keys.

Required prototypes: Full size

Samples in prototypes: Required samples may form part of prototypes.

Samples

Window and door framing: Submit the following:

- Accessory and hardware items documented descriptively or by performance (i.e. not documented as proprietary items) including locks, latches, handles, catches, sash operators, anchor brackets and attachments, masonry anchors and weather seals (pile or extruded).
- Colour samples of prefinished production material (e.g. anodised or organic coated extrusions and sheet), showing the limits of the range of variation in the selected colour.
- Joints made by proposed techniques.
- Sections proposed to be used for frames, sashes, louvres and slats.
- Label each sample, giving the series code reference and date of manufacture.

Glazing: Submit samples of glazing materials, each at least 200 x 200 mm, showing documented visual properties and the range of variation, if any, for each of the following types of glass or glazing plastics:

- Tinted or coloured glass or glazing plastics.
- Surface modified or surface coated glass.
- Patterned or obscured glass or glazing plastics.
- Ceramic coated glass.
- Wired glass.
- Mirror glass.

Hardware: Submit samples of generic hardware, not documented as proprietary items, as follows:

- Accessory and hardware items documented descriptively or by performance (i.e. not documented as proprietary items) including locks, latches, handles, catches, sash operators, anchor brackets and attachments, masonry anchors and weather seals (pile or extruded).
- Particular samples required: Any samples notified as required

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.

Subcontractors

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

Evidence of experience: minimum 5 years

Warranties

Requirement: Specified in the GENERAL REQUIREMENTS specification. Submit the manufacturer's published product warranties for finishing and hardware.

1.6 PROTECTION OF OPENABLE WINDOWS

General

Requirement: Restrictions to opening dimensions of windows shall meet requirements of the Building Code of Australia. A window must be fitted with either a device to restrict the window opening, or a suitable screen, so a 125mm diameter sphere cannot pass through. The device or screen must also be able to withstand an outward horizontal force of 250 N.

1.7 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.

1.8 TESTS

Interpretation

Type tests: Type tests are test conducted on a representative specimen of the assembly to demonstrate that it has attained the specified performance.

Requirements

Certificates: SUBMIT documentation demonstrating:

- the performance for each of the proposed installations and assemblies
- against each of the following Type Tests.

Project profiles: Submit evidence or certification that assembly profiles proposed for the project are the same manufacture as those tested in the type tests. Do not substitute profiles of different manufacture.

Type tests to AS 2047

Submit Type Tests of assemblies demonstrating that a representative specimen of the assembly has attained the performance to AS 2047 and AS 4420.1, at the design wind loads or applicable rating; including:

- Deflection test
- Operating force test
- Air infiltration test
- Water penetration test
- Ultimate strength test

Acoustic rating (Rw) tests

Type test assemblies demonstrating that a representative specimen of the assembly has attained the specified Rw rating.

- Test method: To AS 1276.

Double glazed systems: Interpolation between test results for similar systems is acceptable provided that:

- Each tested system differs from the proposed system by not more than one variable of one of the following elements:
 - First panel: Glass type, glass thickness.
 - Cavity: Width dimension.
 - Second panel: Glass type, glass thickness.
 - Mounting: Type, seal type.
 - Cavity reveal: Acoustic absorption treatment; and
- Dimensional (thickness or width) differences do not exceed a ratio of 1: 1.5.

Thermal performance tests

Test method: To AAMA 1503

Type test designated assemblies demonstrating that a representative specimen of the assembly has at least the required values for

- condensation resistance factor (CRF); and
- thermal resistance (R).

2 PRODUCTS

2.1 GENERAL

Fire-resistance of building elements

Fire-resistance level: To AS 1530.4.

Protection of openable windows

Fall prevention: To AS 5203.

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

Window assemblies for housing: To AS 2047 Section 8.

Aluminium frames

Material: Extruded aluminium components manufactured from aluminium alloy 6063, temper T6.

Acceptable Manufacturer: Approved equivalent to Capral Aluminium.

Profile: Refer to Architectural Drawings and Exterior Finishes Schedule.

Finish and colour: Refer to drawings and finishes and schedule. Where manufacturer makes more than one grade of any material specified, use the grade selected in accordance with the manufacturer's recommendations for suitability to the application, installation and exposure conditions.

Refer to clause 2.6 Aluminium window and door frame finishes of this specification also.

Flashings

Standard: To AS/NZS 2904.

Materials: Provide flashings and weatherings which are corrosion resistant, compatible with the other materials in the installation, and coated with a non-staining compound where necessary.

Fasteners

General: Provide fasteners of sufficient strength and quality to perform their required function.

Sealant materials

Selections Selected for suitability to the applications and installation conditions.

Certification: Provide certification verifying that the sealants selected are:

- Suited to their respective applications and installation conditions

Contact with other materials

Coat metal surfaces in contact with mortar, concrete, plaster, masonry, wet-application of fire-proofing and absorbent materials with an anti-galvanic, moisture barrier material. Isolate, with inert material, dissimilar metals for the prevention of electrolytic action and corrosion.

2.2 GLASS

Glass and glazing materials

Acceptable Manufacturer: Approved equivalent to Viridian Glass.

Selection: Refer to Architectural Drawings and Exterior Finishes Schedule.

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.

Heat soaking

Requirement: All toughened glass products.

Standard: To EN 14179-1.

Ceramic-coated glass

Description: Heat strengthened or toughened glass with a coloured ceramic coating fused to and made an integral part of the surface: To ASTM C1048, Condition B.

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: To AS/NZS 4667.

Insulating glass units (IGUs)

Selection and installation: To AS/NZS 4666.

2.3 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): To ASTM C920 or ISO 11600.

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

Sealing compound (butyl): To ASTM C1311.

Priming

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

Control joints

Depth of elastomeric sealant: One half the joint width or 6 mm, whichever is the greater.

Foamed materials (in compressible fillers and backing rods): Closed-cell or impregnated types which do not absorb water.

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

2.4 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.

2.5 WINDOW PELMET RECESSES FOR BLIND SYSTEM

General

Requirement: Make a reasonable allowance for the provision of prefinished metal pelmet suitable for integral blinds system. Refer to drawings for configuration and schedule of finish for selected colour. Coordinate pelmet recesses with exhaust ductwork and services to façade window to avoid conflicts. If it is believed that a conflict exists, notify the contract administrator and the Architect immediately and provide a recommendation to resolve the conflict.

2.6 ALUMINIUM WINDOW AND DOOR FRAME FINISHES

General: Provide aluminium extruded or folded box frame sections with mesh fixing channel, mitred, staked and screwed at corners, fabricated into the required assemblies for glazing to provide weather-proof window installations. Provide an extended frame section where necessary to adapt to window opening gear.

Engineering: Suites shall be those engineered to a Commercial Grade, including those engineered for all the applicable performance requirements, including:

- Water and Weather resistance
- Movement characteristics
- Acoustic sealing

Mesh: Bead the mesh into the frame channel with a continuous resilient gasket, so that the mesh is taut and without distortion.

Proprietary items: A selection of members from proprietary framing suites to form assemblies of the required profiles.

Selection, Finishes and Configuration: Refer to drawings and finishes schedule.

Material: Extruded aluminium components manufactured from aluminium alloy 6063, temper T6.

Powder coatings

Service condition category to AS 3715 - moderate environment in proximity to the bay.

Corrosion protection: corrosion level(s) in accordance with AS 4312, and design accordingly. The site is within 1 km of the Bay.

Anodised

Standard: To AS 1231.

Thickness: ≥ 50 microns to 80 microns.

2.7 OTHER MATERIAL FRAME FINISHES

Requirements

Standard: Comply with AS 2047 clause 3.4.1.4 and materials manufacturer's printed instructions.

2.8 ANCILLARY MATERIALS

Trims

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

Extruded gaskets and seals

General: Provide seals for suitability to the applications and installation conditions.

Materials: Non-cellular (solid) elastopressive seals as follows:

- Flexible polyvinyl chloride (PVC): To BS 2571, 100% solids with high consistency, ultraviolet stabilised.
- Rubber products (neoprene, ethylene propylene diene monomer (EPDM) or silicone rubber): To BS 4255-1.

Flashings

General: Corrosion resistant, compatible with the other materials in the installation, and coated with a non-staining compound where necessary.

Standard: To AS/NZS 2904.

Nylon brush seals

General: Dense nylon bristles locked into galvanized 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.

2.9 HARDWARE

Hardware documented generically

General: Provide hardware of sufficient strength and quality to perform its function, appropriate to the intended conditions of use, compatible with associated hardware, and fabricated with fixed parts firmly joined.

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 shown on drawings.

2.10 KEYING

Contractor's keys

Master key systems: Do not use any key under a master key system.

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.

Keying system

Requirement: As documented in the **Key codes schedule**.

Coding of locks: If window locks are included in building key code groups, provide cylinder or pin tumbler locks coded to match.

Number of keys table

Code	Key type	Minimum number of keys
KD	Locks keyed to differ	2 for each lock
KA#	Locks keyed alike:	
	- 2 locks in code group	4

Code	Key type	Minimum number of keys
	- 3-10 locks in code group	6
	- 11-40 locks in code group	10
	- 41 and over locks in code group	1 for every 4 locks or part thereof

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.

Windows and glazed doors

General: Install windows and glazed doors frames as follows:

- Plumb, level, straight and true within building tolerances.
- Fixed or anchored to the building structure in conformance with the wind action loading requirements.
- Isolated from any building loads, including loads caused by structural deflection or shortening.
- Allow for thermal movement.

Weatherproofing

Flashing and weatherings: Install flashings, weather bars, drips, storm moulds, 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.

Warrant the Façade System against service defects in design, materials and workmanship

Refer to Worksection 0171 *General Requirements*.

END OF SECTION

0453 DOORS AND ACCESS PANELS

Revision history (Revisions are highlighted yellow and deletions are struck through)			
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T00	06/05/2019	Tender	

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1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide doors, frames, doorsets and frames as shown on drawings and described in the schedules.

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- 0160 Quality.
- 0171 General requirements.
- 0451 Window and Glazed Doors
- 0461 Glazing
- 0511 Lining
- 0551 Joinery
- 0581 Signage

1.3 STANDARDS

General

Timber and composite doors: To AS 2688.

Large access doors: To AS/NZS 4505.

1.4 INTERPRETATION

Definitions

General: For the purposes of this worksection the definitions given in AS 2688, AS/NZS 4505 and AS 1905.2 and the following apply::

- Fire-resisting doorset: A doorset which retains its integrity, provides insulation and limits, if required, the transmittance of radiation in a fire.
- Smoke-doorset: A doorset which restricts the passage of smoke.
- Wicket: Door side-hung on the vertical guide and interlocking with the closed curtain

1.5 SUBMISSIONS

Operation and maintenance manuals

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

Products and materials

Type tests: when requested submit results, as follows:

- Fire-resisting and smoke doorsets: To AS 1905.1 and BCA Spec C3.4.
- Weighted sound reduction index (R_w): To AS/NZS ISO 717.1.

Samples

General: Submit 2 samples as follows:

- Colour range from prefinished production material (e.g. anodised or organic coated extrusions and sheet). Following the colour selection, submit 5 sets of samples showing the colour range.
- Door manufacturer's standard hardware items.
- Finishes to prepared surfaces.
- Joints using proposed techniques.
- Proposed sections for frames, louvres, architectural features.

Prior ordering

Submit Statement that the proposed doorsets meet the regulatory requirements, fire engineering brief, construction and warranty requirements specified; noting in detail any exceptions.

Shop drawings

General: Submit shop drawings showing details of each assembly, component and connection and information relevant to fabrication, surface treatment and installation for the following:

- Steel door frames
- Acoustic and fire rated door frames,
- RHS jamb support posts, where required
- Door seals
- Hardware

Fire resistant and smoke sealed doorsets: Submit shop drawings showing details of each assembly, component and connection and information relevant to fabrication, seals, surface treatment and installation.

Motorised overhead doors: Submit shop drawings showing location of motor, wiring, power requirements, location and type of safety devices, location of manual operation switch, and other electronic components.

Subcontractors

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

1.6 INSPECTION

Notice

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

- Door frames in place before building in to masonry.

- Door frames installed before fixing trim.
- Framing or structure to receive tracks and motor.
- Tracks and guides installed before doors or shutters are hung.

1.7 TYPE TESTS

General

Type tests: Type tests are tests conducted on a representative specimen of the assembly to demonstrate that it has attained the specified performance.

Certificates: Submit documentation for each of the type tests required.

- Fire and Smoke resistant doorsets and seals: Submit certification from an independent testing authority showing compliance with the required fire rating to AS 1905.1 and BCA Spec C3.4

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: AZ150 or Z275 as applicable.

Finish: Grind the welds smooth, cold galvanize the welded joints and shop prime. Refer to *Worksection 0671 Painting, Schedules of Finishes and Door Schedule*.

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. Refer also to *Hardware Schedule*.

Assembly methods: Shop assemble fire rated and heavy duty frames by continuous welding. Grind the welds smooth and cold galvanise the welded joints before shop priming.

Knock-down: Do not use or supply.

Hinge reinforcement: Where doorsets include screw fixed hinges, provide with reinforcement plates for flush fitting screw fixed hinges.

Electronic security hardware: Where doorset is fitted with electronic security hardware, provide adequate housing, cut-outs, boxes and the like to protect from mortar and to receive the relevant fittings, such as reed switches, electronic strikes and the like.

Reed switches: Provide housing boxes to suit reed switch location and type. Form from steel sheet of the same type as the frame, with clearance hole top and bottom, and weld into position.

2.2 DOORS

General

Doors: Proprietary products manufactured for interior or exterior applications complete with the manufacturer's standard operating system, hardware, and accessories. Finish as described in the schedules.

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 program applicable to the product. Locate the brand on faces or edges which will be concealed in the works.

Joinery doors

General: Provide joinery doors, as documented.

Flush panel doors

General: Provide flush doors of balanced construction.

Medium density fibreboard doors: Single thickness of moisture resistant general purpose medium density fibreboard with the same surface finish to both sides, for internal use.

Smoke doors: Solid core not less than 35 mm thick, unless noted otherwise in the doors schedule.

Fire rated doors

General: As noted in the doors schedule or on the drawings.

Fire-resistant doorsets: To 1905.1:2015 and BCA Spec C3.4.

Grade: Commercial grade fire doorsets.

Exterior Doors: Provide exterior grade to any exterior doors.

Compliance: The door and frame assemblies shall match a prototype assembly which has been tested in accordance with the provisions of AS 1905.1 and AS 1530, varying only as permitted under AS 1905.1.

Marking : Mark and tag doors and frames in accordance with the provisions of AS 1905.1.

Frames: As noted in the doors schedule or on the drawings. For each fire rated doorset, the frame shall be from the same manufacturer as the leaf of the doorset.

Frame cavities: Fill cavities as follows:

- Masonry and concrete walls: Mortar
- Stud framed walls: Rockwool Fireseal Batts

Metal door faces

Metal facings: Flush faces and edges pressed from metal sheet.

Construction

Adhesives:

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

Door thickness: Thickness of doors shall be as scheduled.

If not scheduled otherwise, verify before commencement, allow door thickness as follows:

- General: 35 mm.
- External doors, solid core 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.

Double doors

Square edged doors: Bevel as necessary to prevent binding between the leaves.

Rebated meeting stiles: If not double acting doors, provide rebated meeting stiles or fix equivalent metal T stop to one leaf. Form rebates to suit standard rebated hardware.

Tolerance

Standard: To AS 2688 clauses 4.1 and 5.3.

2.3 DOORSETS

Automatic door assemblies

Standard: To AS 5007.

Arrangement: As shown on drawings.

Control systems: Refer to *0455 Door hardware*.

Cavity sliding doors

General: Proprietary product comprising steel and timber frame construction with rigid steel top, base and rear supporting members and incorporating the overhead door track, ball race type wheel carriages, guides, stops, split jamb linings and removable pelmet.

Duct access panels

General: Proprietary products comprising metal-faced doors side hung to steel door frames, including hardware and accessories such as hinges and lock and installation lugs.

Fire-resisting doorsets

Standard: To AS 1905.1 and BCA Spec C3.4.

2.4 ANCILLARY MATERIALS

Trims

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

Extruded gaskets and seals

General: provide seals to the **Door hardware/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.

Type: 2mm stainless steel strip

2.5 UNDERCUT DOORS

Requirement

Undercut door leafs where required and as scheduled.

Height of undercut: As required for mechanical system operation.

- Generally: 20 mm, unless noted otherwise in the doors schedule or drawings.

2.6 LIFT-OFF DOORS

Reference

NCC/BCA: Vol 1, Clause F2.5(b)

Locations: Provide lift-off doors:

- where required by the referenced clauses of the BCA
- where scheduled.

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

Installation

General: Install doors in conformance with the manufacturer's recommendations.

Preparation

Substrate: Before start of installation, check the alignment of substrates or framing and adjust if required.

Priming

General: Prime timber door leaves on top and bottom edges before installation.

3.3 DOORSETS

Security screen doorsets (as required or scheduled)

Standard: To AS 5040.

Vision panels

Install in accordance with the Doors Schedule.

3.4 COMPLETION

Operation

General: Make sure moving parts operate freely and smoothly, without binding or sticking, at correct tensions or operating forces and that they are lubricated where appropriate.

Safety: Make sure all safety features are operating.

Remote control devices: Make sure devices are programmed and operating.

Protection

Temporary coating: On or before the date for practical completion, or before joining up to other surfaces, remove all traces of temporary coatings used as a means of protection.

Warranties

General: Submit the manufacturer's published product warranties.

END OF SECTION

0455 DOOR HARDWARE

Revision history (Revisions are highlighted yellow and deletions are struck through)			
Revision	Date	Status	Comment
T00	05/05/2019	Tender	

1	General	1
1.1	Responsibilities	1
1.2	Cross references	2
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1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide Door Hardware In Conformance With The Door Hardware Schedule

Handing: Before supply, verify on site, the correct handing of hardware items.

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.

Operation: Ensure 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 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.

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- 0160 Quality
- 0171 General requirements
- 0451 Windows and glazed doors
- 0453 Doors and access panels
- Also refer to the 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.

1.4 SUBMISSIONS

Execution details

Door-by-door schedule: Submit a door-by-door hardware schedule.

- Information sources: This worksection and the contract drawings.

Re-use of recovered hardware: Submit a proposal describing the standard of cleaning, repair and testing of recovered items and the location where each is to be reused.

Key control system:

- New works: Submit details of the proprietary key control security system proposed by the lock manufacturer for locks required to accept a group key (master, grandmaster).
- Alterations and additions: Submit details to extend the existing key control security system for locks required to accept a group key.

Operation and maintenance manuals

Automatic door operators: Submit the installer's proposal for continuing maintenance after completion on an annual renewal basis.

Manual: Submit the manufacturer's published recommendations for use, care and maintenance of the hardware provided.

Records

Door hardware schedule: Submit an amended schedule, prepared by the door hardware supplier, showing changes to the contract door hardware schedule resulting from the following:

- Approval of a hardware sample.
- Acceptance of an equivalent to a specified proprietary item.
- A contract variation to a door hardware requirement.

Samples

Generic items: Submit samples of hardware items offered as meeting the description of items not specified as proprietary items.

Reconditioned items: Submit samples of hardware items offered as meeting the standard of cleaning, repair and testing of recovered items.

Subcontractors

Automatic door operators: Submit names and contact details of proposed supplier and installer.

Pressure floor mat: Submit names and contact details of proposed supplier and installer.

Technical data

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.

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

Warranties

Automatic door operators: Submit a warranty (or interlocking warranties) from the supplier and installer for the system and its installation, for a period of at least twelve months from the date of practical completion.

1.5 STATUTORY AND PERFORMANCE REQUIREMENTS

Requirements

Fire rated doorsets: All hardware supplied for Fire rated doors shall be hardware tested and approved for use as a component of a fire door assembly to AS 1905.1 - 2015. Provide hardware marked as and where required by AS 1905 Part 1 clause 6.2.

Egress hardware: Shall meet requirements of the Building Code of Australia.

Smoke sealing: Shall meet requirements of the Building Code of Australia.

Acoustic sealing: To the required acoustic ratings, where nominated.

Accessibility set out: Set out hardware in compliance with AS 1428.1.

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.

Replacement items

Door hardware: Match items being replaced with existing unless documented otherwise. Upgrade hinges as necessary to conform to **Hinges for timber doors table** and **Hinges for aluminium doors table**.

2.2 LOCKS AND LATCHES

Standard

General: To AS 4145.2.

Padlocks

Standard: To AS 4145.4.

Lock and latch classification

Rating systems: To AS 4145.1 Section 3.

Performance requirements: To AS 4145.2 Section 3.

2.3 HINGES

Supply and fit

Supply and fit each frame with required hinges.

Hinge fixing

All hinges shall be: Screw fixed hinges
NO welded hinges.

- Exceptions: Where expressly permitted or required by Authorities such as an Energy Supplier for a Substation.

Butt hinge sizes

Provide fixings to receive hinges of sizes as scheduled in the DOOR HARDWARE SCHEDULE.

- IF the SCHEDULE is not available, ALLOW for the hinge sizes in the following in accordance with the clause HINGE TABLES;

- VERIFY prior and not later than SHOP DRAWINGS stage.
- Material: Stainless steel hinges
- Thickness: 1.6 mm min
- Pin: Loose, unless required otherwise for security.

Hinge pins

Exterior or security doors opening out: Provide fixed pin hinges or security hinges.

Hinge materials

Aluminium hinges: Where required, shall be:

- High tensile aluminium with fixed stainless steel pins in nylon bushes, and with nylon washers to each knuckle joint.

Stainless steel hinges: Provide as required and SCHEDULED.

- Generally: External hinges shall be stainless steel.

For doors fitted with closers: Provide low friction bearing hinges.

Screw fixings

Screw fixings shall generally be as follows:

- Hole pattern: Consistent throughout, minimum of 4 hole pattern.
- Screw material: To match hinge material.

Proprietary items

Hinges generally:

- Equal to hinges by Lanes.

Lift-off hinges

Provide hinges as lift-off hinges to doorsets where so required.

Toilet cubicles require lift-off doors, provide lift-off hinges and allow for door panel with sufficient clearance at the head to facilitate door removal.

Broad butt hinges

Material: Stainless steel hinges

Thickness: 2.5 mm min

Pin: Loose, unless required otherwise for security.

Doors fitted with closers: Provide low friction ball bearing hinges.

Fire-resisting doors: To AS 1905.1.

Power transfer hinges: Do not load and install with other compatible hinges.

Lift-off doors: If toilet cubicles require lift-off doors, provide lift-off hinges and allow for door panel with sufficient clearance at the head to facilitate door removal.

Timber solid core doors

Number of hinges: Determine the number of hinges required based on the nominated door leaf size and weight only. For other door leaf sizes or for doors with applied finishes, use the weight of the door to determine the number of hinges required. For a door leaf over 80 kg, use pivot hinges.

Size of hinges: Determine the size of the hinge based on the door leaf thickness:

- 35 to 43 mm thick door: 100 x 75 mm butt hinges with a minimum thickness of 2.5 mm.
- 44 to 55 mm thick door: 100 x 100 mm butt hinges with a minimum thickness of 2.5 mm.
- > 55 mm thick door: Refer to the door by door hardware schedule.

Hinge pin: Supply fixed pins to hinges of doors opening out or designated as a security doors. For all other doors, provide loose pins.

Wide throw: If necessary, provide wide throw hinges to achieve the required door swings in the presence of obstacles such as nibs, deep reveals and architraves.

Hinges for timber doors table

Nominal door leaf size (H x W x T) (mm)	Door leaf weight	Number of hinges
2040 x 400 x 35	≤ 19	2
2040 x 600 x 35	≤ 29	2
2040 x 720 x 35	≤ 35	3
2040 x 820 x 35	≤ 39	3

Nominal door leaf size (H x W x T) (mm)	Door leaf weight	Number of hinges
2040 x 920 x 35	≤ 44	3
2040 x 1020 x 35	≤ 49	4
2040 x 720 x 40	≤ 37	3
2040 x 820 x 40	≤ 42	3
2040 x 920 x 40	≤ 48	3
2040 x 1020 x 40	≤ 52	4
2040 x 720 x 50	≤ 45	3
2040 x 820 x 50	≤ 50	3
2040 x 920 x 50	≤ 57	3
2040 x 1020 x 50	≤ 68	4
2400 x 720 x 40	≤ 50	4
2400 x 820 x 40	≤ 52	4
2400 x 920 x 40	≤ 55	4
2400 x 1020 x 40	≤ 60	4
2400 x 1220 x 50	≤ 72	5
2040 x 920 x 70	≤ 88	Pivot hinges

Aluminium doors

Application: Provide aluminium hinges for aluminium doors, or for doors of other materials in aluminium frames of a weight of 40 kg or less.

Hinges for aluminium doors table

Nominal hinge size (L x W x T) (mm)	Door leaf weight	Knuckles (minimum)	Screws/hinge leaf (minimum)
100 x 70 x 3	≤ 30	3	3
100 x 80 x 3.5	≤ 50	5	4
130 x 50 x 3.4	≤ 75	Interfold	3

Note: Length (L) is the dimension along the knuckles, not including hinge tips, if any, and width (W) is the dimension across both hinge leaves when opened flat.

2.4 DOOR HANGING SYSTEMS

General

Requirement: Provide sliding door tracks as documented in the **Door hardware selection schedule**.

2.5 ANCILLARIES

Bolts

General: Provide bolts including barrel bolts, flush bolts and tower bolts with keepers, including lock plates, staples, ferrules or floor sockets.

Mortar guards

General: For steel door frame installations, provide mortar guards designed to allow the full extension of the lock tongue or similar devices and the correct operation of the locking mechanism.

Rebated doors

General: For mortice locks or latches to rebated doors, provide purpose-made rebated pattern items.

Sliding doors

Locks specified for sliding doors shall have a suitable bolt action of the expanding type in which a pair of claws automatically extend vertically into the staple; or approved equivalent.

Furniture sets

Door furniture shall generally be provided in paired sets.

Where half sets are scheduled, include to provide matching blank plates opposite half sets where appropriate.

Furniture function

Lock and latch furniture shall be suitable for use with the lock or latch to which it is installed.
Lever handles shall have integral springs to counteract sag.

Plates

Provide knobs and lever handles with roses or plates of matching material and finish.

Provide plates with keyways, snib turnbuttons, cut-outs for lock cylinders, and the like, as required by the lock type.

Provide separate matching keyhole plates, escutcheons for cylinder locks, snib turnbuttons, and the like, as required by the lock type.

Provide to exterior plates and roses with concealed fixings by means of metal thread screws passing through the door from inside into tapped blind holes in the plate, or by an equivalent method.

Strike plates

General: Use strike plates provided with the locks or latches. Do not provide universal strike plates.

2.6 DOOR CONTROLLERS

Standard

General: To AS 4145.5.

Performance

Requirement: 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.

Automatic door operators

General: Provide complete automatic door operators for opening and closing doors, including door hanging (hinges, pivots or sliding gear) and electrical connection to distribution board.

Installation: Provide necessary recesses and cores, grout in components where required, and repair any damage. Provide cover plates for access to units in door heads, frames or transoms.

Automatic adjustable function: If the door opening angle or width is manually set below the maximum possible, under conditions of continuous traffic the doors must automatically creep to full opening, returning to reduced opening on the next cycle.

Radio remote door controllers: Provide a device, comprising a radio receiver and separate transmitter, for activating a motorised door operator so as to open and close the door by remote radio signal.

Key switch: If there is no separate access to the enclosure, provide a key switch mounted externally for opening and closing the door from outside the enclosure without the transmitter. Provide two keys.

Light: Provide an internal light which any signal to the receiver also switches on and which remains on for not less than 2 minutes and switches off automatically.

Receiver: House within a wall unit incorporating a push-button switch permanently illuminated. Mount within the enclosure and connect to power.

Transmitter: Portable battery-powered unit sending a coded signal effective up to not less than 12 m from the receiver.

Pressure floor mats: Automatic door activating system consisting of a mat which when deflected by foot pressure operates a switch which activates the door or doors.

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.

Accessibility

Operating forces shall be in compliance with the applicable access requirements including those of: AS 1428.1

Rectification: For any doors that, upon testing, do not comply with the requirements of AS 1428.1:

- Rectify the door, including replacement of any components as necessary until the doors do so comply

2.7 SLIDING DOOR TRACKS AND COMPONENTS

Performance

Requirement: Provide a proprietary sliding doors suspended from overhead tracks and wheel carriages appropriate to the dimensions and weight of the door leafs to suit opening. Refer to architectural drawings and schedules.

Product selections: Selected from an approved manufacturer's range of sliding door hardware sets and components to suit the exposures, applications, installation configurations and service conditions.

Components

Tracks:

- Length: To match the door leaf dimensions and travel configuration.
- Number of tracks: Matched to number of door leaves.

Wheel carriages: Shall be fully adjustable precision ball race type providing smooth quiet operation.

Guides and stops: Provide a complete set of components including the following:

- Concealed guides: Provide groove to bottom of door leafs to receive concealed under door guide
- Adjustable nylon floor guides to suit grooved or ungrooved doors, as applicable.
- Buffer type track stop to limit the travel of the door leaf.

2.8 ELECTRONIC CONTROL DEVICES

General

Requirement: Provide electric strikes, electric locks, drop bolts, or similar devices to suit door construction and hardware.

Electromagnetic hold-open devices: To AS 1905.1 and AS 1670.1.

Fail-safe: Connect door control devices in a fail-safe mode to permit egress in the event of power failure.

Fail-secure: Connect door control devices in a fail-secure mode to prevent egress in the event of power failure.

Authorised products: Provide equipment listed in the ActivFire Register of Fire Protection Equipment.

Glass doors: Provide tumbler, drop bolts or magnetic holders.

Double leaf doors (solid frame): Provide an electric strike or lock on the fixed leaf, connected to the door frame by concealed flexible wiring.

Activation

Activation device: Provide keypads, card readers or other activation devices, and locate next to entry points.

External: Provide weatherproof (IP56) hoods or housings for external units.

Mounting height: 900 to 1100 mm from floor level and not less than 500 mm from internal corners.

2.9 KEYING

Keying requirements

Requirement: Provide door hardware and keys as documented.

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.

For locks keyed to differ and locks keyed alike: Check the quantity against key records, and deliver keys to the contract administrator at practical completion.

Group keying

Keying system: Provide a group keying system as documented in the **Key codes schedule**.

Existing system: Obtain the details of existing group or master key systems to which a new system is required to be an extension.

Future extensions: Provide master and grandmaster group keying systems which are capable of accommodating future extensions.

Keying control security system: If cylinder or pin-tumbler locks accept a group key (e.g. master key, maison key) provide to those locks a proprietary keying control security system.

Stamping: Stamp keys and lock cylinders to show the key codes and/or door number as scheduled.

Identification

Labelling: Supply each key with a purpose-made plastic or stamped metal label legibly marked to identify the key, attached to the key by a metal ring.

Key material

Lever locks: Malleable cast iron or mild steel.

Pin tumbler locks: Nickel alloy, not brass.

Number of keys table

Key code	Key type	Minimum number of keys
GGMK	Great grandmaster keys	2
GMK	Grandmaster keys	2
MK	Master keys	2 per code group
KD	Locks keyed to differ	2 per lock
KA	Locks keyed alike:	
	- 2 locks in code group	4
	- 3 to 10 locks in code group	6
	- 11 to 40 locks in code group	10
	- 41 and over locks in code group	1 per 4 locks or part thereof

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

Locks

Cylinders: Fix vertically and with consistent key alignment.

Door stops

Fixing: Fix on the floor, skirting or wall, as appropriate, to prevent the door or door furniture striking the wall or other surface.

Fasteners

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

- Concealed 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.

Floor springs

General: Form a recess in the floor slab for the floor spring box and grout the box in place so that the cover plate is flush with the finished floor.

Hinges

Metal frames: Fix hinges using metal thread screws.

Timber doorsets: Install butt hinges in housings equal in depth to the thickness of the hinge leaf (except for hinges designed for mounting without housing), and fix with countersunk screws.

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.

Cleaning and Protection

Properly clean work of this section and protect as necessary under various working conditions to avoid damage of any nature.

Repair or replace damaged parts, including repairs to adjacent work damaged in connection with work of this specification

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.

END OF SECTION

0457 EXTERNAL SCREENS AND LOUVRES

Revision history (Revisions are highlighted yellow and deletions are struck through)			
Revision	Date	Status	Comment
T1	30/11/2018	Tender Issue	

1	General	1
1.1	Responsibilities	1
1.2	Cross references	2
1.3	Standards	2
1.4	Interpretation.....	2
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2	Products	4
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2.6	Perforated metal work	6
3	Execution.....	6
3.1	Fabrication	6
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3.3	Embedded fixings	6
3.4	Installation.....	7
3.5	Completion.....	7

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Supply, engineer, fabricate and install a complete assembly of external screens and louvres that are for the sole purpose of setting the performance requirements, prescribing the design intent, and providing schematic profiles, including but not limited to

- Aluminium exhaust louvres, in powercoat finish
- Aluminium privacy screen, in powercoat finish
- Perforated mild steel sheet screens to courtyard exhaust risers and roof mechanical plant, in powdercoat finish.
- Structural supports, conceal fixings and accessories
- Aluminium cover plates, caps and trims.

The drawings are to be considered essentially schematic except for profiles of exposed surfaces and panel arrangement where indicated.

The design must conform to the profiles indicated on the drawings and perform in accordance with the design constraints set out in this specification. The design and installation must meet the requirements of relevant codes and of authorities having jurisdiction over the works.

Take responsibility for the final structural calculations, system design detailing, shop drawings, material installation, cleaning, protection, guarantees and certification.

Performance

Requirements: Conform to the following:

- Plumb, level, straight and true within the building tolerances of the structural system.
- Undamaged and free of surface defects or distortions.
- Fixed or fastened to the building structure.
- Able to resist wind and other actions without vibration or permanent distortion.

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- 0160 Quality
- 0171 General requirements
- 0310 Concrete, refer to structural Engineer's documents.
- 0341 Structural Steel, refer to structural Engineer's documents.
- 0431 Cladding
- 0511 Lining
- 0673 Powder Coatings

1.3 STANDARDS

General

Aluminium framed screens:

- Aluminium and aluminium alloys—Anodic oxidation coatings: to AS 1231
- Stress analysis of members: To AS/NZS 1664.1 or AS/NZS 1664.2.
- Horizontal screen loadings: To AS/NZS 1170.1 Table 3.2.
- Electrically operated external louvres and blinds:
 - . Drive motors: To AS/NZS 60335.2.97
- Structural design actions - Wind actions: to AS/NZS 1170.2
- Access for maintenance: To AS 1657.
- Metal finishing - Thermoset powder coating for architectural applications of aluminium and aluminium alloys: To AS 3715-2002 (R2017)
- Powder coating to metals, other than aluminium: To AS 4506 Appendix I.

1.4 INTERPRETATION

Abbreviations

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

- BMS: Building Management Systems.
- PVC-U: Unplasticised Polyvinylchloride.

Definitions

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

- Screen: Includes external screens to provide privacy or to provide an architectural feature. It applies to fixed, adjustable, operable and automatically controlled types.
- Louvre arrangements:
 - Horizontal: Louvres span between frame stiles or mullions.
 - Continuous horizontal: Louvres run continuously past, and are supported by, concealed mullions.
 - Vertical: Louvres span between frame heads and sills.
- Membrane: A thin and flexible sheet of fabric material.
- Shade fabric: A fabric designed to prevent a proportion of sunlight or other light from reaching the area beyond the shade fabric.
- Tensioned membrane: A thin cloth or sheet that is held in a predetermined 2- or 3-dimensional shape under permanent tension. The shape and the tension are interrelated and designed to safely carry the permanent and imposed loads (such as those resulting from wind actions) in a predictable manner.

1.5 SUBMISSIONS

Certification

Aluminium screens: Submit a report certifying that the screen meets structural design actions to AS/NZS 1170.1 and AS/NZS 1170.2.

Fire performance

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

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

Operation and maintenance manuals

Requirement: At completion, submit the screen manufacturer's recommendations for operation, care and maintenance.

Samples

General: Submit samples of the following:

- Sections proposed for frame members, louvres, accessories, cover panels and trim.
- Joints made, using proposed techniques.
- Colour samples of prefinished production material (e.g. anodised or organic coated extrusions or sheet, glazing, infill panel material or fabric), each at least 200 x 200 mm, showing the limits of the range of variation in the selected colour, if any, for each component of the screens specified.
- Accessory and hardware items documented descriptively or by performance (i.e. not proprietary items). Include handles, operators, controls, switches, sensors, motors, fixing clips, anchor brackets and attachments, fixings, gaskets and weather seals.

Labelling: Label each sample, giving the brand and product name, manufacturer's code reference, date of manufacture and intended building location.

Sample installations: Install the designated typical screens in their final position incorporating at least one example of each component in the system, including attachments to the structure, flashing, caulking, sealing, infill materials, operating hardware and controls.

Required sample installations: full size

Sealant compatibility

Compatibility statements: Submit statements from all parties to the installation that certify the compatibility of sealants with screen components, finishes and all substrates.

Shop drawings

General: Submit shop drawings to a scale that best describes the detail, calculations and specifications conveying the following information:

- Layout of the aluminium screen assembly (sectional plans, vertical sections, and elevations of each building face where screens are to be installed).
- Full size sections of typical members including mullions, transoms, subheads, sills, subsills, infill panel material or fabric, beads, bearings, linkages, exposed fixings, sealant beads, glazing gaskets, splice plates, trays and cover strips, with notes specifying the proposed materials. Verify structural requirements of the nominated item and submit such design and installation certification.
- Lubrication requirements for adjustable or operable louvre screens.
- Method of assembly, including isometric or axonometric and exploded views of typical framing junctions, showing panel to panel joints (for modular systems).
- Method of installation, including the following:
 - . Location and magnitude of reactions to be accommodated by the support structure.
 - . Type and location of fasteners and other attachments to be cast or otherwise built into the building structure.
 - . Erection tolerances.
 - . Accurate locations and full size details of machined slots, keyholes and other penetrations in frame extrusions for lifting and installing the units.
 - . Junctions and trim to adjoining surfaces.
 - . Caulking and flashing.
 - . Locations of visible heads of fasteners.
- Provision for differential vertical or horizontal movements, including the following:

- . Thermal expansion and contraction.
- . Frame deflections.
- Details of motor and operating mechanism enclosures as may be required.
- Method of draining the assembly, including details showing the following:
 - . Pressure equalised drained joints.
 - . Location, number and size of weepholes.
- Connection points to rainwater or stormwater systems when requested.
- Hardware, fittings and accessories including window cleaning restraints and visible heads of fasteners.
- Infill panel stiffening.
- Location and power requirements of motors, sensors and controls.
- Wiring diagrams of control systems and how they connect to BMS.
- Scale drawings and descriptions of prototype external screens.

Subcontractors

General: Submit names and contact details of the proposed manufacturers and, if the manufacturer is not the installer, the installers recommended by the manufacturers.

Warranties

Screens: At completion, submit the manufacturer's published product warranties.

1.6 INSPECTION

Notice

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

- Sample assembly.
- Fabricated screen assemblies at the factory ready for delivery to the site.
- Fabricated screen assemblies delivered to the site, before installation.
- Commencement of installation of screen assemblies.
- Completion of installation.

2 PRODUCTS

2.1 FIRE PERFORMANCE

Combustibility

Cladding: Tested to AS 1530.1.

Fire hazard properties

Bonded laminated materials: Tested to AS/NZS 1530.3. Fire hazard indices, as follows:

- Spread of Flame Index: 0.
- Smoke-Developed Index: ≤ 3 .

2.2 MATERIALS GENERALLY

Aluminium Structures

Design and materials: To AS/NZS 1664.1:1997. Extruded aluminium components manufactured from aluminium alloy 6063, temper T5 or T6.

Structural steel

Design and materials: To AS 4100.

Welding: To the AS/NZS 1554 series.

Galvanizing: To AS/NZS 4680.

Cables

Requirement: Preload cables by cyclic loading to achieve a uniform modulus of elasticity and a linear stress/strain relationship within the working range. Use a swaging system to achieve a breaking strength of terminals not lower than the minimum design strength of the cable system.

Materials: Stainless steel type 316 or galvanized steel.

Fabric

Supply: Supply fabric by a single manufacturer as part of a single batch.

Inspection: Check each roll of material for flatness, faults in the woven fabric and the coatings, where present, by visual inspection in directional sunlight at a distance of 4 m and by passing the membrane over a uniformly illuminated surface.

Stitching: Use UV stabilised polyester thread with a minimum tensile strength of 180 N. Use lock type stitching with a twin needle machine.

Perimeter reinforcing: Reinforce the perimeter of each with UV stabilised polyester, coated with PVC and incorporating pockets for the tension cables.

2.3 METAL FINISHES

Surface preparation

Standard: To AS 1627 series.

Anodised

Standard: To AS 1231.

Thickness: ≥ 15 microns to 20 microns.

Hot-dip galvanizing

Coating mass/thickness minima: To AS/NZS 4680.

Powder coating

Standard for architectural applications: To AS 3715, AAMA 2604, AAMA 2605 or AS 4506, as appropriate. Refer to schedules of finishes and drawings.

2.4 FIXED PANEL TYPE SCREENS

General

Requirement: Provide aluminium infill panel materials mounted in a metal perimeter frame or subframe as follows:

- To withstand imposed actions and wind actions for the location without failure or permanent distortion, and without panel flutter.
- To shed water without pooling.
- Refer to drawings for aluminium screens configuration, extent and types.
- Refer to Schedule of Finishes for aluminium for finishes and types.

Expansion joints

Requirement: Provide for expansion and contraction in continuous sections at spacings not exceeding the manufacturer's recommendations, or 6 m, whichever is the lesser.

Fixing: Provide a fixing system appropriate to the panel material that will retain the panel without distortion or dislocation.

Framing materials

Requirement: Provide frames fabricated from solid or hollow metal sections. Fix to fastener brackets or arms mounted on the face of the building, and brace as necessary with stays, including tensile elements such as wire cables and turnbuckles.

2.5 ALUMINIUM EXHAUST LOUVRES AND PRIVACY SCREENS

General

Requirement: Provide weather proof metal rigidly-fixed horizontal blades louvre, mounted in a metal perimeter frame or subframe and able to withstand the permissible-stress-design wind pressure for that location without failure or permanent distortion of members, and without blade flutter.

Dimension: To conform with Architectural drawings and the mechanical engineers specification.

Location and configuration: To conform with Architectural and Mechanical drawings.

Finish: Power coat, colour to as noted in the Schedule of Finishes. if the colour is not selected, the selection as directed by the Architect.

Vermin proof mesh screens

Requirement: Unless noted otherwise, provide vermin and bird proof mesh to all louvre assemblies.

Material: Corrosion resistant metal vermin and bird mesh.

Fixing: Fix securely to the frame and louvres.

2.6 PERFORATED METAL WORK

General

Requirement: Provide perforated mild steel sheet in powdercoat finish to Courtyard Exhaust Risers, Car park entry door & Roof mechanical plant screen, mounted in a metal perimeter frame or subframe and able to withstand the permissible-stress-design wind pressure for that location without failure or permanent distortion of members, and without blade flutter.

Selection and dimension: To conform with Architectural drawings and the finishes schedule.

Location and configuration: To conform with Architectural drawings and the finishes schedule.

Finish: Power coat, colour to as noted in the Schedule of Finishes. if the colour is not selected, the selection as directed by the Architect.

3 EXECUTION

3.1 FABRICATION

Aluminium fabrication and construction

Standard: To AS/NZS 1664.1 or AS/NZS 1664.2.

Framing System : Fabricate from extrusions to profiles shown on Shop Drawings.

Form junctions so that no fixings, such as pins, screws, pressure indentations and the like are visible on exposed faces.

Show clearly on Shop Drawings fixings any and all which will be exposed.

Cut edges, drill holes, rivet joints and clean flat sheets, neat, free from burrs and indentations.

Remove sharp edges without excessive deformation. Fit mitred joints accurately to a fine hairline.

Pre-assemble the assemblies and match mark before delivery.

Fasteners

Requirement: Provide fasteners of sufficient strength and quality to perform their required function.

Joints

Requirement: Make accurately fitted tight joints so that neither fasteners nor fixing devices create pressure indentations that are visible on exposed faces. Where heads of fasteners are unavoidably visible, finish them to match the adjacent finished surface.

Protection

Corrosion protection: Provide protection against corrosion which may be caused in metals by products or processes normally employed on a building site or by normal atmospheric or other ambient conditions and by-products including rainwater, potable and non-potable water, airborne salt and airborne pollution.

Durability: Provide materials resistant to exposure to weather and UV radiation so that their colour, surface finish, flexibility and water resistance are maintained.

Framing system: Protect metal surfaces as necessary during erection. Finish surfaces free from mechanical imperfections such as scratches, scrapes, dents, spots, stains and streaks

Temporary measures: Do not use adhesive tape, film or paper, or applied coatings liable to bond to the substrate, when exposed to sunlight or weather, as temporary measures to protect screen components during the course of the works. If temporary measures are used, remove all traces, particularly from contact mating surfaces before joining up.

3.2 WELDING

General

Quality: Provide finished welds descaled and free of surface and internal cracks, slag inclusion and porosity. Provide continuous welding unless permanently concealed.

Restrictions: Do not weld as follows:

- On site.
- On finished surfaces.
- Next to a finished surface or glass, unless the adjacent surface is protected from damage.

3.3 EMBEDDED FIXINGS

General

Fixing: Fix screens to the building structure by one of the following methods:

- Fasteners cast into the concrete of the building structure. Do not displace reinforcement, when locating embedded items
- Chemical fixings, expanding bolt sockets.
- Bolting or welding to brackets or structural framing.

Submission: If other methods of fixing (e.g. preformed pockets or explosive tools) are proposed, submit details.

Standard for embedment

For concrete: To AS 3600.

For masonry: To AS 3700.

Fixing brackets

Requirement: Provide fasteners and other methods of attachment of the screens to the structure with the following characteristics:

- Three-way adjustment to accommodate fabrication and construction tolerances.
- Provision for building movements while fixing the screens in their correct positions.
- Adequacy for structural design actions.

Protection

Cast-in items: Prevent the entry of concrete slurry into bolt holes, channels, and other openings for the fasteners. Fill the openings using an easily removed water repellent material before casting in.

Placement

Tolerance:

- Maximum deviation from correct position: 13 mm.

Fastener channels embedded parallel or perpendicular to the edge of a concrete structural member:

- Minimum length of embedded anchor: 200 mm.
- Minimum distance from the concrete edge to the nearest part of the anchor: 100 mm.

3.4 INSTALLATION

General

Install items in accordance with manufacturer's instructions.

Install screens so that the frames:

- are plumb, level, straight and true within acceptable building tolerances;
- are adequately fixed or anchored to the building structure; and
- will not carry any building loads, including loads caused by structural deflection or shortening.

Installation tolerance

Alignment:

- Maximum deviation of any member from its true alignment (plumb, level, or line of slope): 1:1000, up to a maximum of 10 mm in a continuous run of members in one direction.
- Maximum misalignment between adjoining members: 1 mm.

Position:

- Maximum deviation of any part from its true position: 10 mm

Marking

Requirement: Before the separate parts of the screens are delivered to the site, provide suitable and sufficient marks or other means for identifying each part, and for showing its correct location and orientation, when installed.

Reference lines and marks

Requirement: Provide on each floor, in agreed locations, accurate perimeter offset reference lines, plumb with corresponding lines on other floors, and height benchmarks.

3.5 COMPLETION

Cleaning

Requirement: During erection, promptly remove foreign matter from the screens without damage to finishes

Method: Clean all visible surfaces with soft clean cloths and clean water or approved cleanser, finishing with a clean cloth. Do not use abrasive or alkaline materials.

END OF SECTION

0461 GLAZING

Revision history (Revisions are highlighted yellow and deletions are struck through)			
Revision	Date	Status	Comment
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1	General	1
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1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Supply, engineer, fabricate and install a complete assembly of glazing and glass components with all required glass and glazing accessories, framing and sub framing, stiffening, anchorage, brackets, fasteners, flashing, trims, joints-sealants, hardware, operators and finishes, coordination with building services, and interfaces with adjacent work and the following:

- Glazed doors, door glass viewing panels and glazed partitions
- Mirrors
- Refer to drawings and schedules of finishes
- Design requirement reports

Performance

Provide glazing systems capable of withstanding specified temperatures and associated thermal movement and wind and impact/maintenance loads (where applicable) without failure, including reduction in performance or glass breakage attributable to the following:

- Glass type and thicknesses to comply with AS 1288
- Sealants or gaskets to remain watertight and airtight
- Provide glass for facade system mock ups for verification and approval

- Thermal qualities: U-Value and Solar heat gain coefficient as specified in the Sustainability Management Plan Report.

Responsibility must be taken for the design, structural calculations, glazing system design detailing inclusive of fabricated metalwork components, shop drawings, material installation, cleaning, protection, guarantees and certification.

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- 0160 Quality
- 0171 General requirements
- 0181 Adhesive, sealants and fasteners
- 0183 Metal and prefinishes
- 0451 Window and Glazed Doors
- 0551 Joinery

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.

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

1.4 INTERPRETATION

Abbreviations

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

- R_w: Weighted sound reduction index.

1.5 SUBMISSIONS

Certification

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

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.

Balustrade design: Submit a professional engineers' certificate confirming conformance with AS/NZS 1170.1 clause 3.6.

Sealant compatibility: Submit statements from all parties to the installation certifying the compatibility of sealants and glazing systems to all substrates.

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

- Not detrimental to the long term structural performance, weathering capabilities and visual qualities of the glass.
- Not cause delamination or other impairment to laminated glass during the service life.

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:

- 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.

Samples

Size: Submit samples of glazing materials, each at least 200 x 200 mm, showing specified visual properties and the range of variation, if any, for each of the following types of glass or glazing plastics:

- Tinted or coloured glass or glazing plastics.
- Surface modified or surface coated glass.
- Patterned or obscured glass or glazing plastics.
- Ceramic-coated glass.
- Wired glass.
- Insulating glass units.
- Mirror glass.

Shop drawings

Requirement: Submit shop drawings showing the following:

- Method of glazing
- Rebate depth.
- Edge restraint.
- Clearances and tolerances.
- Glazing gaskets and sealant beads.
- Pocket fixing details for frameless glass balustrades.

Subcontractors

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

Evidence of experience: Minimum 5 years

Warranties

Requirement: Specified in the worksection 0171 GENERAL REQUIREMENTS specification. Refer to the end of this specification also.

1.6 INSPECTION

Notice

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

- Glass products before they are installed.

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.

Ceramic-coated glass

Heat strengthened or toughened glass with a coloured ceramic coating fused to and made an integral part of the surface: To ASTM C1048, Condition B.

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: To ASTM C1048.

Insulating glass units (IGUs)

Manufacture and installation: To AS/NZS 4666.

Glass thickness selection: 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.

AAMA 800 exterior perimeter sealing compound definitions:

808.3: Perimeter sealing compound intended to remain elastic or ductile and to permit movement without loss of bond.

Jointing materials

Requirement: Provide recommended jointing and pointing materials which are compatible with each other and with the contact surfaces and non-staining to finished surfaces. Do not provide bituminous materials on absorbent surfaces.

Elastomeric sealants

Sealing compound (polyurethane, polysulphide, acrylic): To ASTM C920 or ISO 11600.

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

Sealing compound (butyl): To ASTM C1311

Priming

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

Movement 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

2.1 MIRRORS

Reflective surface

Type: Silver layer deposited on the glass or glazing plastic.

Protective coatings: Copper free coating, at least 5 µm thick, and 2 coats of mirror backing and edge sealing paint having a total dry film thickness of at least 50 µm.

Venetian silvered mirror (one way vision glass): 15 mm wide silvered strips alternating with 3 mm wide clear strips.

Safety mirror

Type to AS 1288: Vinyl backed Grade A safety mirror.

Safety compliance: To AS/NZS 2208.

Solid backed annealed glass mirrors

Backing: 9 mm waterproof plywood.

Adhesive fixing to backing: Non-acidic silicone adhesive at the rate recommended by the manufacturer.

2.2 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.

2.3 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.

2.4 HUMAN IMPACT MANIFESTATION MARKINGS (SAFETY DECALS)

Description

Explanation: Safety decals are decals on fixed glazed panels that may be mistaken for unimpeded openings.

Requirement

Provision: Provide Human Impact Manifestation Marking as required for compliance with:

- AS 1428.1 Clause 6.6
- AS 1288 Clause 5.19

Marking: Decal adhesive fixed to internal face of glass.

- Position on glass: As required to meet AS 1288 cl. 5.19 and AS 1428.1.

Pattern:

- Custom pattern to the requirements of the PRINCIPAL.
 - Artwork supplied by PRINCIPAL

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.

Frameless installations: Join the vertical edges of adjacent glass panels with silicone jointing compound

Preglazing

Window assemblies and glazed doors: Supply inclusive of glazing, shop preglazed.

Curtain walls: Supply inclusive of glazing, shop preglazed.

3.3 FIXING MIRRORS

Vinyl backed Grade A safety mirrors and solid backed annealed glass mirrors

Solid backed annealed glass mirrors:

- Installation to backing: Clean the back of the glass panel and apply walnuts of adhesive together with double sided adhesive tape for temporary support and affix directly to the backing.

Screw fixing: Fix direct to wall plugs with dome-headed chromium-plated screws in each corner and at 900 mm maximum centres around perimeter. Provide polyethylene sleeves and washers to prevent contact between screw and glass. Do not over-tension the screws.

Frame fixing: Proprietary aluminium frames to mirror perimeter, corners mitred. If unbacked, bed glass edges in a continuous resilient gasket. Attach the frame to the substrate with concealed screw fixings. Seal the frame to the substrate with paintable sealant which will not react with the mirror coating. Do not allow the sealant to contact the mirror back.

Bead fixing: Rebated timber beads to mirror perimeter, corners mitred. If unbacked, bed glass edges in a continuous resilient gasket. Screw fix the beads to the substrate.

Clip fixing: Fix direct to wall plugs with chromium-plated fixed clip and spring clip fixings at 900 mm maximum centres around perimeter. If unbacked, provide polyethylene or cork washers to prevent contact between clips and mirror back.

Proprietary Mirror Wardrobe Systems

Proprietary brand mirror faced wardrobe door systems installed in accordance with manufacturer's printed instructions.

3.4 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.

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.

END OF SECTION

0471 THERMAL INSULATION AND PLIABLE MEMBRANES

Revision history (Revisions are highlighted yellow and deletions are struck through)			
Revision	Date	Status	Comment
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1	General	1
1.1	Responsibilities	1
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1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide thermal insulation and pliable membrane systems to walls, roof areas in accordance with the BCA Section J requirements.

Performance

Requirements:

- Complete for their function.
- Conforming to the detail and location drawings.
- Firmly fixed in position.
- Maintain their performance for the life of the building

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- 0160 Quality
- 0171 General requirements
- 0423 Roofing - profiled sheet metal
- 0434 Cladding
- 0472 Acoustic insulation
- 0511 Lining

1.3 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.
- Fire hazard properties: 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.

1.4 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).

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.

Warranties

Manufacturer's published product warranties: Submit on completion.

1.5 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 .

Non-combustible construction required: Comply with BCA requirements.

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 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.

Vapour barrier:

- Vapour barrier classification: Class 1.

Sarking membrane (other than walls and gables):

- Water control classification: Water barrier.

Vapour permeable (breathable) membrane: Minimum Class 4.

Fasteners and supports

General: Metallic-coated steel.

Mesh support to roof insulation

Metallic-coated steel wire netting: To AS 2423 Section 4.

- Size: 45 mm mesh x 1 mm diameter.

Welded safety mesh: To AS/NZS 4389.

3 EXECUTION

3.1 GENERAL

Bulk insulation

Requirement: To AS 3999 and BCA J1.2.

Requirement: 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.

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

Pliable membrane

Installation: To AS/NZS 4200.2 and BCA J1.2 or BCA 3.12.1.1, as appropriate.

3.2 WALL

Framed wall thermal break strips

Product type: Proprietary item.

Application: To steel framing with lightweight external cladding.

R-Value: ≥ 0.2 .

Screw fixing: Button head screws at 1 m centres.

Adhesive fixing: Wallboard adhesive walnuts at 1 m centres.

Framed walls – bulk insulation

Product type: Fibre batts.

Installation: Friction fit between framing members. If other support is not provided, staple nylon twine to the framing and stretch tight.

Masonry veneer cavity walls

Product: Rigid cellular insulation board.

Application: To steel or timber framing.

Installation: Horizontally with the tongue to the top edge, pushed over prefixed wall ties and held firmly against the wall frame. Keep boards clean and dry and free from mortar and grout. Do not bridge the cavity.

Fixing: Hex head screws at 450 mm centres.

Flashings: Install flashings before installing insulation panels. Prevent entry of water behind the insulation boards.

Full masonry – cavity walls

Product: Rigid cellular insulation board.

Application: To the inner masonry skin.

Installation: Horizontally with the tongue to the top edge and firmly against the inner masonry skin. Keep boards clean and dry and free from mortar and grout. Do not bridge the cavity.

Fixing: Proprietary plastic clips on pre-installed wall ties.

Flashings: Install flashings before installing insulation panels. Prevent entry of water behind the insulation boards.

Full masonry walls – internal face

Product type: Rigid cellular extruded boards.

Preparation of substrates: Conform to the following:

- Remove any deposit or finish which may impair adhesion.
- Remove excessive projections and fill voids and hollows with plaster.
- Maximum surface deviation from a 2400 mm straightedge: 6 mm.

Substrate correction: Skim plaster.

Installation: Apply boards horizontally with staggered vertical joints, all close butted and without crushing.

Fixing: Proprietary adhesive compatible with the insulation. Apply sufficient pressure to evenly distribute adhesive.

Vapour permeable (breathable) membrane

Application: Provide a vapour permeable membrane behind external facing material which does not provide permanent weatherproofing or which may be subject to condensation forming on the internal face, including the following:

- Boards fixed vertically or diagonally.
- Boards or planks fixed in exposed locations where wind driven rain can penetrate the joints.
- Unpainted or unsealed cladding.
- Masonry veneer.

Installation: Run the vapour permeable membrane horizontally on the outer face of external wall framing, over the flashing, from the bottom plate up. Pull taught over the framing and fix to framing members. Seal across the wall cavity at the top.

Horizontal laps: At least 150 mm wide, lapped to make sure water is shed to the outer face of the membrane.

End or vertical overlaps laps: At least 150 mm wide made over framing.

Openings: Run the vapour permeable membrane over the openings and leave covered until windows and doors are installed. Cut the membrane on a 45° diagonal from each corner of the opening, fold the flaps inside and fix to the inside frame of the opening. If the membrane is used to provide a continuous air tight layer, seal all joints with pressure sensitive adhesive tape.

Fixing: Install as follows:

- Timber frames: Metallic-coated clouts, 20 mm long 6 to 8 mm staples or punched multi-point metallic-coated steel brads.
- Steel or aluminium frames: Hex head screws, with either 20 mm diameter washers or through hardboard strips.
- Plywood: Alternatives:
 - . Metallic-coated clouts, 20 mm long 6 to 8 mm staples or punched multi-point metallic-coated steel brads at minimum 300 mm centres.
 - . Water based contact adhesive with a 50% adhesive cover.

3.3 ROOFS

General

Location: The whole of the roof area including skylight shaft walls, except the following:

- Eaves, overhangs, skylights, vents and openings.
- Roofs to outbuildings, semi-enclosed spaces.

Mesh support to roof insulation

Locations: Provide support to the following:

- Sarking, vapour barrier or reflective thermal insulation membranes laid over roof framing members which are spaced at more than 900 mm centres.
- Blanket type thermal insulation laid over roof framing members 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.

Installing welded safety mesh: To AS/NZS 4389.

Pliable membranes

Sarking membrane:

- Location: Provide sarking under tile and shingle roofing.

Vapour barrier:

- Installation: Lay over the roof framing with sufficient sag to allow the bulk insulation to achieve its full thickness. Overlap all edges 150 mm and seal all joints with pressure sensitive adhesive tape.

Metal roofs – bulk insulation

Product: Fibre blankets or batts.

Installation:

- Batts: Fit tightly between framing members.
- Blanket for sound insulation: Install over the roof framing, reflective thermal insulation (if any), and mesh support, so that the blanket is in continuous contact with the underside of the metal roofing sheets.
- Combined blanket and reflective insulation: Lay facing reflective insulation face downwards over safety mesh.

Waterproof membrane roofs – IRMA/PMR types

Product type: Rigid cellular extruded sheets.

Preparation: Make sure membrane is clean and free of loose material.

Separation layer: Lay over membrane with edges lapped 300 mm and turned up at upstands and penetrations.

Installation: Lay insulation boards in brick pattern with shiplap edges pushed together firmly, cut neatly around penetrations and extend up upstands.

Ceiling insulation – bulk insulation

Product type:

- Framed ceilings: Fibre batts.
- Suspended ceiling: Fibre blanket.

Application: Over ceiling lining.

Installation:

- Batts: Fit tightly between framing members.
- Blankets: Butt joint and lay over ceiling panels or lining.

3.4 COMPLETION

Warranties

Insulation and pliable membranes: Submit the manufacturer's published product warranties.

END OF SECTION

0472 ACOUSTIC INSULATION

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1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide acoustic insulation to walls, services within and/or adjacent to apartments in accordance with the BCA Part F5 requirements.

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- 0160 Quality
- 0171 General requirements
- 0181 Adhesives, Sealants and Fasteners
- 0471 Thermal Insulation and Pliable Membranes
- 0511 Lining
- 0531 Suspended Ceilings

1.3 INTERPRETATION

Definitions

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

- Acoustic insulation: Materials or methods of construction to reduce the transmission of airborne and structure-borne sound through floors, walls and ceilings or other enclosing elements in buildings.
- Acoustic material: Building material with specific acoustic properties to achieve sound transmission loss, sound absorption, damping of resonance or resilience against impact noise.

- Acoustic underlay: A resilient material laid between the structural floor and the flooring material to provide sound isolation.
- Airborne sound: Sound radiated directly from a source, such as a loudspeaker or machine, into the surrounding air.
- Fire hazard properties: To BCA A2.4.
- Fibre batts: Flexible insulation supplied as factory cut pieces and composed of mineral wool (glass and rock fibre) or polyester fibre.
- FBS-1 (fibre-bio-soluble) mineral wool: Insulation composed of bio-soluble glass or rock fibres.
- Impact sound: Sound caused by impacts on building structure. Typical sources include footsteps, dropped objects on horizontal surfaces and the slamming of doors.
- Sound insulation (isolation): Reduction of sound energy passing through building elements.
- Structure-borne sound: Sound waves transmitted within the building structure and re-radiated into other spaces as airborne sound. Typical sources include direct impact from dropped objects and vibrating machinery.

1.4 SUBMISSIONS

Acoustic insulation properties

Evidence required: A report issued by a Registered Testing Authority, a Certificate of Accreditation issued by a State accreditation body or approved equivalent, that the building element system meets compliance with BCA sound transmission requirements and acoustic report.

Fire hazard properties

Requirement: Submit evidence of conformance to PRODUCTS, **GENERAL, Fire hazard properties** in accordance with BCA, Appendix C1.10 – Early Fire Hazard Properties for materials.

Warranties

Manufacturer's published product warranties: Submit on completion.

1.5 INSPECTION

Notice

Inspection: Give notice so inspection may be made of the insulation installed before it is covered up or concealed.

2 PRODUCTS

2.1 GENERAL

Fire hazard properties

Fire hazard indices for all materials: Conform to the following tested to AS/NZS 1530.3:

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

Facing materials Flammability Index tested to AS 1530.2: ≤ 5 .

Non-combustible construction required: Comply with BCA requirements.

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 INSULATION MATERIALS

Bulk insulation

Mineral wool blankets and batts: Glasswool and rockwool bonded with thermosetting resin.

Polyester blankets and batts: Thermally bonded polyester fibres.

Board insulation

Mineral wool panels: High density glasswool and rockwool bonded with thermosetting resin.

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

Composite plasterboard panels: Proprietary items.

Flexible sheet insulation

Impregnated vinyl: Lead impregnated vinyl sheeting.

Recycled rubber/cork: Recycled rubber granules and/or cork bound with polymers.

Fasteners and supports

General: Metallic-coated steel.

Resilient mounts: Proprietary fixing clips with rubber or acrylic pads.

Adhesives

General: Compatible with the substrate and the insulation.

Sealants

Acoustic sealant: Non-hardening sealant compatible with the substrate materials.

Fire-resisting sealant: Non-hardening sealant compatible with the substrate materials and having a fire-resistance rating equal to that of the building element it seals.

Sealant strips: Closed cell resilient foam.

3 EXECUTION

3.1 GENERAL

Bulk insulation

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.

Glasswool and rockwool insulation: Conform to the ICANZ Industry code of practice for the safe use of glass wool and rock wool insulation.

Marking: Deliver mineral wool products to site in packaging labelled FBS-1 BIOSOLUBLE INSULATION.

3.2 WALL SYSTEMS

Framed walls and partitions – bulk insulation

Product type: Fibre batts.

Installation: Friction fit between framing members. If other support is not provided, staple nylon twine to the framing and stretch tight.

Framed walls and partitions – rigid insulation

Product type: Mineral wool panels.

Installation: Fix to face of studs with adhesive and temporarily fasten with single screw until plasterboard installed.

Full masonry – cavity walls

Sheet size: Select or cut to suit wall tie spacing.

Flashings: Install flashings before installing insulation. Prevent entry of water behind the insulation.

Full masonry walls – internal face

Product type: Mineral wool panels.

Preparation of substrates: Conform to the following:

- Remove any deposit or finish which may impair adhesion.
- Remove excessive projections and fill voids and hollows with plaster.
- Maximum surface deviation from a 2400 mm straightedge: 6 mm.

Substrate correction: Skim plaster.

Installation: Apply boards horizontally with staggered vertical joints, all close butted and without crushing.

Fixing: Adhesive compatible with the insulation. Apply sufficient pressure to evenly distribute adhesive.

3.3 CEILINGS

Suspended ceilings – bulk insulation

Product type: Fibre batts and blankets.

Installation: Lay batts/blankets over the ceiling system close butted to each other and to the suspension rods.

Framed ceilings – bulk insulation

Product type: Fibre batts.

Installation: Fit tightly between framing members. If support is not otherwise provided, staple nylon twine to the framing and stretch tight.

3.4 PLENUM BAFFLES

Baffles

General: Install plenum baffles so that they fit closely up to the surfaces of the building structure, service ducts, pipes and conduits and to the top of the partition or the suspended ceiling structure directly above the line of the partition. Seal the joints, penetrations and intersections and maintain the documented acoustic performance.

Bulk insulation to plenum baffles: Install individual layers to fill space between building structure and the top of the partition or the suspended ceiling.

Flexible sheet plenum baffles: Fix to soffit through a continuous furring channel, hang to meet the top of the partition and extend horizontally 900 mm over the suspended ceiling.

3.5 FLANKING SOUND INSULATION

Penetrations

Ductwork and piping: Refer to services documents and to the Acoustic Report

Abutments

Seal: Refer to *Adhesives, Sealants and Fasteners* and the Acoustic Report.

Cable management

Power outlets: Do not install general purpose socket outlets back to back. Separate adjoining socket outlets with a continuous layer of the nominated wall insulating material.

Ducted skirtings: If a ducted skirting extends continuously across an abutment, pack the cavities firmly with bulk insulating material for 300 mm each side of the abutment and scribe and seal the joint.

4 SELECTIONS

4.1 ACCEPTABLE MANUFACTURES

General: Approved equivalent to CSR BRADFORD www.bradfordinsulation.com.au

Provide the work in accordance with the requirements stated in the clause DESIGN REQUIREMENTS REPORTS of the specification 0171 General Requirements

END OF SECTION

0511 LINING

Revision history (Revisions are highlighted yellow and deletions are struck through)			
Revision	Date	Status	Comment
T00	06/05/2019	Tender	

1	General	1
1.1	Responsibilities	1
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1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide complete internal lining systems, as shown on drawings and schedule of finishes of the following:

- Plasterboard
- Fibre Cement boards
- Particleboard or fibreboard
- Other linings as shown on drawings, wall types schedule and described in the schedules of finishes

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:

- 0160 *Quality*
- 0171 *General requirements*
- 0342 *Light steel framing*
- 0471 *Thermal Insulation and pliable membranes*
- 0472 *Acoustic Insulation*
- 0531 *Suspended ceilings*
- 0551 *Joinery*
- 0671 *Painting*

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: A panel manufactured under pressure and heat from wood particles and/or lignocellulosic material with the addition of an adhesive.
- Wet processed fibreboard (hardboard): A panel material 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 PERFORMANCE, 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.

Warranties

Requirement: Specified in the GENERAL REQUIREMENTS specification.

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

1.6 INSPECTION

Notice

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

- Substrate or framing before installation of linings.
- Finished surface of installation before applying:
 - . Sealer.
 - . Finish coatings or decorative papers.

2 PRODUCTS

2.1 GENERAL

Storage and handling

Requirement: Dry and undamaged lining stacked in pallets horizontally on a smooth, level surface. Prevent distortion or moisture ingress.

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.

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 FIRE PERFORMANCE

Fire hazard properties

Group number: To AS 5637.1.

2.3 PLASTERBOARD

General

Standard: To AS/NZS 2588.

Location: Refer to drawings and schedule of finishes

Grade: Standard, fire-rated and water resistant

Thickness (mm): Refer to Wall type schedules

Edge finish: Recessed

2.4 FIBRE CEMENT

General

Standard: To AS/NZS 2908.2.

Wall and ceiling linings: Type B category 2.

Minimum thickness:

- Internal applications: 6 mm, uno
- External applications: 9 mm, uno
- Refer to Wall Types drawings

Location: Refer to drawings and schedules of finishes

2.5 PLYWOOD AND BLOCKBOARD

General

General interior use: To AS/NZS 2270.

Areas requiring moisture resistance: To AS/NZS 2271.

Visible surfaces with a clear finish: Veneer quality A.

Other visible surfaces: Veneer quality B.

Back/face veneer: Veneer quality C or D.

Preservative treatment (if applicable): To AS 1604.3

Presealed plywood: Plywood pre-sealed both sides and edges with a machine applied sealer.

Plywood formaldehyde emission class to AS/NZS 2270 and AS/NZS 2271

2.6 PARTICLEBOARD

General

Standard: To AS/NZS 1859.1.

Classification: To suit application as per AS/NZS 1859.1. The application shall be compatible with the defined properties of the material.

Particleboard formaldehyde emission class to AS/NZS 1859.1

2.7 WET PROCESSED FIBREBOARD

General

Hardboard, medium board and softboard: To AS/NZS 1859.4.

General purpose board

General purpose: Interior use generally.

Tempered (MR) board

Location: For areas with humid conditions or subject to occasional wetting.

Veneered general purpose board

Location: Timber veneer faced to one or both sides for decorative ceiling and wall lining.

Softboard

Location: Pinboards and insulation boards for roofing/ceiling, walls, partitions and doors.

Hardboards

Proprietary Item: approved equivalent to "EcoWall" by Weathertex Pty Ltd.

Profile: EcoWall Smooth

Thickness: 9.5mm

Profile and dimensions: Conform with Drawings and Schedule of Finishes

Finish: Paint the panels as specified following priming of all sawn edges with solvent-borne or latex tanning-resistant wood primer

2.8 DRY PROCESSED FIBREBOARD (INCLUDING MEDIUM DENSITY FIBREBOARD)

General

Standard: To AS/NZS 1859.2.

Melamine overlaid medium density fibreboard: Medium density fibreboard (STD MDF) overlaid on both sides with low pressure melamine.

Dry-processed fibreboard formaldehyde emission class to AS/NZS 1859.2

2.9 DECORATIVE OVERLAID WOOD PANELS

General

Standard: To AS/NZS 1859.3.

2.10 HIGH PRESSURE DECORATIVE LAMINATE SHEET

General

Standard: To AS/NZS 2924.1.

2.11 COATED STEEL

General

Standard: To AS 1397.

- Coating class interior: Z275.
- Coating class exterior: Z450.

2.12 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.

Multiple sheet layers

Application: Fire-resistance rated and acoustic rated walls.

Joints: Fill and flush up all joints and fasteners in each layer and caulk up perimeters and penetrations before installing following layers. Stagger all sheet joints by minimum 200 mm.

Joints

Flush joints: Provide recessed edge sheets and finish flush using perforated paper reinforcing tape.

Butt joints: Make joints over framing members or provide back blocking.

External corner joints: Make joints over metallic-coated steel corner beads.

Dry joints: Provide square edged sheet and finish with a PVC-U joining section.

Control joints: Provide purpose-made metallic-coated control joint beads at not more than 12 m centres in walls and ceilings and to coincide with structural control joints.

Wet areas: Install additional supports, flashings, trim and sealants as required.

Joints in tiled areas: Do not apply a topping coat after bedding perforated paper tape in bedding compound.

3.3 FIBRE CEMENT LINING

Installation

Joints and layout: Run sheets across the framing members. In flush jointed applications, stagger end joints in a brick pattern and locate them on framing members, away from the corners of large openings. Provide supports at edges and joints.

Supports

General: Install timber battens or proprietary cold-formed galvanized steel furring channels as follows:

- Where framing member spacing exceed the recommended spacing.
- Where direct fixing of fibre cement is not possible, due to the arrangement or alignment of the framing or substrate.
- Where the lining is the substrate for tiled finishes.
- If required for penetrations for services, including mechanical grilles and lighting fixtures.
- If required to support fixtures.

Fixing

Timber framed construction: Nail only or combine with adhesive.

Steel framed construction: Screw only or combine with adhesive.

Wall framing: Conform to the following:

- Do not fix to top and bottom plates or noggings.
- In tiled areas: Provide an extra row of noggings immediately above wall-to-floor flashings. Fix sheet at 150 mm centres to each stud and around the perimeter of the sheet.

Masonry wall construction: Conform to the following:

- Direct fixing: Adhesive fix to the masonry except where lining forms a substrate for tiled finish.
- Furring channels: Fix using screw and/or adhesive.

Ceilings: Fix using screw and/or adhesive to ceiling furring members. Do not fix sheets directly to the bottom chords of trusses.

- Ceiling battens: Fix at 600 mm maximum centres.

Wet areas: Do not use adhesive fixing alone.

Multiple sheet layers

Application: Fire-resistance rated and acoustic rated walls.

Joints: Fill and flush up all joints and fasteners in each layer and caulk up perimeters and penetrations before installing following layers. Stagger all sheet joints by minimum 200 mm.

Joints

Joint width:

- Butt joints: 1 to 2 mm.
- Exposed joints: 10 mm maximum.

Joint backing for exposed joints: Black self-adhesive polyurethane tape.

Flush joints: Provide recessed edge sheets and finish flush using perforated paper reinforcing tape.

External corner joints: Make joints over metallic-coated steel corner beads.

Dry joints: Provide square edged sheet and finish with a PVC-U joining section.

Control joints: Provide control joints to coincide with structural control joints and as follows:

- Walls: ≤ 7.2 m centres.
- Ceilings: To divide into bays not larger than 10.8 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 HARDBOARD CLADDING

Installation

General: Install in accordance with the Manufacturer's current instructions and recommendations, Weathertex "ecowall architectural panels".

Structural Support: Timber stud framing direct fix to frame.

- Installation: Provide stud framing at maximum 600 mm centres.

Fasteners: In accordance with the manufacturer's recommendations and to satisfy the design wind conditions applicable to the site.

Accessories: Provide product specific joiners, corner treatments and flashings recommended by the Weathertex Installation Manual as necessary to complete the installation.

3.5 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.

3.6 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.

END OF SECTION

0531 SUSPENDED CEILINGS – COMBINED

Revision history (Revisions are highlighted yellow and deletions are struck through)			
Revision	Date	Status	Comment
T00	06/05/2019	Tender	

1	General	1
1.1	Responsibilities	1
1.2	Cross references	2
1.3	Standards	2
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1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide a complete system of suspended ceilings to the following:

- Plasterboard ceilings and bulkhead linings
- Flush fibre cement ceilings
- Suspended ceiling grids and support framing, as required
- Ceiling access panels
- Insulating material

1.2 PERFORMANCE

Requirement

Provide installations to achieve the performance required in each case, including:

- Sound ratings

- Thermal ratings
- Structural integrity

1.3 CROSS REFERENCES

General

Requirement: Conform to the following:

- 0160 Quality
- 0171 General requirements.
- 0382 Light timber framing
- 0511 Lining.

1.4 STANDARDS

General

Suspended ceilings: To AS/NZS 2785.

Luminaire and air diffuser interface: To AS 2946.

1.5 INTERPRETATION

Definitions

General: For the purposes of this worksection the definitions given in AS/NZS 2785 and the following apply:

- Ceiling unit: Tile, panel, plank, strip or open grid supported within a ceiling suspended system.

1.6 TOLERANCES

Suspension system

Flatness, twist, winding and bow: 1.5 mm deviation from a 1.5 m straightedge placed in any position.

Sheeted or flush ceiling system

Suspension system bearing surface for flush lined ceiling: To AS/NZS 2589 Table 4.2.2.

Suspended grid system deflection: To AS/NZS 2785 Table 3.4.4.

1.7 SUBMISSIONS

Fire hazard properties

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

Operation and maintenance manuals

General: On completion, submit manufacturer's recommendations for the care and maintenance of the ceiling, and operating instructions for demounting, if applicable.

Products and materials

Type tests: Submit results as follows:

- Weighted suspended ceiling normalized level difference: To AS/NZS ISO 717.1.
- Weighted sound absorption coefficient: To AS ISO 11654, as tested to AS ISO 354.

Prototypes

General: Provide a prototype of the ceiling system, including at least one example of each of the specified components, including services terminals.

Size: At least 10 m².

Samples

General: Submit samples as follows:

- Suspension system: Sections proposed for the suspension system, including suspension rods, clips, wall angles and trim.
- Ceiling material: Lining and ceiling units, with insulation, showing the extremes and mean of variation in colour, pattern, or texture of the proposed finish.
- Methods: Methods of jointing, fixing, height adjustment, retaining and removing ceiling units.

Shop drawings

Set-out drawings: Submit proposed set-out, indicating cut ceiling units if any, before installation. Coordinate with plenum services layouts, building structure and other factors affecting the layout.

Warranties

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

1.8 INSPECTION

Notice

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

- The suspension system before the installation of ceiling units or lining.
- The ceiling assembly before the installation of fittings and site painting, if applicable.
- The completed ceiling.

2 PRODUCTS

2.1 GENERAL

Fire hazard properties

Group number: To AS 5637.1.

Fire-resistance of building elements

Fire-resistance level: Test to AS 1530.4.

Product substitution

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

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 CEILING SYSTEMS

Proprietary systems

Consistency: Provide suspended ceilings as complete proprietary systems, fabricated by one manufacturer.

Installation: Specialist installers recommended by the ceiling system manufacturer.

Support: Fix proprietary suspension system to the structural soffit.

2.3 SUSPENSION SYSTEM

Proprietary systems

General: Provide a complete ceiling suspension ceiling system approved equivalent to "Rondo KEY-LOCK® Concealed Suspended Ceiling System".

Protective coatings for steel components: To AS/NZS 2785 Table F1.

2.4 LINING

Plasterboard

Standard: To AS/NZS 2588.

Fibre cement

Standard: To AS/NZS 2908.2.

Wall and ceiling linings: Type B category 2.

Sealants

Fire-resisting sealant: Non-hardening sealant compatible with the ceiling materials and documented fire-resistance level.

Acoustic sealant Non-hardening sealant compatible with the ceiling materials and rated to R_w 65.

3 EXECUTION

3.1 CONSTRUCTION GENERALLY

Working environment

General: Do not start work before the building is enclosed, wet work is complete and dry, and all work above the ceiling, including services, is complete.

Protection

General: Protect existing work from damage during the installation.

Partitions

General: If partitions are attached to the underside of the ceiling systems, include the partition mass in the seismic mass of the ceiling.

Bracing: Brace partitions attached to the ceiling at concentrated load points such as window and door openings and shelving.

Stability

General: Install the ceilings level, to the nominated plane and fix to prevent looseness or rattling of ceiling components under normal conditions.

Structure-borne sound

General: Provide a ceiling system which does not amplify structure-borne sound. Provide suitable proprietary products or systems for reducing contact vibrations between structure and ceiling.

Control of movement

Abutments: Install the ceiling to allow for differential movement at abutting surfaces.

Alignment: Align ceiling control joints with structural control joints. Do not bridge structural control joints.

Prefinishes

General: Repair damaged prefinishes by recoating.

Curtain recesses

General: Provide curtain recesses, including the following:

- Lining.
- Curtain track support.
- Accommodation for motors and cabling.

3.2 SUSPENSION SYSTEM

Ceiling grid

Set-out: Align ceiling unit joints and centrelines of visible suspension members with documented grid lines. If not documented, set out with equal margins. Maintain a consistent and uniform grid set-out conforming to with manufacture's span tables.

Clearances: Allow for adequate clearance between ceiling grid and building facade elements.

Suspension system

Support members: Install support members as follows:

- Space as required by the loads on the system and the type of ceiling.
- Allow for the installation of services and accessories, including ductwork, light fittings and diffusers.
- Provide additional back support or suspension members for the fixing of access panels or air registers to prevent distortion, overloading or excessive vertical deflection.

Alignment: Align suspension system with ceiling grid members.

- Vertical misalignment: < 5° (9H in 100V) in either direction.

Clearances: Provide minimum clearance between suspension system and services in the plenum space, to manufacturer's recommendations.

Height adjustment: Provide height adjustment with a length adjustment device at each suspension point, permitting length adjustment of at least 50 mm.

Grid members: If required, notch grid members at the junction with the perimeter trim to make sure the ceiling units lay flat on the perimeter trim.

Restriction: Do not attach the suspension system to the lip or flange of purlins.

Services

Support: Conform to the following:

- Do not fix suspension members to services (e.g. ductwork).
- If services obstruct the ceiling supports, provide bridging and suspension on each side of the services.
- Do not support services terminals on ceiling units.
- Clearances: Maintain clearance between services and the suspension system to manufacturer's recommendations.

Bracing

General: If the ceiling grid is unable to transfer sufficient load at the perimeter junction, provide plenum bracing to prevent lateral movement of the ceiling grid and to resist the imposed horizontal seismic force.

Bulkheads

General: Integrate bulkheads with the ceiling structure and brace to prevent lateral movement. If the ceiling is terminated at a bulkhead, provide for the resulting seismic force within the bulkhead bracing.

External suspended soffits

General: Support external suspended soffits on rigid members capable of carrying the loads from imposed actions. Install members to minimise any eccentricity, and ensure that the upward and downward loads from wind actions are carried through to the supporting structure.

Fasteners

General: Provide concealed fasteners to the manufacturer's recommendations. If material supporting hangers is less than 1.2 mm thick, do not use single screw fasteners in tension.

3.3 CEILING UNITS

Installation

Fitting: Fit ceiling units accurately and neatly, without distortion, and free from air leakage and staining.

Tile hold down clips: If ceiling units are required to be restrained for security or to prevent dislodgement of the ceiling tile under seismic actions, insert tile hold down clips at the junction of carrier rails and units.

Pattern and texture: Set out patterned or heavily textured materials with a consistent direction of pattern or texture, or as documented.

Service penetrations

General: Provide openings for all services elements, including light fittings, ventilation outlets, detectors, sprinklers and loudspeakers.

Repair: If services pass through ceiling grid members, provide additional grid members and support or relocate service.

Cut ceiling unit edges

General: Conceal, or finish to match prefinished edges, including at openings for services elements.

3.4 PLASTERBOARD LINING

Installation

Gypsum plasterboard and fibre reinforced gypsum plaster: To AS/NZS 2589.

Suspended flush ceilings: Fix using screw or screw and adhesive to ceiling members or support frame.

Multiple sheet layers

Application: Fire-resisting and acoustic rated ceilings.

Joints: Fill and flush up all joints and fixings in each layer and caulk up perimeters and penetrations before starting succeeding layers. Stagger all sheet joints by minimum 200 mm in both directions.

Joints

Flush joints: Provide recessed edge sheets and finish flush using perforated paper reinforcing tape.

Butt joints: Make joints over framing members or otherwise provide back blocking.

External corner joints: Make joints over metallic-coated steel corner beads.

Control joints: Align lining control joints with structural control joints and as follows:

- Ceilings: At maximum 12 m centres.
- Control joint beads: Purpose-made metallic-coated.
- Location: If possible, position joints to intersect light fixtures, vents or air diffusers.

Wet areas: Install additional supports, flashings, trim and sealants, as required..

3.5 FIBRE CEMENT LINING

Installation

General: 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.

Suspended flush ceilings: Screw or screw and adhesive fix to ceiling members or support frame.

External areas: Close up ceiling grid spacing to the manufacturer's recommendations for fibre cement, as appropriate.

Multiple sheet layers

Application: Fire-resisting and acoustic rated ceilings.

Joints: Fill and flush up all joints and fixings in each layer and caulk up perimeters and penetrations before starting succeeding layers. Stagger all sheet joints by minimum 200 mm in both directions.

Joints

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: Align lining control joints with structural control joints and as follows:

- 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.
- Location: If possible, position joints to intersect light fixtures, vents or air diffusers.

Wet areas: Install additional supports, flashings, trim and sealants, as required.

3.6 ACCESS PANELS

Finish

General: Match the access panels to the ceiling in appearance and performance.

Identification

General: Provide each access panel with an identification mark.

Non-demountable ceilings

General: Provide access panels supported and anchored to permit ready removal and refixing.

Reinforcement

General: Reinforce the back of the access panel to prevent warping and facilitate handling.

3.7 TRIM

General

Trim: Provide trim at junctions with other building elements and surfaces, including walls, beams and penetrations, consistent with the materials and finishes of the ceiling system.

Accessories

General: Provide accessories as part of the proprietary ceiling system necessary to complete the installation.

Plasterboard cornices

Fixing: Mitre at corners and adhesive fix with cornice cement. Pin in place at cornice edges until adhesive sets, remove pins and fill holes.

Vertical movement: If minor vertical movement of the ceiling is anticipated, use flexible mastic to joints to vertical surfaces.

Fibrous plaster cornices and roses

Fixing: Pin or prop in place and fix with wet gypsum plaster and scrim straps over framing members.

Fire-resisting walls

Requirement: Seal to soffit with sealant with an equivalent fire-resistance level before fixing decorative cornices, if any.

3.8 COMPLETION

Spares

General: Provide spare matching ceiling units and accessories of each type. Store the spare materials on site where directed.

- Supporting system: One spare supporting member (hanger or framework member) for every 100 members or part thereof of the same type installed in the ceiling.
- Ceiling units: One spare unit for every 50 units or part thereof installed in the ceiling.
- Accessories: One spare of each type for every 50 units or part thereof installed in the ceiling.

Warranties

Requirement: Provide warranties for materials and workmanship in the form of interlocking warranties from the supplier and the installer.

Form: Against failure of materials and execution under normal environment and conditions of use.

4 SELECTIONS

4.1 GENERAL

Acceptable Manufacturers, approved equivalent to:

- CSR Gyprock Plasterboard: <http://www.gyprock.com.au/Pages/Resources/Red-Book.aspx>
- Boral Plasterboard:
https://www.usgboral.com/content/dam/USG_Boral/Brochures/Installation_manual/USGBoral%20Installation%20Manual%20Oct14.pdf
- Rondo Building Systems: Concealed Suspended Grid Assemblies <http://www.rondo.com.au/>

END OF SECTION

0551 JOINERY

Revision history (Revisions are highlighted yellow and deletions are struck through)			
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1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: The work of this specification covers the fabrication, supply and installation of joinery items, as shown on drawings and described in the schedule of finishes..

Use materials selected for their suitability to their required functions, application and installation conditions, and to the finish and method of fabrication, and in sections of adequate strength and stiffness for their purpose.

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- 0160 Quality
- 0171 General requirements
- 0181 Adhesives, sealants and fasteners
- 0461 Glazing
- 0511 Lining
- 0552 Metalwork
- 0555 Fixtures, fittings & equipment

1.3 STANDARDS

General

Tactile indicators: To AS/NZS 1428.4.1.

1.4 TOLERANCES

General

Requirement: Fabricate and install joinery items to substrates undamaged, plumb, level, straight and free of distortion.

Tolerances table

Property	Tolerance
Plumb and level	1:800
Offsets in flush adjoining surfaces	0.5 mm
Offsets in revealed adjoining surfaces	2 mm
Alignment of adjoining doors	0.5 mm
Difference in scribe thickness for joinery items centred between walls	2 mm
Doors centred in openings	0
Joints in finished surfaces	0

1.5 SUBMISSIONS

Certification

Certificate: Submit a supplier's certificate (which may be included on an invoice or delivery docket) verifying conformance to grading, species, and noting moisture content.

Inspection: If neither branding nor certification is adopted, submit a report by an independent inspecting authority verifying conformance.

Environmental rating evidence or certification:

- Timing: Before fabrication.

Operation and maintenance manuals

General: Submit manufacturer's published recommendations for service use.

Products and materials

Manufacturer's data: Submit manufacturer's product data.

Proprietary items: Submit the manufacturer's standard drawings and details showing:

- Methods of construction.
- Assembly and fixing, with dimensions and tolerances.

Hardware: Samples of all hardware proposed referenced to its application.

Samples

General: Submit samples as follows:

- Boards: Two of each type, complete with finish and edge stripping.
- Joints: Two of each type.
- Typical hardware item: Two samples, showing each finish.
- Timber veneer: Provide three variants, two samples of each variant showing maximum expected variation.
- Fabric: Two swatches of each type.
- Stainless steel items: Two of each type.
- Timber bench cupboard door: One sample, complete with hardware.
- Drawer front: One sample, complete with hardware.

Clear finished timber: Submit samples as follows:

- Initial submission:
 - . Veneered board: Three samples each 600 x 600 mm for each species.
 - . Solid timber: Three samples each 40 x 19 x 600 mm for each species.
- Control sample: The approved selection from the initial submission.

- Finished sample: Cut the control sample in half and apply the finish to half the remaining area.

Shop drawings

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

- Overall dimensions.
- Materials, thicknesses and finishes of elements including doors, divisions, shelves and benches.
- Type of construction including mitre joints and junctions of members.
- Hardware type and location.
- Temporary bracing, if required.
- Procedures for shop and site assembly and fixing.
- Locations of benchtop joints and bench/bench junctions.
- Benchtop layout including joint arrangement and penetrations.
- Material, grade and finish.
- Locations of sanitary fixtures, stoves, ovens, sinks, and other items to be installed in the units.
- Relationship of fixture to adjacent building elements.
- Details of fabrication involving other trades or components.
- Proposals for the break-up of large items as required for delivery to the site.
- Proposed method of joining the modules of large items.

Schedules: Contractor's schedule of every joinery item by type, number, location and construction, cross referenced to the SHOP DRAWINGS and building plans. Include building plans marked up to show the location of each joinery item so scheduled.

Timing: Before fabrication.

Subcontractors

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

1.6 INSPECTION

Notice

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

- Shop fabricated or assembled items ready for delivery to the site.
- Openings prepared to receive assemblies.
- Site erected assemblies on completion of erection, before covering up by cladding and encasing.
- Surfaces prepared for, and immediately before, site applied finishes.
- Completion of installation.

1.7 PROTOTYPES

Requirement

For each specified installation, the first installation shall provide the prototype for review and acceptance.

Upon approval, this installation shall provide the prototype for assessment of subsequent installations.

Approved prototypes may be incorporated into the work.

2 PRODUCTS

2.1 DELIVERY AND STORAGE

General

Requirement: Deliver joinery units to site in unbroken wrapping or containers and store so that its moisture content is not adversely affected. Do not store in areas of wet plaster. Keep storage time to a minimum by delivering items only when required for installation.

2.2 JOINERY MATERIALS AND COMPONENTS

Visible work

Clear finished timber and veneer: Make sure all visible surfaces are free of branding, crayon or chalk marks and of blemishes caused by handling.

Joinery timber

Hardwood for trim: To AS 2796.1.

Hardwood for furniture: To AS 2796.3.

Seasoned cypress pine: To AS 1810.

Softwood for trim: To AS 4785.1.

Softwood for furniture: To AS 4785.3.

Finished sizes of milled timbers: Not less than the documented dimensions unless qualified by a term such as nominal, out of or ex to which industry standards for furnished sizes apply.

Plywood

Interior use generally: To AS/NZS 2270.

Interior use, exposed to moisture: To AS/NZS 2271.

Visible surface with a clear finish: Veneer quality A.

Other visible surfaces: Veneer quality B.

Non-structural glued laminated timber

Standard: AS 5067

Wet processed fibreboard (including hardboard)

Standard: To AS/NZS 1859.4.

Particleboard

Standard: To AS/NZS 1859.1.

Melamine overlaid particleboard: Particleboard overlaid on both sides with low pressure melamine.

Dry-processed fibreboard (including medium density fibreboard)

Standard: To AS/NZS 1859.2.

Melamine overlaid medium density fibreboard: Medium density fibreboard (STD MDF) overlaid on both sides with low pressure melamine.

For applications adjacent wet areas: Use a highly moisture resistant (HMR) grade.

Decorative overlaid wood panels

Standard: To AS/NZS 1859.3.

Certification

General: Brand panels under the authority of a recognised certification program applicable to the product. Locate the brand on faces or edges which will be concealed in the works.

Plywood formaldehyde emission class to AS/NZS 2270 and AS/NZS 2271

Reconstituted wood-based panel formaldehyde emission class to the AS/NZS 1859 series

High-pressure decorative laminate (HPDL) sheets

Standard: To AS/NZS 2924.1.

Proprietary items: High Pressure Decorative Laminates manufactured and supplied by Laminex Group or approved equivalent

- www.thelaminexgroup.com.au

Minimum thickness: Conform to the following:

- For horizontal surfaces fixed to a continuous substrate: 1.2 mm.
- For vertical surfaces fixed to a continuous substrate: 0.8 mm.
- For post formed laminate fixed to a continuous substrate: 0.8 mm.
- For vertical surfaces fixed intermittently (e.g. to studs): 3.0 mm.
- For edge strips: 0.4 mm.

Stainless steel

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

Surface finish: No. 4 finish, not including to underside of shelves, and door and drawer backs.

Thickness: 1.2 mm minimum.

Toughened glass panels

Provide: Refer to drawings and schedule of finishes.

Splashbacks and Benchtops

Selection: Stainless steel, refer to drawings and schedule of finishes.

2.3 VENEERS

Timber veneer

Veneer quality: To AS/NZS 2270.

Grades (minimum requirement):

- Select grade, veneer quality A, for visible surfaces to have clear finish or to have no coated finish.
- General purpose grade, veneer quality B, for other visible surfaces.

Requirement: Provide veneers slip matched and flitch batched and falling within the visual range of the approved samples.

Vinyl veneer

Type: Proprietary unbacked vinyl fabric factory-bonded to the designated surface.

2.4 JOINERY ASSEMBLIES

Standard

Domestic kitchen assemblies: To AS/NZS 4386.1.

Product certification

Certification scheme: Furntech-**AFRDI** laboratory accredited by NATA

Plinths

Material: Select from the following:

- Exterior general purpose plywood.
- High moisture resistant particleboard.
- High moisture resistant medium density fibreboard.

Thickness: 16 mm.

Fabrication: Form up with front and back members and full height cross members at not more than 900 mm centres.

Finish: High-pressure decorative laminated sheet

Fasteners: Conceal with finish.

Installation: Scribe to floor and secure to wall to provide level platform for carcasses.

Carcasses

Material: Select from the following:

- Overlaid high moisture resistant particleboard.
- Overlaid high moisture resistant medium density fibreboard.

Thickness: 16 mm.

Joints: Select from the following:

- Proprietary mechanical connections.
- Dowels and glue.
- Screws and glue.
- Proprietary joining plates and glue.

Adjustable shelves: Support on proprietary pins in holes bored at equal centres vertically.

- Spacing: 32 mm.

Finish: Refer to drawings and schedule of finishes.

Fasteners: Conceal with finish.

Installation: Secure to walls at not more than 600 mm centres.

Drawer fronts and doors

Material: Select from the following:

- Melamine overlaid high moisture resistant particleboard.
- Melamine overlaid high moisture resistant medium density fibreboard.

Thickness: 16 mm.

Door size: Not exceeding 1.5 m² on face, with 2400 mm maximum height and 900 mm maximum width.

Drawer fronts: Rout for drawer bottoms.

Finish: Refer to schedule of finishes.

Colour: Refer to schedule of finishes.

Drawer backs and sides

Material: PVC film wrapped particleboard.

Thickness: 12 mm.

Colour: Refer to schedule of finishes.

Installation: Mitre corners leaving outer skin of foil intact, finish with butt joints, glue to form carcass and screw to drawer front. Rout for drawer bottoms.

Drawer bottoms

Material: PVC film laminated hardboard.

Thickness: 3 mm.

Colour: Refer to schedule of finishes.

Drawer and door hardware

Hinge types: Concealed metal hinges with the following features:

- Nickel plated.
- Adjustable for height, side and depth location of door.
- Self-closing action.
- Hold open function.

Piano hinges: Chrome plated steel, extending full height of doors.

Slides: Metal runners and plastic rollers with the following features:

- 30 kg loading capacity.
- Closure retention.
- White thermoset powder coating or nickel plated.

Full height doors

Material: Refer to drawings and schedule of finishes

Size: Refer to drawings and schedule of finishes

Thickness: Refer to drawings and schedule of finishes

Finish: Refer to drawings and schedule of finishes

Flaps and pull-out shelves

Material: Refer to drawings and schedule of finishes

Size: Refer to drawings and schedule of finishes

Thickness: Refer to drawings and schedule of finishes

Finish: Refer to drawings and schedule of finishes

2.5 WORKING SURFACES

Laminated benchtops (*unless noted otherwise*)

Exposed edges: Extend laminate over shaped nosing, finishing more than 50 mm back on underside. Splay outside corners at 45°.

Balance underside: Extend laminate to the undersides of benchtops.

Installation: Scribe to walls. Fix to carcass at least twice per 600 mm length of benchtop.

Joint sealing: Fill joint with sealant matching finish and clamp with proprietary mechanical connectors.

Stainless steel benchtops

Material: Stainless steel sheet. Refer to drawings and schedule of finishes.

Thickness: 2 mm.

Bench height: To top of dry bench and to top of perimeter bead to wet bench.

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.

3 EXECUTION

3.1 JOINERY

General

Joints: Provide materials in single lengths whenever possible. If joints are necessary, make them over supports.

Framing: Frame and trim where necessary for openings, including those required by other trades.

Concealed surfaces: Prime surfaces concealed by substrates.

Deficiencies: Examine joinery units for completeness and remedy deficiencies.

Substrate: Damp clean and vacuum substrate surfaces that will be permanently concealed.

Services

Supply and installation for services shall be by the respective services trades, including but not limited to:

- Hydraulics: Fixtures and fittings, including sinks, taps and the like
- Electrical: Fixtures and fittings, including GPO's and the like

Coordinate with closely related work of other trades.

Acclimatisation

General: Acclimatise the joinery items by stacking in the in-service conditions with air circulation to all surfaces after the following are complete:

- Air conditioning operational.
- Lighting operational.
- Site drainage and stormwater works are complete.
- Space fully enclosed and secure.
- Wet work complete and dry.

Accessories and trim

General: Provide accessories and trim necessary to complete the installation.

Fasteners

Visibility: Do not provide visible fasteners except in the following locations:

- Inside cupboards and drawer units.
- Inside open units, in which case provide proprietary caps to conceal fixings.

Visible fasteners: Where fasteners are unavoidable on visible joinery faces, sink the heads below the surface and fill the sinking flush with a material compatible with the surface finish. In surfaces which are to have clear or tinted finish, provide matching wood plugs showing face (not end) grain. In surfaces which are to have melamine finish, provide proprietary screws and caps finished to match.

Fix joinery units to substrates as follows:

- Floor mounted units: 600 mm centres maximum.
- Wall mounted units: To each nogging and/or stud stiffener.

Fasteners: Screws with washers into timber or steel framing, or masonry anchors.

Adhesives

General: Provide adhesives to transmit the loads imposed and for the rigidity of the assembly, without causing discolouration of finished surfaces.

Finishing

Junctions with structure: Scribe, plinths, benchtops, splashbacks, ends of cupboards, kickboards and returns to follow the line of structure.

Joints: Scribe internal and mitre external joints.

Edge strips: Finish exposed edges of sheets with edge strips which match sheet faces.

Matching: For surfaces which are to have clear or tinted finish, arrange adjacent pieces to match the grain and colour.

Hygiene requirements: To all food handling areas and voids at the backs of units in all areas, seal all carcass and junctions wall/floor, and cable and pipe entries with silicone beads for vermin proofing.

Apply water resistant sealants around all plumbing fixtures and make sure sealants are fit for purpose.

Stainless steel benchtops fabrication

General: Install as recommended by the manufacturer.

Hardware fixing

General: Drill and tap, or weld fix.

Finishing 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.

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.

Splashbacks

General: Install as recommended by the manufacturer.

Labelling

General: Permanently mark each unit of furniture with the manufacturer's name, on an interior surface.

3.2 TRIM

General

Requirement: Provide trim such as beads, mouldings, stops and skirtings to make neat junctions between lining components, finishes and adjacent surfaces.

Fixing

To masonry walls: Wall plugs at 600 mm centres maximum.

To stud walls: Nail to plate or framing at 600 mm centres maximum.

3.3 COORDINATION WITH FIXTURES, FITTINGS AND EQUIPMENT

General

Requirement: Coordinate the configurations of the work with the selected Fixtures, Fittings and Equipment, including but not limited to the following:

- Light fittings
- Appliances
- Tapware and Sanitary fittings
- Loose fittings, such as white goods, including refrigerators and dishwashers

Confirm and coordinate the configuration with the installation requirements and clearances of these items, including but not limited to the following:

- Openings and holes for fixtures, cables
- Dimensions
- Ventilation requirements
- Power fitting locations
- Structural support for fixings

3.4 COMPLETION

Cleaning

Temporary coatings: On or before completion of the works, or before joining up to other surfaces, remove all traces of temporary protective coatings.

Requirement: Remove all dust, marks and rubbish from all surfaces and internal spaces. Clean and polish all self-finished surfaces such as anodised and powder coated metals, sanitary ware, glass, tiles and laminates.

END OF SECTION

0552 METALWORK & MISCELLANEOUS FIXTURES

Revision history (Revisions are highlighted yellow and deletions are struck through)			
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1	General	1
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1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide a complete fabricated and manufactured metalwork systems, including but not limited to:

- Steel surface mounted platforms for services equipment
- Roof walkway, guard rails, ladders for access and maintenance
- Storages cages
- Stainless steel floor dividing angles
- Frame, fixings and accessories for support of services equipment
- Steel fence and gates to services areas, PVC coated chain wire mesh and high-grade galvanized steel post and frame, coated to match chain wire mesh.
- Bicycle racks
- Stainless steel bollards
- Floor finish dividers at junctions with differing floor finishes
- Other metalwork items as shown on drawings and schedule of finishes
- Refer to drawings for location and configuration

Performance

Requirements:

- Undamaged, plumb, level and straight.

- Free of surface defects or distortions.

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- 0160 Quality
- 0171 General requirements
- 0183 Metals and prefinishes
- 0193 Building access safety systems
- 0431 Cladding – combined
- 0673 Powder coatings

1.3 STANDARDS

General

Access for maintenance: To AS 1657.

Tactile indicators: To AS/NZS 1428.4.1

Bicycle Parking: to AS 2890.3-2015

Design loads: to AS 1170.1

1.4 SUBMISSIONS

Certification

General: Engage a Professional Engineer and submit certification for the design and installation of all fixtures and items expected loads complying with the following standards Australian Standards – AS1170.1, AS1170.2, AS1657 & AS1664.1, and relevant Clauses of the Building Code of Australia.

Execution details

Welding procedures: Submit details of proposed welding procedures before fabrication.

Welding dissimilar metals: Submit the following details:

- Type and thickness of materials to be welded.
- Proposed joint preparation and welding procedures.
- Proposed filler metal.
- Expected dilution (proportion of fused parent metal in the weld metal).

Fastenings to aluminium (including aluminium alloys): Stainless steel or aluminium.

Operation and maintenance manuals

General: Submit manufacturer's published recommendations for service use.

Products and materials

Manufacturer's data: Submit manufacturer's product data including standard drawings and details.

Proprietary items: Submit the manufacturer's standard drawings and details showing:

- Methods of construction.
- Assembly and fixing, with dimensions and tolerances.

Stainless steel: For each batch of stainless steel supplied to the works, submit the certificate of conformance or test certificate to the applicable standard, as documented.

Stainless steel welding: Before fabrication commences, submit evidence of qualification of the welding procedure by testing to AS/NZS 1554.6 clause 4.7 or evidence of prequalification to AS/NZS 1554.6 clause 4.13.

Prototype

Install the first 'section' of each item in an agreed location, treat as a Prototype and schedule as such in the project Quality Assurance plan.

On completion of the Prototype, give notice that an inspection / review may be undertaken.

When approved, the prototype may be incorporated into the works. Otherwise remove all traces.

Prototypes:

- Prototype: The first of each scheduled item of Fabricated metalwork.
- Prototype: The first of each scheduled item of Manufactured metalwork.

Samples

General: Submit samples of the following:

- Each type of joint.
- Each type of finish illustrating the range of variation.
- Sections for use in fabricated work.

Structural design and certification

Design: Where design is required, provide Design by a Registered Structural Engineer.

Certification: Submit certification of the structural adequacy of each design that is required by this clause, including:

- Clear identification of the Assemblies to which the Certificate applies
- Clear identification of the Design Engineer and Registration, including Contact details.

Structural Steel

General: Architectural documents do not provide or imply that they provide Structural Steel Design. Structural steel work, including that supporting Metalwork items, shall be as documented in the Structural Engineer Documents.

Shop drawings

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

- Overall dimensions.
- Details of fabrication and components.
- Details of fabrication involving other trades or components.
- Information necessary for site assembly.
- Proposals for the break-up of large items as required for delivery to the site.
- Proposed method of joining the modules of large items.

Subcontractors

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

1.5 INSPECTION

Notice

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

- Shop fabricated or assembled items ready for delivery to the site.
- Commencement of shop or site welding.
- Site erected assemblies on completion of erection, before covering up by cladding and encasing.
- Steel surfaces prepared for, and immediately before, site applied finishes.

2 PRODUCTS

2.1 MATERIALS AND COMPONENTS

Metals and components

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

Aluminium and aluminium alloys

Drawn pipe: To AS/NZS 1867.

Drawn rod, bar and strip: To AS/NZS 1865.

Extrusions: To AS/NZS 1866.

Plate and sheets: To AS/NZS 1734.

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

General: Provide a finish to match the sample in terms of the mill grade and finish process.

Grade (minimum):

- 316
- 304 only where noted

Bars: To ASTM A276.

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

Welded pipe (plumbing applications): To AS 1769.

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

Steel

Sheet: To AS/NZS 1595.

Structural bars and sections: To AS/NZS 3679.1.

Structural hollow section: AS/NZS 1163.

Steel for prefinishes

Cold rolled bar: To AS 1443 - Bright.

Cold rolled sheet: To AS/NZS 1595.

- Designation: CA2S-E.

Electric resistance welded tube: To AS 1450.

Completion

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

Protection: Secure packaging or strippable plastic sheet

3 EXECUTION

3.1 CONSTRUCTION GENERALLY

Aluminium structures

Standard: To AS/NZS 1664.1 or AS/NZS 1664.2.

Metals

Performance: Provide metals capable of transmitting the loads imposed and sufficient for the rigidity of the assembly without causing deflection or distortion of finished surfaces.

Incompatible metals: Separate using concealed layers of suitable materials in appropriate thicknesses.

Fasteners

Performance: Provide non-galvanic corrosion fasteners.

Materials: Provide fasteners in materials of mechanical strength and corrosion resistance at least equal to that of the lowest resistant metal joined.

To copper and copper alloys: Provide copper or copper-alloy fixing devices only.

To aluminium and aluminium alloys: Provide aluminium alloy or non-magnetic stainless steel fixing devices only.

To stainless steel: Provide appropriate stainless steel materials only.

Fabrication

Workshop: Fabricate and pre-assemble items in the workshop wherever practicable.

Edges and surfaces: Keep clean, neat and free from burrs and indentations. Remove sharp edges without excessive radiusing.

Tube bends: Form bends in tube without visibly deforming the cross section.

Colour finished work: Match colours of sheets, extrusions and heads of fasteners.

Thermal movement: Accommodate thermal movement in joints and fastenings.

Tolerances: ± 2 mm from design dimensions.

Joints

General: Fit joints to an accuracy appropriate to the class of work. Finish visible joints made by welding, brazing or soldering using grinding, buffing or other methods appropriate to the class of work, before further treatment.

Self-finished metals: Free of surface colour variations, after jointing.

Joints: Fit accurately to a fine hairline.

Marking

General: Provide suitable and sufficient marks or other means for identifying each member of site-erected assemblies, and for their correct setting out, location, erection and connection. Mark bolted connections to show the bolting category. Do not mark stainless steel by notching.

Splicing

General: Provide structural members in single lengths.

3.2 WELDING AND BRAZING

Welding

Quality: Provide finished welds which are free of surface and internal cracks, slag inclusion, and porosity.

Site welds: Avoid site welding wherever possible. If required, locate site welds in positions for down hand welding.

Butt weld quality level: Not inferior to the appropriate level recommended in AS/NZS 1554.1 Section 6, AS/NZS 1554.6 Section 6 or AS 1665 Appendix A, as appropriate.

Brazing

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

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

3.3 STAINLESS STEEL FABRICATION

Welding stainless steel

Certification of welders: To AS 1796.

Riveting

General: Riveting may be used only to join stainless steel sheet or strip less than 1 mm thick. Drill (not punch) the rivet hole, and drive the rivet cold. On completion, clean and passivate the riveted assembly.

Soldering

General: Do not solder stainless steel.

3.4 FIXED STEEL LADDERS

Assembly

Materials, design and construction: To AS 1657.

Fixing: Fix ladder stiles securely to the building structure at tops and bottoms of flights, and at intermediate points.

3.5 PIPE RAIL BALUSTRADES

Fabrication

Method: Welding.

Joints: Produce smooth unbroken surfaces at joints. Scribe the joints between posts and rails. Make end-to-end joints over an internal sleeve.

Bends: Make changes of direction in rails by evenly curved pipe bends.

Free ends: Seal the free ends of pipes with fabricated or purpose-made end caps.

Fixing to structure

General: Provide fabricated predrilled or purpose-made brackets or post bases, and attach the piping to the building structure with fixings, including bolts into masonry anchors, and coach screws or bolts into timber, of metal compatible with the piping.

Galvanizing

General: If possible, complete fabrication before galvanizing; otherwise apply a zinc-rich primer to affected joint surfaces.

3.6 METAL FIXTURES

General

General: Provide metal fixtures as shown on drawings and as follows.

- Components and their location, indicative construction details, scribes and trims, materials, dimensions and thicknesses, and finishes.
- Confirm on site all dimensions noted on drawings.
- Finishes selections as documented.
- Hardware and equipment.

3.7 CORNER GUARDS

Guards

General: Where salient corners of the structure are required to be protected from mechanical damage, provide metal corner guards as follows:

- Consisting of rolled angle sections or sections fabricated from metal sheet bent to the radius or angle of the corner.
- Fitting close to adjoining surface finishes.
- Solidly grouted up at the back as necessary to eliminate voids.
- Securely fixed by a method which does not cause distortion in the guard surface, and consists of either concealed built in lugs, or flush countersunk head fixings into masonry anchors.

3.8 MISCELLANEOUS

Fasteners : Provide required bolts, screws, inserts, fasteners, templates and other accessories required for a complete installation.

Co-ordinate with other trades as to the proper fastening systems suitable for the substrates to which the item is to be secured. Refer to Architect if in doubt.

Fasten galvanised items with galvanised fasteners.

3.9 COMPLETION

Cleaning

Temporary coatings: On or before completion of the works, or before joining up to other surfaces, remove all traces of temporary coatings used as a means of protection.

END OF SECTION

0555 FIXTURES, FITTINGS & EQUIPMENT

Revision history (Revisions are highlighted yellow and deletions are struck through)			
Revision	Date	Status	Comment
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1	General	1
1.1	Responsibilities	1
1.2	Cross references	1
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2	Design and performance	2
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3	Materials and components	3
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4	Execution.....	3
4.1	Installation.....	3
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1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: The work of this trade section includes but is not limited to, supplying and fixing of a complete range of fixtures, fittings and equipment as indicated on drawings and described in the schedules.

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- 0160 Quality
- 0171 General requirements
- 0183 Metal and prefinishes
- 0511 Lining
- 0551 Joinery
- 0552 Metalwork & miscellaneous fixtures
- 0631 Ceramic Tiling

1.3 STANDARDS

General

Laundry troughs and tubs: To AS/NZS 1229 2002

Washbasins: To AS/NZS 1730 1996

Shower bases and shower modules: To AS 3588 1996

Plumbing and drainage: To AS/NZS 3500.0, AS/NZS 3500.1, AS/NZS 3500.2, AS/NZS 3500.3, AS/NZS 3500.4 and the PCA.

Domestic kitchen assemblies – Installation: To AS/NZS 4386.2 1996

Comply with requirements of statutory authorities having jurisdiction and applicable portions of the referenced Standards.

1.4 SUBMISSIONS

Products and materials

Submit the following samples and details at least 3 weeks before ordering and fabrication:

- A list of the product selections and data particularly where the specified material is not available and alternatives are offered
- Brand name.
- Storage and handling recommendations.
- Maintenance recommendations.

Inspection

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

- Any inspections notified as required.

Warranties

General: Submit the materials supplied by manufacturers of specified components.

Installation, for 5 years from the date of Practical Completion: the specified components.

Requirement: Refer to *0171 General Requirements - warranty schedule*.

1.5 OPERATION AND MAINTENANCE DOCUMENTATION

Requirement

For each installed item:

- Submit a copy of the manufacturers' documentation for Operation and Maintenance.

Formats

For the Body Corporate / Management: Provide the sets of documents relating to the installations in the common areas in the original formats as supplied with each item.

For each Apartment: Provide the sets of documents relating to the installations in each apartment in the original formats as supplied with each item.

Documentation

Provide the full set of product documentation that was included with the packaging of each product.

Documentation includes:

- Product identification
- Operation
- Maintenance
- Warranty

If documentation is absent from the packaging, obtain the documentation from the manufacturer which can be in the form of Acrobat (pdf) files from the manufacturer's web site.

2 DESIGN AND PERFORMANCE

2.1 PERFORMANCE

General

Provide items matched to the application and installation conditions in each case.

2.2 SCHEDULES

Design schedule

A schedule is provided that describes the required:

- Fixtures, fittings and equipment

Verify and coordinate selections prior to ordering and installation.

Discrepancies:

- Submit notice of any instances where the scheduled items do not meet the related requirements of this specification.
- In these cases verify selections before ordering or supplying.

3 MATERIALS AND COMPONENTS

3.1 SELECTED ITEMS

Selections

The selected items are described in:

- Fixtures, Fittings And Equipment Schedule

Supply and install

Unless noted otherwise, the work for the selected items shall include:

- Supply and installation

Supplied items

Supplied items shall:

- meet the general requirements of the specification
- conform with the SCHEDULE .

3.2 SUPPLY ONLY ITEMS

Supply only

Items shall be "Supply Only", ONLY IF and where specifically noted.

The work of supply only shall include the following work for:

- packing
- delivery

Delivery and hand-over

Establish a clear and agreed program for delivery and hand-over, including:

- Proof of delivery of the respective items

4 EXECUTION

4.1 INSTALLATION

General

Install items in accordance with:

- manufacturers' and suppliers' instructions
- the schedules
- the drawings

Check deliveries on arrival. Keep items secured until needed.

Fit accurately and at correct heights and set-out.

Protect until completion of project.

Fixings

General: Provide materials compatible with the item being fixed, matching where exposed, and of sufficient strength, size and quality to perform their function. Provide a corrosion resistant finish to concealed fixings, and match exposed fixings to the material fixed.

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

Hollow metal sections: Provide backing plates drilled and tapped for screw fixing, or provide rivet nuts with machine thread screws, not self-tapping screws or pop rivets.

Services

Coordinate with and connect to services as required for the operation of the equipment and in accordance with the written instructions of the manufacturers of the items and the requirements of the responsible authority.

Adjustment

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

Towel rails and the like: Cut to required lengths..

Testing

Cover no pipes, joints or connections until tested and passed by the relevant authority, and approved by the project manager and/or architect.

Submit copies of certificates issued by relevant authorities.

4.2 CLEANING AND PROTECTION

General

Properly clean work of this section and protect as necessary under various working conditions to avoid damage of any nature.

Repair or replace damaged parts, including repairs to adjacent work damaged in connection with the work of this specification.

END OF SECTION

0581 SIGNAGE

Revision history (Revisions are highlighted yellow and deletions are struck through)			
Revision	Date	Status	Comment
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1	General	1
1.1	Responsibilities	1
1.2	Cross references	1
1.3	Standards	1
1.4	Interpretation.....	1
1.5	Submissions	2
1.6	Inspection	2
2	Products	2
2.1	Materials	2
3	Execution.....	2
3.1	Workmanship.....	2
4	Selections.....	3
4.1	Statutory signs	3

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide signage systems, as documented.

Performance

Requirement: Provide signage as follows:

- Appropriately secured.
- Located within a clear line of vision.
- To contrast with the background.
- With clean, well defined edges or arrises, and free from blemishes.

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- 0171 General requirements.

1.3 STANDARDS

Signs

Safety signs - design and use: To AS 1319.

Signs and graphics for disability access: AS 1428.1 and AS 1428.2.

1.4 INTERPRETATION

Definitions

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

- Changeable letter systems: Sign systems consisting of display boards or holders into which can be inserted removable individual letters, numbers, etc.

-
- Changeable plate systems: Sign systems consisting of fixed plate holders to which may be attached or inserted removable interchangeable sign plates.
 - House signage: Internal and external project specific signs.
 - Illuminated signs: Signs consisting of cabinets enclosing an illuminated source, lighting translucent face panels bearing the specified signage.
 - Statutory signage: Signs prescribed by the BCA and statutory authorities.
 - Variable room identification systems: Changeable plate systems incorporating fixed room numbers and removable name strips.

1.5 SUBMISSIONS

Samples

Materials: Submit samples showing each colour and finish of exposed signage materials and accessories. If there is a range of colours and/or textures for a particular item, submit samples showing the extremes and mean of the range.

Shop drawings

General: Submit shop drawings showing the following information if appropriate:

- Layout, construction and fixing details for custom designed (non-standard) sign systems.
- Large scale (full size if practicable) lettering layouts for individual letter signs.
- Computer generated graphic images.
- Full size spacing templates for individually mounted characters.
- Location template drawings for anchorages to permanent construction. Show type of anchorage.
- Wiring diagrams for illuminated signs.

1.6 INSPECTION

Notice

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

- Custom-built signage and graphic items fabricated and ready to be delivered to the site.
- Signage and graphic items delivered to site before installation.
- Building locations or substrates prepared to receive signage and graphic items before they are installed.

2 PRODUCTS

2.1 MATERIALS

Materials standards

Aluminium:

- Plate for engraving: Alloy and temper designation 6063-0.
- For casting: To AS 1874.

Stainless steel: Surface finish designation 4 (general purpose polished).

Plastics:

- PVC-U sheet: Semi-rigid sheet.
- Rigid cellular polystyrene: To AS 1366.3, class VH for cut-out shapes.

Photoluminescent exit signs: To BCA E4.8(b).

3 EXECUTION

3.1 WORKMANSHIP

Production

General: Form signage and graphic items accurately with clean, well defined edges or arises, free from blemishes.

Engraving to two layer plastic laminate: Engrave lettering to expose the lower laminate.

Engraved and filled: Lettering precision cut and filled colouring material. Clean faces of all filling material.

Casting: Produce shapes free of pits, scale, blow holes or other defects, hand or machine finished if necessary.

Laser cut lettering: Individual vinyl letters with self-adhesive backing.

Printed lettering: Lettering and graphic images screen/digitally printed on:

- Film with self-adhesive backing.
- Acrylic sheet.
- Aluminium plate.
- Stainless steel plate.

Large format digital printing: Lettering and graphic images screen printed film with self-adhesive backing.

Signwriting: Lettering and graphic images hand painted direct to the background by a tradesman with recognised qualifications and demonstrated experience.

Fabricated: Three dimensional, formed as follows:

- Laser cutting from solid material and hand finished as necessary.
- Moulding: Individual plastic hollow three dimensional characters and shapes formed by:
 - . Injection moulding.
 - . Vacuum forming.
- Built-up individual shapes by fabricating the faces and edges from separate pieces neatly and securely joined.

Installation

General: Install signage and graphic items level and plumb, securely mounted, with concealed theft-resistant fixings.

Self-adhesive signs: Fix free of bubbles and creases.

4 SELECTIONS

4.1 STATUTORY SIGNS

Termite protection

Position	In or near meter box or similar
Message	Indicate: <ul style="list-style-type: none">- The method of protection- The date of installation- The life expectancy of a chemical barrier as listed on the appropriate authority's pesticides register label- The installer's recommendation for inspections
Sign type	Laminated page(s)
Compliance	BCA 3.1.3.4, BCA B1.4(i)(ii) AS 3660.1 Appendix A

Exit signs,

Position	On, above, or adjacent every door in BCA clause E4.5
Message	EXIT
Letter height (minimum)	25 mm
Sign type	
Compliance	BCA E4.5

Braille and tactile exit signage-buildings required to be accessible

Position	To BCA Spec D3.6 for every door in BCA E4.5
Message	Exit (and) Level (followed by the floor level number)
Letter height (minimum)	BCA Spec D3.6
Sign type	
Compliance	BCA E4.5, BCA D3.6 and BCA Spec D3.6

Fire hose reels and fire hydrants

Position	Cupboard door or adjacent the FHR
Message	FIRE HOSE REEL (and/or) FIRE HYDRANT
Letter height (minimum)	External cabinets: 75 mm Internal cabinets: 50 mm
Sign type	White adhesive backed vinyl
Compliance	AS 2441 AS 2419.1 BCA E1.3 and BCA E1.4

Fire hose reel location sign

Position	Above or adjacent the FHR if located in a recess or obscure location
Message	To AS 2441 Figure 10.1
Letter height (minimum)	16 mm
Sign type	Adhesive backed vinyl
Compliance	AS 2441

Fire brigade booster assembly cabinet location sign

Position	Cabinet doors
Message	FIRE HYDRANT BOOSTER, or FIRE HYDRANT AND SPRINKLER BOOSTER, or COMBINED FIRE HYDRANT AND SPRINKLER BOOSTER, as appropriate. If a feed fire hydrant is enclosed in the cabinet, add the symbol FH within a 100 mm circle of thickness and colour to match lettering.
Letter height (minimum)	50 mm
Sign type	Adhesive backed vinyl
Compliance	AS 2419.1 clause 7.10.1

Fire brigade booster assembly – Notice of pressure

Position	Adjacent or within the cabinet or recess
Message	(Boost pressure and test pressure in kilopascals)
Letter height (minimum)	25 mm
Sign type	
Compliance	AS 2419.1 clause 7.10.1

Fire brigade relay pumps

Position	At each pump location
Message	FIRE BRIGADE RELAY PUMP
Letter height (minimum)	75 mm
Sign type	
Compliance	AS 2419.1 clause 7.7

Boosters in series with pumps

Position	Adjacent the pressure gauge
Message	WARNING-THIS BOOSTER IS CONNECTED IN SERIES (RELAY) WITH THE FIXED ON-SITE FIRE PUMPS WHICH MAY BE RUNNING. THIS GAUGE SHOWS THE TRUE BOOST PRESSURE AT THE FIXED ON-SITE PUMP DISCHARGE
Letter height (minimum)	25 mm
Sign type	
Compliance	AS 2419.1 clause 7.6

Hose reel system valve

Position	At any system valve that can isolate flow in the hose reel water supply main
Message	FIRE SERVICE VALVE – CLOSE ONLY TO SERVICE FIRE HOSE REELS
Letter height (minimum)	8 mm
Sign type	Label with engraved non-ferrous metal tag
Compliance	AS 2441, clause 6.2

Warden Intercommunications Point (WIP)

Position	Door for WIP
Message	WARDEN INTERCOMMUNICATIONS POINT
Letter height (minimum)	20 mm
Sign type	
Compliance	AS 4428.4

Portable fire extinguishers – cabinet

Position	Cabinet
Message	FIRE EXTINGUISHER
Letter height (minimum)	32 mm
Sign type	Adhesive backed vinyl
Compliance	BCA E1.6 AS 2444 clause 3.6 Fire Brigade

Portable fire extinguishers – location signs

Position	As nominated in AS 2444 clause 3.2 at every installed extinguisher nominated BCA Table E1.6
Message	Prescribed graphic
Letter height (minimum)	16 mm
Sign type	Computer generated adhesive backed vinyl graphic
Compliance	BCA E1.6 AS 2444 clause 3.3 Fire Brigade

Fire point

Position	As nominated in AS 2444 clause 3.8 at each fire point
Message	FIRE POINT (and prescribed graphic)
Letter height (minimum)	
Sign type	Computer generated adhesive backed vinyl graphic
Compliance	AS 2444 clause 3.8

Fire blankets

Position	As nominated in AS 2444 clause 6.4 at every blanket location
Message	Prescribed graphic
Letter height (minimum)	
Sign type	Computer generated adhesive backed vinyl graphic
Compliance	BCA E1.6 AS 2444 clauses 6.3, 6.4 and Fig 6.1 Fire Brigade

Regulatory carpark signs: Stop and Give Way

Position	As required for traffic control
Message	Graphic nominated AS/NZS 2890.1 clause 4.3.4(b)
Sign type	AS 1742.2 R1-1, R1-2
Compliance	AS/NZS 2890.1 clause 4.3.4

Regulatory carpark signs: Speed limit

Position	As required for traffic control
Message	Graphic nominated AS/NZS 2890.1 clause 4.3.4(c)
Sign type	AS 1742.2 R4-1
Compliance	AS/NZS 2890.1 clause 4.3.4

Regulatory carpark signs: Disabled persons parking facilities

Position	Designated car space
Message	Graphic nominated AS/NZS 2890.1 clause 3.1 figure 3.1
Sign type	Pavement marking paint.
Compliance	AS/NZS 2890.6 clause 3.1

Unisex accessible sanitary facilities

Position	To BCA Spec D3.6
Message	<ul style="list-style-type: none"> - Braille and tactile signage incorporating the international symbol of access. - Indicate suitability for left or right handed use.
Symbol size	AS 1428.2 clause 16, Table 1.
Letter height (minimum)	Braille: BCA Spec D3.6 Raised characters: Sans serif type font 20 mm.
Sign type	
Compliance	AS 1428.1 BCA D3.6

Ambulant sanitary facilities

Position	To BCA Spec D3.6
Message	Braille and tactile signage incorporating the male/female ambulant symbol.
Symbol size	AS 1428.2 clause 16, Table 1.
Letter height (minimum)	Braille: BCA Spec D3.6 Raised characters: Sans serif type font 20 mm.
Sign type	
Compliance	AS 1428.1 BCA D3.6

Non-accessible sanitary facilities

Position	At each bank of sanitary facilities that are not provided with an accessible unisex sanitary facility.
Message	<ul style="list-style-type: none"> - Braille and tactile signage incorporating the international symbol of access. - Indicate location of the nearest accessible unisex sanitary facility.
Letter height	AS 1428.2 clause 17, Table 2.
Symbol size	AS 1428.2 clause 16, Table 1.
Sign type	
Compliance	AS 1428.1 BCA D3.6

END OF SECTION

0612 CEMENTITIOUS TOPPINGS

Revision history (Revisions are highlighted yellow and deletions are struck through)			
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1	General	1
1.1	Responsibilities	1
1.2	Cross references	2
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1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Supply and install a complete system of cementitious toppings/screeds, including but not limited:

- Floor and wall tiling/stone, pavers and the like
- Applied Granolithic Screeds
- Matching coves, risers, kerbs, margins, pit covers, etc.
- Float Screeding, Curing and Protection
- Extent as indicated on drawings and schedule of finishes.

Performance

Requirements:

- If floating, without edge curl.
- If bonded, without drummy areas.
- Without obvious shrinkage cracks.

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- 0160 Quality
- 0171 General requirements
- 0315 Concrete
- 0621 Waterproofing - wet areas
- 0631 Ceramic tiling

1.3 STANDARDS

Slip resistance

Classification: To AS 4586 and HB198.

1.4 INTERPRETATION

Definitions

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

- 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.
- Granolithic topping: A topping mix with the coarse aggregate restricted to between 2 and 3 mm.
- Substrate: The surface to which a material or product is applied.
- Topping: Mixture of binders, aggregate and water applied to substrates in a plastic state and dried and cured to a hard surface.
- Topping function:
 - . Levelling: Topping placed to receive applied floor finishes.
 - . Wearing: Topping placed to act as the finished floor.
- Topping method:
 - . Bonded or post applied: Topping which is bonded to a hardened substrate from which laitance has been removed and to which a bonding agent has been applied.
 - . Floating: Topping which is separated from a hardened substrate by a resilient layer.
 - . Monolithic or wet applied: Topping placed on a plastic substrate so that a chemical bond is created between the substrate and the topping.
 - . Separated: Topping which is separated from a concrete subfloor by a membrane.

1.5 TOLERANCES

General

Thickness: Deviation from the documented thickness:

- Thickness < 15 mm: ± 2 mm.
- Thickness $\geq 15 < 30$ mm: ± 5 mm.
- Thickness ≥ 30 mm: ± 10 mm.

Flatness: Maximum deviations from a straightedge laid in any direction on a plane surface:

- Class A: 4 mm from a 2 m straightedge.
- Class B: 6 mm from a 3 m straightedge.

1.6 DESIGN PERFORMANCES

General

Undertake and take responsibility for the detail design of the cementitious toppings.

The design shall include a methodology for regular cleaning and maintenance.

Performance criteria

Design the cementitious topping works in accordance with the following design criteria:

- Compliance with the Cement and Concrete Association of Australia's Guides
- Achieve architectural intent for colour, pattern and setout as indicated on the Drawings and schedules
- Accommodate varying substrate conditions and levels

- Accommodate substrate movement
- Co-ordinate floor joints with structural joints in slabs
- Resistant to chemicals used in the regular maintenance and operation of the facility.
- Accommodate heavy pedestrian traffic without perceptible signs of wear over the design life.
- Resistant to abrasion by furniture
- Resistant to food spillage including greases, oils and colourings

1.7 SUBMISSIONS

Products and materials

General: Submit product data on the following:

- Admixtures.
- Bonding products.
- Colouring products.
- Curing products.
- Sealant products.
- Slip-resistant products.
- Surface treatment products.

Prototypes

General: Prepare prototypes of each topping type:

- Size: 1200 x 2400 mm.

Upon approval the prototype shall provide a reference for the standard of the work.

Approved prototypes may be incorporated into the work.

Samples

General: Submit samples of the following products:

- Colouring products.
- Control joint products.
- Surface treatment products.

Tests

Site tests: Submit results, as follows:

- Flatness.
- In situ crushing resistance/soundness.
- Slip resistance test of completed installation. Demonstrate compliance with AS 4586-2013

1.8 INSPECTION

Notice

General: Give notice so that inspections may be made of the following:

- Topping placed and surfaced before finishing.
- Substrates ready for laying of toppings.
- Prototypes ready for inspection.

2 PRODUCTS

2.1 MATERIALS

Admixtures

Standard: To AS 1478.1.

Aggregates

Standard: To AS 2758.1.

Coarse aggregate: Nominal single size less than or equal to 1/3 topping thickness.

Fine aggregate: Fine, sharp, well-graded sand with a low clay content and free from efflorescing salts.

Bonding products

General: Provide proprietary products manufactured for bonding cement-based toppings to concrete substrates.

Cement

Standard: To AS 3972.

- Type: SL.

Colouring products

General: Provide proprietary products manufactured for colouring cement toppings.

Integral pigment proportion: 10% maximum by weight of cement.

Concrete

Standard: To AS 1379.

Unreinforced topping:

- Class: Normal.

Reinforced topping table

Exposure location	Strength grade	Cover to reinforcement
Internal and External greater than 50 km inland and non-industrial and non-tropical	N25	20 mm
External greater than 50 km inland and tropical and External near coastal (> 1 km < 50 km)	N32	30 mm
External coastal less than 1 km but not in the splash zone	N40	35 mm

Reinforcement

Standard: To AS/NZS 4671.

Mesh sizes for joint spacing as follows:

- SL 42: Up to 3 m internal, 2 m external.
- SL 62: Up to 6 m internal, 4 m external.

Curing products

General: Provide proprietary products manufactured for use with cement-based toppings and with the floor finish to be laid on the toppings.

Mixes

General: Provide toppings as follows or select mix proportions to the **Mix proportion table**:

- Air entrainment: $\leq 3\%$.
- Nominal coarse aggregate size: $\leq 0.3 \times$ topping thickness.
- Slump: 80 mm.
- Standard strength grade: N25.

Water quantity: The minimum necessary to achieve full compaction and prevent excessive water being brought to the surface during compaction.

Mix proportion table

Mix type	Thickness (mm)	Upper and lower limits of proportions by weight		
		Cement	Fine aggregate	Coarse aggregate
Bonded – cement and sand	35	1 1	3 4.5	0 0
Bonded – fine concrete	40	1 1	3 3	1 2
Floating – fine concrete	100	1 1	3 3	1 2
Granolithic	Floors: 25 Skirtings: 13	1	2	1, of 2 mm -

Mix type	Thickness (mm)	Upper and lower limits of proportions by weight		
				3 mm
Separated – fine concrete	70	1 1	3 3	1 2

Slip resistance products

General: Provide proprietary products manufactured to improve the wet slip resistance of toppings.

- Silicon carbide granules:
 - . Granule size: $\geq 300 < 600 \mu\text{m}$.
- Silicon carbide two-part resin:
 - . Granule size: $\geq 300 \mu\text{m}$.

Surface treatment products

General: Provide proprietary products manufactured for use with cement-based toppings to change the characteristics of the surface of the finished topping.

Water

General: Clean and free from any deleterious matter.

2.2 CONTROL JOINTS

Control joint materials

Control joint strip: A proprietary expansion joint consisting of a neoprene filler sandwiched between 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 terrazzo surface.

- Floors: Trafficable, shore hardness greater than 35.

Backing rod: Compressible closed cell polyethylene foam with a bond-breaking surface.

3 EXECUTION

3.1 PREPARATION

Substrates

General: Provide substrates as follows:

- Clean and free from any deposit which may impair adhesion of monolithic or bonded toppings.
- Remove excessive projections and voids and fill hollows with a mix not stronger than the substrate or weaker than the topping.
- Roughen hardened concrete by scabbling or the like to remove 2 mm of the laitance and expose the aggregate.

Bonded toppings

General: Before laying topping wash the substrate with water and provide a bonding product, or treat as follows:

- Keep wet for 2 hours or more.
- Remove surplus water and brush on neat cement or a clean slurry of cement and water.
- Place the topping while the slurry is wet.

3.2 LAYING TO FALLS AND LEVELS

Requirements

Lay to falls and levels as required for the location.

Levels: Lay to the levels required including:

- Finished surfaces: At required finish levels.
- Set down surfaces: As required for the work over to achieve the required finish levels.

Level work

Where work is required to finish level:

- Lay without fall or change in level and to the scheduled Tolerance Class.
- Lay so as to prevent the occurrence of ponding due to uneven falls.

Work to falls

Locations : Where indicated on the drawings or where required for water shedding.

Where work is required to finish to falls:

- Lay concrete surfaces to true and even falls to outlets, edges and the like.
- Do not allow ponding to occur due to uneven falls.

Falls for waterproofing

Locations: Where waterproofing is laid directly over slab surfaces.

Provide falls to slab surface so as to provide falls in the waterproofing.

3.3 APPLICATION

Laying

General: Spread the mix and compact. Strike off, consolidate and level surfaces to finished levels.

Monolithic toppings: Lay while concrete subfloor is plastic and the surface water is no longer visible.

Toppings over 50 mm thick:

- Lay in two layers of equal thickness.
- Place a layer of reinforcement between the layers of toppings. Lap reinforcement 200 mm and tie. Do not create four way laps.

3.4 SURFACE FINISHES

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:

- Produce a smooth surface relatively free from defects using power tools.
- When the surface has hardened sufficiently, use steel hand trowels 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 from trowel marks and defects.

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

Broom finish: After machine floating draw a broom or hessian belt across the surface to produce a coarse even-textured slip-resistant transverse-scored surface.

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

Sponge finish: After machine floating, obtain an even textured sand finish by wiping the surface using a damp sponge.

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 fine, hard, sharp, graded abrasive particles.

Coloured applied finish: Apply a proprietary liquid or dry shake material to a steel trowel finished surface, in conformance with the manufacturer's written requirements.

Stamped and coloured pattern paved finish: A complete proprietary finishing system.

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

Surface finishes

General: Provide surface finishes as specified in worksection 0315 Concrete Finishes specification.

Slip-resistant treatment

Surface treatment: Apply silicon carbide granules after floating and before the topping surface has set, and trowel into the surface so that the granules remain exposed.

Application rate: 1 kg/m² evenly distributed.

Surface colouring

General: Apply the colouring product after floating and before the topping surface has set and trowel into the surface so that it is even in colour.

Surface treatment

General: Apply the surface treatment after floating and before the topping surface has set.

Temperature

General: Make sure that the temperature of mixes, substrates and reinforcement are not less than 5°C or greater than 35°C at the time of application.

Severe temperature: If the ambient shade temperature is greater than 38°C, do not mix topping.

3.5 CONTROL OF MOVEMENT

General

Requirement: Provide control joints as follows and as documented in the **Control joints schedule**:

- 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 topping-finished areas into bays.
 - . At abutments with the building structural frame and over supporting walls or beams where flexing of the substrate is anticipated.
- Depth of joint: Right through to the substrate.
- Depth of elastomeric sealant: One half the joint width, or 6 mm, whichever is the greater.

Control joints to divide topping into bays: Provide joints using one of the following methods:

- Form in situ using square edge steel forms and trowelling a 3 mm radius to edges.
- Form 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.
- Install a control joint product.

3.6 JOINT ACCESSORIES

Weather bars

General: Provide a corrosion-resistant metal weather bar under hinged external doors. Locate under the centres of closed doors.

Floor finish dividers

General: Finish cementitious toppings at junctions with differing floor finishes with a corrosion resistant metal dividing strip suitably fixed to the substrate, with top edge flush to the finished floor. If changes of floor finish occur at doorways make the junction directly below the centre of the closed door.

3.7 TESTING

Construction tests

General: Test and assess conformity of construction as follows:

- Flatness: If flatness properties are required:
 - . Method: To ASTM E1155.
- In situ crushing resistance/soundness: If a soundness category is required:
 - . Method: To BS 8204-1.

Completion tests

Slip resistance of completed installation: To AS 4663.

3.8 COMPLETION

Curing

General: Prevent premature or uneven drying out and protect from the sun and wind.

Curing: Use a curing product or, as soon as toppings have set sufficiently, keep them moist by covering with polyethylene film for seven days.

Joint sealant

General: If required, seal joints as follows:

- Formed joints: ≤ 25 mm deep with filler and bond-breaker.
- Sawn joints: Full depth of cut.

Protection

General: Protect finished work from damage during building operations.

END OF SECTION

0621 WATERPROOFING – WET AREAS

Revision history (Revisions are highlighted yellow and deletions are struck through)			
Revision	Date	Status	Comment
T00	06/05/2019	Tender	

1	General	1
1.1	Responsibilities	1
1.2	Acceptable manufacturer	1
1.3	Cross references	2
1.4	Standards	2
1.5	Manufacturer's documents	2
1.6	Interpretation	2
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2	Products	3
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1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: The work of this specification is the design completion, supply and installation of wet area waterproofing systems including preparatory work and associated materials.

The specification and the drawings show waterproofing systems that are for the sole purpose of setting the performance requirements, prescribing the design intent, and providing schematic design profiles.

Responsibility to be taken for the system design detailing, material installation, protection, guarantees, and certification.

Performance

Requirements:

- Grade to floor wastes, to dispose of water without ponding.
- Prevent moisture entering the substrate or adjacent areas.

1.2 ACCEPTABLE MANUFACTURER

Approved equivalent to **Parchem**

Website: www.parchem.com.au/parchem-specification-team

1.3 CROSS REFERENCES

General

Requirement: Conform to the following:

- 0160 Quality
- 0171 General requirements
- 0411 Waterproofing – external and tanking
- 0511 Lining
- 0612 Cementitious Toppings
- 0631 Ceramic tiling

1.4 STANDARDS

Waterproofing wet areas

Standard: To AS 3740.

1.5 MANUFACTURER'S DOCUMENTS

Technical manuals

Website: www.parchem.com.au/construction/

1.6 INTERPRETATION

Definitions

General: For the purposes of this worksection the definitions given in AS 3740 and the following apply:

- Bond breaker: A system preventing a membrane bonding to the substrate, bedding or lining.
- Membranes (waterproof): Impervious barriers to liquid water which may be:
 - . Installed below floor finishes.
 - . Installed behind the wall sheeting or render and termed External.
 - . Installed to the face of the wall sheeting or render and termed Internal.
 - . Applied in liquid or gel form and air cured to form a seamless film.
 - . Applied in sheet form with joints lapped and sealed.
- Substrate: The surface to which a material or product is applied.
- Waterproof (WP): The property of a material that does not allow moisture to penetrate through it.
- Waterproofing systems: Combinations of membranes, flashings, drainage and accessories which form waterproof barriers and which may be:
 - . Loose-laid.
 - . Bonded to substrates.
- Water resistant (WR): The property of material that restricts moisture movement and will not degrade under conditions of moisture.
- Wet area: An area within a building supplied with a floor waste.

1.7 SUBMISSIONS

Products and materials

Documentation: Submit copies of product manufacturer's:

- Product technical data sheets.
- Safety data sheets (SDS).
- Type tests certificates verifying conformance to AS/NZS 4858.

Records

Placing records: Photographically record the application of membranes and information as follows:

- Date.
- Portion of work.
- Substrate preparation.
- Protection provided from traffic.

Samples

General: Submit 300 x 300 mm samples of each type of membrane.

Shop drawings

Submit shop drawings showing:

- Junctions with vertical surfaces and upstands.
- Junctions at perimeters.
- Drainage details.
- Control joints.
- Flashings.
- Penetrations.
- Corners.
- Terminations and connections.

Warranties

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

1.8 INSPECTION

Notice

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

- Substrate preparation completed.
- Secondary layers preparation completed.
- Before membranes are covered up or concealed.
- After flood testing, if applicable.

2 PRODUCTS

2.1 GENERAL

Storage and handling

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

- Protect materials from damage.

2.2 MEMBRANES

Standards

Standard: To AS/NZS 4858.

Membrane systems

Requirement: Provide a proprietary membrane systems suitable for the intended internal wet area waterproofing.

2.3 ACCESSORIES

Water stop angles

Material: Rigid, corrosion resistant angles compatible with the waterproof membrane system.

Bond breakers

Requirement: Compatible with the extensibility class of the membrane to be used.

Material: Purpose made bond breaker tapes and closed cell foam backing rods or fillets of sealant.

Flashings

Requirement: Flexible waterproof flashings compatible with the waterproof membrane system.

Liquid membrane reinforcement

Requirement: Flexible fabric compatible with the waterproof membrane system.

Sealants

Requirement: Waterproof, flexible, mould-resistant and compatible with host materials.

Adhesives

Requirement: Waterproof and compatible with host materials.

3 EXECUTION

3.1 PREPARATION

Substrates

General: Make sure substrates are as follows:

- Clean and free of any deposit or finish which may impair adhesion of membranes.
- If walls are plastered, remove loose sand.
- If walls or floors are framed or discontinuous, support members are in full lengths without splicing.
- If floors are solid or continuous:
 - . Excessive projections are removed.
 - . Voids and hollows greater than 10 mm with abrupt edges are filled with a cement:sand mix not stronger than the substrate nor weaker than the bedding.
 - . Depressions less than 10 mm are filled with a latex modified cementitious product with feathering eliminated by scabbling the edges.
 - . Cracks in substrates wider than 1.5 mm are filled with a filler compatible with the membrane system.

Concrete substrates: Cure for more than 28 days.

External corners: Round or arris edges.

Moisture content

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

Falls

Membrane directly under the floor finish: Make sure the fall in the substrate conforms to the fall documented for the finish.

Sheet substrate fastening

Requirement: Fasten or adequately fix to the supporting structure.

Control joints

Finishes: Align control joints in finishes and bedding with control joints or changes in materials in the substrate.

Water stop angles

Requirement: Provide water stop angles at door thresholds and shower enclosures to support the waterproof membrane at junctions between waterproofed and non-waterproofed areas.

Sizing: Size the vertical leg of the water stop angle to conform to the requirements of AS 3740.

Corners: Cut the horizontal leg and bend the vertical leg at corners instead of forming vertical joints between separate lengths of angle.

Fixing: Fix water stop angles to the substrate with compatible sealant or adhesive and corrosion-resistant countersunk or wafer head screws.

Priming

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

Bond breakers

Requirement: After the priming of surfaces, provide bond breakers at all wall/floor, hob/wall junctions and at control joints where the membrane is bonded to the substrate.

Sealant fillet bond breakers:

- Application: Form a triangular fillet or cove of sealant to internal corners within the period recommended by the membrane manufacturer after the application of the primer.
- Widths: 5 mm x 5 mm to vertical corners. 6 mm x 6 mm to 9 mm x 9 mm to horizontal corners.

Backing rod bond breakers: Retain in position with continuous length of tape pressed firmly in place against the surfaces on each side of the rod.

3.2 APPLICATION

Protection

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

Extent of waterproofing

Waterproof or water resistant surfaces: To the requirements of BCA F1.7 Waterproofing of wet areas in buildings.

Sheet membrane joints

Bituminous sheet membranes:

- Side laps at least 75 mm.
- End laps at least 100 mm.

Synthetic rubber membranes:

- Factory-vulcanized laps at least 40 mm.
- Field side laps at least 50 mm for side laps.
- Field end-laps at least 100 mm for end laps.

PVC membranes:

- Factory welded laps at least 30 mm.
- Field-welded laps at least 75 mm.

Vertical membrane terminations

Upstands: At least 150 mm above the finished tile level of the floor or 25 mm above the maximum retained water level, whichever is the greater.

Anchoring: Secure sheet membranes along the top edge.

Edge protection: Protect edges of the membrane.

Flashings

Junctions between waterproof surfaces: Provide a bond breaker at internal corners behind flashings.

Junctions between waterproof surfaces and other surfaces: Provide a bead of sealant at the following junctions:

- Waterproof and water-resistant surfaces.
- Water-resistant and water-resistant surfaces.
- Water-resistant and non water-resistant surfaces.

Perimeter flashings: Provide continuous flashings to the full perimeter of waterproof areas at wall/floor junctions and to water stop angles.

Vertical flashings: Provide vertical corner flashings continuous across wall/wall junctions to at least 1800 mm above finished floor level.

Vertical liquid applied flashings:

- Return legs at least 40 mm on each wall.
- Overlap the vertical termination of the floor waterproofing membrane at least 20 mm.

Vertical sheet flashings:

- Return legs at least 50 mm on each wall.
- Overlap shower tray upstands at least 50 mm.
- Do not penetrate flashing with wall lining fasteners.

Reinforcement: At coves, corners and wall/floor junctions with gaps greater than 3 mm reinforce liquid applied membranes with reinforcement fabric tape recommended by the membrane manufacturer.

Fold the tape in half lengthways and imbed it in the first flashing coat of membrane with one half of the tape on each side of the corner or joint. Apply a second coat of liquid membrane to seal the fabric.

Door jambs and architraves

Requirement: If the bottom of doorjambs and architraves do not finish above the floor tiling, waterproof their surfaces below tile level to provide a continuous seal between the perimeter flashing to the wall/floor junction and the water stop angle.

Drainage connections

Floor wastes: Provide floor wastes of sufficient height to accommodate the thickness of floor finishes and bedding at the outlet position. Position drainage flange to drain at membrane level. Turn

membrane down 50 mm minimum into the floor waste drainage flanges, and adhere to form a waterproof connection.

Preformed drainage channels:

- With continuous drainage flanges: Provide a continuous waterproof connection between the membrane and the channel.
- Without drainage flanges: Provide continuous waterproofing under the channel and terminate the membrane at a floor waste with a recessed drainage flange.

Taps and spouts

Requirement: Waterproof penetrations for taps and spouts with proprietary flange systems or a sealant.

Provision for servicing: Install taps in a manner that allows tap washers or ceramic discs to be serviced without damaging the waterproofing seal.

Curing of liquid applied systems

General: To the manufacturer's instructions.

Curing: Allow membrane to fully cure before tiling.

Overlaying finishes on membranes

Requirement: Protect waterproof membranes with compatible water-resistant surface materials that do not cause damage to the membrane.

Suitable materials: Conform to AS 3740.

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

3.3 COMPLETION

Protection

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

Reinstatement: Repair or replace faulty or damaged work.

Warranties

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

- Form: Against failure of materials and execution under normal environment and use conditions.
- Period: Refer to Worksection 0171 *General requirements*.

4 SELECTIONS

4.1 SYSTEMS

Liquid membrane system schedule under tiles

Property	Liquid membrane system
Proprietary system	Approved equivalent to Parchem – Emer-proof Aqua Barrier Quick Dry
Material type	Water-based, fast drying two part, polymer/cementitious
Tensile stress at break (MPa)	1.3
VOC (g/L)	0.042
Tensile strain (elongation at the break) %	> 320
Adhesion to concrete (primed) (MPa)	> 1.7
Water vapour transmission (g/24 h/m ²)	0.45
Shore A hardness	65
Colour	Grey
Priming: Porous surfaces (e.g. masonry)	Emer-Proof Multi-Purpose Primer and Additive

Property	Liquid membrane system
Priming: Non-porous surface (e.g. ceramic tile, metals, and plastics)	Emer-Proof Non-Porous Primer
Number of coats (with a minimum WFT of 1.5mm coverage of 1.5 litres/m ²)	2
Membrane first coat	Emer-Proof Quick Dry Two Part
Membrane second coat	Emer-Proof Quick Dry Two Part
Method of application	Thick brush or roller
Application rate/coat (L/m ²)	1.5
Dry film thickness (total) (mm)	1.5
Bond breakers	Emer-Proof Elastic Joint Band System
Tile adhesive	Emer-Proof Tilebond Flex

END OF SECTION

0631 CERAMIC TILING

Revision history (Revisions are highlighted yellow and deletions are struck through)			
Revision	Date	Status	Comment
T00	06/05/2019	Tender	

1	General	1
1.1	Responsibilities	1
1.2	Cross references	2
1.3	Standards	2
1.4	Interpretation.....	2
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2	Products	4
2.1	General	4
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2.3	Tiles and accessories	4
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3	Execution.....	6
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3.3	Fixing underlay	7
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3.9	Control of movement	9
3.10	Grouted and sealant joints.....	9
3.11	Joint accessories	9
3.12	Testing	10
3.13	Completion.....	10

1 GENERAL

1.1 RESPONSIBILITIES

General

Provide tiling systems to walls, floors and other substrates as shown on drawings and Schedule of Finishes and as follows:

- Preparation of surfaces before tiling or bedding
- Wall tile
- Floor tile
- 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.
- To direct all water flowing from supply points to drainage outlets without leakage to the substrate or adjacent areas.
- Refer to drawings and schedule of finishes for tiles selection, location, set out, and the like.
- Cleaning of finished tiled surfaces.

Performance

General: This specification and the drawings show tiling for the sole purpose of setting the performance requirements, prescribing the design intent, and providing schematic designs. Responsibility must be taken for the design, system design detailing, shop drawings, material installation, cleaning, protection, guarantees and certification.

The ceramic tiling must conform to slip resistant requirements as set out in the standards and take steps to maintain slip prevention in the detailed execution of the works

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:

- *0160 Quality*
- *0171 General requirements*
- *0181 Adhesive, sealants and fasteners*
- *0310 Concrete*
- *0511 Lining*
- *0552 Metalwork & miscellaneous fixtures*
- *0612 Cementitious toppings*
- *0621 Waterproofing – Wet areas*

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. Also, HB198

1.4 INTERPRETATION

Definitions

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

- Acoustic underlay: A resilient material laid between the structural floor and the flooring material to provide sound isolation.
- 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 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

Product conformity: Submit evidence of conformity to the following:

- Marking and classification of tiles with regard to water absorption and shaping to AS ISO 13006.
- Marking and classification of tile adhesive to AS ISO 13007.1.
- Weighted normalised impact sound pressure level to AS ISO 717.2 as measured for the acoustic underlay as part of the entire tiling system.

Type tests: Submit results, as follows:

- Slip resistance of tiles.

Samples

General: Submit labelled samples of tiles, including fittings, accessories, grout and sealants, illustrating the range of variation in colour and finish.

Sample panels: Prepare a sample panel of each type of tiling system as follows:

- Size: > 2 m².
- Include samples of junction details and trim.
- Preserve the panel until related work is complete.

Work Method Statement

Prepare and submit for review, a 'Work Method Statement' that includes a description of the proposed installation methods. Include descriptions of equipment to be used, access path for large elements, waste disposal method, proposed services diversions, and temporary services during construction.

Prototype

Install the first 'section' of each tiling type in an agreed location, treat as a Prototype and schedule as such in the project Quality Assurance plan.

Included in the review:

- Trial set-out for each area
- Method of fixing and bedding system
- Tolerances
- Junction/sealant details
- Expansion joint details
- Treatment of penetrations/fixtures
- Patterns
- Colour uniformity
- Grouting
- Proposed protection of works.

On completion of the Prototype, give notice that an inspection / review may be undertaken. When approved, the prototype may be incorporated into the works. Otherwise remove all traces.

Subcontractors

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

Evidence of experience: Minimum 5 years

Tests

Site tests: Submit results, as follows:

- Slip resistance of completed installation. Type test slip resistance of tiles to AS/NZS 4586.
- Impact sound insulation.

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 UNDERLAY

Fibre cement underlay

Standard: To AS/NZS 2908.2, Type B, category 2 minimum.

Thickness: 5 mm minimum.

Acoustic underlay

General: Provide proprietary product recommended by the manufacturer as compatible with the tiling system.

2.3 TILES AND ACCESSORIES

Tiles

Standard: To AS ISO 13006.

Tactile ground surface indicators: To AS/NZS 1428.4.1.

Coves, nosings and skirtings: Provide matching stop-end and internal and external angle tiles moulded for that purpose.

Exposed edges: Purpose-made border tiles with the exposed edge (whether round, square or cushion) glazed to match the tile face. If such tiles are not available, mitre tiles on external corners.

Accessories

General: Provide tile accessories which match the composition, colour and finish of the surrounding tiles.

2.4 ADHESIVES

General

Standard: To AS ISO 13007.1.

Type

General: Provide adhesives compatible with the materials and surfaces to be adhered, and as scheduled and shown on drawings. Tile adhesives must be compatible with the tile type and the waterproof membrane. refer to Worksection *0621 Waterproofing – Wet areas* for additional requirements and compliance.

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.

2.5 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.

2.6 GROUT

Type

Cement based proprietary grout: Mix with water. Fine sand may be added as a filler in wider joints.

Terracotta tiles: Use proprietary polymer modified grout.

General purpose cement based grout: Mix with fine sand. Provide minimum water consistent with workability.

Mix proportions (cement:sand), by volume:

- For joints < 3 mm: 1:2.
- For joints ≥ 3 mm: 1:3.

Pigments

Pigments for coloured grout: Provide colourfast fillers compatible with the grout material. For cement-based grouts, provide lime-proof natural or synthetic metallic oxides compatible with cement.

2.7 CONTROL JOINTS

Control joint materials

Control joint strip: A proprietary control joint consisting of a neoprene core sandwiched between metal plates with lugs or ribs for mechanical keying. Set flush with the finished surface.

Proprietary slide plate divider strip: An arrangement of interlocking metal plates grouted into pockets formed in the concrete joint edges.

Sealant: One-part self-levelling non-hardening mould resistant, silicone or polyurethane sealant applied over a backing rod. Finish flush with the finished surface.

- Floors: Trafficable, shore hardness greater than 35.

Backing rod: Compressible closed cell polyethylene foam with a bond-breaking surface.

3 EXECUTION

3.1 SUBSTRATES

Drying and shrinkage

General: Before tiling, allow at least the following times to elapse (for initial drying out and shrinkage) for these substrates:

- Concrete slabs: 42 days.
- Concrete blockwork: 28 days.
- Toppings on slabs and rendering on brick or blockwork: A further 21 days.
- Rendering 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 FIXING UNDERLAY

Installation

Requirement: Lay in staggered (brick) pattern, perpendicular to the direction of the subfloor, with joints in the underlay not coinciding with joints in the subfloor. Fix with fasteners and fastener spacing to the manufacturers recommendations.

3.4 TILING GENERALLY

Sequence

General: submit for review and approval, a proposed sequence of setting and fixing ceramic tiles.

Cutting and laying

Cutting: Cut tiles neatly to fit around fixtures and fittings and at margins where necessary. Drill holes without damaging tile faces. Cut recesses for fittings such as soap holders. Rub edges smooth without chipping.

Laying: Return tiles into sills, reveals and openings. Butt up to returns, frames, fittings, and other finishes. Strike and point up beds where exposed. Remove tile spacers before grouting.

Variations

General: Distribute variations in hue, colour, or pattern uniformly, by mixing tiles or tile batches before laying.

Protection

Floor tiles: Keep traffic off floor tiles until the bedding has set and attained its working strength.

Cleaning: Keep the work clean as it proceeds and protect finished work from damage.

3.5 SETTING OUT

Tile joints

Joint widths: Set out tiles to give uniform joint widths within the following limits:

- Floors:
 - . Dry pressed tiles: 3 mm.
 - . Extruded tiles: 6 mm.
 - . Vitrified: 3 to 5 mm.
 - . Quarry tiles: 6 to 12 mm.
 - . Chemical resistant epoxy jointed tiling: 5 to 6 mm.
- Large and/or irregular floor tiles: 6 to 12 mm.
- Mounted mosaics: To match mounting pattern.
- Walls:
 - . Dry pressed tile: 1.5 mm.
 - . Extruded tile: 6 mm.

Joint alignment: Set out tiling with joints accurately aligned in both directions and wall tiling joints level and plumb.

Joint position: Set out tiles from the centre of the floor or wall to be tiled.

Margins

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

Fixtures

General: If possible position tiles so that holes for fixtures and other penetrations occur at the intersection of horizontal and vertical joints or on the centre lines of tiles. Continue tiling fully behind fixtures which are not built in to the tiling surface. Before tiling make sure that fixtures interrupting the tile surfaces are accurately positioned in their designed or optimum locations relative to the tile layout.

3.6 FALLS AND LEVELS

Grading

General: Grade floor tiling to even and correct falls to floor wastes and elsewhere as required. Make level junctions with walls. Where falls are not required, lay level.

Fall, general: 1:100 minimum.

Change of finish: Maintain finished floor level across changes of floor finish including carpet.

3.7 BEDDING

Standard

Cement mortar: To AS 3958.1 clause 5.5.

Adhesive: To AS 3958.1 clause 5.6.

Preparation of tiles

Adhesive bedding: Fix tiles dry; do not soak.

Mortar bedding: Soak porous tiles in water for half an hour and then drain until the surface water has disappeared.

Terracotta tiles: Use pre-sealed tiles or apply a breathable sealer and lay dry. If a final sealed finish is selected, use a compatible laying sealer.

Bedding

General: Use bedding methods and materials which are appropriate to the tile, the substrate, the conditions of service, and which leave the tile firmly and solidly bedded in the bedding material and adhered to the substrate. Form falls integral with the substrate.

Thin adhesive beds

General: Provide only if the substrate deviation is less than 3 mm, tested with a 3 m straightedge.

Cover the entire tile back with adhesive when the tile is bedded.

Thickness: 1.5 to 3 mm.

Thick adhesive beds

General: Provide on substrates with deviations up to 6 mm, tested with a 3 m straightedge, and with tiles having deep keys or frogs.

Nominal thickness: 6 mm.

Adhesive bedding application

General: Apply adhesive by notched trowel to walls and floors and direct to tiles if required, to provide evenly distributed coverage after laying as follows:

- Domestic internal walls: > 65%.
- Domestic internal floors: > 80%.
- Other wall and floors: > 90%.
- Wet areas and bench tops: 100%.

Pattern of distribution of adhesive: To the recommendations of AS 3958.1 clause 5.6.4.3. Verify by examining one tile in ten as work proceeds.

Wall tile spacers: Do not use spacer types that inhibit the distribution of adhesive.

Curing: Allow the adhesive to cure for the period nominated by the manufacturer before grouting or allowing foot traffic.

Mortar beds

For floor tiles: Either lightly dust the screeded bed surface with dry cement and trowel level until the cement is damp, or spread a thin slurry of neat cement, or cement-based thin bed adhesive, on to the tile back. Do not use mortar after initial set has occurred.

- Nominal thickness: 20 to 40 mm.

Thick reinforced beds: Place mortar bed in two layers, and incorporate the mesh reinforcement in the first layer.

Mechanical fixing

General: Provide a proprietary system of support and fixing appropriate to the type of tile and the substrate conditions.

3.8 TILING OVER WET AREA WATERPROOFING

General

Inspect and ensure wet areas have been waterproofed to AS 3740 before commencing with tiling. Also, refer to Worksection *0621 Waterproofing – Wet Areas*, for waterproofing system.

Notify any discrepancies and await rectification before proceeding.

3.9 CONTROL OF MOVEMENT

General

Requirement: Provide control joints carried through the tile and the bedding to the recommendations of AS 3958.1 clause 5.4.5 and as follows:

- Floor location:
 - . Over structural control joints.
 - . To divide complex room plans into rectangles.
 - . Around the perimeter of the floor.
 - . At junctions between different substrates.
 - . To divide large tiled areas into bays.
 - . At abutments with the building structural frame and over supporting walls or beams where flexing of the substrate is anticipated.
- Wall location:
 - . Over structural control joints.
 - . At junctions with different substrate materials when the tiling is continuous.
 - . At vertical corners in shower compartments.
- Depth of joint: Right through to the substrate.
- Sealant width: 6 to 25 mm.
- Depth of elastomeric sealant: One half the joint width, or 6 mm, whichever is the greater.

3.10 GROUTED AND SEALANT JOINTS

Grouted joints

General: Commence grouting as soon as practicable after bedding has set. Clean out joints as necessary before grouting.

Face grouting: Fill the joints solid and tool flush. Clean off surplus grout. Wash down when the grout has set. When grout is dry, polish the tiled surface with grout film remover and a clean cloth.

Edges of tiles: Grout exposed edge joints.

Epoxy grouted joints: Make sure tile edge surfaces are free of extraneous matter such as cement films or wax, before grouting.

Mosaic tiles

Grouting mosaics: If paper faced mosaics are to be bedded in cement mortar, pre-grout the sheeted mosaics from the back before fixing. After fixing, rub grout into the surface of the joints to fill any voids left from pre-grouting. Clean off surplus grout. When grout has set, wash down. If necessary, use a proprietary cement remover.

Sealant joints

General: Provide joints filled with sealant and finished flush with the tile surface as follows:

- Where tiling is cut around sanitary fixtures.
- At internal corners of walls in showers.
- Around fixtures interrupting the tile surface, for example pipes, brackets, bolts and nibs.
- At junctions with elements such as window and door frames and built-in cupboards.

Material: Anti-fungal modified silicone.

Width: 5 mm.

Depth: Equal to the tile thickness.

3.11 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.

Refer to *Worksection 0552 Metalwork and Miscellaneous Fixtures, Schedule of finishes and Drawings.*

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.

3.12 TESTING

Completion tests

Slip resistance of completed installation: To AS 4663.

3.13 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: As directed by the Project Manager on site.

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.

END OF SECTION

0652 CARPETS

Revision history (Revisions are highlighted yellow and deletions are struck through)			
Revision	Date	Status	Comment
T00	06/05/2019	Tender	

1	General	1
1.1	Responsibilities	1
1.2	Cross references	1
1.3	Standards	2
1.4	Interpretation.....	2
1.5	Submissions	2
1.6	Inspection	2
2	Products	3
2.1	General	3
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2.3	Carpet	3
2.4	Carpet tiles.....	3
2.5	Mats	4
2.6	Underlays.....	4
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2.8	Accessories	4
2.9	Testing	4
3	Execution.....	6
3.1	Preparation	6
3.2	Laying carpet	7
3.3	Laying carpet tiles.....	7
3.4	Completion.....	7

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide carpet to floor areas and substrates, as shown on drawings and finishes schedule.

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- 0160 Quality
- 0171 General requirements
- 0315 Concrete finishes

1.3 STANDARDS

Slip resistance

Classification: To AS 4586.

1.4 INTERPRETATION

Definitions

General: For the purposes of this worksection, the definitions given in AS 2454 and the following apply:

- Substrate: The surface to which a material or product is applied.
- Underlay: A non-structural layer of sheet material or in situ levelling material on the substrate to provide a smooth and level surface.

1.5 SUBMISSIONS

Fire hazard properties

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

Operation and maintenance manuals

Contents: Submit maintenance manuals with the following:

- A technical specification of the carpet installation.
- The manufacturer's recommendations for use, care and maintenance of the carpet conforming to AS/NZS 3733.
- The names and addresses of the suppliers and manufacturers of each component.

Products and materials

Slip resistance: Submit evidence of conformance.

Samples

General: Submit labelled production run samples demonstrating the range of colour, pattern, texture and pile yarn available in the required carpet types.

Sample size: Submit the following:

- Carpet: Manufacturer's standard swatch.
- Tiles: 4 x tile size.
- Edge strip, trims, extrusions and stair nosings: Submit a 300 mm length of each type.
- Underlay: Submit one labelled sample at least 600 x 600 mm.

Penetrations: If required, submit one production carpet sample with a penetration access cut as specified in EXECUTION, **LAYING CARPET.**

Stitching: Submit one sample, at least 1 m long, of a stitched seam.

Sample panel: Lay a sample area at least 10 m² of each type of carpet, including underlay, accessories, and 3 m of typical seam.

Location: To the Superintendent's Instruction.

Shop drawings

General: Submit drawings indicating the proposed layout, including location of joints in carpet installations.

Subcontractors

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

Tests

Site tests: Submit results, as listed in **PRODUCTS, TESTS.**

Warranties

General: Submit the manufacturer's product warranties.

Requirement: Specified in the *Worksection 0171 GENERAL REQUIREMENTS* specification

1.6 INSPECTION

Notice

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

- Each batch of material upon delivery.
- Substrate immediately before fixing underlay.

- Fixings, edge strips, and underlay installed ready to lay carpet.
- Completed carpet after cleaning and before covering for protection.

2 PRODUCTS

2.1 GENERAL

Storage and handling

Requirement: Store in a clean, dry, well ventilated environment.

2.2 FIRE PERFORMANCE

Fire hazard properties

Critical radiant flux: Tested to AS ISO 9239.1.

2.3 CARPET

Tolerances

Requirement: To AS/NZS 1385.

Batching

Requirement: Provide from one manufacturing batch and dye lot for carpet laid in a single area and of a single specified type, quality, colour and design.

Anti-microbial treatment

Requirement: Non-metallic, colourless, odourless, positively charged polymer applied during manufacturing to form a molecularly bonded surface to resist bacteria and mould growth.

Insect resistance

Requirement: Provide carpets and underlays composed entirely of materials either inherently resistant to insect attack or treated against insect attack by moth and carpet beetle, by application of insecticide to the yarn during the dyeing or scouring process.

Insect resist agents for wool: Conform to the recommended application levels published by the Woolmark Company for Level 4 protection.

Electrostatic propensity

Criterion: Provide a maximum electrostatic propensity value for carpet of 2500 V at a relative humidity of 25%.

Test method: AATCC TM 134.

Stain and soil resistance

Requirement: Provide one or more of the following:

- Fluoro-treatments: Fluorochemical soil and liquid repelling chemical treatment applied during manufacturing.
- Stain blockers: Colourless acid-based dye stainblocker applied to dyed fibres.

VOC limits

Maximum total VOC emission: 0.5 mg/m²/h.

Compliance: To the Environmental Classification Scheme (ECS) operated by the Carpet Institute of Australia Limited (CIAL).

2.4 CARPET TILES

General

Type: Non-stick, non-curling tiles capable of being taken up without damage and then re-laid in different positions.

Marking: On the back, showing manufacturer's instructions or directional arrow for laying.

Tolerances: Conform to the following:

- Dimensional tolerance: 0.2%.
- Squareness: Maximum difference of 2 mm between lengths of diagonals.

Sustainable carpet tile backing

Re-usable backing: Proprietary vinyl backing to carpet tiles capable of separation and recycling in new carpet tiles.

2.5 MATS

Mats

General: Provide a mat made to fit each designated mat recess.

Mats Type: Refer to Finishes Schedule

2.6 UNDERLAYS

General

Installation: To AS/NZS 2455.1.

Fibre cement underlay

Thickness: 5 mm minimum.

Wet processed fibreboard (hardboard) underlay

Standard: To AS/NZS 1859.4.

Classification: General purpose medium board, manufactured specifically as flooring underlay.

Thickness: 5.5 mm.

Soft underlay

Standard: To AS 4288.

2.7 ADHESIVES AND TAPES

Adhesives

General: Compatible with the floor covering material, and suitable for bonding it to the subfloor.

Friction compound: Suitable for holding tiles in position without permanent sticking.

Total VOC limits

VOC limits refer to *Worksection 0181 Adhesives, Sealants and Fasteners*.

Hot-melt adhesive tapes

General: Commercial grade glass fibre and cotton thermoplastic adhesive coated tape 60 mm wide on a 90 mm wide metal foil base and backed with silicone-coated release paper.

2.8 ACCESSORIES

Preformed gripper strips

General: Commercial grade plywood carpet gripper strip with 3 rows of corrosion-resistant angled pins of length appropriate to the carpet type.

Size (minimum): 33 mm wide x 7 mm thick.

Location: At edges, except where edge strips are used. Provide double gripper strips to edges where recommended.

Edge strips

Type: Heavy duty edge strip appropriate to the floor covering type (tackless or adhesive fixed), capable where necessary of accommodating different levels of adjacent floor finishes.

Form: Metal moulding or extrusion, with vinyl inserts.

Colour: Refer to Finishes Schedule

Location: At exposed edges of the carpet, and at junctions with differing floor finishes or finishes of a different thickness. Where edge strips occur at doorways, locate the junctions directly below the closed door.

2.9 TESTING

General

Tests: Arrange for the Australian Wool Testing Authority Limited (AWTA) to do the following:

- Take random samples in conformance with AS/NZS 2119.
- Conduct the documented testing.
- Submit the original copy of each relevant test report.

Test groups: In the **Tests table**, the letters T, S and Q each comprise one test group defined as follows:

- Type test group (T): Tests on samples of carpet having the same specification, but not necessarily from carpet manufactured for the project. Authenticated test reports less than 12 months old are acceptable.

- Specification test group (S): Tests on samples taken before laying from carpet manufactured for the project.
- Quality assurance test group (Q): Tests on samples taken from the site during laying or from the manufacturer's premises before dispatch to the site.

Number of tests

Requirement: Perform the documented number of tests for each test group (T, S or Q) as follows:

- For each type of carpet documented.
- For each documented area (or part) of installed carpet.

Number of tests schedule

Test group type	Number of tests	Per installed area
T	One only	not applicable
S		each 5000 m ²
Q		each 5000 m ²

Carpet property tests

Requirement: Test the carpet properties in each test group, by the appropriate test method.

Tests table

Carpet property	Test method	Test group
Colour fastness: To artificial light	AS 2001.4.21	T S Q
Colour fastness: To water	AS 2001.4.E01	T S
Colour fastness: To rubbing	AS/NZS 2111.19.1	T S
Colour fastness: To shampoo solution	AS/NZS 2111.19.2	T S Q
Colour fastness: To solvents	AS 2001.4.16	T S
Treatment: For insect resistance	AS 2001.6.1	S
Dichloromethane extractable matter of pile	AS 2001.3.4	S Q
Pile structure: Total pile mass	AS/NZS 2111.11	S
Pile structure: Pile mass above substrate	AS/NZS 2111.4	S Q
Pile structure: Tuft density	AS/NZS 2111.9	S
Pile structure: Tuft withdrawal force	AS/NZS 2111.15	S Q
Burning behaviour	AS/NZS 2111.18	T
Bond strength between backing components	AS/NZS 2111.16	S Q
Electrostatic protection: Electrostatic propensity	AATCC TM 134	S
Soft underlay property: Mass per unit area	AS/NZS 2111.3	Q
Soft underlay property: Fibre content	AS 2001.7	Q
Soft underlay property: Performance	AS 4288	T
Soft underlay property: Thickness	BS 4051	Q
Soft underlay property: Thickness deviation	AS 4288	Q
Soft underlay property: Extractable matter	AS 2001.3.4	Q
Tile dimensions	BS 5921	S Q
Pile yarn construction: Yarn count	AS 2001.2.23	S

Carpet property	Test method	Test group
Pile yarn construction: Twist level	AS 2001.2.14	S

3 EXECUTION

3.1 PREPARATION

Substrate tolerance table

Property	Length of straightedge laid in any direction	Max. deviation under the straightedge
Flatness Class B	3 m	6 mm
Smoothness	150 mm	1 mm

Substrates

General: Conform to the following:

- To AS/NZS 2455.1 or AS/NZS 2455.2, as appropriate.
- Clean and free of any deposit or finish which may impair adhesion or location and functioning of control joints.
- Free of any imperfections, including ridges, indentations and projections which may adversely affect the installed carpet.

Concrete substrate rectification: Remove projections, grind as necessary and fill voids and hollows with a levelling compound compatible with the adhesive to achieve the required tolerance.

Timber substrate rectification: Remove projections. If conformance with the **Substrate tolerance table** cannot be achieved, fix an underlay in brick pattern. Make sure joints do not coincide with substrate joints.

Moisture content: Do not start installation unless:

- Concrete: The moisture content of the concrete has been tested to AS/NZS 2455.1 Appendix B and the values in AS/NZS 2455.1 clause 2.4.2 (c) have been obtained.
- Timber, plywood or particleboard substrates: The moisture content has been tested to AS 1080.1 for timber and particleboard or AS/NZS 2098.1 for plywood and values are obtained as follows:
 - . Air conditioned buildings: 8 to 10%.
 - . Intermittently heated buildings: 10 to 12.5%.
 - . Unheated buildings: 12 to 15%.

Fixtures: Remove door stops and other fixtures, and refix in position undamaged on completion of the installation. Make sure fixings penetrate substrate and are stable.

Working environment

General: Do not start work before the building is enclosed, wet work is complete and dry, overhead work is complete and good lighting is available. Protect adjoining surfaces.

Conditioning

General: Stabilise the room temperature for seven days before, and two days after laying carpet as follows:

- Areas with air conditioning installed: Run air conditioning at operational temperature.
- Air conditioned areas not operational: Maintain a room temperature range between 10°C and 35°C.
- Underfloor heating: Turn off heating and allow substrate to stabilise at the temperature recommended by the carpet manufacturer.
- Non-air conditioned areas: Install at room temperature between 10°C and 35°.

Carpet: Cut to length and lay in position, 24 hours prior to installation.

Hardboard underlay: Expose both faces of each sheet for more than 24 hours before fixing.

Soft underlay: Unroll the carpet and allow to come to the temperature of the in-service environment before laying.

3.2 LAYING CARPET

General

Installation: To AS/NZS 2455.1.

Setting out

General: Lay the carpet in continuous lengths without cross joins in the body of the area. If unavoidable cross joints occur at doorways, locate the joints directly below the closed doors.

Joints in underlay: Make sure joints in underlay do not coincide with carpet joints. Do not carry underlay over carpet grippers or edge strips.

Partition layout: Confirm that permanent partitions have been installed before starting carpet laying.

Fixing underfelt

To timber floors: Secure underfelt with staples at 100 mm centres at edges and joints, in parallel lines 600 mm apart.

To concrete floors: Glue continuously at edges and joints with a 100 mm wide strip to each piece, and at 600 mm centres both ways with 150 mm diameter patches.

Seaming methods

Woven carpet: Machine or hand sew. Do not provide glued taped seams unless selvages are woven to suit and recommended by manufacturer.

Tufted carpet: Seam with hot-melt adhesive tape.

Seam sealing: Apply appropriate seam sealer to each cut edge.

Carpet installation

Stretching: To AS/NZS 2455.1 clause 3.4

Gripper system: To AS/NZS 2455.1 clause 3.5.

Direct-stick system: To AS/NZS 2455.1 clause 3.6.

Double-bond system: To AS/NZS 2455.1 clause 3.7.

Pre-applied underlay adhesive system: To AS/NZS 2455.1 clause 3.8.

Hook and loop system: To AS/NZS 2455.1 clause 3.9.

Cutting laid carpet

Method: If penetrations through laid carpet are necessary for electrical, telephone or other outlets, cut the carpet either by cross cutting or by cutting rectangular or circular openings.

Cutting holes in concrete floors: Protect the carpet and remove concrete particles and dust on completion. Replace the cut carpet over the opening without any signs of fraying or other damage, and fix with a peel-up adhesive, or resew.

3.3 LAYING CARPET TILES

General

Installation: To AS/NZS 2455.2.

Set-out: Do not provide cut tiles which are less than half a tile width. Provide full tiles in doorways. Keep joint lines straight.

Laying: Do not allow the pile to catch in the joint.

Pattern: Refer to Finishes Schedule

Fixing

Perimeter and grid system: To AS/NZS 2455.2 clause 7.1.

Fully adhered pressure sensitive system: To AS/NZS 2455.2 clause 7.2.

Double-bond system: To AS/NZS 2455.2 clause 7.3.

Fixing cut tiles: Adhesive fix to 100% of tile.

3.4 COMPLETION

Spares

Spare material: Supply spare matching materials of each type, colour and design of carpet from the same batch for future replacement purposes.

Offcuts: Retain carpet offcuts exceeding 0.5 m² in area and 450 mm in both length and width.

Labelling: Label spare and offcut material appropriately, including the location of the laid area corresponding to each batch. Securely and separately package each batch in a suitable wrapping.

Quantity of spare material: At least 1% of the quantity installed, in full or part length rolls.

Storage locations: To the Superintendent's instruction

Cleaning

Requirement: Progressively clean the work. Remove waste, excess materials and adhesive.

Final cleaning: When the installation is complete, clean the carpet as necessary to remove extraneous matter, marks and soiling and to lift the pile where appropriate.

Protection

Requirement: Provide fabric drop sheets. Do not use plastic sheeting. If wheeled traffic is to follow carpet installation, protect with hardboard sheets butted and fixed with adhesive tape.

END OF SECTION

0671 PAINTING

Revision history (Revisions are highlighted yellow and deletions are struck through)			
Revision	Date	Status	Comment
T00	29/06/2018	Tender	

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1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Supply and application of painting and applied coating systems to internal and external substrates, *approved equivalent to DuluxGroup/Dulux paint systems*, as shown on Drawings and Schedule of Finishes.

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.

This specification painting systems outlines are for the sole purpose of setting the performance requirements.

Determine the protective systems, the programmed execution of the works, testing, cleaning,

protection, guarantees and certification.

Selections: Conform to the Selections including the details of the required paint systems to be used on the project. Refer to Drawings and Schedule of Finishes also.

Refer to *0171 General requirements* Submissions with regard to the procedure for substitution if an alternate paint system is proposed

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:

- *0160 Quality*
- *0171 General requirements*
- *0453 Doors and access panels*
- *0431 Cladding – combined*
- *0511 Lining*
- *0531 Suspended Ceilings*

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

Products and materials

General: Submit the following 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.

Samples

Clear finish coatings: Submit samples of timber or timber veneer matching those to be used in the works as follows:

- Requirement: Label for identification and prepare, putty, stain, seal and coat in conformance with the documented system.
- Size: Large enough to be cut into 4 segments.

Opaque coated samples: Submit labelled samples of each coating system, on representative substrates, showing surface preparation, colour, gloss level, texture, and physical properties.

Coated samples schedule

Substrate	Colour	Sample size
Plasterboard	Refer to Finishes Schedule	A4
Timber	Clear finish	A4
Concrete	Sealers	A4

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.

Subcontractors

Specialist applicators: Submit names and contact details of proposed specialist applicators.

Evidence of experience: Minimum 5 Years

Wet samples

General: Submit two clearly labelled 500 mL samples of each type of paint to be tested.

Warranties

Requirement: Refer to Worksection 0171 *General requirements – Warranty Schedule*

Material warranty: Submit the manufacturer's material warranty as follows:

- Extent: Paintwork generally.
- Terms: Paint systems are suitable for their intended use.
- Warranty period: As defined by the manufacturer.

Material performance warranty: Submit an alternative performance warranty as follows:

- 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

Standards

Paint types: To AS/NZS 2311 Table 4.2 and the following:

- Metal primer for steel, lead and chromate free: To AS 3730.21 and AS/NZS 3750.19.
- Metal primer, latex: To AS 3730.15.
- Metal primer for metallic-coated surfaces, solvent-borne: To AS 3730.21.
- Zinc-rich organic binder/primer for steel: To AS/NZS 3750.9.
- Paint types: Conform to the Australian Standard referenced in the **OCP/Dulux paint type reference table**.

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 March 2018 (including SUSMP 20)* Part 2 Section 7.

Graffiti Prevention Measures

Provide anti-graffiti clear coating for long term protection to walls / spaces accessible to the public as indicated on drawings. The coating system must be treated in accordance with Safer Design and CPTED (Crime Prevention Through Environmental Design) Principles.

Where appropriate the following measures must be implemented to the satisfaction of the Responsible Authority:

- Use of textured or rough services that make it difficult to apply graffiti.
- Use of permeable fencing instead of solid walls.
- Construct buildings with high-density, low absorbency materials.
- Use anti-graffiti coating to protect the surface when building or revitalising the walls (including façade).
- Install sensor lighting and / or enhance surveillance to deter graffiti.
- Break up large surfaces to minimise the canvas available for graffiti.
- Use measures to make the surface less accessible to the public

The anti-graffiti clear coating system shall be from "Dulux precision anti-graffiti coating" or approved equivalent system.

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 2311P RN (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

Paint type	DuluxGroup/Dulux material description	Dulux PDS No.	AS/NZS 2311P RN (Table 4.2)	Standard
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)	DD02070	B7a	AS 3730.3
	Dulux Wash&Wear +Plus Kitchen & Bathroom Low Sheen (low VOC)	DD02074		
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
	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

Paint type	DuluxGroup/Dulux material description	Dulux PDS No.	AS/NZS 2311P RN (Table 4.2)	Standard
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
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	DW0736 DW0737 DW1611 DW1612 DW1617	B19	AS 3730.25 or AS 3730.27 (for floors)

Paint type	DuluxGroup/Dulux material description	Dulux PDS No.	AS/NZS 2311P RN (Table 4.2)	Standard
	Feast Watson Stain & Varnish – not suitable for floors Feast Watson Stain & Varnish Liming White – Gloss, Satin – not suitable for floors	DW1248 DW01804 DW01805		
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 Cabot's Stain & Varnish Water Based – not suitable for floors	DW0762 DW0761 DW01800 DW1634 DW1635	B19a	NE or AS 3730.27 (for floors)
Floor varnish, solvent based, clear (moisture cure)	Feast Watson Commercial Maxithane – Gloss, Satin	DW0701 DW0703	B20	AS 3730.27
Floor Varnish, water-based, one-pack	Intergrain Enviropro Endure 1 Pack - Matt, Satin, Gloss (low VOC)	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	Dulux Durebild STE 2 Pack Epoxy (high build & surface tolerant)	DI1109	B29	AS/NZS 3750.1

Paint type	DuluxGroup/Dulux material description	Dulux PDS No.	AS/NZS 2311P RN (Table 4.2)	Standard
topcoats, interior only	Dulux Duremax GPE	DI1115		
Epoxy paint, two-pack, solvent-borne topcoats, exterior & pools		N/A	B29	AS/NZS 3750.1
Epoxy paint, two-pack, water based, interior only	Dulux Luxafloor ECO2 (low VOC) Dulux Enviropoxy WBE	I1315 DI1120	B29a	NE
High Build Recoatable two-pack, solvent-borne gloss polyurethane	Dulux Weathermax HBR Luxathane HPX	DI1156 DC02059	B29c B29c	NE
Stain sealer, solvent-borne for water soluble stains	Dulux Precision High Opacity Stain Blocker	DD02065	B30	NE
Stain sealer, water based for oil stains	Dulux Precision Maximum Strength Adhesion Primer	DD02066	B30	
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:	Dulux Effects Range (interior)		B38a	NE

Paint type	DuluxGroup/Dulux material description	Dulux PDS No.	AS/NZS 2311P RN (Table 4.2)	Standard
interior only				
Clear or colourless coatings (waterborne) for timber, exterior	Intergrain UltraClear Exterior – Gloss, Satin Note: not suitable for decking.	DW1401 DW1400	B39	NE
Clear coatings (waterborne) for timber, interior	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 -	16	Dulux Professional	2

Green Star Interiors	VOC Limits MAX g/litre	DULUX Products compared to the GBCA specification	VOC g/litre Untinted
interior semi-gloss		Enviro2 Interior Semi-Gloss	
Walls and ceilings - interior semi-gloss	16	Dulux Wash&Wear Semi Gloss Dulux Wash&Wear +Plus Kitchen&Bathroom Semi Gloss	5 5
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	<60

Green Star Interiors	VOC Limits MAX g/litre	DULUX Products compared to the GBCA specification	VOC g/litre Untinted
		Primer Sealer Undercoat (PSU)	
Interior sealer	65	Dulux Professional Enviro2 Acrylic Sealer Undercoat (ASU)	1
Interior sealer	65	Dulux Luxafloor Eco2 (clear)	10
		Dulux Luxafloor WB (Clear)	10
One and two pack performance coatings for floors	140	Dulux Luxafloor Eco2	10
		Dulux Luxafloor WB	10
		Intergrain Enviropro	<75
		Endure One Pack	
		Intergrain Enviropro	<105
		Endure Two Pack	

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 **Interior painting schedule** and the **Exterior painting schedule**.

General: Apply the paint system nominated for each substrate to the referenced manufacturer's Product Data Sheets (PDS) and Spec Sheets and include:

- The number and order of coats.
- The paint type for each coat.

Additional coats: Apply if necessary to:

- prepare porous or reactive substrates with prime or seal coats consistent with the manufacturer's recommendations;
- achieve the total film thickness or texture specified; or
- achieve a satisfactory opacity, in the specified or required colour.

Painting systems

Standards: The scheduled DuluxGroup/Dulux paint systems override AS/NZS 2311 as follows:

- New unpainted interior surfaces: To AS/NZS 2311 Table 5.1.
- New unpainted exterior surfaces: To AS/NZS 2311 Table 5.2.
- Standard: To AS/NZS 2311 clause 5.2. Provide the following final coats:
 - . High build textured or membrane finishes for concrete and masonry: B38 using products conforming to the AS 4548 series.
 - . Two-pack gloss pigmented polyurethane: B44.
 - . Two-pack epoxy: B29.
 - . Two-pack water based epoxy: B29A.

Paint Reference Number (PRN): The number in brackets against the individual product refers to the Paint Ref. No. (PRN) listed in the **DuluxGroup/Dulux paint type reference table** (See **PRODUCTS**) and AS/NZS 2311 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	Dulux Wash&Wear Matt	Dulux Wash&Wear Matt	SD 05883

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
	based)			
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
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

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
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
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

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
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	Dulux Wash&Wear +Plus Kitchen &	Dulux Wash&Wear +Plus Kitchen &	SD 5014

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
	based)	Bathroom Semi Gloss	Bathroom Semi Gloss	
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 & Bathroom Semi Gloss	Dulux Wash&Wear +Plus Kitchen & Bathroom Semi Gloss	SD 3333

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

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
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
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

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
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
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
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
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	Cabot's Cabothane	Cabot's Cabothane	Cabot's Cabothane	SW 07479 (gloss) or

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
veneer (solvent based system)	(solvent based) Gloss or Satin	(solvent based) Gloss or Satin	(solvent based) Gloss or Satin	SW 1202 (satin)
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)

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. Zinalume, Galvabond, Zincaneal, 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
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 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 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. Zinalume, Galvabond, Zincanneal,	Dulux Weathershield Low Sheen	Dulux Weathershield Low Sheen	Dulux Weathershield Low Sheen	SD 3275

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
zincseal, zinc-primed steel)				
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. Zinalume, Galvabond, Zincanneal, zincseal, zinc-primed steel)	Dulux Professional Galvanised Iron Primer	Dulux Weathershield Gloss	Dulux Weathershield Gloss	SD 07813
HD galvanized	Dulux Durebuild	Dulux	Dulux	SI 3762

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
steel or zinc-primed steel (Domestic)	STE Two Pack Epoxy	Weathershield Gloss	Weathershield Gloss	
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
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	Dulux Professional	Dulux Aquanamel	Dulux Aquanamel	SD 7549

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
products	Acrylic Primer	Semi Gloss	Semi Gloss	
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
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,	Dulux Professional Galvanised Iron	Dulux Aquanamel Gloss	Dulux Aquanamel Gloss	SD 11239

Substrate	1st coat	2nd coat	3rd coat	Manufacturer's Spec Sheet Ref
Galvabond, Zincanneal, zincseal, & zinc-primed steel)	Primer			
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

Car parking line marking

Requirement:

- Apply nominally 70 mm wide line marking for car parking spaces. Refer to Drawings.

Materials:

- Paint System: Dulux Roadmaster WB2, spray applied to manufacturers written recommendations.
- Colour shall be white and shall not be subject to discolouration by the bitumen from the road surface.

Application: Unless approved all paint shall be applied by a mechanical line marking sprayer. The road surface shall be clean and dry at the time of painting. Paint shall be applied at wet thickness in the range of 0.35 to 0.40 mm. Bitumen shall be at least 30 days old before coating.

Standard: To AS/NZS 2890.1.

END OF SECTION

0673 POWDER COATINGS

Revision history (Revisions are highlighted yellow and deletions are struck through)			
Revision	Date	Status	Comment
T00	06/05/2019	Tender	

1	General	1
1.1	Responsibilities	1
1.2	Cross references	1
1.3	Standards	1
1.4	Interpretation.....	1
1.5	Submissions	2
2	Execution.....	2
2.1	Preparation	2
2.2	Completion.....	2

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide powder coating systems to substrates, as indicated on Drawings and described in the Schedule of Finishes.

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- 0160 Quality
- 0171 General requirements
- 0183 Metal and prefinishes
- 0451 Windows and glazed doors
- 0552 Metalwork & miscellaneous fixtures

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.

Samples

Powder coating samples: Submit samples of each coating system on representative substrates, showing surface preparation, colour, gloss level, texture, and physical properties.

Subcontractors

Specialist applicators: Submit name and contact details of proposed specialist applicators as registered by the coating manufacturer.

Warranties

General: Submit the coating manufacturer's warranties, as documented.

Requirement: Refer to *0171 General Requirements - warranty schedule*.

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.

END OF SECTION

1011 LIFTS DESIGN AND INSTALL

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide passenger lifts, as documented.

1.2 DESIGN

General

Requirements: Design lifts in conformance with AS 1735.1.

Facilities for persons with disabilities: To AS 1735.12.

Design for durability and maintainability

Design for durability: Design lifts to achieve the documented performance, reliability, service life, energy efficiency and safety requirements and for ease of maintenance.

Access for maintenance: Design lifts so that the installations conform to **EXECUTION, ACCESS FOR MAINTENANCE** in 0171 General requirements.

1.3 CROSS REFERENCES

General

Requirement: Conform to the following:

- 0171 General requirements.
- 0581 Signage.

1.4 STANDARDS

General

Standard: To AS 1735.1, AS 1735.11 and AS 1735.12.

Design for access and mobility: To AS 1428.1.

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

1.5 INTERPRETATION

Abbreviations

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

- LCD: Liquid crystal display.

Definitions

General: For the purpose of this worksection, the definitions given in AS 1735.1 and the following definition applies:

- Consumable: Materials or components intended to be replaced within the service life of the associated plant or equipment.

1.6 SUBMISSIONS

Authority approvals

Requirement: If authorities require approval, or plant design or plant item registration, submit evidence of authority approval and registration for each lift.

Fire performance

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

Operation and maintenance manuals

Requirement: Conform to 0171 General requirements and include the following:

- Procedures for identifying and rectifying common faults.

Products and materials

Requirement: Submit evidence that the equipment submitted meets the requirements of the contract and statutory authority requirements.

Samples

Finishes: Submit samples of the following:

- Lift car interior finishes including handrails.
- Faceplates and indicator panels.
- Buttons and indicators.
- Engravings and signs.

Shop drawings

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

- General arrangement, in plan and section, of the lift equipment in the liftwell including lift overrun clearances.
- General arrangement of the equipment in the machine room in plan and section, showing details of overhead lifting devices.
- Liftwell and machine room sizes, including details of sumps, vision panels, bond block mountings and insert positions.
- Car superstructure, including finishes.
- Landing doors, door frames, surrounds and other enclosure work.
- Car control, accessible control panels, indicator faceplates and communications details.
- Landing button, indicator faceplates and hall lanterns.
- Proposed method of fixing to the structure, wells or other building elements.
- Details of all holes, penetrations, covered hatches, recesses, vision panels, sumps, chasing and other necessary work.
- Dead loads of equipment on the machine room floor.
- Dynamic and dead loads during normal operation.
- Dynamic loads from operation of the buffers.
- Loads on the guide rails and wall inserts, including from safety gear at rated load and governor trip speed.
- Seismic restraint details, if seismic restraint is required.
- Provisions for access for maintenance and removal of components to **EXECUTION, ACCESS FOR MAINTENANCE** in 0171 *General requirements*.
- Machine room ventilation, if required.
- Associated services required including fire detection and lift shaft and machine room lighting.
- Connections to other services.
- Switchboard details.
- Wiring diagrams.
- Electrical loads.
- Heat loads.

Subcontractors

General: Submit names and contact details of the proposed suppliers, installers and maintenance contractor.

Evidence of installation experience: Submit the names of at least 3 projects in Australia where the proposed supplier has installed the lift type offered, in the past 5 years.

Maintenance contractor: Submit evidence that the proposed contractor has maintained the lift type offered, in Australia in the past 5 years.

Maintenance by others: Submit evidence that all requirements/items necessary for persons other than the subcontractor to maintain the lifts will be available after the end of the contract maintenance period.

Evidence of ability to respond in emergency: Submit details of the proposed strategy for attending the site within the documented call out response time.

Tests

Testing: Submit results of the following:

- Statutory tests confirming conformance for all statutory requirements.
- Load and levelling tests, as documented.

Noise type tests: If sound power levels are specified for individual items of equipment, submit type test data stating the sound power level of the equipment offered, and the method of determination used.

Warranties

Requirement: Submit the manufacturer's published product warranties.

2 PRODUCTS

2.1 GENERAL

Suppliers

Requirement: Provide only equipment from a supplier that has operated in Australia for at least 5 years and has a service network that covers the site.

Consistency: Provide all components of the same type from the same manufacturer.

2.2 LIFTS

General

Seismic provisions: To AS 1170.4 and **EXECUTION, SEISMIC RESTRAINT OF NON-STRUCTURAL COMPONENTS** in 0171 *General requirements*.

Fire hazard properties

Critical radiant flux of floor lining/covering: Not less than 2.2 tested to AS ISO 9239.1.

Wall and ceiling lining: Group 1 or Group 2 material to AS 5637.1.

Performance

Contract speed: 1.0 m/s.

Minimum motor starts per hour: 60.

Levelling accuracy: Maximum ± 10 mm, measured at the floor nosing, under all load conditions.

Re-levelling: Required.

Noise levels in the car: With ventilation fans running and a maximum noise level in the lobby of 45 dB (A), do not exceed the following noise levels:

- 55 dB (A) with the car at contract speed.
- 65 dB (A) with the car accelerating, decelerating, levelling to a floor or with the door opening.

Noise levels in adjacent spaces: Prevent transmission of audible noise from the lift, liftwell and machinery to adjacent spaces.

Operation: Smooth, without sudden changes of speed or oscillation of floor level.

Cars

Car handrails: The manufacturer's standard and to AS 1735.12.

Car skirting, if provided: The manufacturer's standard.

Car finishes: As documented.

Car protection: One set of removable padded canvas, lift car wall protectors with toggle clip fastening at the top to protect the walls.

Threshold plate: Slip-resistant, finishing flush with the finished floor level.

Notices: Vandal resistant and to regulatory authority requirements.

Components

Hydraulic lifts: If required to limit the hydraulic fluid temperature to 45°C under all conditions of lift operation, provide an oil cooler or heat exchanger.

Pit ladder: Required.

Sump cover plate: Required.

Controls

Control system: Microprocessor based two-button, single cancellation collective automatic.

Number of main car operating panels: To AS 1735.12.

Audible information system: If the lift serves more than two levels, provide an audible communication system inside the car and at each floor to announce position, direction of travel and status sufficient time before car arrival for passengers to reach the door before arrival.

Car buttons and switches: Braille and illuminating call, alarm, door open, and door close.

Indications in car: Backlit LCD type showing, position and direction.

Key switches: Car lights, ventilation fan, limited access, maintenance.

Landing buttons: Braille and illuminating controlled by access limiting key switch.

Landing indication: Audible and backlit LCD type car position indicator with travel direction on all floors. Provide time scheduled announcement with sound levels programmable for selected times of day.

Other landing devices: Out-of-use signs on all levels.

Proximity card readers: If documented, provide in each lift and landing and connect to the security access control system.

Supplementary control features: Provide the following:

- Out-of-use control and signs.
- Special service operation controls.

Communication

Communication from car: Alarm button activated concealed hands-free auto-dialler phone, connected to a 24 hour monitoring service. Provide a telephone connection to the public network on behalf of the principal.

Fire brigade intercom: Required.

Doors

Door type: Automatic power operated.

Door protection system: Adjustable depth, proximity door safety control using full height microwave or beam detectors.

Door operator: Power operated with adjustable opening and closing speeds.

Materials: Conform to the following:

- Car doors and surrounds: Satin stainless steel.
- Landing doors and frames: Satin stainless steel.

Electrical

Harmonics and EMC: To AS/NZS 61000.

Socket outlets: Provide sufficient socket outlets for the safe and effective maintenance of the equipment.

Lighting

Emergency car lighting: Self-contained to illuminate car, control panels, telephone and to provide power to alarm bell.

Normal car lighting: Manufacturer's standard, LED type.

Ventilation

Car ventilation: Mechanical and natural.

Machinery ventilation: If a separate machine room is provided, provide thermostatically controlled mechanical ventilation to the following:

- Limit the temperature rise due to machinery operation to less than 43°C under all operating conditions and outdoor ambient temperatures.
- Prevent odours from the machine room entering the lift shaft or car.

Ventilation and cooling of lift shaft: To BCA Spec E3.1.

3 EXECUTION

3.1 INSTALLATION

General

Liftwell and pit fixed illumination: Required.

Keys: Provide the following:

- 3 sets of keys for each key operated switch and lock, each set on a key ring with an identifying tag that includes the name of the building and lift.
- One set for emergency liftwell access, tagged.

Painting and finishes: Except for the documented car interior and doors, finish all surfaces of the components and equipment to **FINISHES TO BUILDING SERVICES** in *0171 General requirements*.

Vibration isolation: Mount equipment on anti-vibration mounts and provide flexible electrical connections.

Vision panels: Required between the lift machine room and liftwell or pit.

Signage

Requirement: If key controlled lift access is documented, provide signage in the lift lobby at each landing, to *0581 Signage* and as documented, describing where keys to operate the lifts can be accessed.

3.2 TESTING

Facilities for testing

Equipment: Provide equipment necessary for the carrying out of the required tests.

Preparation: Before starting testing, clean the well, machine and equipment using vacuum cleaning equipment. Remove rubbish from the site.

Car control system

Requirement: Demonstrate by a comprehensive series of tests that the car control system conforms with documented requirements and AS 1735.1.

Load tests

Requirement: Load test each lift as follows while carrying the contract load, in both directions of travel and in continuous operation, the second test following immediately after the first:

- For 45 minutes using landing controls stopping at every floor for 16 seconds.
- For 45 minutes using car controls only stopping at terminal floors for 16 seconds.

Pass criteria: The lift passes the test if there is no malfunction of the lift, doors or machinery, the temperature rise in motors and other components is within their design rating, noise levels are within documented limits, levelling remains within tolerance, ride remains smooth and there are no detectable odours.

Levelling

Testing: Test and record floor levelling of each lift at each floor under no-load, balanced load, and contract load.

Additional tests

Requirement: In addition to documented tests and those required by AS 1735.1, demonstrate the effective and safe operation of safety and protective devices by appropriate tests, including the following:

- Operational timing devices: Demonstrate that the settings are correct.
- Car load weighing device: Demonstrate that the settings are effective and correct.
- Insulation resistance of wiring and equipment: Demonstrate conformance with AS/NZS 3000.

3.3 COMPLETION

Cleaning

Requirement: On completion of installation, clean and remove debris from all parts including the lift machine room, liftwell, liftwell equipment, interior and exterior of the car.

Training

Requirement: Within 14 days before the maintenance period begins, conform to **EXECUTION, TRAINING** in 0171 *General requirements* including submission of operation and maintenance documentation, in preparation for lift hand over. In conjunction with this, visit each item that may require routine or emergency action by the principal. Instruct the principal on that action. Include in the instruction relevant operating procedures.

Item registration

Requirement: If authorities require item registration, submit evidence for each lift.

3.4 MAINTENANCE

General

Maintenance period: To 0171 *General requirements*.

Periodic maintenance

Operational maintenance: Provide the labour and material required to maintain the lifts including testing, adjustments, repairs, replacements and items commonly referred to as consumable.

Time between routine maintenance visits: To the lift manufacturer's recommended frequency but not more than 90 days.

Minimum level of maintenance: To the operations and maintenance manual, and to the manufacturer's recommendations.

End of maintenance period service: Include all tasks scheduled for annual service.

Emergency response

Requirement: Respond to call outs for breakdowns or other faults requiring emergency repairs. Rectify faults and replace faulty materials and equipment.

Maximum call out response time: Attend site within two hours of notification.

Statutory certification

Annual and other certification: Inspect and submit certification for all items requiring inspection and testing annually or more frequently under statutory requirements.

4 SELECTIONS

4.1 LIFTS

Lift schedule

Property	Lift A	Lift B	Lift C
Name of building for notices and key tags			
Rated load of lift			
Designation of levels served			
Main dispatch floor (car to home at this level)			
Door type			
Clear door opening (width x height)			
Minimum car inside (width x depth)			
Car wall finish			
Car ceiling finish			
Car floor covering			
Proximity card readers			

