

***BUILDING SPECIFICATION FOR:
MRJT DEVELOPMENTS,
LOT 3 STAGE 4 TE MANATU***

ALL CONSTRUCTION MUST COMPLY WITH NZBC AND LOCAL BODY BYLAWS AND RELEVANT STANDARD, SPECIFICATION MUST BE READ IN CONJUNCTION WITH WORKING DRAWINGS, ENGINEER DOCUMENTS (IF RELEVANT) AND ANY MANUFACTURES TECHNICAL LITRITURE, CONTRACTORS MUST VERIFY ALL DIMENSIONS ON SITE, IN CASES OF CONFLICTING INFORMATION CONSULT WITH DESIGNER. DRAFTSPERSON FOR CLARIFICATION IF REQUIRED

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SECTION 2

SPECIFICATION

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2210 PREPARATION AND GROUNDWORK

1. GENERAL

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

- footings and floor slabs

Documents

1.1 DOCUMENTS

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

- | | |
|----------|---|
| NZS 3604 | Timber-framed buildings |
| OSH | Approved code of practice for safety in excavation and shafts for foundations |

1.3 SITE SAFETY

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

1.4 ARCHAEOLOGICAL DISCOVERY

If fossils, antiquities and other items of value are found refer to the general section 1270 CONSTRUCTION for actions to be taken with archaeological discovery.

2. PRODUCTS

2.1 EXCAVATED CLEAN FILL

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

2.4 SAND FILL

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

3. EXECUTION

3.1 WASHOUT BAY FOR TRUCK

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

3.2 EXCAVATION GENERALLY

Carry out excavation, using plant suitable for the purpose, to the guidelines set by the OSH publication: Approved code of practice for safety in excavation and shafts for foundations.

3.3 BURNING OF MATERIALS

Burning of materials is not permitted on site.

3.4 PROTECT EXISTING WORK

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

3.5 PROTECT TREES

Protect from damage trees, shrubs, natural site features and existing landscaped areas nominated on the drawings as being retained. Ensure existing levels are undisturbed beneath the dripline of retained trees.

3.6 EROSION CONTROL

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

- 3.7 **SURFACE PREPARATION**
Comply with NZS 3604, section 3.5, **Site preparation**. Remove all turf, vegetation, trees, topsoil, stumps, uncontrolled fill and rubbish from the area to be built on.
- 3.8 **UNDERGROUND ELEMENTS AND SERVICES**
Break out and remove old foundations, slabs, drainage pipes, manholes, tanks, cables and redundant services. Report for instructions when any unexpected voids, made-up ground or services are encountered. Seal off the ends of drains or remove to territorial authority approval.
- 3.9 **STOCKPILE TOPSOIL**
Stockpile excavated topsoil on site where directed. Keep separate from other excavated materials. Spread and level where directed before completion of the works.
- 3.11 **GENERAL EXCAVATION**
Trim ground to required profiles, batters, falls and levels. Remove loose material. Protect cut faces from collapse. Keep excavations free from water.
- 3.13 **FOUNDATION EXCAVATION**
Take foundation excavations to depths shown. Keep trenches plumb and straight, bottoms level and free of soft spots, stepped as detailed and clean and free of water.
- 3.14 **INADEQUATE BEARING**
If bearing is not to NZS 3604, 3.1.2 **Foundations** and 3.1.3 **Determination of good ground**, then excavate further and backfill with material as follows. Confirm any changes with the territorial authority.
- | | |
|-----------------------|------------------------------------|
| Below slabs on grade: | Hardfill compacted in 150mm layers |
| Below footings: | 10 MPa concrete |
| Service trenches: | Hardfill compacted in 150mm layers |
- If excavation exceeds the required depths, backfill and compact to the correct level with material as listed.
- 3.15 **STANDARD OF COMPACTION**
Place fill in layers of not more than 150mm and compact to achieve 95% of maximum dry density. For granular fill material, the fill shall be compacted to 80% of saturated dry density.
- 3.17 **GENERAL BACKFILLING**
Obtain written confirmation from the owner before using any excavated material. Compact approved backfilling in 150mm layers with the last 200mm in clean topsoil, lightly compacted and neatly finished off.
- 3.19 **SURPLUS MATERIAL**
Remove surplus and excavated material from the site.

3120 CONCRETE

1. GENERAL

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

Documents

1.2 DOCUMENTS

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

NZBC B1/AS1	Structure
NZBC E2/AS3	External moisture
AS 1366.3	Rigid cellular plastics for thermal insulation - Rigid cellular polystyrene - Moulded (RC/PS - M)
NZS 3101.1	Concrete structures standard
NZS 3104	Specification for concrete production
NZS 3109	Concrete construction
NZS 3114	Specification for concrete surface finishes
NZS 3604	Timber-framed buildings
AS/NZS 4671	Steel reinforcing materials
AS/NZS 4858	Wet area membranes
CCANZ CP 01	Code of practice for weathertight concrete and concrete masonry construction

2. PRODUCTS

2.1 NORMAL CONCRETE

Normal concrete 17.5, 25 MPa grade, maximum aggregate size 19mm ready-mixed to NZS 3104. Provide delivery dockets listing mix and despatch details.

2.2 PRESCRIBED MIX CONCRETE

Prescribed mix concrete 17.5, or 25 MPa grade minimum strength, using either separate batching of sand and builder's mix or coarse aggregate to NZS 3104, table 3.1, Grading recommendations for combined and uncombined coarse aggregates.

2.3 SITE CONCRETE

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

2.4 REINFORCEMENT

As per engineer design details

2.5 TYING WIRE

Mild drawn steel wire not less than 1.2mm diameter.

2.6 SPACERS AND CHAIRS

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

2.7 DAMP-PROOF MEMBRANE

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

3. EXECUTION

3.1 HANDLE AND STORE

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

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

3.2 FALSEWORK AND FORMWORK

Use falsework and formwork of sufficient strength to retain and support the wet concrete to the required profiles and tolerances. Select formwork finish to produce the specified finished quality. Ensure timber or plywood used for formwork is non-staining to the set concrete.

Securely fix and brace formwork sufficiently to support loads and with joints and linings tight enough to prevent water loss. Do not use tie wires or rods unless approved in writing by the Contract Administrator. Unless detailed otherwise, provide a 19mm chamfer or fillet strip at all interior and exterior angles of beam and column forms. Mitre at intersections.

Water blast to clean formwork. Keep formwork wet before concrete is placed.

Unless detailed otherwise, set up soffit boxing for beams and slabs to provide a camber when forms are stripped, of 3mm rise for every 3 metres of total clear span.

3.3 INSTALL DAMP-PROOF MEMBRANE

Apply polythene membrane to prepared basecourse with 150mm laps between sheets. Tape seal laps and penetrations with 50mm wide pressure sensitive plastic tape. Refer to drawings for perimeter details.

3.5 CUT AND BEND REINFORCEMENT

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

3.6 ADJUSTMENTS

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

3.7 TOLERANCES, BENDING

To NZS 3109, 3.9, Tolerances for reinforcement.

3.8 SECURE REINFORCEMENT

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

3.9 LAPPED SPLICES

Length of laps where not dimensioned on the drawings in accordance with the SELECTIONS. Increase laps of plain round steel by 100%. Provide laps only where indicated on the drawings. Tie all lapping bars to each other.

3.10 REINFORCEMENT COVER

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

3.11 CASTING IN

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

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

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

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

3.12 CONSTRUCTION JOINTS

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

3.13 PRE-PLACEMENT INSPECTION

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

3.16 CONCRETE SURFACE TOLERANCES

To NZS 3114, 104, Surface tolerances and NZS 3114, 105, Specification of finishes, with the suggested tolerances becoming the required tolerances.

3.17 PUMPING CONCRETE

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

3.18 COMPACTION

Use power operated vibrators on foundations, vertical constructions and beams.

3.20 SAW CUTS

Cut slabs where indicated on the drawings and as required to control shrinkage cracking. Carry out cutting as soon as possible, without causing tear-out of aggregate and before shrinkage cracking has occurred, generally within 24 hours of pouring. Where saw cuts are made, cut out 100mm of every second wire of the mesh for a length of 50mm each side of the saw cut position. Saw cuts: $\frac{1}{3}$ slab depth or 30mm minimum.

Spacing of sawcuts

Floor situation	Maximum spacing of sawcuts both ways
Industrial floor	5m
Architectural, exposed floor, thin finishes, rigid finishes	4m
Carpet on underlay flooring	6m

3.21 SURFACE DEFECTS

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

3.22 CURING OF CONCRETE

Keep damp for not less than seven days. Ensure curing of slabs commences as soon as possible after final finishing, by the use of continuous water sprays, or ponding. Alternately, apply a curing membrane. Ensure any membrane used will not affect subsequent applied finishes.

3.23 STRIKE FORMWORK
Strike formwork without damaging or overloading structure. Do not remove formwork before the following minimum periods:

12 hours:	Sides of beams, walls and columns
4 days:	Slabs in beam and slab construction (leave props under slab spans over 2 metres)
10 days:	Props from under slab spans over 2 metres
18 days:	Beams, soffits and slab spans over 5 metres

3.24 WATERPROOFING EXTERIOR OPENINGS
Apply waterproofing to the exposed face of openings for, windows, doors, meters etc, also if necessary the top of parapets/balustrades and ends of masonry walls abutting other claddings. To CCANZ CP 01, waterproofing manufacturer's requirements and as detailed.
Provide temporary protection from direct sunlight.

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

3.26 REMOVE
Remove all unused materials and all concrete and reinforcing debris from the site.

3421AX AXXIS STEEL FOR FRAMING

1. GENERAL

This section relates to the supply and erection of light steel framing using New Zealand Steel **AXXIS® Steel For Framing**, roll formed and fabricated as a framed structure, or as part of a flush-lined partitioning system;

- for load bearing structures
- and non-load bearing partitioning

1.2 ABBREVIATIONS AND DEFINITIONS

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

The following abbreviations apply specifically to this section:

NASH National Association of Steel-framed Housing Inc.
Web site www.nashnz.org.nz.

Documents

1.3 DOCUMENTS

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

AS/NZS 1170.0	Structural design actions - General principles
AS/NZS 1170.2	Structural design actions - Wind actions
AS 1397	Steel sheet and strip - hot-dipped zinc-coated or aluminium-zinc coated
NZS 2295	Pliable, permeable building underlays
NZS 3604	Timber-framed buildings
AS/NZS 4600	Cold formed steel structures
NZ NASH Standard	Residential and low-rise steel framing Part 1: Design Criteria
NASH N-11	House Insulation Guide
NASH 3405	An alternative solution for steel framed buildings

1.4 MANUFACTURER/SUPPLIER DOCUMENTS

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

AXXIS® Steel For Framing A better way to build
Durability statement for Galvsteel™ (galvanised steel) and AXXIS® steel manufactured by New Zealand Steel Limited and used for structural building elements.
Steel frame Fabricators documents:

Manufacturer/supplier contact details

Company:	AXXIS® Steel For Framing
Web:	www.axxis.co.nz
Email:	info@nzsteel.co.nz
Telephone:	09 375 8999
Facsimile:	09 375 8213

Requirements

1.5 QUALIFICATIONS

Work to be carried out by trades people experienced, competent and familiar with the materials and techniques specified.

1.6 NO SUBSTITUTIONS

Substitutions are not permitted to the **AXXIS® Steel** material selection, the specified steel framing fabricators associated components and accessories, and associated products listed in this section.

1.7 CO-ORDINATION

Ensure details and fixings required are provided for in the steel fabricators framing system. Refer to all drawings and calculations.

- 1.8 **INSTALLATION**
Install **AXXIS**[®] roll formed framing to any technical recommendations or instructions given by the steel frame fabricator.
- 1.9 **SEPARATION**
Ensure DPC between the bottom plate and concrete slab in residential construction. Ensure separation between any treated timber and **AXXIS**[®] Steel with DPC. Refer to the Durability statement.
- 1.10 **DISSIMILAR METALS**
Avoid contact with dissimilar metals (e.g. between copper and **AXXIS**[®] Steel). Refer to NZ NASH 3405 for information on the use of stainless steel fixings, and NASH Handbook, 6 **Connectors**. Ensure plumbers take care to isolate copper piping from steel framing by inserting specialised plumbing grommets into the pre punched surface holes in the studs.
- 1.11 **THERMAL BREAKS AND CAVITY CONSTRUCTION**
Install suitable thermal break and/or cavity thermal battens. Refer to NASH Handbook, 10.7 **Condensation and Thermal Break** and NASH N-10 **Thermal Break and cavity Construction** for information on the selection and installation methods for thermal break and/or cavity thermal battens.
- 1.12 **PROVIDE INFORMATION**
Provide a building consent approved producer statement (design) and supplementary drawings showing dimensions, bracing and assembly.
- 1.13 **STEEL SECTION TOLERANCES**
Web thickness: 0.50 to 1.00mm: ± 0.06mm
1.15 to 3.00mm: ± 0.07mm

Flange thickness: 0.50 to 1.00mm: ± 0.06 mm
1.15 to 3.00mm: ± 0.07 mm
- 1.14 **STRAIGHTNESS**
Hold within L/600. (Approximately 5mm in 3 metres).
- 1.15 **LOAD-CARRYING MEMBERS**
Using the specified steel frame fabricators design data, NASH 3405 and NZ NASH Standard Residential and low-rise steel framing Part 1: Design Criteria, select sections that will satisfy the transverse, dead and live load requirements.

Compliance information

- 1.16 **DURABILITY**
The work covered by this part of the specification has been designed and constructed to achieve a durability of 50 years. Refer to the following:
NASH Handbook, 8 **Durability**.

Performance

- 1.17 **LOADING CODE REQUIREMENT**
To NZBC B1/VM1, AS/NZS 1170.0, AS/NZS 1170.1, AS/NZS 1170.2, AS/NZS 1170.3, NZS .1170.5, AS/NZS 4600.
- 1.18 **SECTION TOLERANCES**
To NASH Standard D1 Manufacturing and Assembly Tolerances.
- Performance - Wind (design by contractor)**
- 1.19 **DESIGN PARAMETERS - NON SPECIFIC DESIGN**
Design the installation to the wind zone parameters of NZS 3604, table 5.1. Refer to general section 1220 PROJECT for details.

Performance - Seismic (design by contractor)

- 1.20 SEISMIC - NON SPECIFIC DESIGN
Design the system and its anchorages/fixings to resist the earthquake loads of the earthquake zone in accordance with NZS 3604, 5.3 **Earthquake bracing demand**. Refer to general section 1220 PROJECT for details.

2. PRODUCTS

Materials

- 2.1 STEEL STRIP
NZ Steel AXXIS® coil,
Galvanised AS 1397: 275g/m² (Z 275)
Steel thickness range: 0.50 to 2.25mm (Galvanised)
Steel grade range: G550 for BMT < 1.00mm, G500 for BMT >1.0 < 1.5mm,
G450 for BMT>1.5mm
- 2.2 STEEL SECTIONS
Cold roll-formed steel sections to AS/NZS 4600, NZ NASH Standard: Residential and low-rise steel framing, Part 1: Design Criteria. To consist of all members required to complete the framing and all to dimensions that satisfy AS/NZS 1170.0.
- 2.3 CAVITY BATTENS
Battens to suit application. Refer to SELECTIONS for options.
- 2.4 TIMBER NOGS
Nogs required for fixing fittings and fixtures that are beyond the scope of the steel nogs shall be timber, SG6 radiata pine, H1.2, kiln dried to 14% moisture content and dimensioned to fit the light steel framing and the application.
- 2.5 DAMP-PROOF COURSE
Heavy kraft strip laminate saturated and coated with bitumen. Refer to 4161 UNDERLAYS, FOIL AND DPC.
- 2.6 UNDERLAYS
Breather type, waterproof to NZS 2295. Refer to 4161 UNDERLAYS, FOIL AND DPC.

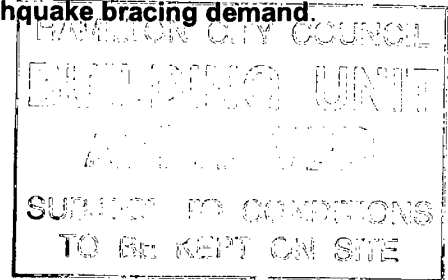
Components

- 2.7 SCREWS
Self-drilling class to suit member, connection method and location and to NASH Handbook, and the fabricators stated requirements.
Screw corrosion protection to NASH Handbook, **6 Connectors**.

3. EXECUTION

Conditions

- 3.1 CONCRETE SLAB
Screed the concrete surface by straight edge or vibrating screed immediately after compaction and to tolerances in NZS 3109: table 5.2, **Tolerances for in situ construction**.
- 3.2 HANDLE AND STORE
Handle and store channels and accessories to avoid damage. Keep dry in transit, store clear of the ground allowing full circulation.
- 3.3 PREFABRICATED FRAMES AND TRUSSES
Do not bring on to site until the subfloor is complete and members can be temporarily stacked on it and from there immediately erected and fixed.



3.4 **SUBSTRATE**
Ensure substrate is plumb, level and in true alignment. Do not start erection if the substrate will not allow work of the required standard. Complete any remedial work found necessary before starting light steel framing erection.

3.5 **COMMENCING THIS WORK**
Commencing this work means the substrate is accepted as allowing work of the required standard.

Fabrication

3.6 **FABRICATION GENERALLY**
To NASH Standard and Nash Handbook.

Installation - steel framing

3.7 **INSTALLATION GENERALLY**
To Nash Handbook and Axxis requirements.

3.8 **INSTALL WALL FRAMING**
From one corner erect the first two panels, Tek screwing the corner studs together. Continue each panel to complete the longer external wall with another return panel and screw together. Check dimensions and fit and bolt or screw the first corner to the subfloor. Continue with the erection from out of the first corner, Tek screwing studs together and checking dimensions before bolt or screw fixing to the subfloor. Leave all this work plumb, square and true to line and face.

3.11 **ERECT ROOF**
Erect trusses and rafters screwing them to framing to leave them square and true to line and plane. Fit and screw fix purlins and ceiling battens lapped and cut to length.

3.12 **PROVIDE TIMBER NOGS**
Provide nogs and fixings required for the fixing of the claddings, linings, fittings and other accessories, all to the manufacturer's requirements. Cut timber square to fit the steel framing and Tek screw firmly in place true to line and face.

3.13 **PROVIDE TIMBER NOGS**
Provide nogs and fixings required for the fixing of fittings and other accessories, all to the manufacturer's requirements. Cut timber square to fit the steel framing and screw firmly in place true to line and face.

3.14 **INSTALL THERMAL BREAKS**
Install thermal breaks to Nash Handbook and to Axxis requirements.

Completion

3.15 **LEAVE**
Leave work to the standard required by following procedures.

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

- 2.3 **DAMP PROOF MEMBRANE**
Polyethylene sheet with minimum thickness of 0.25mm to NZS 3604, 7.5.6, **Polyethelene (polythene) sheet damp-proof membranes.**

Wall Underlays

- 2.8 **BITUMINOUS STANDARD WEIGHT WALL UNDERLAY**
Wall underlay tested to NZS 2295.

Roofing Underlay

- 2.15 **BITUMINOUS SELF-SUPPORTING ROOFING UNDERLAY**
Self supporting roofing underlay tested to NZS 2295.

- 2.16 **BITUMINOUS FIRE RETARDANT SELF-SUPPORTING TWO WAY REINFORCED**
Self supporting roofing underlay consisting of two layers of heavy weight Kraft underlay, surfaced coated with water repellence formula which is solvent free, two-way reinforced, and then laminated using a fire retardant adhesive tested to NZS/AS 1530.2.

Vapour Barriers

- 2.22 **MOISTURE VAPOUR BARRIER**
Moisture vapour barrier film to AS/NZS 4200.1, complete with adhesive pressure-sensitive tape required by the film manufacturer, used for the prevention of moisture damage.

Accessories

- 2.23 **WINDOW DOOR SEALING SYSTEM**
Proprietary window and door flashing tape and accessories to E2/AS1, paragraph 4.3.11, **Flexible flashing tape**, paragraph 9.1.5, **Wall underlays to wall openings.**

- 2.24 **STUD STRAPS**
19mm wide polyethylene straps.

- 2.27 **GUTTER AND UNDER FLASHINGS**
Bituminous breather type underlay cut to width by manufacturer for use under valley, apron flashing and internal gutters. Soffit liner cut to width from bituminous breather type underlay.

- 2.28 **ADHESIVE TAPE**
Adhesive tapes to compliment the underlay. Pressure sensitive tapes for joining foil insulation and vapour barriers.

3. EXECUTION

Conditions

- 3.1 **GENERAL REQUIREMENTS**
To NZBC E2/AS1 Table 23 Properties of Roof Underlays and Wall Underlays; and manufacturers technical literature.
Note: Care should be taken not to expose the underlay to continuous wet and windy conditions.

- 3.2 **STORAGE**
Store wall and roofing underlays and accessory materials, under conditions that ensure no deterioration or damage. Store rolls in an upright position on a smooth floor and protected from sunlight, UV radiation and moisture.

- 3.3 **INSPECTION**
Before starting work, check that the framing will allow work of the required standard.
Carry out remedial work identified before laying underlay.

Application - DPC

- 3.5 **BITUMINOUS DPC TO TIMBER**
Lay bituminous DPC under timber of all timber framed walls on concrete, in a single layer with 50mm overlaps at joints to provide a waterproof barrier.
NOTE: Do not use bituminous DPC under LOSP treated timber.

- 3.6 **DPC TO MASONRY AND BRICK VENEER**
Lay DPC along base of cavity and fix top edge to studs with galvanized clouts. Turn DPC out over concrete rebate under bottom course of veneer.

- 3.7 **DPC BETWEEN DISSIMILAR MATERIALS**
Lay DPC between dissimilar materials where required.

Application - DPM

- 3.8 **DPM TO CONCRETE FLOOR**
Lay DPM under concrete floor substrate over sand binding, in a single layer with 150mm overlaps at joints to provide a waterproof barrier.

Application - Wall Underlay

- 3.10 **WALL UNDERLAY**
Fix horizontally to outside face of substrate in true alignment, with succeeding sheets overlapping 150mm to NZBC E2/AS1, clause 9.1.7, **Wall underlay** and refer to manufacturer for requirement for fastenings. Fix to manufacturers requirements. Scribe neatly around penetrations and openings to leave no gaps. Tape all penetrations. Keep clean, undamaged and without visible weather deterioration until closed in.

- 3.11 **METAL CLADDING ON TIMBER CAVITY BATTENS**
Fix strip of underlay to face of batten before fixing the metal cladding.

Application - Roofing Underlay

- 3.14 **ROOF UNDERLAY**
Lay vertically over purlins on wire netting with a 150mm side lap. Fix securely to purlins with galvanized fixing clips. Lay underlay to avoid excessive dishing between purlins. When used vertically limit individual runs to 10 metres for bituminous based roofing underlays, 7 metres for fire retardant underlays and 20 metres for synthetic roofing underlays. Do not lay vertically on roof pitches under 10°.

Lay horizontally across the rafter/trusses starting at the gutter line with succeeding sheets in true alignment and lapping 150mm. Scribe around and fit neatly to all penetrations. Avoid prolong exposure by installing the roof immediately. UV exposure maximum 7 days.

- 3.15 **GUTTER AND UNDER FLASHINGS**
Lay bituminous breather type underlay cut to width by manufacturer for use as an underlay to valley, apron flashings, internal gutters and soffit liner. Lap under flashings with adjoining underlays. Fix soffit liner from top plate down 150mm past ribbon plate.

Completion

- 3.21 **CLEAN UP**
Clean up as the work proceeds.

- 3.22 LEAVE
Leave work to the standard required by following procedures.
- 3.23 REMOVE
Remove debris, unused materials and elements from the site.

4261 BRICK VENEER CLADDING

1. GENERAL

This section relates to clay brickwork as a veneer cladding.

It includes:

- Standard brick veneer cladding
- Proprietary two storey brick veneer system

1.2 ABBREVIATIONS AND DEFINITIONS

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

The following definitions apply specifically to this section:

Two Storey Brick Veneer System	Proprietary system for two storey clay brick veneer construction as contained in BRANZ Appraisal 690 - Two Storey Brick Veneer System.
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Documents

1.3 DOCUMENTS

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

NZBC E2/AS1	External moisture
NZBC B1/AS3	Structure
AS/NZS 1170	Structural design actions
AS/NZS 1170.2	Structural design actions - Wind actions
NZS 1170.5	Structural design actions - Earthquake actions - New Zealand
AS/NZS 2699.1	Built-in components for masonry construction - Wall ties
AS/NZS 2699.3	Built-in components for masonry construction - Lintels and shelf angles (durability requirements)
AS/NZS 2918	Domestic solid fuel burning appliances - Installation
NZS 3103	Sands for mortars and plasters
NZS 3604	Timber-framed buildings
NZS 4210	Masonry construction: materials and workmanship
SNZ HB 4236	Masonry veneer wall cladding
AS/NZS 4455	Masonry units and segmental pavers
BRANZ	Good practice guide: Masonry veneer
BRANZ Appraisal 690 - Two Storey Brick Veneer System	

Requirements

1.5 QUALIFICATIONS

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

1.6 NO SUBSTITUTIONS

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

1.7 SAMPLES

Refer to the general section 1270 CONSTRUCTION for details of how samples will be reviewed.

Provide the following samples for review by the Contract Administrator:
clay bricks

Compliance information

- 1.8 **INFORMATION REQUIRED FOR CODE COMPLIANCE**
Provide the following compliance documentation:
- Producer Statement - Construction from the installer of Two Storey Brick Veneer System.
- Other information required by the BCA in the Building Consent Approval documents.

Performance

- 1.9 **DESIGN PARAMETERS - NON SPECIFIC DESIGN**
Design the installation to the seismic parameters of NZS 4210 Masonry construction: materials and workmanship.
Refer to SELECTIONS for details.
- 1.11 **COMPLIANCE**
Brickwork to comply with SNZ HB 4236 Masonry veneer wall cladding.

2. PRODUCTS

Materials

- 2.1 **CLAY BRICKS**
To AS/NZS 4455.
- 2.4 **VERMIN STOP**
Galvanized hexagon 10mm mesh of 1mm diameter steel wire 100mm wide, complete with galvanized steel staples.
- 2.5 **DAMP-PROOF MEMBRANE**
Heavy kraft, strip laminates saturated and coated with bitumen, butyl rubber sheet with adhesive, or equivalent.

Components - standard brick veneer

- 2.7 **WALL TIES**
To AS/NZS 2699.1. Veneer ties screw fixed to framing.

3. EXECUTION

Conditions

- 3.1 **TOLERANCES**
To NZS 4210, table 2.2 Maximum tolerances.
- 3.2 **HANDLING AND STORAGE OF MATERIALS**
To NZS 4210 for aggregates, cement, bricks and reinforcement.
- 3.3 **CONCRETE BASE**
Check vertical and horizontal alignment. Any discrepancies exceeding the permitted tolerances shall be corrected before units are laid.
- 3.4 **TIMBER FRAMING**
Check timber framing stud spacing is in accordance with NZS 3604.
- 3.6 **PENETRATIONS**
Confirm that exterior wall openings have been prepared ready for the installation of all window and door frames and other penetrations through the brick veneer. Required preparatory work includes the following:
- brick veneer wall underlay to openings finished and dressed off ready for the installation of window and door frames and other penetrations
- brick veneer neatly finished off to all sides of openings

- installation of flashings (those required to be installed prior to installation of penetrating elements).

3.7 MEASURE MATERIALS

Measure materials for mortar accurately by weight or volume using suitably calibrated equipment.

3.8 WET WEATHER

Keep bricks dry at all times prior to laying. Protect the top row of uncompleted brick walls. Protect freshly laid brickwork during interruption through rain and at completion of each day's work. Protect brickwork for a minimum of 6 hours.

3.9 COLD WEATHER CONSTRUCTION

When air temperature is below 5°C take the precautions required by NZS 4210: 2.18 Cold weather construction.

3.10 HOT WEATHER CONSTRUCTION

When air temperature is above 25°C or there is a drying wind, or lower temperatures, take the precautions required by NZS 4210: 2.19 Hot weather construction.

3.11 KEEP FACE WORK CLEAN

Keep clean during erection and until completion of the contract works. Turn back scaffold boards at night and during heavy rain. Do not rub face work to remove stains.

Installation - general

3.13 UNIFORMITY

Carry up work with no portion more than 1500mm above another at any time, raking back between levels.

3.14 BONDING

Lay bricks to the required bonding in the various locations. Refer to SELECTIONS/drawings.

3.15 PROVIDE WEEPHOLES

Provide weepholes at the bottom of cavities and cells to SNZ HB 4236 and NZBC E2/AS1, 9.2.6, **Cavities**, and as necessary to drain moisture to the outside air. Provide vent gap at the top of the veneer.

3.16 INSTALL VERMIN STOP

Fold and staple one edge of the mesh to the substrate and with the mesh sloping outwards, set the other edge half the thickness of the veneer or 50mm, whichever is less, into the mortar joint.

3.17 CAVITY VENTILATION

Ventilate to outside air with top and bottom openings to the requirements of SNZ HB 4236 and NZBC E2/AS1, 9.2.6, **Cavities**. Seal cavity off from roof space.

3.19 FORM OPENINGS

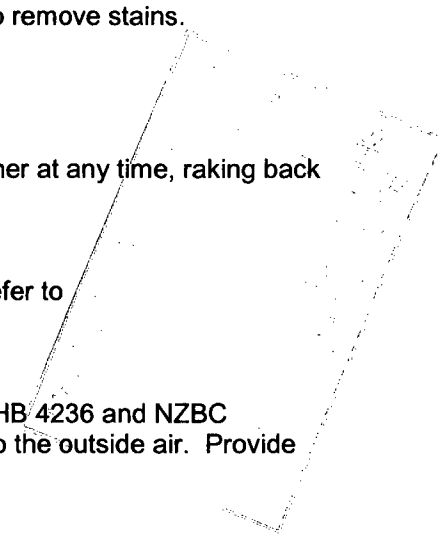
Unless detailed otherwise form openings to typical details from BRANZ Masonry veneer - Good practice guide.

3.20 SEPARATION JOINTS

Provide for wall movements of veneer with control joints to NZS 4210: 2.10 Methods of controlling wall movements. Weatherproof as necessary.

3.21 FORM REVEALS

Form lintels, jambs and sills as detailed complete with flashings and all ready for following work.



- 3.23 **JAMB FLASHINGS**
Provide a flexible flashing to jambs of openings in cavity walls, fully lapped with horizontal damp-proof courses at head and sill, in accordance with E2/AS1, 9.2.4, **Flashings**.
- 3.24 **SILL FLASHINGS**
Provide a flexible flashing under jointed sills, turned up at back and ends, in accordance with E2/AS1, 9.2.4, **Flashings**.
- 3.25 **REBATE DAMP PROOFING**
Provide damp-proof course to stepped rebates supporting brick veneer in accordance with E2/AS1, 9.2.5, **Foundation support and damp-proofing**.

Installation - standard brick veneer

- 3.27 **CAVITY WIDTH**
No cavity width less than 40mm or more than 75mm.
- 3.28 **PLACE TIES**
Place ties to: -
- NZS 4210: 2.9.5 Tie anchorage, cover and fixing; and
- NZS 4210: 2.9.6 Placing of ties
- NZS 4210: 2.9.7 Tie classification and spacing
- NZBC E2/AS1, 9.2.7, **Wall ties**, for requirements, spacing, embedment, placement and materials

At unsupported edges and at all openings through veneered walls or non-grouted cavity walls, wall ties to be provided:
At the top and bottom of the opening:
- Not more than 300mm or 2 courses, whichever is the smaller
At the sides of the opening or at an unsupported edge:
- Not more than 300mm
- Where the veneer wall continues above or is interrupted by a damp-proof course or waterproof membrane, wall ties shall be provided in each of the first two courses above the membrane.

Completion

- 3.40 **ROUTINE CLEANING**
Carry out routine trade cleaning of this part of the work including periodic removal all debris, unused and temporary materials and elements from the site.
- 3.41 **EFFLORESCENCE, WATER CLEANING**
To remove deposits, brush with a stiff-bristle broom and take away brushings from the locality. Remove remaining deposit with a damp sponge. Wash wall thoroughly with a plentiful supply of clean water. Repeat this process every 4 weeks from appearance through to the completion of the contract works.
- 3.42 **DEFECTIVE OR DAMAGED WORK**
Repair damaged or marked elements. Replace damaged or marked elements where repair is not possible or will not be acceptable. Leave work to the standard required for following procedures.

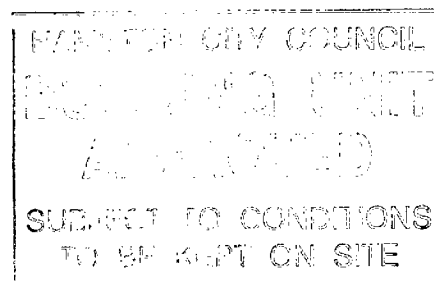
the site.

4521 ALUMINIUM WINDOWS AND DOORS

1. GENERAL

This section relates to the manufacture, supply, and installation of ~:

- aluminium windows
- aluminium doors and frames
- hardware and furniture
- overhead glazing
- flashings



1.2 ABBREVIATIONS AND TERMS

PVF ²	Polyvinylidene Fluoride
SLS	Serviceability limit state
ULS	Ultimate limit state
WANZ	Windows Association of Zealand
PQAS	Powder Coating Quality Assurance System

Documents

1.3 DOCUMENTS

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

NZBC E2/AS1	External moisture
NZBC F4/AS1	Safety from falling
NZBC H1/VM1	Energy efficiency
NZBC H1/AS1	Energy efficiency
AS/NZ 1580	Methods of test for paints and related materials - Determination of dry film thickness on metallic substrates - Non destructive methods
AS/NZS 1170.2	Structural design actions - Wind loads
NZS 1170.5	Structural design actions - Earthquake actions - New Zealand
AS/NZS 1734	Aluminium and aluminium alloys - flat sheets, coiled sheet and plate
AS/NZS 1866	Aluminium and aluminium alloys - Extruded rod, bar, solid and hollow shapes
NZS 3604	Timber-framed buildings
AS 3715	Metal finishing - Thermoset powder coatings for architectural applications
BS 3900	Methods of tests for paints, Part C5: Determination of film thickness
NZS 4211	Performance of windows
NZS 4223.3	Glazing in buildings - Human impact safety requirements
AS/NZS 4680	Hot-dip galvanized (zinc) coatings on fabricated ferrous articles
WANZ	Window installation system - An Alternative Solution for the installation of windows and doors
WANZ	Powder Coating Quality Assurance System (PQAS)
WANZ	SFA 3503-03:2005 Anodising Standard
BRANZ BU 337	Protecting Window Glass from Surface Damage
AAMA 2604.05	Performance requirements and test procedures for high performance organic coatings on aluminium extrusions and panels
US Federal Specification	
TT-S-001543A	Sealing compound, silicone rubber base (for caulking, sealing and glazing in buildings and other structures)
TT-S-00230C	Sealing compound, elastomeric type, single component (for caulking, sealing and glazing in buildings and other structures)

Warranties

1.5 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:
5 years: For fabrication

Refer to the general section for the required form of 1237WA WARRANTY AGREEMENT and details of when completed warranty must be submitted.

- 1.6 **WARRANTY - INSTALLER**
Provide an installer/applicator warranty:
2 years: For installation

- Provide this warranty in the installer/applicator standard form.

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

- 1.8 **QUALIFICATIONS**
Work to be carried out by tradesmen experienced, competent and familiar with the materials and techniques specified.

- 1.9 **COMPLIANCE**
Windows and doors to be manufactured and installed to NZBC E2/AS1.

- 1.12 **CERTIFICATION**
Provide evidence of a certificate by a laboratory accredited by International Accreditation of New Zealand that the windows and doors offered comply with the requirements of NZS 4211.

Performance

- 1.13 **PERFORMANCE - WINDOWS AND DOORS**
To NZS 4211, including:
- deflection, opening sashes, air infiltration, water penetration, ultimate strength, torsional strength of sashes, marking.
Refer to SELECTIONS.

- 1.14 **PERFORMANCE - STRUCTURAL/WEATHER-TIGHTNESS**
The structural and weather-tight performance of the completed joinery, the glazing and infill panels is the responsibility of the window manufacturer.

Performance - Wind (design by contractor)

- 1.15 **DESIGN PARAMETERS - NON SPECIFIC DESIGN**
Design the installation to the wind zone parameters of NZS 3604, table 5.1.
Refer to SELECTIONS for wind zone.

Finishes

- 1.17 **CERTIFY COATINGS - POWDER COATING**
Certify on request, compliance with this specification and support with control and sampling records. Test for film thickness to BS 3900, part C5, method No. 4, using method (b) or to AS/NZ 1580.108.1 for certifying thickness and method (a) where any dispute arises as to the thickness provided.
The coating should be applied by an applicator who can certify that the coating has been applied in accordance with the specification.

2. PRODUCTS

Materials

- 2.1 **WINDOWS**
Refer to Drawings for type and finish.

- 2.2 **DOORS**
Refer to Drawings for type and finish.
- 2.3 **ALUMINIUM EXTRUSIONS**
Alloy designation to comply with AS/NZS 1866. Branded and extruded for anodising or powder coating.
- 2.4 **ALUMINIUM SHEET AND STRIP**
Complying with AS/NZS 1734 of suitable thickness. Rolled for anodising or powder coating.
Alloy designation: 5251 - H16 or 5005 - H16
- 2.6 **GLASS**
Refer to the glazing section for glass types and installation.
- 2.7 **REVEALS - TIMBER PAINTED**
Timber reveals for paint finish with all sides primed grooved for wall linings or flush finished for architraves.
- 2.10 **FLASHINGS GENERALLY**
To NZBC E2/AS1, 9.1.10 **Windows and Doors**. Material, grade and colour of head flashings to match the window frames. Ensure that materials used for head, jamb and sill flashings are compatible with the window frame materials and fixings and cladding materials.

Components - for cavity systems

- 2.15 **STANDARD CAVITY CLOSER**
A perforated device constructed from either aluminium or PVC to close the cavity above the window or door unit, between the cladding and head flashing, to provide ventilation in accordance with NZBC E2/AS1 to the spaces above the window or door.
- 2.16 **WANZ SUPPORT BAR**
Extruded aluminium support bar with built in drainage and ventilation to NZBC E2/AS1, to provide continuous support to the window unit. Size to suit cladding type.

Components

- 2.17 **GLAZING GASKETS**
Thermoplastic rubber. Do not stretch glazing gaskets during installation. Measure and cut gaskets 5-10% over length before installation.
- 2.18 **HARDWARE AND FURNITURE**
Hinges, stays, catches, fasteners, latches, locks and furniture as offered by the window and door manufacturer. Refer to SELECTIONS for type and finish. Key alike all lockable window hardware able to be keyed alike.
- 2.19 **SAFETY STAYS**
Stainless steel non releasable restrictors to limit window opening to NZBC F4/AS1, Table 2, Acceptable opening sizes for barriers.

Sealants

- 2.21 **WEATHERING/INSTALLATION SEALANT**
Building sealant used in accordance with manufacturer's instructions for weather sealing aluminium frames to the cladding, complying with US Federal Specification TT S 0011534A, or a one-part polyurethane moisture curing, elastic joint sealant of medium modulus ($\pm 25\%$ movement) to US Federal Specification TT S 00230C.
- 2.22 **FOAM TAPE**
Foam tape to NZBC E2/AS1, 9.1.10.7 **Closed cell foam tape**.

Finishes

- 2.24 **POWDER COATED ALUMINIUM**
Polyester powder organic coating in accordance with WANZ Powder Coating Quality Assurance System and AS 3715.

3. EXECUTION

Conditions - generally

- 3.1 **DO NOT DELIVER**
Do not deliver to site any elements which cannot be unloaded immediately into suitable conditions of storage.
- 3.2 **UNLOAD WINDOW JOINERY**
Unload, handle and store elements in accordance with the window manufacturer's requirements.
- 3.3 **AVOID DISTORTION**
Avoid distortion of elements during transit, storage and handling.
- 3.4 **PREVENT DAMAGE**
Prevent prefinished surfaces rubbing together, and contact with mud, plaster and cement. Keep paper and cardboard wrappings dry.
- 3.5 **PROPRIETARY ELEMENTS**
Fix in accordance with the window manufacturer's requirements.
- 3.6 **PROTECTIVE COVERINGS**
Retain protective coverings and coatings to BRANZ BU 337 and keep in place during the fixing process. Provide protective coverings and coatings where required to prevent marking of surfaces visible in the completed work and to protect aluminium joinery from following trades. Remove protection on completion.
- 3.7 **ADDITIONAL PROTECTION**
Supply and fix additional protection as necessary to prevent marking of surfaces which will be visible on completed work.

Conditions - fixings and fastenings

- 3.8 **SUPPLY OF FIXINGS**
Use only fixings and fastenings recommended by the manufacturer of the component being fixed and to comply with the ULS wind pressure stated in SELECTIONS. Ensure fixings and fastenings exposed to the weather are of aluminium, or Type 316 stainless steel or if not exposed to the weather may they be hot-dip galvanized steel with a coating weight of 610 g/m² complying with AS/NZS 4680.
- 3.9 **INSTALLATION FIXING**
To NZBC E2/AS1, 9.1.10.8, **Attachments for windows and doors**. Fix windows/doors through reveal to frame with a pair of 75 x 3.15mm minimum galvanised jolt head nails or a pair of 8 gauge x 65mm minimum stainless steel screws. Fix at a maximum of 450 centres along all reveals and a maximum of 150mm from reveal ends. Ensure fixings do not penetrate metal flashings.
Install packers between reveals and framing at fixing points, except at the head.

Assembly

- 3.10 **FABRICATION**
Fabricate frames as detailed on shop drawings. Install glazing, hinges, stays and running gear as scheduled. Provide temporary bracing and protection. Temporarily secure all opening elements for transportation.

3.11 **TIMBER / PVC REVEALS**
Before fixing to aluminium frames, ensure that timber reveals which are being painted have been primed on all surfaces.

3.12 **HARDWARE GENERALLY**
Factory fit all required and scheduled hardware. Account for all keys and deliver separately to the site manager.

3.13 **SAFETY STAYS**
Factory fit safety stays to all windows scheduled for safety stays and to all windows where safety stays are required to comply with NZBC F4/AS1 4.0, Opening windows.

Installation - windows and doors

3.14 **CORROSION PROTECTION**
Before fixing, apply suitable barriers of bituminous coatings, stops or underlays between dissimilar metals in contact, or between aluminium in contact with concrete.

3.15 **CONFIRM PREPARATION OF EXTERIOR WALL OPENINGS**
Confirm that exterior wall openings have been prepared ready for the installation of all window and door frames. Do not proceed with the window and door installation until required preparatory work has been completed.

Required preparatory work includes the following:

- wall underlay/building wrap to openings finished and dressed off ready for the installation of window and door frames to NZBC E2/AS1:9.1.5 **Wall underlays to wall openings.**
- Full height 20mm jamb battens to NZBC E2/AS1 figure 72A (direct fix only)
- claddings neatly finished off to all sides of openings
- installation of flashings (those which are required to be installed prior to frames).

3.16 **INSTALLATION**
Fix to comply with the reviewed shop drawings and installation details including flashings and bedding compounds, pointing sealants and weathering sealants.

3.18 **INSTALLATION CAVITY CONSTRUCTION**
Install to WANZ Installation System details and drawings including WANZ cavity closers, sill support bars and support angles.
For thresholds with support bars fixed through membranes, pre-fill support bar screw holes with silicone sealant to NZBC E2/AS1, figure 62(d).

3.19 **INSTALL FLASHINGS**
Install flashings to heads, jambs and sills of frames as supplied and required by the window manufacturer and as detailed on the drawings. Finish head flashings to match window finish.

Place all flashings so that the head flashing weathers the jamb flashings, which in turn weathers over the upstand of the sill flashing. Ensure that sill flashings drain to the outside air.

Except where window/door frames are recessed, ensure that head flashings over-sail unit by 30mm minimum at each end.

3.20 **COMPLETE AIR SEAL**
To NZBC E2/AS1:9.1.6 Air seals. Form an air-tight seal by means of a proprietary expanding foam or sealants used with backing rods, applied between the window / door reveal and structural framing to a depth of 10 - 20mm, to provide a continuous air tight seal to the perimeter of the window or door.

3.21 **FIX HARDWARE**
Fix all sash and door hardware and furniture as scheduled.

Application - jointing and sealing

- 3.24 **SEAL FRAMES ON SITE**
Seal frames to each other and to adjoining structure and finishes, all as required by the window manufacturer and to make the installation weathertight. In very high and extra high or greater wind zones, seal between the window head and the head flashing. Do not seal the junction between the sill member and the cladding or sill flashing which must remain open.
- 3.25 **PREPARE JOINTS**
Ensure joints are dry. Remove loose material, dust and grease. Prepare joints in accordance with the sealant manufacturer's requirements, using required solvents and primers where necessary. Mask adjoining surfaces which would be difficult to clean if smeared with sealant.
- 3.26 **BACK UP**
When using back-up materials do not reduce depth of joint for sealant to less than the minimum required by the manufacturer of the sealant. Insert polyethylene rod or tape back-up behind joints being pointed with sealant.
- 3.27 **SEALANT FINISH**
Tool sealant to form a smooth fillet with a profile and dimensions required by the sealant manufacturer. Remove excess sealant from adjoining surfaces, using the cleaning materials nominated by the sealant manufacturer and leave clean.

Completion - cleaning

- 3.28 **REMOVE TRADE DEBRIS**
Remove trade debris by appropriate means on a floor by floor basis as each floor is completed and again before any work is covered up by others. Arrange for general removal.
- 3.29 **TRADE CLEAN**
Trade clean window frames, operable windows and doors, glass and other related surfaces inside and out at the time of installation to remove marks, dust and dirt, to enable a visual inspection of all surfaces.

Completion

- 3.30 **PROTECTIVE COVERINGS**
Retain protective coverings and coatings and keep in place during the fixing process. Provide protective coverings and coatings where required to prevent marking of surfaces visible in the completed work and to protect aluminium joinery from following trades.
- 3.31 **SAFETY**
Indicate the presence of transparent glasses for the remainder of the contract period, with whiting, tape or signs compatible with the glass type. Indicators other than whiting must not be applied to the glass surface. Masking tape must not be used for this purpose.
- 3.32 **IN SITU TOUCH-UP TO POWDER COATED ALUMINIUM**
In situ touch-up of polyester or fluoropolymer coated aluminium is only permitted only to minor surface scratching. Otherwise replace all damaged material.
- 3.33 **REMOVE**
At the appropriate stage of the project, remove safety indicators and protective coverings and wipe down all joinery thoroughly.
- 3.34 **REPLACE**
Replace damaged, cracked or marked elements.

3.35

MANIFESTATIONS

Apply manifestations to comply with NZS 4223.3, 303.1 Manifestations.



4610 GLAZING RESIDENTIAL

1. GENERAL

This section relates to the supply and fixing of glass products for external and internal joinery in residential type buildings and includes:

- windows and doors
- frameless shower and bath screens
- splashbacks, wall linings
- balustrade systems, pool fences
- mirrors and mirror frames

1.2 ABBREVIATIONS AND DEFINITIONS

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

The following abbreviations apply specifically to this section:

PVB	Polyvinyl Butyral
CIP	Cast in place

Documents

1.3 DOCUMENTS

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

NZBC B1/AS1	Structure
NZBC F2/AS1	Hazardous building materials
NZBC F4/AS1	Safety from falling
NZBC H1/AS1	Energy Efficiency
NZS 3604	Timber-framed buildings
NZS 4211	Performance of windows
NZS 4218	Thermal insulation - Housing and Small Buildings
NZS 4223.1	Glazing in buildings - Glass selection and glazing
NZS 4223.Supp1	Glazing in buildings - Supplement 1 to NZS 4223.1:2008 and NZS 4223.4:2008
NZS 4223.3	Glazing in buildings - Human impact safety requirements
NZS 4223.4	Glazing in buildings - Wind, dead, snow and live action
AS/NZS 2208	Safety glazing materials in buildings
AS/NZS 4666	Insulating glass units
BRANZ BU 337	Protecting window glass from damage

Warranties

1.5 MANUFACTURERS WARRANTY

Warrant glass under normal environmental and use conditions against failure of materials.

10 years:	for insulating glass units
10 years:	for laminated glass
10 years:	for toughened glass

Refer to the general section for the required form of 1237WA WARRANTY AGREEMENT and details of when completed warranty must be submitted.

Requirements

1.6 SAMPLES

Submit samples of selected glass for review if required.

Performance

- 1.7 **ENERGY EFFICIENCY**
Provide glazing to meet the energy requirements of NZS 4218 and NZBC H1/AS1 for housing small buildings.
Refer to SELECTIONS and schedules for location and type of glazing.

2. PRODUCTS

Materials

- 2.1 **CLEAR FLOAT GLASS**
Clear ordinary annealed transparent float glass for general window glazing. Thickness to NZS 4223.1 and NZS 4223. Supp 1.
- 2.2 **TEXTURED, PATTERNED OR OBSCURE GLASS**
Translucent, annealed, rolled glass with a decorative pattern on one surface.
- 2.4 **TOUGHENED GLASS**
Grade A Safety Glass to AS/NZS 2208.

Materials, mirrors

- 2.9 **SAFETY MIRROR GLASS**
4mm, 5mm and 6mm annealed float glass mirror vinyl back safety glazing material to AS/NZS 2208.

Materials, screens

- 2.10 **GLASS SCREENS**
Proprietary shower / bath screens, formed to shape before toughening, complete with matching hardware.

Components, general

- 2.11 **JOINTING, PUTTY AND SEALING MATERIALS**
Ensure jointing, putty and sealing materials are compatible with glass substrates.
Confirm compatibility with laminated glass, IGUs and coatings.

Components, aluminium and uPVC glazing

- 2.17 **GLAZING TAPE AND GASKETS**
Single/double sided pressure sensitive self-adhesive low/medium/high density foam tapes/butyl tapes selected to suit the glazing detail to window manufacturers' requirements.
- 2.18 **SETTING BLOCKS**
Santoprene/Neoprene, 80-90 Shore A hardness, set at quarter points or to detail, to support the weight of glass panes.

Components, mirrors

- 2.19 **MIRROR ADHESIVE**
Adhesive mirror-mastic and double-sided adhesive tape.

3. EXECUTION

Conditions

- 3.1 **GENERAL REQUIREMENTS**
To NZS 4223.1, NZS 4223.3, NZS 4223.4 and NZBC B1/AS1, 7.0 **Glazing**. All external glazing to be wind and watertight on completion.

3.2 DELIVERY
Keep glass dry and clean during delivery and bring on to site when ready to glaze directly into place. Comply also with the storage requirements set out in BRANZ BU 337.

3.3 GLASS CONDITION
All glass to have undamaged edges and surfaces.

3.4 GLASS THICKNESS
If not specifically stated in the glazing schedule determine the minimum thickness of glass for each sheet as required by NZS 4223.1, NZS 4223.3, NZS 4223.4 and NZS 4223. Supp 1.

Determine the final glass thickness based on whether wind loading or human impact considerations govern.

3.5 REBATE DIMENSIONS
Provide rebates for glazing to the widths and depths necessary for each situation including minimum glass edge cover to NZS 4223.1, Section 4 Glazing.

Conditions - human impact safety requirements

3.6 SAFETY GLAZING, GENERAL REQUIREMENTS
Glazing of doors, side panels, low level and window seat glazing, shower doors and screens, bath enclosures, stairwell landings and similar locations, to NZS 4223.3 and NZBC B1/AS1, 7.0 **Glazing**, in respect of, thickness, maximum areas of panel Grade A Safety Glass.

3.7 SAFETY GLAZING MATERIAL
Use only materials from NZS 4223.3, Appendix 3.A Schedule of safety glazing materials that also comply with the relevant requirements of AS/NZS 2208. Ensure material is permanently marked and if cut by the distributor or installer mark each piece to NZS 4223.3, clause 303.7 Identification of safety glazing materials.

3.8 CONTAINMENT
Edge cover to comply with NZS 4223.1, Section 4 Glazing, table 5. Otherwise to NZS 4223.3, clause 303.2 Containment.

Assembly

3.9 WORKING OF GLASS
All working of glass as required in NZS 4223.1.

3.10 EDGE WORK AND BEVELLING
Edgework other than a clean cut. Refer to SELECTIONS/drawings for type.

3.11 SURFACE TREATMENT
Refer to SELECTIONS/drawings for finish.

3.12 SURFACE CUTTING
Refer to SELECTIONS/drawings for finish.

Application aluminium

3.22 INSTALL GLASS TO ALUMINIUM FRAMES
Install glass to NZS4223.1.
- Bead glaze to Section 4 Glazing.
- Channel glaze to Section 4 Glazing, and Section 5 for Framed, Unframed, Partly Framed Glass Assemblies.

3.23 INSTALL SAFETY GLASS
To NZS 4223.3, as modified by NZBC F2/AS1 and NZBC B1/AS1, 7.0 **Glazing**.

Application uPVC

- 3.24 **INSTALL GLASS TO UPVC FRAMES**
Install glass to NZS 4223.1.
- Bead glaze to Section 4 Glazing.
- Channel glaze to Section 4 Glazing, and Section 5 for Framed, Unframed, Partly Framed Glass Assemblies.

- 3.25 **INSTALL SAFETY GLASS**
To NZS 4223.3, as modified by NZBC F2/AS1 and NZBC B1/AS1, 7.0 **Glazing**.

Application - mirrors

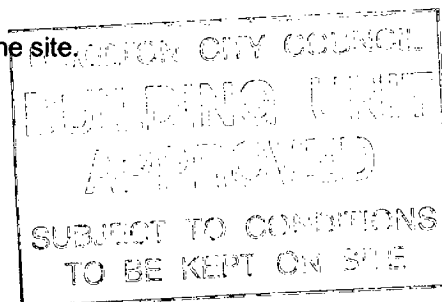
- 3.26 **MIRRORS, SCREW FIXED**
Fix with proprietary zinc-plated steel countersunk-head screws, fitted with black neoprene washers with fine-threaded upstands to receive chrome plated dome screw covers.
- 3.27 **MIRRORS, CHANNEL MOUNTED**
Fix with proprietary mounting channels, to the channel manufacturer's requirements.
- 3.28 **MIRRORS, ADHESIVE FIXED**
Fix with adhesive mirror-mastic and double-sided adhesive tape. Adhesive mastic area 0.25 m² per 1 m² of mirror.

Finishing

- 3.31 **SAFETY**
Indicate the presence of transparent glass for the remainder of the construction period, with whiting, tape or signs compatible with the glass type.
- 3.32 **MANIFESTATIONS**
To NZS 4223.3, clause 303.1 Manifestation (making glass visible).

Completion

- 3.33 **TRADE CLEAN**
Clean off or remove safety indicators at completion of the building.
- 3.34 **REPLACE**
Replace damaged, cracked or marked glass.
- 3.35 **LEAVE**
Leave work to the standard required by following procedures.
- 3.36 **REMOVE**
Remove debris, unused materials and elements from the site.



4710 INSULATION

1. GENERAL

This section relates to materials installed, laid, hung or fitted as thermal and/or acoustic insulation.

1.1 RELATED WORK

Refer to 3120 CONCRETE for insulation under concrete slabs.

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

Refer to roofing sections for roofing underlays.

1.2 ABBREVIATIONS AND DEFINITIONS

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

The following abbreviations apply specifically to this section:

BIB	Building Insulation Blanket
EPS	Expanded polystyrene sheets

Documents

1.3 DOCUMENTS

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

NZBC H1/AS1	Energy efficiency
NZS 4218:2004	Energy efficiency - Small building envelope
NZS 4246	Energy efficiency - Installing insulation in residential buildings
AS/NZS 4534	Zinc and zinc/aluminium-alloy coatings on steel wire
HSE Act	Health and Safety in Employment Act
NZCEP 54	New Zealand Electrical Code of practice for the installation of recessed luminaires and auxiliary equipment

Requirements

1.5 QUALIFICATIONS

Work to be carried out by tradesmen experienced, competent and familiar with the specified insulation materials and techniques specified.

2. PRODUCTS

Materials

2.1 GLASS FIBRE THERMAL INSULATING PADS

Glass fibres bonded with a thermosetting resin to form a rectangular insulating pad.

2.2 GLASS FIBRE THERMAL BLANKET/ROLL

Glass fibres bonded with a thermosetting resin to form a flexible blanket roll.

Components

2.10 NAILS

Galvanized steel clouts, 25mm gauge.

2.11 STAPLES

Stainless steel gauge and length to suit application and to manufacturer's requirements.

- 2.12 **SCREWS POLYESTER BLANKET**
Specially coated self drilling screws with embossed or profiled washer system suitable to cover oversize predrilled holes.
- 2.13 **STRAPPING TAPES**
Proprietary plastic strapping tape, stapled over framing to retain insulation in unlined wall, ceiling and underfloor locations.
- 2.14 **ADHESIVE TAPE**
Adhesive tapes to compliment the underlay. Pressure sensitive aluminium foil tapes for joining foil insulation and vapour barriers.

3. EXECUTION

- 3.1 **DELIVERY**
Keep insulation dry in transit. Take delivery of insulation dry and undamaged and store in a location that protects them from the weather and damage. Reject all damaged materials.
- 3.2 **STORAGE**
Accept materials undamaged and dry and store in a location that protects them from the weather and damage. Avoid distortion, stretching, puncturing and damage to edges of sheet materials. Do not use damaged sheets.
- 3.3 **HANDLING**
Wear protective clothing as necessary and when handling, avoid delamination or distortion of the rectangular form. Maintain full thickness unless compression is an installation system requirement.
- 3.4 **HAZARD MANAGEMENT**
Comply with HSE Act and take all safety precautions necessary to reduce potential hazards.
- 3.5 **INSPECTION**
Before starting installation of blankets and pads, check that the location and framing are free from moisture, that the cavities are not interconnected and that mesh, wall underlay and vapour barriers are in place.

Application - general

- 3.6 **INSTALL INSULATION - GENERAL**
Lay, install, fit and fix to NZBC H1/AS1: Energy efficiency, 2.0 Building thermal envelope, and to manufacturer's requirements. Install in housing to NZS 4218 and NZS 4246. Allow insulation to re-loft/relax prior to installation. Do not cover vents and cut around all recessed light fittings and metal flues to the safety requirements of NZECP 54. Lift up electrical wires, lighting transformers/controllers and lay the insulation underneath.
- 3.7 **INSTALL INSULATION - CLEARANCE**
Ensure a minimum 25mm clearance is maintained between the insulation and any non rigid roofing underlay.
- 3.10 **INSTALL WALL UNDERLAY**
In retrofit situations install a wall underlay prior to fitting the insulation when wall underlay is not present.
- 3.14 **FIT GLASS FIBRE THERMAL INSULATING PADS**
Friction fit insulating pads in place to completely fill the whole of the cavities. Carefully scribe cut insulating pads slightly oversize to maintain friction fit to each other, to smaller spaces and around penetrations. Leave no gaps between, and maintain full thickness of the insulating pads over the whole of the installation. Do not cover vents and leave a 150mm gap around recessed light fittings and metal flues.

- 3.15 **FIT GLASS FIBRE THERMAL INSULATING BLANKET**
BIB application
- Lay blanket in the same direction and over the mesh/vapour barrier, firmly butting edges together. Carefully scribe cut blanket to maintain firmly butted edges and ends.
Maintain full thickness of the blanket over the whole installation except where detailed otherwise.

Completion

- 3.22 **CLEAN UP**
Clean up as the work proceeds, so no spare offcuts or any other matter or item remain behind claddings or linings.
- 3.23 **CHECK FOILS**
Ensure foils are dry, clean, bright, undamaged and free of debris before being covered.
- 3.24 **CHECK WALL WRAPS AND ROOF UNDERLAYS**
Ensure these are dry, clean, undamaged and free of debris before being covered.
- 3.25 **CHECK VAPOUR BARRIERS**
Ensure these form one homogeneous sheet vapour barrier and remain as such throughout the ensuing construction process.
- 3.26 **LEAVE**
Leave work to the standard required by following procedures.
- 3.27 **REMOVE**
Remove debris, unused materials and elements from the site.

5113G GIB® PLASTERBOARD LININGS

1. GENERAL

This section relates to the supply, fixing and jointing of GIB® plasterboard linings and accessories to timber and steel framed walls and ceilings to form:

- standard systems
- bracing systems
- fire rated wall systems
- wet area systems

1.1 RELATED SECTIONS

Refer to 5171G GIB® PLASTERBOARD FIRE & SOUND LININGS for performance wall linings

1.2 ABBREVIATIONS

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

AWCINZ Association of Wall and Ceiling Industries New Zealand

Documents

1.3 DOCUMENTS REFERRED TO

Documents referred to in this section are:

NZBC E2/AS1	External moisture
AS 1397	Steel sheet and strip - hot-dipped, zinc-coated, or aluminium/zinc-coated
AS/NZS 2588	Gypsum plasterboard
AS/NZS 2589	Gypsum linings - Application and finishing
NZS 3604	Timber-framed buildings
AS/NZS 4600	Cold-formed steel structures
BRANZ technical paper P21:	A wall bracing test and evaluation procedure
NASH	Residential and Low-Rise Steel Framing Part 1 2010 Design Criteria

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

1.4 MANUFACTURER'S DOCUMENTS

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

- GIB® Site Guide (Jan 2010)
- GIB Ultraline® Plus lining system (February 2006)
- GIB® Noise Control Systems (March 2006)
- GIB Aqualine® Wet Area Systems (March 2007)
- GIB® Ezybrace® Systems (June 2011)
- GIB® Ezybrace® Software (2011)
- GIB® Ezybrace® for Steel Frame Housing (NASH) Software (2011)
- GIB® Residential Garage Boundary Walls (March 2009)
- GIB® Rondo® Metal Ceiling Batten Systems
- GIB-Cove®
- GIB® Goldline® Platinum Tape-on Trims
- GIB® UltraFlex high impact corner mould
- BRANZ Appraisal 294 - GIB® Ezybrace® Systems
- BRANZ Appraisal 427 - GIB Aqualine® Wet Area Systems

Copies of the above literature are available at

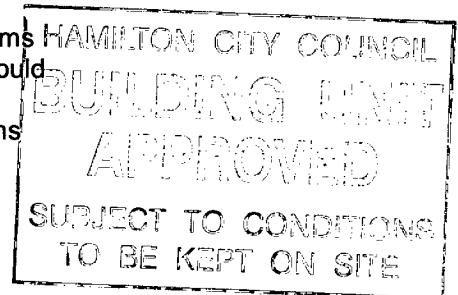
Web: www.gib.co.nz

Telephone: 0800 100 442

Requirements

1.5 NO SUBSTITUTIONS

Substitutions are not permitted to any specified GIB® systems, GIB® system components, GIB® plasterboard, associated GIB® products or GIB® accessories.



- 1.6 **INSTALLER WORK SKILLS AND QUALIFICATIONS**
GIB® plasterboard fixers and plasterers to be experienced competent workers, familiar with GIB® plasterboard lining systems installation and finishing techniques. Submit evidence of experience on request. For example:
- National Certificate of Interior Systems; or
- Certified Business member of AWCINZ.

Performance

- 1.7 **INSPECTIONS AND ACCEPTANCE**
Allow for inspection of the finished plasterboard surface:
- before applying sealer and
- before applying finish coatings or decorative papers,
so that after assessment of the type and/or angle of illumination and its effect on the completed decorative treatment, group approval and acceptance of the surface can be given.

- 1.8 **FIRE RATING REQUIREMENTS**
Provide the GIB® fire resistant rated garage boundary wall systems. Refer to Drawings for system/FRR.

- 1.10 **BRACING REQUIREMENTS**
Provide braced wall systems using GIB® Ezybrace® Systems (June 2011) or GIB® Ezybrace® Software (2011) to meet the requirements of NZS 3604 when tested to BRANZ Technical paper P21

2. PRODUCTS

Materials

- 2.1 **GIB® PLASTERBOARD**
Gypsum plaster core encased in a face and backing paper formed for standard and water resistance use to AS/NZS 2588. Refer to SELECTIONS for location, type, thickness and finish.
GIB® Standard plasterboard
GIB Wideline® plasterboard
GIB Fyrelime® fire resistant plasterboard
GIB Braceline® & GIB® Noiseline dual purpose wall bracing & noise control plasterboard
GIB Aqualine® wet area plasterboard

- 2.2 **CORNICE**
GIB-Cove® plasterboard cornice. Refer to drawings for profile and size.

Components

- 2.3 **CEILING BATTENS**
GIB® Rondo® metal ceiling battens, batten joiners and perimeter channel.

- 2.4 **SCREWS**
GIB® Grabber® drywall screws.

- 2.7 **METAL ANGLE TRIMS**
GIB® galvanized steel slim angle trims.

- 2.8 **CONTROL JOINTS**
GIB® Rondo® P35 control joints.
GIB® Goldline® tape-on trims

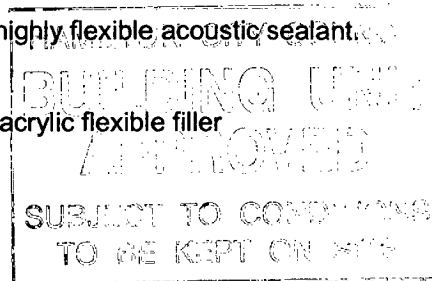
Accessories

- 2.9 **ADHESIVE**
 Timber frame and/or steel frame:
 GIBFix[®] One ultra low VOC water based wallboard adhesive
 GIBFix[®] All-Bond solvent based wallboard adhesive
- 2.10 **JOINTING COMPOUND**
 Bedding compound: GIB Tradeset[®], GIB Lite Blue[®], GIB MaxSet[®], GIB ProMix[®] All Purpose, GIB Plus 4[®]
 Finishing compound: GIB ProMix[®] All Purpose, GIB[®] Trade Finish[®], GIB[®] Trade Finish[®] Lite, GIB ProMix[®] Lite, GIB[®] U-Mix, GIB Plus 4[®]
 Cove: GIB-Cove[®] Bond

- 2.11 **JOINTING TAPE**
 GIB[®] paper jointing tape.

- 2.12 **ACOUSTIC SEALANT**
 GIB Soundseal[®] ultra low VOC water based highly flexible acoustic sealant.

- 2.13 **GAP FILLER**
 GIB[®] Gap Filler ultra low VOC multi-purpose acrylic flexible filler



3. **EXECUTION**

Conditions

- 3.1 **STORAGE**
 Store GIB[®] plasterboard sheets and accessories in dry conditions stored indoors out of direct sunlight in neat flat stacks on either an impervious plastic sheet or clear of the floor with no sagging and avoiding damage to ends, edges and surfaces. Reject damaged material. Refer to GIB[®] Site Guide (Jan 2010).
- 3.2 **LEVELS OF PLASTERBOARD FINISH**
 Provide the selected plasterboard surfaces to the pre decorative levels of finish specified in AS/NZS 2589.
- 3.3 **CONFIRM LEVELS OF PLASTERBOARD FINISH ACCEPTANCE**
 Before commencing work, agree in writing upon the surface finish assessment procedure towards ensuring that the quality of finish expectations are reasonable and are subsequently obtained and acceptable.
- Do not apply decorative treatment until it is agreed in writing by the contractor, subcontractors and decorator that the specified plasterboard Level of Finish has been achieved.**
- "Levels of plasterboard finish" is a tool for specifying the required quality of finish when installing and flush stopping GIB[®] plasterboard prior to the application of a range of decorative finishes under various lighting conditions. Refer to AS/NZS 2589.
- 3.4 **SUBSTRATE**
 Do not commence work until the substrate is plumb, level and to the standard required by the sheet manufacturer's requirements. Refer to GIB[®] Site Guide (Jan 2010).
- 3.5 **TIMBER FRAME MOISTURE CONTENT**
 Maximum allowable moisture content to AS/NZS 2589 for timber framing at lining: 18% or less for plasterboard linings. Refer to NZBC E2/AS1 and GIB[®] Site Guide (Jan 2010).
- 3.7 **PROTECTION**
 Protect surfaces; cabinetwork, fittings, equipment and finishes already in place from the possibility of water staining and stopping damage. Refer to GIB[®] Site Guide.

Application

- 3.8 **INSTALL CEILING BATTENS**
Install to GIB® Rondo® Ceiling Batten Systems.
- 3.9 **LINING WALLS AND CEILINGS GENERALLY**
Form to GIB® Site Guide (Jan 2010). Ensure bulk insulation thickness shall not exceed that of the wall framing.
- 3.10 **BOARD ORIENTATION**
Minimise joints by careful sheet layout using the largest sheet sizes possible, and generally fixing horizontally. Where part sheets are required for various stud heights they should be positioned so the cut sheet is as low as possible to keep joints below eye level.
- 3.11 **FORM NOISE CONTROL SYSTEMS**
Form to GIB® Noise Control Systems.
- 3.12 **FORM WET AREA SYSTEMS**
Form to GIB Aqualine® Wet Area Systems.
- 3.13 **FORM BRACING SYSTEMS**
Form to GIB® Ezybrace® Systems (June 2011).
- 3.14 **FORM CONTROL JOINTS**
Form control joints to GIB® Site Guide.
- 3.15 **INSTALL COVES**
Install to GIB-Cove® literature using GIB-Cove® Bond.
- 3.16 **INSTALL TAPE-ON TRIMS**
Install to GIB® Goldline® Tape-on trims literature and/or GIB® Ultraflex high impact corner mould literature.
- Finishing**
- 3.17 **FINISHING GENERALLY**
To GIB® Site Guide (Jan 2010) and AS/NZS 2589.
- Completion**
- 3.18 **REPLACE**
Replace damaged sheets or elements.
- 3.19 **CLEAN DOWN**
Clean down completed surfaces to remove irregularities and finally sand down with fine paper to the sheet manufacturer's requirements, to leave completely smooth and clean.
- 3.20 **REMOVE**
Remove debris, unused materials and elements from the site.
- 3.21 **LEAVE**
Leave work to the standard required by following procedures.

6700 PAINTING GENERAL

1. GENERAL

This section relates to the general matters related to painting work

1.2 ABBREVIATIONS

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

APAS	Australian Paint Approval Scheme
MPNZA	Master Painters New Zealand Association Inc.
VOC	Volatile organic compound

Documents

1.3 DOCUMENTS

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

AS/NZS 2311	Guide to the painting of buildings
AS/NZS 2312	Guide to the protection of structural steel against exterior atmospheric corrosion by the use of protective coatings
OSH	Guidelines for the provision of facilities and general safety in the construction industry
OSH	Guidelines for the management of lead-based paint
MPNZA	Specification manual
MPNZA	Painters hazard handbook
Health and Safety in Employment Act 1992	

Requirements

1.5 NO SUBSTITUTIONS

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

1.6 QUALIFICATIONS

Painters to be a member of MPNZA and experienced competent workers, familiar with the materials and the techniques specified.

1.7 CONTROL SAMPLES

Prepare samples of the finished work as scheduled, including preparation and colour as specified. Obtain written approval of the appearance before proceeding. Refer to SELECTIONS for requirements.

1.8 HEALTH AND SAFETY

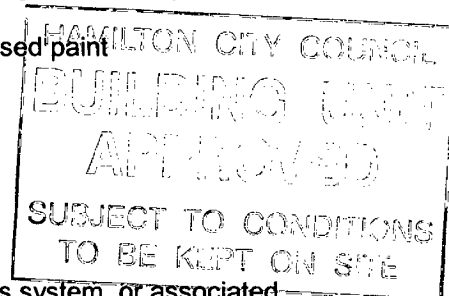
Refer to the requirements of the Health and Safety in Employment Act and OSH: Guidelines for the provision of facilities and general safety in the construction industry. If the elimination or isolation of potential hazards is not possible then minimise hazards in this work on site by using the proper equipment and techniques as required in the MPNZA Painters hazard handbook. Supply protective clothing and equipment. Inform employees and others on site of the hazards and put in place procedures for dealing with emergencies.

Refer to OSH: Guidelines for the management of lead-based paint for the required procedures and precautions when:

- treating/removing lead-based paint
- burning off paint
- sanding off paint
- using solvent based paint removers.

1.9 MATERIAL SAFETY DATA SHEET

Obtain from each paint manufacturer the material safety sheet for each product used. Keep sheets on site and comply with the required safety procedures.



Warranties

- 1.10 **WARRANTY**
Warrant this work under normal environmental and use conditions against failure.
2 years: Warranty period

Refer to the general section 1237WA WARRANTY AGREEMENT for the required format and details of when completed warranty must be submitted.

Performance

- 1.11 **MANUFACTURER'S INSPECTION**
Allow the paint manufacturers to inspect the work in progress and to take samples of their products from site if requested.
- 1.12 **INSPECTION OF WORK**
Inspection of the whole of the work at each of the stages scheduled may be made. Agree a programme that will facilitate such inspection, including notification when each part and stage of the work is ready for inspection.

2. PRODUCTS

Materials

- 2.1 **PAINT TYPES**
Use the manufacturer's complete system and only the products specified.
- 2.2 **MATERIALS GENERALLY**
Use only the Manufacturer's products which are guaranteed for their consistency and performance under ISO 9001 and APAS approval, prepared, mixed and applied as directed in the Manufacturer's specification sheets, specification manuals and product data sheets.
- 2.3 **THINNERS AND ADDITIVES**
Only use thinners or additives within the stated limits for the particular situations specified.

Accessories

- 2.4 **FILLERS**
For recommendations on; fillers, stopping, paint strippers, cleaning agents, etching solutions, mould inhibitors, rust inhibitors, knotting and other commodities used for the surface preparation, refer to the manufacturer of the specified coating.

3. EXECUTION

Conditions

- 3.1 **EXECUTION**
To conform to manufacturer's requirements and those methods, practices and techniques contained in AS/NZS 2311, the MPNZA Specification manual, and OSH Guidelines for the provision of facilities and general safety in the construction industry.
- 3.2 **PREPARE**
Prepare surfaces to the coating manufacturer's requirements.
- 3.3 **COATED SURFACES**
Ensure that substrate surfaces are able to achieve the specified finish.
- 3.4 **PRE-PRIMED SURFACES**
Sand down any breakdown or damage of the primer to a sound surface and immediately re-prime.

- 3.5 **BRUSH DOWN**
Brush down surfaces immediately before application, to remove dust, dirt and loose material.
- 3.6 **COMPATIBILITY**
Check that materials are as required by the paint manufacturers for the particular surface and conditions of exposure, and that they are compatible with each other. Use paint from the same manufacturer for each paint system. If not compatible, obtain instructions before proceeding.
- 3.7 **TREATED SURFACES**
Where surfaces have been treated with preservatives or fire retardants, check with the treatment manufacturer that coating materials are compatible with the treatment and do not inhibit its performance. If they are not compatible, obtain instructions before proceeding.
- 3.8 **ANCILLARY SURFACES**
The coatings listed in schedules and elsewhere are of necessity simplified. Coat ancillary exposed surfaces to match similar or adjacent materials or areas, except where a fair-faced natural finish is required or items are completely prefinished. In cases of doubt obtain instructions before proceeding.
- 3.9 **HARDWARE**
Do not paint hinges or hardware that cannot be removed. If items can be removed, carefully remove hardware, fixtures and fittings before commencing work. Set aside where they cannot be damaged or misplaced and replace on completion.
- 3.10 **PROTECTION**
Use dropsheets, coverings and masking necessary to protect adjoining fixtures, fittings and spaces from paint drops, spots, spray and damage.

Preparation - unpainted and pre-primed timber and wood based products

- 3.11 **MOISTURE CONTENT**
Ensure moisture content at the time of application is near to the equilibrium moisture content pertaining to the particular locality in which the timber is used, without any excessive moisture content gradient between core and surface.
- 3.12 **PREPARING DRESSED TIMBER**
Ensure dressed timber is smooth, free from raised or woolly grain, planing burrs or other machining defects. Slightly round or ease sharp edges to ensure they can be properly coated. Sand timber to bring up to a smooth finish along the direction of the grain. Sand timber back to new condition timber that has been weathered.
- 3.13 **PREPARING ROUGH SAWN TIMBER**
Thoroughly brush along the direction of the grain to remove dust and dirt.
- 3.14 **PREPARING PRE-PRIMED TIMBER**
Check pre-prime coat for damage, powdering, weathering or loss of adhesion. Where primer is sound, thoroughly brush along the direction of the grain to remove dust and dirt. If there is doubt, sand back and re-prime.
- 3.15 **TIMBER SPECIES**
Check that the preparation and paint system is suitable for the timber species.
- 3.16 **PREPARING DAMAGE AND DEFECTS**
Scrape clean loose or soft material holes, depressions, resin or gum pockets, knot holes, surface splits, checks, or any localised decay. Apply primer and/or sealer specified and fill these areas with linseed oil putty or other appropriate filler.
- 3.17 **FIXINGS**
Take timber fixings below the painted or clear finished surface. Leave corrosion resistant timber fixings flush with clear finished surfaces.

- 3.18 **CLEANING**
Remove grease and oil by wiping down with solvent or water-based degreasing agent. Remove resin by wiping down with solvent or water-based degreasing agent or heating and scraping. Remove sanding dust. Bad staining may be untreatable and require replacement of timber, discuss with paint manufacturer and main contractor.

Preparation - gypsum plaster

- 3.26 **PREPARING GYPSUM PLASTER**
Fill and sand small crevices and cracks. Surface moisture content not to exceed 12% at time of coating.

Preparation - unpainted linings

- 3.27 **PREPARING FIBROUS PLASTER**
Check for and remove release agents and other contaminants by washing with clean water or solvent and allow to dry. Fill cracks and surface imperfections with patching plaster and lightly sand smooth. Remove dust.

- 3.28 **PREPARING PLASTERBOARD**
Check that joints are prepared to a smooth level surface finish. Fill cracks and surface imperfections with the sheet manufacturer's required stopping compound and lightly sand smooth. Remove dust.

Preparation - painted surfaces generally

- 3.31 **SURFACE PREPARATION**
Refer to the Manufacturer's specification sheets and product data sheets. Carry out the preparatory work required by them for each of the substrates.

For interior surfaces such as paper faced plasterboard use the Manufacturer's recommended finishing compound as an aid to achieving a Level 5 finish.

- 3.32 **MOULD**
Sterilise surface mould by washing or sponging the whole surface with a one part sodium hypochlorite household bleach to three parts clean water solution. Allow bleach to act for 30 minutes and wash off with clean water. Wash cloths and sponges regularly in clean water. Reapplication may be necessary. Treat with anti-mould solution to the treatment manufacturer's requirements.

- 3.33 **GAP FILLING**
Fill cracks, holes, indented and damaged surfaces with putty, plaster filler, wood filler, or plastic wood, as appropriate and in accordance with the paint manufacturer's requirements. Allow to dry or set before sanding back level with the surface. Prime coat or seal the timber before using putty. Wet cement or gypsum base plasters before applying filler. Use only Portland cement base types, or water-insoluble organic-based gap fillers in exterior or wet areas.

Application - before applying final coatings

- 3.40 **OFF-SITE WORK**
Carry out off-site preparation and coating under cover, in a suitable environment and with adequate lighting. Store items both before and after coating in a clean, dry area, protected from the weather and mechanical damage, properly stacked and spaced to permit air circulation and to prevent sticking of surfaces.

- 3.41 **PRIMING JOINERY**
Before priming preservative treated timber ensure that any cut surfaces have been retreated. Liberally coat end grain, allow to soak in and then recoat. Ensure LOSP treated joinery has dried sufficiently to lose odour.
- 3.42 **CONCEALED JOINERY SURFACES**
Apply off-site coatings to all surfaces including those which will be concealed when incorporated into the building.
- 3.43 **CONCEALED METAL SURFACES**
Apply primer to suit the coating system to all metal surfaces which will be concealed when incorporated into the building.
- 3.44 **DOORS**
Prime or seal and paint all six faces of doors before hanging.
- 3.45 **BEAD GLAZING**
Before glazing apply the first two coats, or the primer and one undercoat, to rebates of stained, varnished or painted joinery and beads.
- 3.46 **PUTTY GLAZING**
Follow putty manufacturers recommendations for application, drying, and painting. Ensure that the putty is fully protected by the coating system as soon as it is sufficiently hard.
- Application - generally**
- 3.47 **PAINTING GENERALLY**
Comply with the paint manufacturer's requirements and any additional requirements in this specification.
- 3.48 **MIXING**
Thoroughly mix paints. Lift any settled pigment and ensure the paint is homogenous.
- 3.49 **ENVIRONMENT**
Paint exterior surfaces only in favourable weather conditions:
- warm dry days without frost or heavy dews
 - avoid painting in direct sunlight any surfaces that absorb heat excessively
 - as far as possible apply paint in the temperature range 15°C to 25°C
 - do not paint if temperatures fall outside the range of 10°C and 35°C unless paints with the necessary temperature tolerance have been specified
 - do not apply solvent borne paint if moisture is present on the surface
- 3.50 **SEQUENCE OF OPERATIONS**
Painting work to generally follow the following sequences:
- complete surface preparation before commencing painting
 - apply paint in the specified sequence using the specified paint
 - allow full drying time between coats to the paint manufacturer's requirements
 - do not expose primers, undercoats and intermediate coats beyond manufacturers stated instructions before applying the next coat
 - finish broad areas before painting trim
 - ensure batch numbers of tins are matched for whole areas
 - internally, paint ceilings before walls and walls before joinery, trim and other items
- 3.51 **PAINT APPLICATIONS**
Select brush, roller, or pad and apply paint to the requirements of the paint manufacturer and to obtain a smooth even coating of correct thickness, uniform gloss and colour.
- 3.52 **DRYING TIME**
Before handling or applying the next coat of paint, give each coat the full drying time as required by the paint manufacturer. Ensure that surfaces are dry and that condensation does not occur before the paint reaches surface-dry condition.

- 3.53 **LIGHTLY SAND**
Lightly sand primers, sealers, undercoats and intermediate coats to remove dust pick-up, protruding fibres and coarse particles. Remove dust immediately before applying the next coat.
- 3.54 **DEFECTIVE WORK**
Correct defective work immediately and re-coat as required, following precisely the paint system specified.
- 3.55 **EACH COAT**
Each coat of paint and the completed paint system to have the following qualities and properties:
- uniform finish, colour, texture, sheen and hiding power
 - the specified number of coats applied
 - no blemishes such as runs, sags, crinkling, fat edges, entrained paint skins, hairs, dust, bare or starved patches, cracks, brush marks, ladder marks and blistering
 - proper covering of corners, crannies, thin edges, cracks, end grain and other difficult places of application
- Completion**
- 3.56 **CLEAN**
Clean adjoining surfaces, glass and fittings of any paint contamination. Clean off glass indicators at completion of the building works. Clean glass inside and out to a shining finish.
- 3.57 **CLEAN EQUIPMENT**
Use the Manufacturer's environmental wash system for the cleaning of water-based paint and plasters from brushes, rollers, plastering or spray equipment to separate the solids from the water component for safe disposal.
- 3.58 **LEAVE**
Leave the whole of this work uniform in gloss and colour, of correct thickness, free from painting defects, clean and unmarked and to the standard required by following procedures.
- 3.59 **REMOVE**
Remove dropsheets, coverings and masking to leave surrounding surfaces and areas clean, tidy and undamaged. Remove debris, unused materials and elements from the site.
- 3.60 **REPLACE HARDWARE**
Replace hardware without damage to it or the adjoining surface. Leave properly fitted and in working order.

7701 ELECTRICAL BASIC

1. GENERAL

This section relates to the wiring for domestic and small scale commercial installations, including:

- power
- lighting
- electrical automation
- security system
- complete with componentry
- electrically-powered fittings

1.2 ABBREVIATIONS AND DEFINITIONS

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

The following abbreviations apply specifically to this section:

CFL	compact fluorescent lamp
ELV	extra low voltage
GLS	general lighting service
IP	international protection classification
LCD	liquid crystal display
LED	light emitting diode
MCB	miniature circuit breaker
NUO	Network Utility Operator
PCB	printed circuit board
PIR	passive infrared
RCBO	residual current-operated circuit breaker with over current protection
RCCB	residual current-operated circuit breakers
RCD	residual current device
SIA	security integration architecture
TPS	tough plastic sheathed

Documents

1.3 DOCUMENTS REFERRED TO

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

NZBC E2/AS1	External moisture
NZBC F6/AS1	Lighting for emergency
NZBC F7/AS1	Warning systems
NZBC G4/AS1	Ventilation
NZBC G9/AS1	Electricity
AS/NZS 1125	Conductors in insulated electric cables and flexible cord
AS/NZS 1768	Lightning protection
AS 1670.6	Fire detection, warning, control and intercom systems - System design, installation and commissioning - Smoke alarms
AS 2293.1	Emergency escape lighting and exit signs for buildings - System design, installation and operation
AS 2293.3	Emergency escape lighting and exit signs for buildings - Emergency escape luminaires and exit signs
AS/NZS 3000	Electrical installations (known as the Australian/New Zealand Wiring Rules)
AS/NZS 3008.1.2	Electrical installations - Selection of cables - Cables for alternating voltages up to and including 0.6/1 kV - Typical New Zealand installation conditions
AS/NZS 3100	Approval and test specification-general requirements for electrical equipment
AS/NZS 3112	Approval and test specification - Plugs and socket-outlets
AS/NZS 3113	Approval and test specification - Ceiling roses
AS/NZS 3190	Approval and test specification - Residual current devices (current-operated earth-leakage devices)

AS/NZS 3350.1	Safety of household and similar electrical appliances - General requirements
AS/NZS 3439.3	Low-voltage switchgear and controlgear assemblies - Particular requirements for low-voltage switchgear and controlgear assemblies intended to be installed in places where unskilled persons have access for their use - Distribution boards
AS 3786	Smoke alarms
NZS 4301.1	Intruder alarm systems - systems installed in clients premises
AS/NZS 5000.2	Electric cables - Polymeric insulated - for working voltages up to and including 450/750v
NZCEP	NZ Electrical Codes of Practice
NZCEP 54	NZ Electrical Codes of Practice for the installation of recessed luminaires and auxiliary equipment (available at www.energysafety.govt.nz)
IEC 61643	Components for low voltage surge protection devices

Electricity (Safety) Regulations 2010

Warranties

1.5

WARRANTY

Warrant the complete electrical installation under normal environmental and use conditions against failure of materials and execution.

1 year: Warranty period

Refer to the general section for the required form of 1237WA WARRANTY AGREEMENT and details of when completed warranty must be submitted.

Requirements

1.6

COMPLY

Comply with the Electricity (Safety) Regulations 2010, AS/NZS 3000, AS/NZS 3008.1.2 and the New Zealand electrical codes of practice for listed and prescribed work and with the utility network operator's requirements. Apply for the service connection. Arrange for the required inspections of listed work. Pay all fees.

1.7

QUALIFICATIONS

Carry out work under the supervision of an electrical licensed supervisor.

1.10

SAFETY OF INSTALLATION - DESIGN BY ELECTRICIAN

Before installation work commences provide a declaration of conformity. The declaration of conformity is to comply with the Electrical (Safety) Regulations (2010), regulations 57 and 58. It must be signed by the designer of the installation.

1.11

CERTIFICATE OF COMPLIANCE

Supply a certificate of compliance to the owner, as required by the Electricity (Safety) Regulations (2010) regulation 67, within 20 days of completion as required by regulation 69.

- Arrange for the NUO to inspect before the meter installation, listed work inspection, polarity check and supply becoming live.
- Arrange for an inspector to inspect as required by regulation 70.

2.

PRODUCTS

2.1

MAINS SUPPLY, SINGLE PHASE

Tough plastic sheathed neutral screened cable to AS/NZS 4961 and AS/NZS 3008.1.2, with a minimum rating of 60 amps per phase. Include pilot cable where required by network utility company.

2.2 CABLES

Tough plastic sheathed copper conductors to AS/NZS 5000.2, stranded above 1.0mm², and to AS/NZS 3008.1.2. Minimum sizes as below. Increase sizes if the method of installation, thermal insulation, cable length or load will reduce the cable rating below that of the MCB rating, or produce an excessive voltage drop.

Lighting circuits:	Domestic:	1.5mm ² on 10 amp MCBs
Lighting circuits:	Commercial:	1.5mm ² on 16 amp MCBs
Power circuits:		2.5mm ² on 16 amp MCBs for domestic and unenclosed or unfilled cavity construction
		2.5mm ² on 16 amp MCBs for domestic insulated construction, or filled cavity
		2.5mm ² on 20 amp MCBs for unenclosed or unfilled cavity construction
		2.5mm ² on 16 amp MCBs for insulated construction, or filled cavity, or lengths over 30 metres
Hot water cylinder circuits:	Single phase:	2.5mm ² on 20 amp MCBs
Range/oven/hob circuits:	Single phase:	6mm ² on 32 amp MCBs

Heat resistant cable for final connections to all heated appliances, and high temperature cable in ambient conditions that may be above 35°C.

2.3 METER BOX

Proprietary manufactured, zinc plated powder coated metal case, or ABS plastic, with glazed panel door, weatherproof where mounted outdoors, and complete with meter mounting, main switch and fuse.

2.4 DISTRIBUTION BOARD

Flush surface mount boards manufactured to AS/NZS 3439.3 and installed in accordance with AS/NZS 3000. Manufactured from engineering grade resin with a glow wire rating of 850°C, complete with neutral and earth busbars, and insulated comb phase bar. Distribution boards to have 20% spare capacity for future additions and alterations.

2.5 CIRCUIT PROTECTION

General requirements including main switch 63A or 100A. Residual current protection 30mA, ensure RCCBs' meet Type A and comply with AS/NZS 3190. MCBs to 4.5kA or 6kA rated.

2.6 WALL BOXES

Standard grid size or equivalent to be manufactured from plastic or metal, with 2 or more gang size to be metal with steel inserts for accessory securing screws. Screw fixed.

2.7 SWITCH UNITS

Single pole switches to be 16 amp minimum rated, double pole or intermediate to be 16 amp minimum rated. All switches to be 230 volt a.c. polycarbonate flushplate units. Refer to drawings/schedules for number of switches per unit, dimmer units, neon (indicator or toggle) units and 2 way units.

2.9 SWITCHED SOCKET UNITS

10 amp, 230 volt flat 3 pin socket outlets fitted with safety shutters and manufactured to AS/NZS 3100, AS/NZS 3112 and AS/NZS 3113, single or multi gang as detailed.

2.10 SMOKE ALARMS

Type 1 domestic smoke alarm to NZBC F7/AS1. 1.2 **Descriptions of alarm systems.** Alarm to AS 3786. A wired 230 volt ionised smoke detector type.

2.11 SURGE PROTECTION

Protection for the homes appliances with IEC 61643 Class II surge protection devices fitted to the switchboard. For variable electronic equipment fit IEC 61643 Class III surge protection to switched socket outlets.

- 2.13 **BATTEN HOLDERS**
Standard white plastic bayonet cap, with cap angled where wall mounted. Brass liners.
- 2.14 **DOOR BELL SYSTEM**
Complete with transformer for mounting on distribution board.
- 2.15 **LIGHT FITTINGS**
Fluorescent and High Intensity Discharge fittings with low loss control gear and power factor corrected to 0.95 minimum. Control gear suitable for dimming if this is required. All fittings complete with lamps; Incandescent GLS lamps pearl, coiled-coil 230v rated, bayonet cap; Fluorescent triphosphor 2700K; CFL; halogen ELV 12v dichroic reflector with cover glass unless detailed otherwise.
- 2.18 **EXHAUST FANS**
Ceiling, wall or duct mounted exhaust fans for ventilation to NZBC G4/AS1, and compliant with AS/NZS 3350.1.
- 2.19 **HEATED TOWEL RAILS**
Fixed wired heated towel warmers, double insulated, IPX4 splash-proof, compliant with AS/NZS 3350.1, scratch resistant powdercoated or chrome finish.
- 2.20 **OUTDOOR SWITCHES & SOCKETS**
Using materials with superior UV protection, impact strength, and addition chemical resistance when compared with interior polycarbonate fittings. Weather protected, switches to IP56 minimum, and sockets to IP53 minimum. Sockets fitted with safety shutters behind socket pins, and all products able to be padlocked off or on.
- 3. EXECUTION**
- 3.1 **MAIN SUPPLY**
Lay underground mains to the NUO requirements. Excavate trench, install cable and marker tape and backfill.
- 3.2 **METER BOX**
Fit to meter box manufacturer's and Electricity Retailer's requirements. Recess into external wall in sheltered area and flash to weatherproof to NZBC E2/AS1 fig 69. Arrange for meter installation and connection.
- 3.3 **DISTRIBUTION BOARD**
Fit to AS/NZS 3000 and board manufacturer's requirements. Recess into wall or surface mount and ensure fire containment properties of the enclosure are maintained.
- 3.4 **CIRCUIT PROTECTION**
Install MCBs at distribution board to AS/NZS3000 to protect each final sub circuit.
- 3.5 **EARTH BONDS**
Bond together and to earth all plumbing fittings not adequately isolated, to AS/NZS 3000, the Electricity (Safety) Regulations 2010 and the fitting manufacturer's requirements.
- 3.6 **MAIN EARTH**
Provide a plastic toby box to contain and protect the earth electrode. Fix the connecting earth wiring closely and securely against wall surfaces.
- 3.7 **EARTH LEAKAGE PROTECTION**
Install RCD protection to AS/NZS 3000.
- 3.8 **DOMESTIC INSTALLATIONS**
Install 30mA RCD protection at the distribution board for all final sub circuits to control socket outlets and lighting except for fixed or stationary cooking equipment, to AS/NZS 3000.

- 3.9 HIGH RISK AREA INSTALLATIONS**
 Install 30mA RCDs at the distribution board for areas not covered in Domestic installations, or using fixed wired RCD protected socket outlets in areas that may represent increased risk of electric shock to the user:
- Wet areas: bathrooms, laundries, kitchens.
 - Near pools and water features.
 - Where intended for use with cleaning equipment.
 - Hand-held tools subject to movement in use, i.e. work-shops, garages.
- 3.10 SET-OUT**
 The position of outlets and equipment shown on drawings is indicative of requirements. Confirm documents and site conditions are not in conflict with other services or features. Resolve conflicts and discrepancies before proceeding with work affected. Confirm on site the exact location, disposition and mounting heights of all outlets, fittings, equipment, penetrations, and use of exposed wiring. Fix outlet items level, plumb and in line.
- 3.11 CABLING**
 Install wiring systems to AS/NZS 3000. All cabling run concealed. No TPS cable laid directly in concrete. Locate holes in timber framing for the passage of cables at the centre line of the timber member. Install cable in conduits where required to pass through concrete or underground. In walls run cabling horizontally and vertically in straight lines. In ceilings either run cabling along ceiling framing or attached to catenary wires. Clip cabling to ceiling framing/catenary wires.
- 3.12 CABLING CIRCUITS**
 Install all circuits with the appropriately rated cable and circuit protection. Install with a maximum of 8 light switch units or 4 double or single switched socket units on any circuit. Minimum 2 lighting circuits per floor. Separate circuits for all electric heating appliances. Kitchen sockets to be on at least two different circuits.
- 3.13 WALL BOXES**
 Mount flush in cavity construction size to fit products selected. Fix vertically mounted wall boxes to studs. Screw fix horizontally mounted switched socket outlet wall boxes to solid blocking or noggs. Fix switch panel wall boxes to solid blocking.
- 3.14 SWITCH AND SOCKET UNITS**
 Fit all single and double switch units, all sockets to the following heights (to the centre of the unit) unless shown otherwise on the drawings.
- | | |
|---------------|--------------------------|
| Switch Units: | 1000mm |
| Socket Units: | 150mm above work benches |
| | 400mm elsewhere |
- Mount light switches and switch socket outlets vertically and socket units horizontally. Label all switch units that control electrical equipment or special lighting circuits by colour filled engraving on the switch. Use proprietary engraved switch mechanisms where applicable.
- 3.15 ISOLATING SWITCHES**
 Locate isolating switches in positions as confirmed by the owner, when not specifically shown on the drawings.
- 3.16 LIGHT FITTINGS**
 Install light fittings in locations and at heights specified and confirmed by the owner, in accordance with the fitting manufacturer's requirements. Install recessed fittings to NZECP 54.
- 3.17 EXTRA LOW VOLTAGE LIGHTING**
 Use electronic transformers for ELV lamps, one transformer per lamp. Locate to manufacturer's requirements and as close as practicable to the lamp. Ensure transformers and rear of light fittings are adequately ventilated and clear of any thermal insulation, to NZECP 54.

- 3.21 **SMOKE ALARMS**
Install Type 1 domestic smoke alarm system to NZBC F7/AS1 3.1 **Domestic smoke alarms**, AS 1670.6 and to the alarm manufacturer's requirements. Fit neatly and without damage to the surrounding finish.
- 3.22 **SURGE PROTECTION**
Install surge protection devices to manufacturer's requirements and in accordance with AS/NZS 3000 and AS/NZS 1768. When fitting IEC 61643 Class II protection at the switchboard, protect the device by a dedicated MCB.
- 3.23 **ELECTRIC POWERED FITTINGS AND EQUIPMENT**
Install and wire fittings and equipment to individual fittings and equipment manufacturer's requirements. Refer to the drawings for required layouts and locations for equipment. Refer to SELECTIONS for schedules of fittings.
- 3.24 **BATHROOM ELECTRICAL FIXTURES**
Install all electrical fixtures. Connect the following bathroom and toilet electrical items:
- Heated towel rails: Install to manufacturers requirements and installed in accordance with AS/NZS 3000 and the NZBC G9/AS1
- Exhaust fans: Install exhaust fans to manufacturer requirements. Installed in accordance with AS/NZS 3000 and NZBC G4/AS1.
- 3.27 **LABELLING**
Include label under each controller, switch and circuit breaker on distribution boards. Include a warning notice if light dimmers are used in the installation. List the rating of each circuit.
- 3.29 **COMPLETION**
Leave installation operating correctly, with equipment clean and operational.