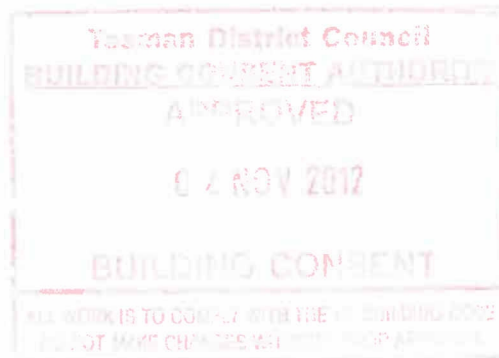


SPECIFICATION

of work to be done and materials to be used in carrying out the works shown on the accompanying drawings

Brown Acre Villas Motueka

Villa 52



Date: 21 September 2010

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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

1.1 DOCUMENTS

Documents referred to in this section are:

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

1.2 SITE SAFETY

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

1.3 ARCHAEOLOGICAL DISCOVERY

If fossils, antiquities and other items of value are found refer to the general section 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.

2.2 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.
- 3.10 SHORING AND UNDERPINNING**
Carry out shoring and underpinning shown on the drawings and as necessary to prevent subsidence of adjoining public or private property and to ensure the safety of the public and site personnel. Maintain protection throughout the progress of the works, or until foundations and subgrade structures have been completed and the stability of adjoining public and private property secured.
- 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.
- 3.12 ROCK EXCAVATION**
If rock is found at any level above the underside of the structural foundations, or above required base levels for site service trenches, immediately notify the owner. Obtain written instructions from the owner on the proposed approach to rock excavation, or consequent alterations to subgrade construction. Confirm any changes with the territorial authority.
- 3.13 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 and 3.1.3, 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.

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

3.17 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.

3.18 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.

1.1 DOCUMENTS

Documents referred to in this section are:

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

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.

2. PRODUCTS

2.1 NORMAL CONCRETE

Normal concrete 17.5 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 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 REINFORCEMENT

Bars to AS/NZS 4671. Grade 300E deformed, other than for ties, stirrups and spirals, unless shown otherwise on the drawings. Welded reinforcing mesh to AS/NZS 4671.

2.4 TYING WIRE

Mild drawn steel wire not less than 1.2mm diameter.

2.5 SPACERS AND CHAIRS

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

2.6 DAMP-PROOF MEMBRANE

0.25mm minimum polyethylene to NZS 3604, clause 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 owner. 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.

3.4 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.

3.5 ADJUSTMENTS

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

3.6 TOLERANCES, BENDING

To NZS 3109: clause 3.9, Tolerances for reinforcement.

3.7 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 laid down in NZS 3109: clause 3.6, Spacing of reinforcement.

3.8 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.

3.9 REINFORCEMENT COVER

Minimum cover to all reinforcing bars, stirrups, ties and spirals, as shown on the drawings. Where cover is not shown on drawings provide minimum cover to NZS 3101 part 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: clause 3.9, Tolerances for reinforcement.

3.10 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 owner. 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.

- 3.11 CONSTRUCTION JOINTS**
Locate and construct as shown on the drawings or in accordance with NZS 3109: clause 5.6, 5.6.3 Type B.
- 3.12 PRE-PLACEMENT INSPECTION**
Do not place concrete until all excavations, boxing and reinforcing have been inspected and passed by the Building Consent Authority.
- 3.13 SURFACE FINISHES**
To NZS 3114: clause 105, Specification of finishes, as scheduled or as denoted on the drawings.
- 3.14 EXPOSED CONCRETE**
Formwork linings and surface finishes as nominated for both fair face and concealed or exposed surfaces. Unless detailed, obtain written confirmation of the type and pattern of all joints.
- 3.15 CONCRETE SURFACE TOLERANCES**
To NZS 3114: clause 104, Surface tolerances and clause 105, Specification of finishes, with the suggested tolerances becoming the required tolerances.
- 3.16 PUMPING CONCRETE**
Set up and supervise pump operation, placing and compaction of the mix to NZS 3109: clause 7.4, Handling and placing and clause 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.
- 3.17 COMPACTION**
Use power operated vibrators on foundations, vertical constructions and beams.
- 3.18 RESIDENTIAL FLOOR SLABS**
Construct to NZS 3604: clauses 4.8 Concrete and 7.5, Concrete slab-on-ground floors in timber buildings. Lay to true and straight surfaces, screeded, floated and steel (manual or power) trowelled finish. Tolerance on flatness: maximum 3mm gradual deviation over a 3 metre straight-edge, to NZS 3109: clause 104, Surface tolerances.
- 3.19 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.
- 3.20 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.
- 3.21 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.
- 3.22 CLEAN OUT**
Clean out saw cuts. Fill with cement grout where the floor will be covered with carpet or vinyl.
- 3.23 REMOVE**
Remove all unused materials and all concrete and reinforcing debris from the site.

4. SELECTIONS

4.1 **DAMP-PROOF MEMBRANE**
Brand/type: Polythene 250mu

4.2 **SURFACE FINISHES FLOOR SLABS AND PAVEMENTS**
Surface finish class to NZS 3114: table 2, Classes of floor, exterior pavement and invert finishes.

3320 CONCRETE MASONRY

1. GENERAL

This section relates to the supply and laying of concrete masonry, the supply and laying of associated reinforcing steel and the grouting of walls, all to NZS 4229.

1.1 DOCUMENTS

Documents referred to in this section are:

NZBC B1/AS1	Structure
NZS 3103	Sands for mortars and plasters
NZS 3109	Concrete construction
NZS 4210	Masonry construction: Materials and workmanship
NZS 4229	Concrete masonry buildings not requiring specific engineering design
NZS 4230	Design of reinforced concrete masonry structures
AS/NZS 4455	Masonry units and segmented pavers
AS/NZS 4671	Steel reinforcing materials

1.2 QUALIFICATIONS

Carry out all masonry work with people competent and experienced in this type of work, under the supervision of a registered mason or a suitably qualified tradesperson as required in NZS 4229 and NZS 4210. Blocklayers are to hold a current NZ Masonry Trades Association Certificate.

The registered mason is to certify in writing to the owner that the observation and work has been carried out in accordance with the relevant NZ Standards. Note that some Building Consent Authorities may require a Producer Statement Construction.

1.3 CONSTRUCTION CONTROL

Supervise masonry construction to the requirements of NZS 4230: table 3.1, Observation types, admissible use and nominal strengths.

1.4 CONSTRUCTION OBSERVATION BY ENGINEER

Inspections shall confirm compliance with the design and the required standards of construction.

Obtain from the engineer Producer Statements required relating to the masonry construction.

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

1.5 TESTS

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

1.6 QUALITY RECORDS

Keep accurate records relating to strength and quality of materials used in the construction, and make the information available to the Building Consent Authority inspector on request.

2. PRODUCTS

2.1 MASONRY UNITS

To AS/NZS 4455.

2.2 REINFORCEMENT

To AS/NZS 4671 and as detailed.

2.3 MORTAR

Sand to NZS 3103. Chloride levels to not exceed 0.04% by dry weight of sand. Mortar to NZS 4210: section 2.2, Mortar. Compressive strength of not less than 12.5 MPa.

- 2.4 **GROUT**
To NZS 4210: section 2.3, Grout. Spread value 450 - 530mm.
- 2.5 **WATER**
Clean, fresh and free from excess alkali, salt, silt and organic materials. Water from a local authority water supply is acceptable.
3. **EXECUTION**
- 3.1 **MASONRY CONSTRUCTION GENERALLY**
To NZS 4210, NZS 4229 and to NZBC B1/AS1 Structure general, 2.0 Masonry.
- 3.2 **STORAGE**
Store masonry units clear of the ground, under cover and well ventilated until placed in the work.
- 3.3 **MOISTURE CONTENT**
Ensure masonry units are air dry prior to laying.
- 3.4 **CHECK BASE CONCRETE**
Ensure the base concrete is true to line and level, requiring a base mortar bed of 10mm (minimum) to 20mm (maximum). Ensure that all laitance, loose aggregate, or anything preventing bond is removed prior to laying masonry units.
- 3.5 **STARTER POSITIONS**
Before commencing laying masonry units, check the location of starter reinforcement by measure or by a dry trial lay up of the first course. Do not correct misplacement by cranking bars. Where misplacement exceeds the location tolerance, obtain written direction before proceeding.
- 3.6 **REINFORCEMENT AND GROUTING**
Reinforcement detailed, bent and placed to NZS 4210: section 2.6, Reinforcing details. Refer to drawings for details of reinforcement and extent of grout filling.
- 3.7 **COVER**
Cover to NZS 3109: 3.8 Cover and 3.9 Tolerances for reinforcement. Minimum cover as required for reinforced concrete, with grout and masonry treated as a homogeneous material. Maintain reinforcing bars for retaining walls and bond beams, a minimum of 15mm and for other masonry a minimum of 9mm from the masonry work face, with the space filled with grout.
- 3.8 **TOLERANCES**
Construct within the tolerances set out in NZS 4210: clause 2.6.5, Tolerances, and clause 2.7.1, General. Lay masonry units with bedding of consistent thickness throughout.
- 3.9 **PROTECTION**
Protect fair-faced masonry walls, keeping them clear of mortar droppings, grout splashes, or stains of any kind.
- 3.10 **LAY MASONRY UNITS**
Ensure consistent, fully filled and tooled joints. Where walls are reinforced, prevent mortar droppings from entering the cells to be grouted. Provide clean out holes at base of wall, unless "low lift" (NZS 4210) grouting is used. Ensure reinforcement is accurately placed and tied. Lay in regular running bond with all necessary special units and sill units. Cut masonry, if necessary, true and square without chipping.
- 3.11 **MASONRY UNITS JOINTS**
Not exceeding 10mm thick, or less than 8mm when the units are bedded in. Joints tooled concave, unless detailed otherwise.

- 3.12 CONTROL JOINTS**
Locate at major changes of wall height or thickness, at openings, and at not more than 8 metre centres, or, as shown on the drawings. Where reinforcement passes through a control joint, provide for breaking bond using methods detailed on NZS 4210: figure 2, Control joint, unless specifically detailed otherwise.
- 3.13 BRACING**
Provide sufficient temporary lateral bracing to ensure stability until the final supporting construction is in place.
- 3.14 PRE-GROUTING INSPECTION**
Inspect walls prior to grouting. Ensure cells are clean and reinforcement is correctly placed. Where "high lift" (to NZS 4210) grouting is used, seal the clean out holes and brace to prevent blow outs.
- 3.15 GROUTING OF CELLS**
Grout all masonry cells below finished grades, all cells in retaining walls and all cells containing reinforcing.
- 3.16 GROUT CELLS**
Grout all masonry unit cells.
- 3.17 GROUTING PROCEDURE**
Use procedures set out in NZS 4210. Methods acceptable on this project are:
- high lift grouting with expansive admixture
- high lift grouting with reduced compaction
- low lift grouting.
- 3.18 CONSTRUCTION JOINTS**
Form and treat construction joints between grout pours and between masonry walls and hardened concrete work to ensure bonding occurs. Comply with NZS 4210: section 2.16, Horizontal control joints.
- 3.19 MORTAR IN COMPONENTS**
Mortar in components such as sills, copings, lintels, and steps, as work proceeds.
- 3.20 BUILD IN**
Build in plugs, bolts, ties, metal flashings, dowels, fastenings and fixings as required by all trades and as shown on the drawings.
- 3.21 PROGRESSIVE CLEANING**
Clean off mortar splashes and grout spills as they occur, making good any damage at the same time.
- 3.22 FINAL CLEANING**
Clean down masonry work and remove waste material from adjoining surfaces and floors at completion.
- 3.23 REMOVE**
Remove from the site materials not used.

3820 CARPENTRY

1. GENERAL

This section relates to the supply and erection of light timber framing.

1.1 DOCUMENTS

Documents referred to in this section are:

AS/NZS 1748	Mechanically stress-graded timber
AS/NZS 2269.0	Plywood - Structural - Specification
AS/NZS 2904	Damp-proof courses and flashings
NZS 3602	Timber and wood-based products for use in building
NZS 3603	Timber structures standard
NZS 3604	Timber framed buildings
NZS 3631	New Zealand national timber grading rules
NZS 3640	Chemical preservation of round and sawn timber
AS/NZS 4347	Damp-proof courses and flashings - Methods of test

1.2 DIMENSIONS

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

2. PRODUCTS

2.1 TIMBER FRAMING, TREATED

Species, grade and in service moisture content to NZS 3602 and treatment to NZS 3640. Either mechanically stress graded to AS/NZS 1748, or visual grading to NZS 3631.

2.2 TIMBER FRAMING, CHEMICAL FREE, MECHANICALLY STRESS GRADED

Species, grade and moisture content in service as set out in NZS 3602. Machine stress graded to AS/NZS 1748, with an average moisture content at supply of 16% or less.

2.3 TIMBER TRUSSES

Moisture content: 16% at supply

2.4 NAILS

Type to NZS 3604, section 4: Durability, and of the size and number for each particular types of joint as laid down in the nailing schedules of NZS 3604, sections 6-10.

2.5 BOLTS AND SCREWS

Bolts and screws of engineering and/or coach type complete with washers, to the requirements of NZS 3604, section 4: Durability, and of the number and form required for each particular junction to NZS 3604, sections 6-10.

2.6 NAIL PLATES

Comply with the requirements of NZS 3604, section 4: Durability, and of the number and form required for each particular junction to NZS 3604, sections 6-10. Plates to the plate manufacturer's design for the particular locations as shown on the drawings.

2.7 CONNECTORS

Comply with the requirements of NZS 3604, section 4: Durability, and of the number and form required for each particular junction to NZS 3604, sections 6-10. Connectors and structural brackets to the connector manufacturer's design for particular locations shown on drawings.

2.8 CORROSION RISKS

Use stainless steel fixings, connectors, etc in all zones, with the timber treatments CuAz (Preservative code 58) and ACQ (Preservative code 90).

2.9 DPC

Refer to 4161 WRAPS, UNDERLAYS AND DPC section

3. EXECUTION

- 3.1 EXECUTION GENERALLY**
To NZS 3603 and NZS 3604 except as varied in this specification. Execution to include those methods, practices and processes contained in the unit standards for the National Certificate in Carpentry and the National Certificate in Joinery (cabinetry, exterior joinery, stairs).
- 3.2 SEPARATION**
Separate all timber framing timbers from concrete, masonry and brick by: -
- a full length bituminous damp-proof membrane overlapping timber by at least 6mm; or
- a 12mm minimum free draining air space
- 3.3 ATTENDANCE**
Provide and fix blocks, noggs, openings and other items as required by other trades.
- 3.4 MOISTURE CONTENT**
Maximum allowable equilibrium moisture content (EMC) for non air-conditioned or centrally heated buildings for framing to which linings are attached.
Framing at erection: 24% maximum
Framing at enclosure: 20% maximum
Framing at lining: 16% maximum
- 3.5 SET-OUT**
Set out framing in accordance with the requirements of NZS 3604 and as required to support sheet linings and claddings.
- 3.6 FRAMING WALLS**
Frame to required loading and bracing complete with lintels, sills and noggs, all fabricated and fastened to NZS 3604, section 8, Walls.
- 3.7 FIT CAVITY BATTENS**
Fit and fix 20mm cavity battens over building wrap, fully nail to timber studs to the requirements of the manufacturer or to NZS 3604. Fit and fix related flashings and cavity closers.
- 3.8 FRAMING ROOFS**
Frame to required loading and bracing complete with valley boards, ridge boards and purlins. Design and fit roof trusses complete with anchorage. All fabricated and fastened to NZS 3604, section 9, Posts and 10, Roof framing.
- 3.9 FRAMING CEILINGS**
Frame to required loading and bracing complete with runners and battens set out to support ceiling lining. All fabricated and fastened to NZS 3604, section 13, Ceilings. Trim for openings in ceilings and hatches to NZS 3604 section 13.3, Openings in ceilings. Provide blocking for water tanks located in the ceiling space to NZS 3604, section 13.4, Water tanks in roof space.
- 3.10 INSTALLING WALL WRAPS, UNDERLAYS**
Refer to 4161 WRAPS, UNDERLAYS AND DPC section
- 3.11 DPC TO LOSP TREATED TIMBER**
Refer to 4161 WRAPS, UNDERLAYS AND DPC section.
- 3.12 DPC TO TIMBER**
Refer to 4161 WRAPS, UNDERLAYS AND DPC section.

4161 WRAPS, UNDERLAYS AND DPC

1. GENERAL

This section relates to the application of:

- DPC/DPM
- wall wraps, includes Kraft based and synthetic building wraps
- roofing underlays
- accessories

1.1 ABBREVIATIONS AND DEFINITIONS

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

The following abbreviations apply specifically to this section:

NZMRM New Zealand Metal Roofing Manufacturers Inc.

1.2 INTERPRETATION

Wall wraps/underlay used in this specification has the same meaning as building wraps in NZS 3604 and NZBC E2/AS1.

Documents

1.3 DOCUMENTS REFERRED TO

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

NZBC E2/AS1	External moisture
NZS/AS 1530	Methods for fire tests on building materials, components and structures
NZS 2295	Pliable, permeable building underlays
AS/NZS 2904	Damp-proof courses and flashings
NZS 3604	Timber framed buildings
AS/NZS 4200	Pliable building membranes and underlays
AS/NZS 4347	Damp-proof courses and flashings - Methods of test
AS/NZS 4389	Safety mesh
AS/NZS 4534	Zinc and zinc/aluminium-alloy coatings on steel wire
NZMRM	NZ metal roof and wall cladding - Code of practice.

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

Requirements

1.4 INSTALLATION SKILL LEVELS

Installers to be familiar with the manufacturer's technical literature and the NZMRM NZ metal roof and wall cladding - Code of practice.

2. PRODUCTS

Materials

DPC

2.1 POLYETHYLENE DPC

Polyethylene film to AS/NZS 2904 and AS/NZS 4347. Thickness 500 microns minimum, manufactured for use as a damp-proof course and concealed flashings to doors and windows.

DPM

- 2.2 **DAMP PROOF MEMBRANE**
Polyethylene sheet with minimum of 250 microns to NZS 3604, 7.5.6, **polyethelene sheet damp-proof membranes**, and to NZBC E2/AS1 10.3.3, **damp proof membranes** and 10.3.4, **acceptable materials**.

Wall Wraps

- 2.3 **ABSORBENT SYNTHETIC WALL WRAP - POLYPROPYLENE**
Absorbent, breathable, fire retardant, non-woven, white soft spun-bonded polypropylene membrane. Designed for use as fire retardant membrane, with Flammability Index of 1, when tested to AS 1530 Part 2.

Roofing Underlay

- 2.4 **BITUMINOUS SELF-SUPPORTING ROOFING UNDERLAY**
Self supporting roofing underlay tested to NZS 2295, with a heavy duty classification to AS/NZS 4200.

Accessories

- 2.5 **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, **Building wrap to wall openings**.

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

- 2.7 **WIRE NETTING**
75mm galvanized hexagonal wire netting to AS/NZS 4534.

- 2.8 **SAFETY MESH**
Galvanized safety mesh AS/NZS 4389.

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

- 2.10 **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 NZS 3604 Section 11 Table 11.1 Underlays; and NZBC E2/AS1 Table 23 Properties of Roof Underlays and Building Wraps; and manufacturers technical literature.
Note: Care should be taken not to expose the underlay to continuous wet and windy conditions.

- 3.2 **STORAGE**
Store building 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

- 3.4 **POLYETHYLENE DPC TO TIMBER**
Lay polyethylene DPC under treated and untreated timber, including LOSP treated timber, of all timber framed walls on concrete and concrete masonry, in a single layer with 50mm overlaps at joints to provide a waterproof barrier.
- 3.5 **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.
- 3.6 **DPC BETWEEN DISSIMILAR MATERIALS**
Lay DPC between dissimilar materials where required.

Application - DPM

- 3.7 **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 Wraps

- 3.8 **WALL WRAP**
Fix horizontally to outside face of substrate in true alignment, with succeeding sheets overlapping 150mm. 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.

Application - Roofing Underlay

- 3.9 **WIRE NETTING**
Lay 75mm galvanized wire netting at right angles across the purlins and drawn taut before fixing. Tie edges of netting together with galvanized wire clips.
- 3.10 **SAFETY MESH**
Lay safety mesh over exposed roof areas securely fixed in place.
- 3.11 **BUILDING PAPER 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 papers, 7 metres for fire retardant underlays and 20 metres for synthetic roofing underlays.
- 3.12 **GUTTER AND UNDER FLASHINGS**
Lay bituminous breather type building paper 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

- 3.13 **CLEAN UP**
Clean up as the work proceeds.
- 3.14 **LEAVE**
Leave work to the standard required by following procedures.
- 3.15 **REMOVE**
Remove debris, unused materials and elements from the site.

4230 WALL CLADDING

1. GENERAL

This section relates to the supply and installation of exterior cladding, including:

- associated flashings
- timber trims
- timber beads

Related work

1.1 RELATED SECTIONS

Refer to WRAPS UNDERLAYS AND DPC for wraps, underlays, foils and DPC.

Documents

1.2 DOCUMENTS

Documents referred to in this section are:

NZBC E2/AS1	External moisture
AS/NZS 1491	Finger jointed structural timber
AS/NZS 2269.0	Plywood - Structural - Specification
AS/NZS 2908.2	Cellulose-cement products - Flat sheets
NZS 3602	Timber and wood-based products for use in building
NZS 3604	Timber framed buildings
NZS 3617	Profiles of weatherboards fascia boards and flooring
NZS 3631	New Zealand national timber grading rules
BRANZ BU 441	Sealed joints in external claddings - 2. Sealants
BRANZ BU 465	Domestic flashing installation
BRANZ BU 467	Principles of flashing design

Performance

1.3 PERFORMANCE

Accept responsibility for the weathertight performance of the completed cladding system, including all penetrations.

2. PRODUCTS

2.1 BUILDING WRAPS AND UNDERLAYS

Refer to WRAPS UNDERLAYS AND DPC section.

2.2 EXTERIOR CAVITY WALL BATTENS

Radiata pine battens, minimum 20mm thickness, width and height to match timber framing studs. To NZS 3602, table 1, reference 1D.10, Requirements for wood-based building components to achieve a 50-year durability performance.

2.3 EXTERIOR CAVITY VERMIN-PROOFING

Perforated uPVC, aluminium or stainless steel trays with upstands. Upstand one side 10mm and the other 75mm. Length and width to suit cavity.

2.4 TIMBER WEATHERBOARD

Dressing grade to NZS 3631, to NZS 3617 for profile and treated to NZS 3602, table 2, reference 2.A1, Requirements for wood-based building components to achieve a 15-year durability performance.

2.5 FIBRE-CEMENT WEATHERBOARD

Cellulose cement autoclaved sheets to NZS/AS 2908.2.

2.6 FIBRE-CEMENT SOFFIT LINING

Cellulose cement autoclaved sheets to AS/NZS 2908.2.

2.7 PVC JOINTERS

To suit sheet thickness.

- 2.8 **NAILS, SCREWS AND FASTENINGS**
Metal, size and pattern, to cladding manufacturer's requirements and complying with the relevant aspects of NZS 3604, section 4: Durability.
- 2.9 **FLASHINGS**
Material, grade and colour as detailed and scheduled. Ensure that materials used for flashings are compatible with the window frame materials and fixings and cladding materials and fixings.
3. **EXECUTION**
- 3.1 **MOISTURE CONTENT**
Maximum allowable moisture content to NZS 3602 for:
Equilibrium moisture content (EMC)
- Framing: 20% at closing in
 - Weatherboards: 14% at time of fixing
 - Exterior joinery and trim: 14%
- 3.2 **EXECUTION METHODS AND PRACTICES**
To NZS 3604 except as varied in this specification. Execution to include those methods, practices and processes contained in the unit standards for the National Certificate in Carpentry and the National Certificate in Joinery (cabinetry, exterior joinery, stairs).
- 3.3 **FIX WRAPS AND UNDERLAYS**
Refer to WRAPS UNDERLAYS AND DPC section
- 3.4 **PENETRATIONS**
Confirm that exterior wall openings have been prepared ready for the installation of all window and door frames and other penetrations through the cladding. Required preparatory work includes the following:
- wall cladding underlay/building wrap to openings finished and dressed off ready for the installation of window and door frames and other penetrations
 - claddings neatly finished off to all sides of openings
 - installation of flashings (those required to be installed prior to installation of penetrating elements).
- 3.5 **INSTALL DRAINED CAVITY**
20mm Minimum thickness drained cavity to NZBC E2/AS1: 9.0 Wall claddings, where required. Fix vertical cavity battens to wall framing studs. The battens are fixed by the cladding fixings which will penetrate the wall framing studs over the building wrap. Seal the top of the cavity and install vermin-proofing at base. Do not use horizontal cavity battens. Use cavity spacers where fixing is required between cavity battens.
- 3.6 **PRIME OR SEAL TIMBER WEATHERBOARDS AND TRIM**
Prime or seal all front and back faces, edges and end grain before fixing weatherboards and exterior trim, to the finish and quality specified in PAINTING sections.
- 3.7 **INSTALL TIMBER WEATHERBOARDS**
Install level, true to line and face, to NZBC E2/AS1: 9.4 Timber weatherboards, and to NZS 3604, section 11.5.2, timber weatherboards. Refer to NZS 3604 for fixings durability requirements for specific provisions.
- 3.8 **INSTALL FIBRE CEMENT WEATHERBOARDS**
Install to the weatherboard manufacturer's requirements and to NZBC/AS1 9.5 Fibre cement weatherboard. Refer to the cladding manufacturer's literature for fixing details and NZS 3604 for fixings durability requirements for specific provisions.
- 3.9 **INSTALL FIBRE CEMENT SOFFITS WITH JOINTERS AND CAPPING MOULDS**
Cut sheets dry and scribe fit to fully support all edges and joints. Nail and drill for and insert fasteners to the sheet manufacturer's requirements. Fit complete with jointers and capping moulds. Refer to the cladding manufacturer's literature for fixing details and NZS 3604 for fixings durability requirements for specific provisions.

- 3.10 INSTALL EXTERIOR TIMBER FINISHINGS**
Install timber facings, beads, trim and enclosures level, true to line and face, with all end grain sealed and joints mitred.
- 3.11 INSTALL FLASHINGS**
Install flashings, covers and soakers as detailed on the drawings and to BRANZ Bulletins 467 Principles of flashing design and 465 Domestic flashing installation.
- 3.12 USE OF SEALANTS**
Selection and use of sealants to follow BRANZ BU 441 Sealed joints in external claddings - 2. Sealants.
- 3.13 COMPLETE**
Ensure the work is complete with all flashings, finishings and trim properly installed so the cladding system is completely weathertight.
- 3.14 REPLACE**
Replace damaged or marked elements. Remove unused materials from the site.

4261 BRICK VENEER CLADDING

1. GENERAL

This section relates to clay brickwork as a veneer cladding.

Documents

1.1 DOCUMENTS REFERRED TO

Documents referred to in this section are:

NZBC B1/AS1	Structure
NZBC B1/AS3	Structure
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
AS/NZS 4455	Masonry units and segmental pavers
BRANZ	Masonry veneer - Good practice guide

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

Requirements

1.2 QUALIFICATIONS

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

Performance

1.3 FIXINGS, WIND

Design and use the fixings appropriate for the wind zone (R) and topographical classification (T) of this site and building height; as required by NZS 3604 and the wind loads on various wall areas as given by AS/NZS 1170.2.

1.4 FIXINGS, EARTHQUAKE

Use fixings and methods capable of sustaining the loads appropriate to the area as set out in NZS 3604 and NZS 4210 and as required by NZS 1170.5.

1.5 COMPLIANCE

Brickwork to comply with NZBC B1/AS1 Structure - General, 2.0 Masonry.

2. PRODUCTS

Materials

2.1 CLAY BRICKS

To AS/NZS 4455.

2.2 VERMIN STOP

Galvanized hexagon 10mm mesh of 1mm diameter steel wire 100mm wide, complete with galvanized steel staples.

2.3 DAMP-PROOF COURSE

Polyethylene based strip used as a damp-proof course and flashing, also for slip joints between brick courses.

Components

- 2.4 **METAL TIES**
To AS/NZS 2699.1. Veneer ties shall be fixed to framing members with screws or other non-impact fasteners.

Accessories

- 2.5 **SAND FOR MORTAR**
To NZS 3103. Chloride levels to not exceed 0.04% by dry weight of sand.
- 2.6 **MORTAR**
Composed of Portland cement, sand and water with an admixture to the provisions of NZS 4210: 2.2 Mortar. Obtain written approval of admixture being used. Obtain written approval if intending to use hydrated lime in the mortar.
- 2.7 **MORTAR COLOUR**
Add mineral oxide pigment conforming to requirements of NZS 4210, clause 2.2.2.2(f).
- 2.8 **ADMIXTURES**
To NZS 4210.
- 2.9 **WATER**
Clean, fresh and free from excess alkali, salt, silt and organic materials.

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 **MEASURE MATERIALS**
Measure materials for mortar accurately by weight or volume using suitably calibrated equipment.
- 3.5 **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.
- 3.6 **COLD WEATHER CONSTRUCTION**
When air temperature is below 5°C take the precautions required by NZS 4210: 2.18 Cold weather construction.
- 3.7 **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.
- 3.8 **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.

Application

- 3.9 COLOUR MIXING**
Check all bricks delivered to site for colour variation, prior to commencing work. Ensure bricks are thoroughly blended from several pallets to ensure an even colour spread throughout the work.
- 3.10 UNIFORMITY**
Carry up work with no portion more than 1500mm above another at any time, raking back between levels.
- 3.11 BONDING**
Lay bricks to the required bonding in the various locations. Refer to SELECTIONS/drawings.
- 3.12 PROVIDE WEEPHOLES**
Provide weepholes at the bottom of cavities and cells to NZS 3604, section 11.7.4 Cavities and as necessary to drain moisture to the outside air.
- 3.13 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.
- 3.14 FORM OPENINGS**
Unless detailed otherwise form openings to typical details from BRANZ Masonry veneer - Good practice guide.
- 3.15 CAVITY WIDTH**
No cavity width less than 40mm or more than 75mm unless detailed otherwise.
- 3.16 CAVITY VENTILATION**
Ventilate to outside air with top and bottom openings to the requirements of NZS 3604, section 11.7.4 Cavities. Seal cavity off from roof space.
- 3.17 CAVITY BRICKWORK BELOW GROUND**
Fill all cavities below finished grade with concrete. Place a continuous damp-proof course within the first three mortar joints above ground. Seal the face of all brickwork below ground.
- 3.18 TIE SPACING**
Unreinforced veneers to NZS 4210: 2.9.7 Tie classification and spacing.
- 3.19 SEPARATION JOINTS**
Provide for wall movements of veneer with control joints to NZS 4210: 2.10 Methods of controlling wall movements. Weatherproof as necessary.
- 3.20 ERECT**
Erect the cavity walls with cavities of the widths detailed. Bond the two thicknesses of brickwork together using 185mm x 105mm box ties, with extra ties at reveals and openings and all ties laid to fall towards outer thickness. Keep the cavity clear by lifting screeds or other means. Leave openings at the base, clean out cavity at completion and after inspection brick up openings to match the surrounding work.
- 3.21 FORM REVEALS**
Form lintels, jambs and sills as detailed complete with damp-proofing and all ready for following work.
- 3.22 CAVITY BRIDGES**
Seal the two thicknesses of brickwork with galvanized drip formers where in situ concrete is being placed above.
- 3.23 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

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.

3.24 FORM OPENINGS

Provide a flexible damp-proof course, extending 200mm beyond ends of lintels and sloping to weepholes over all openings in cavity walls.

3.25 LIQUID DAMP-PROOFING

Apply bituminous brush-on liquid applied membrane as a primer and 2 coats, to drain water effectively out of the cavity.

3.26 DAMP COURSE TO JAMBS

Provide a flexible damp-proof course to jambs of openings in cavity walls, fully lapped with horizontal damp-proof courses at head and sill.

3.27 DAMP COURSE TO SILLS

Provide a flexible damp-proof course under jointed sills, turned up at back and ends.

Application - ancillary work

3.28 BUILD IN FIXINGS

Build in necessary fixing bricks or blocks for trims.

3.29 BUILD IN ELEMENTS

Build in sills, copings, lintels, steps and other elements using mortar similar to that in adjacent walls.

3.30 BUILD IN DOORS AND WINDOWS

Build in door and window frames as the work proceeds and bed in mortar similar to that in adjacent work.

Completion

3.31 PROGRESSIVE CLEANING

Clean off all mortar and other contaminants from the face work immediately they occur.

3.32 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.

3.33 REPLACE

Replace damaged, cracked or marked elements.

3.34 LEAVE

Leave work to the standard required by following procedures.

3.35 REMOVE

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

4. SELECTIONS

4.1	BRICKS Brand Type Size	Austral Bricks 70 series 70mm x 230mm x 75mm
4.2	SILL TILES Brand Type	Austral Bricks 70 series
4.3	VENEER TIES Brand Type Size	Lumerlock Galvanised 80mm screw tie

4320 TILE ROOFING

1. GENERAL

This section relates to the supply and installation of tile roof, complete with all roof underlays and accessories to create a watertight roof.

1.1 DOCUMENTS

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
NZS 3403	Specification for hot-dipped galvanized corrugated steel sheet for building purposes
NZS 3602	Timber and wood-base products for use in building
NZS 3604	Timber framed buildings
NZS 4206	Concrete interlocking roofing tiles
NZS 4217	Pressed metal tile roofs
AS/NZS 4534	Zinc and zinc/aluminium-alloy coatings on steel wire

1.2 QUALIFICATIONS

Carry out roofing work using experienced, competent roofers familiar with the materials and techniques specified.

1.3 WIND AND EARTHQUAKE LOADINGS

Use fixings and methods capable of sustaining the loads appropriate to the area as set out in NZS 3604, section 5.

1.4 CO-ORDINATE

Co-ordinate to ensure substrate and preparatory work is complete and other work programmed in the order required for access and completion of the roof.

1.5 PERFORMANCE

Accept responsibility for the weather-tight performance of the completed roofing system, including all penetrations through the roof and junctions with walls and parapets.

1.6 WARRANTY

Warrant this work under normal environmental and use conditions against failure.

Warranty period - materials: 5 years

Warranty period - execution: 5 years

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

2. PRODUCTS

2.1 TILE BATTENS

Douglas fir, or No 1 framing radiata pine to NZS 3602, table 1E, Requirements for wood-based building components to achieve a 50-year durability performance. Size to NZS 3604, section 10: Roof framing.

2.2 WIRE NETTING

Galvanized hexagonal 75mm mesh from 1mm steel wire to AS/NZS 4534.

2.3 UNDERLAY

Breather type kraft paper laminates.

2.4 METAL ROOFING TILES

Pressed steel sheet galvanized to NZS 3403, aluminium/zinc coated to AS 1397. Finish as specified. Accessories, cappings, flashings, and fixings to match and to the roofing manufacturer's requirements.

- 2.5 **NAILS, SCREWS AND FASTENINGS**
Metal, size and pattern, to roofing manufacturer's requirements and complying with the relevant aspects of NZS 3604, section 4: Durability.
3. **EXECUTION**
- 3.1 **STORAGE**
Stack roofing and accessories on clean, level areas of the site and protect from damage and from weather until ready to fix in place. Avoid overloading roof structure when roofing materials are placed on the roof area prior to installation.
- 3.2 **SET-OUT**
Set out the planned layout before fixing commences, to ensure true lines and the correct relationship to module, grid and roof features.
- 3.3 **LAY ROOF UNDERLAY**
Lay and fix to NZBC E2/AS1: 8.1.5 Underlays, NZS 3604, section 11.2.2, Roof cladding underlays and the roofing manufacturer's requirements.
- 3.4 **LAY ROOFING, GENERALLY**
To NZBC AS/1: 8.0 Roof claddings. Take care to avoid damaging pre-finished roofing both during and after fixing. Wear only soft-soled shoes on the finished surface.
- 3.5 **INSTALL TILE BATTENS**
Install the tile battens to the roofing manufacturer's requirements and with all joints fully supported and staggered.
- 3.6 **CUT METAL TILES**
Cut with tools specified by the roofing manufacturer. Fold ends and seal cut edges of tiles and accessories without damaging their integrity or finish, all to the roofing manufacturer's requirements.
- 3.7 **INSTALL METAL TILES**
Lap metal tiles and fix complete with matching accessories, flashed to roof features and penetrations; all to the roofing manufacturer's requirements and NZS 4217 and to NZBC AS/1: 8.3 Pressed metal tiles.
- 3.8 **FIXINGS**
Refer to the roofing manufacturer's literature for fixing details and to NZS 3604 for fixings durability requirements.
- 3.9 **INSTALL COVERS AND FLASHINGS**
Install and fix as detailed and to the roofing manufacturer's details and to comply with NZBC E2/AS1: 4.0 Flashings, 5.0 Roof/wall junctions and 6.0 Parapets.
- 3.10 **PENETRATIONS**
Flash and overflash all penetrations through the roof.
- 3.11 **PENETRATIONS AND JUNCTIONS**
Check that adjoining walls and parapets are prepared ready for the installation of the roofing. Confirm that openings have been prepared ready for the installation of skylights and other penetrations through the roof. Required work includes the following:
- underlay turned up at wall and parapet lines
 - underlay finished and dressed off to all openings, ready for the installation of skylights and other penetrations
 - roofing installation neatly finished to all sides of openings and to all wall and parapet junctions
 - installation of flashings (those required to be installed prior to installation of penetrating elements and/or wall linings).
- 3.12 **USE OF SEALANTS**
Select and use sealants only as recommended by the roofing manufacturer.

- 3.13 COMPLETE**
Ensure the work is complete with all flashings, undercloaks, valleys, ridges and hips properly installed so the finished roof is completely weathertight.
- 3.14 REMOVE FILINGS**
Remove metal filings from roofing surfaces at least daily.
- 3.15 CLEAR**
Clear trade rubbish and unused materials from the roof and surrounds regularly during the work and at completion. Sweep down the completed roof and flush out spoutings, gutters and rainwater pipes, ensuring that metal filings, metal scraps and loose fixings are removed.
- 3.16 REPLACE**
Replace damaged or marked elements. Remove unused materials from 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
- flashings

Related work

1.1 RELATED SECTIONS

Refer to GLAZING for glass types

Documents

1.2 DOCUMENTS REFERRED TO

Documents referred to in this section are:

NZBC E2/AS1	External moisture
NZBC F4/AS1	Safety from falling
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
AAMA 2604.05	Performance requirements and test procedures for high performance organic coatings on aluminium extrusions and panels
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 4284	Testing of building facades
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

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)
BRANZ BU 337	Protecting Window Glass from Surface Damage

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

1.3 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

Requirements

1.4 QUALIFICATIONS

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

1.5

SHOP DRAWINGS AND INSTALLATION DETAILS

Shop drawings to show the general arrangement of the aluminium joining including, but not be limited to:

Construction details (minimum scale 1:5) showing the interface between joinery elements and the building structure including: -

- Jointing details and method of fixing between individual elements and between this installation and adjacent work
- Interaction between claddings and linings
- Flashing details
- Sealants and air seals
- Non standard fixing details including bracketing

And where required the following:

- Design calculations
- Producer Statement in the form PS1 Producer Statement Design
- Rebate sizes
- Dimensions of all typical elements and of any special sizes and shapes
- Provision for the exclusion and/or drainage of moisture
- Provision for adjustment of fixings to ensure true alignment of windows and doors
- Sealant types and full size sections of all sealants and backing rods
- Provision for thermal movement
- Provision for seismic movement and movement under wind loads
- Sequence of installation
- Glazing specification and details

Where requested provide the following additional information

- Information of Professional Indemnity Insurance held by the person proving the shop drawings

Refer to the general section SHOP DRAWINGS for the requirements for submission and review and the provision of final shop drawings.

Complete shop drawing review before commencing fabrication.

Warranties

1.6

WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

5 years: For fabrication

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

1.7

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 WARRANTIES for additional requirements.

Performance

1.8

PERFORMANCE - WIND

Construct windows, exterior doors and frames to withstand design wind pressures to NZS 3604.

1.9

AIR INFILTRATION

To NZS 4211 section 8 Air infiltration

- 1.10 **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.

Finishes

- 1.11 **CERTIFY COATINGS**
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) 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.

- 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 and the specified design wind pressure and air leakage level.

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 powder coating.
- 2.4 **STAINLESS STEEL SHEET AND STRIP**
Type: 316 austenitic steel
Finish grade: 2B (satin lustre)
- 2.5 **REVEALS - TIMBER PAINTED**
Timber reveals for paint finish with all sides primed grooved for wall linings or flush finished for architraves.
- 2.6 **FLASHINGS GENERALLY**
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 direct fix systems

- 2.7 **SILL PAN FLASHING**
Flashing for direct fix claddings to collect and drain water that may penetrate through the window or door unit. Size to extend from the inner most point of the aluminium frame out over the external face of the cladding.
- 2.8 **WANZ SUPPORT ANGLE**
Support angle for use with the sill pan for deeper claddings to transfer the weight of the window back to the frame.

Components - for cavity systems

- 2.9 **WANZ CAVITY CLOSER**
Flashing device to close the cavity above the window or door unit to direct water that occasionally penetrates the wall cladding into the cavity spaces adjacent to the window.

- 2.10 **WANZ SUPPORT BAR**
Extruded aluminium support bar with built in drainage and ventilation to NZBC E2, to provide continuous support to the window unit.

Components

- 2.11 **GLAZING GASKETS**
Thermoplastic rubber. Do not stretch glazing gaskets during installation. Measure and cut gaskets 5-10% over length before installation.

- 2.12 **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.

- 2.13 **SAFETY STAYS**
Stainless steel non releasable restrictors to limit window opening to NZBC F4/AS1, Table 2, Acceptable opening sizes for barriers.

Finishes

- 2.14 **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.

- 3.9 **EXPOSED FIXINGS AND FASTENINGS**
Ensure fixings and fastenings exposed to the weather are of aluminium, or Type 316 stainless steel.
- 3.10 **PROTECTED FIXINGS AND FASTENINGS**
Fixings and fastenings not exposed to the weather may be hot-dip galvanized steel with a coating weight of 610 g/m² complying with AS/NZS 4680.
- 3.11 **TIMBER REVEALS**
Before fixing to aluminium frames, ensure that timber reveals which are being painted have been primed on all surfaces.

Assembly

- 3.12 **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.
- 3.13 **HARDWARE GENERALLY**
Factory fit all required and scheduled hardware. Account for all keys and deliver separately to the site manager.
- 3.14 **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

- 3.15 **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.
- 3.16 **CONFIRM PREPARATION OF EXTERIOR WALL OPENINGS**
Confirm that exterior wall openings have been prepared ready for the installation of all window and door frames. Do not proceed with the window and door installation until required preparatory work has been completed.
- Required preparatory work includes the following:
- wall cladding underlay/building wrap to openings finished and dressed off ready for the installation of window and door frames to NZBC E2/AS1:9.1.5 Building wrap to wall openings.
 - claddings neatly finished off to all sides of openings
 - installation of flashings (those which are required to be installed prior to frames).
- 3.17 **INSTALLATION**
Fix to comply with the reviewed shop drawings and installation details including flashings and bedding compounds, pointing sealants and weathering sealants.
- 3.18 **INSTALLATION DIRECT FIX**
Install to window manufacturers details and drawings including sill pans to window and door units.
- 3.19 **INSTALLATION CAVITY CONSTRUCTION**
Install to WANZ Installation System details and drawings including WANZ cavity closers, support bars and support angles
- 3.20 **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.

3.21 **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.

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

Application - jointing and sealing

3.23 **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. Do not seal the junction between the sill member and the cladding or sill flashing which must remain open.

3.24 **PREPARE**
Ensure joints are dry. Remove loose material, dust and grease.

3.25 **PREPARE JOINTS**
Prepare joints in accordance with the sealant manufacturer's requirements, using required solvents and primers where necessary.

3.26 **PREPARATION**
Mask adjoining surfaces which would be difficult to clean if smeared with sealant.

3.27 **BACKING**
Insert polyethylene rod or tape back-up behind joints being pointed with sealant.

3.28 **BACK UP**
When using back-up material do not reduce depth of joint for sealant to less than the minimum required by the manufacturer of the sealant.

3.29 **POINTING, BEAD**
Tool sealant to form a smooth, flat bead.

3.30 **POINTING, FILLET**
Tool sealant to form a smooth fillet with a profile and dimensions required by the sealant manufacturer.

3.31 **FINISHING**
Remove excess sealant from adjoining surfaces, using the cleaning materials nominated by the sealant manufacturer and leave clean.

Completion - cleaning

3.32 **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.

3.33 **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.

- 3.34 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. Remove protection on completion.
- 3.35 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.
- Completion**
- 3.36 REPLACE**
Replace damaged, cracked or marked elements.
- 3.37 PROTECTION**
Protect finishes against damage from adjacent and following work.
- 3.38 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.
- 3.39 LEAVE**
Leave work to the standard required for following procedures.
- 3.40 REMOVE**
Remove safety indicators and protective coverings, and wipe down all joinery thoroughly to leave it perfectly clean. Remove debris, unused materials and elements from the site.
- 3.41 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
- mirrors and mirror frames

1.1 ABBREVIATIONS AND DEFINITIONS

Refer to the general section INTERPRETATION AND 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

1.2 DOCUMENTS REFERRED TO

Documents referred to in this section are:

NZBC B1/AS1	Structure, 7.0 Glazing
NZBC F2/AS1	Hazardous building materials, 1.0 Glazing
NZBC F4/AS1	Safety from falling, 1.0 Barriers in buildings
NZBC H1	Energy Efficiency
NZS 3604	Timber framed buildings
NZS 4218	Thermal insulation - Housing and Small Buildings
NZS 4223.1	Glazing in buildings - Glass selection and glazing
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

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.

Warranties

1.3 MANUFACTURERS WARRANTY

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

Warranty period: 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 WARRANTY AGREEMENT and details of when completed warranty must be submitted.

Requirements

1.4 SAMPLES

Submit samples of selected glass for review if required.

Performance

1.5 ENERGY EFFICIENCY

Provide glazing to meet the energy requirements of NZS4218 and NZBCH1 for housing small buildings.

2. PRODUCTS

Materials

- 2.1 **CLEAR FLOAT GLASS**
Clear ordinary annealed transparent float glass for general window glazing. Thickness as required by NZS 4223.
- 2.2 **TEXTURED, PATTERNED OR OBSCURE GLASS**
Translucent, annealed, rolled glass with a decorative pattern on one surface.
- 2.3 **LAMINATED GLASS**
Grade A Safety Glass to AS/NZS 2208 with PVB or CIP resin interlayer.

Materials, mirrors

- 2.4 **MIRROR GLASS**
Clear annealed mirror float glass, including silver, activation, passivation and two protective coats.
- 2.5 **SAFETY MIRROR GLASS**
4mm, 5mm and 6mm annealed float glass mirror vinyl back safety glazing material to AS/NZS 2208.

Materials, screens

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

Components, aluminium glazing

- 2.7 **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.
- 2.8 **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

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

3. EXECUTION

Conditions

- 3.1 **GENERAL REQUIREMENTS**
To NZS 4223, Parts 1, 3 and 4 with all external glazing is 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, 3 and 4.

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 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.

Application aluminium

- 3.11 **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.

- 3.12 **INSTALL SAFETY GLASS**
To NZS 4223.3, as modified by NZBC F2/AS1.

Application - mirrors

- 3.13 **MIRRORS, ADHESIVE FIXED**
Fix with adhesive mirror-mastic and double-sided adhesive tape. Adhesive mastic area 0.25 m² per 1 m² of mirror.

Application miscellaneous

- 3.14 **INSTALL GLASS SCREENS**
Install shower and bath screens and doors to manufacturer's requirements.

Finishing

- 3.15 **SAFETY**
Indicate the presence of transparent glass for the remainder of the construction period, with whiting, tape or signs compatible with the glass type.

3.16 **MANIFESTATIONS**
To NZS 4223.3, clause 303.1 Manifestation (making glass visible).

Completion

3.17 **TRADE CLEAN**
Clean off or remove safety indicators at completion of the building.

3.18 **REPLACE**
Replace damaged, cracked or marked glass.

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

3.20 **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 or acoustic insulation.

1.1 RELATED SECTIONS

Refer to CONCRETE for insulation under concrete slabs.

Refer to WRAPS, UNDERLAYS AND DPC for building wraps and roofing underlays.

Refer to ROOFING sections for roofing underlays.

1.2 DOCUMENTS REFERRED TO

Documents referred to in this section are:

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

Documents listed above and cited in the clauses that follow are part of this specification.

However, this specification takes precedence in the event of it being at variance with the cited document.

1.3 ABBREVIATIONS

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

BIB Building Insulation Blanket

NZCEP New Zealand Electrical Code of Practice

EPS Expanded polystyrene sheets

Requirements

1.4 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 (BIB)

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

2.3 WIRE NETTING

Galvanized hexagonal 50mm mesh from 1mm steel wire to AS/NZS 4534.

Components

2.4 NAILS, NETTING AND PAPER

Galvanized steel clouts, 25mm gauge.

2.5 STAPLES

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

2.6 TAPES

Proprietary plastic tape, stapled across framing to retain insulation in unlined wall and ceiling locations.

2.7 ADHESIVE TAPE

Pressure sensitive adhesive tape.

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, building papers and vapour barriers are in place.

Application

3.6 INSTALL INSULATION - GENERAL

Lay, install, fit and fix to NZBC H1/AS1: Energy efficiency, 2.0 Building thermal envelope, and to the insulation manufacturer's requirements. Install in housing to NZS 4218 and NZS 4246.

3.7 WIRE NETTING TO SUBSTRATE

Lay at right angles across the rafters/roof joists. Pull tight and temporarily fix. Tie edges of netting together with galvanized wire clips.

3.8 LAY WIRE NETTING

Lay at right angles across the purlins with enough slack to allow insulation to retain its nominal thickness between. Tie edges of netting together with galvanized wire clips.

3.9 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.

3.10 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

3.11 CLEAN UP

Clean up as the work proceeds, so no spare offcuts or any other matter or item remain behind claddings or linings.

3.12 CHECK FOILS

Ensure foils are dry, clean, bright, undamaged and free of debris before being covered.

- 3.13 CHECK WALL WRAPS AND ROOF UNDERLAYS**
Ensure these are dry, clean, undamaged and free of debris before being covered.
- 3.14 CHECK VAPOUR BARRIERS**
Ensure these form one homogeneous sheet vapour barrier and remain as such throughout the ensuing construction process.
- 3.15 LEAVE**
Leave work to the standard required by following procedures.
- 3.16 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
- superior finish quality systems
- bracing systems
- fire rated garage boundary wall systems
- wet area systems

1.1 ABBREVIATIONS

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

AWCINZ Association of Wall and Ceiling Industries New Zealand

Documents

1.2 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	

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

1.3 MANUFACTURER'S DOCUMENTS

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

- GIB® Site Guide (May 2006)
- GIB Aqualine® Wet Area Systems (March 2007)
- GIB® Ezybrace Systems (April 2009)
- GIB® Goldline™ Platinum Tape-on Trims

BRANZ Appraisal 294 - GIB® Ezybrace Systems
BRANZ Appraisal 427 - GIB Aqualine® Wet Area Systems
BRANZ Appraisal 97/008 - Standard 10 and 13mm GIB® plasterboard

Copies of the above literature are available at

Web: www.gib.co.nz
Telephone: 0800 100 442

Requirements

1.4 NO SUBSTITUTIONS

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

1.5 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

- 1.6 **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.
- 1.7 **FIRE RATING REQUIREMENTS**
 Provide the GIB® fire resistant rated garage boundary wall systems. Refer to drawings for system/FRR.
- 1.8 **BRACING REQUIREMENTS**
 Provide braced wall systems using GIB® Ezybrace Systems to meet the requirements of NZS 3604 when tested to BRANZ Technical paper P21. Refer to drawings for location and type.

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 Fyrelite® fire resistant plasterboard
 GIB Braceline® wall bracing plasterboard
 GIB Aqualine® wet area plasterboard

Components

- 2.2 **CEILING BATTENS**
 Timber ceiling battens and perimeter channel.
- 2.3 **SCREWS**
 GIB® Grabber® drywall screws.
- 2.4 **NAILS**
 GIB® Nails (gold passivated).
 Size: 30mm, 40mm
- 2.5 **METAL ANGLE TRIMS**
 GIB® galvanized steel slim angle trims.
- 2.6 **CONTROL JOINTS**
 GIB® Goldline™ tape-on trims
- 2.7 **TAPE ON TRIMS AND EDGES**
 GIB® Goldline™ tape-on trims

Accessories

- 2.8 **ADHESIVE**
 Timber frame and/or steel frame:
 GIBFix® One ultra low VOC water based wallboard adhesive
 GIBFix® All-Bond solvent based wallboard adhesive
- 2.9 **JOINTING COMPOUND**
 Bedding compound: GIB Tradeset®, GIB Lite Blue®, GIB(r) MaxSet®, GIB ProMix® All Purpose, GIB Plus 4®

Finishing compound: GIB ProMix® All Purpose GIB ProMix® Lite, GIB® U-Mix,
GIB Plus 4®, GIB® Topcoat
Cove: GIB-Cove® Bond

- 2.10 JOINTING TAPE
GIB® paper jointing tape.
- 2.11 ACOUSTIC SEALANT
GIB Soundseal® ultra low VOC water based highly flexible acoustic sealant.
- 2.12 GAP FILLER
GIB® Gap Filler ultra low VOC multi-purpose acrylic flexible filler
- 2.13 MOULD RESISTANT SEALANT
GIB® Aquaseal ultra low VOC mould resistant water based silicone sealant

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.
- 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.
- 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.
- 3.6 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

- 3.7 INSTALL CEILING BATTENS
Install to Timber Ceiling Batten Systems.
- 3.8 LINING WALLS AND CEILINGS GENERALLY
Form to GIB® Site Guide. Ensure bulk insulation thickness shall not exceed that of the wall framing.

- 3.9 **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.
- 3.10 **FORM WET AREA SYSTEMS**
Form to GIB Aqualine® Wet Area Systems.
- 3.11 **FORM BRACING SYSTEMS**
Form to GIB® Ezybrace Systems.
- 3.12 **FORM CONTROL JOINTS**
Form control joints to GIB® Site Guide.
- 3.13 **INSTALL TAPE-ON TRIMS**
Install to GIB® Goldline™ Tape-on trims literature .

Finishing

- 3.14 **FINISHING GENERALLY**
To GIB® Site Guide and AS/NZS 2589.

Completion

- 3.15 **REPLACE**
Replace damaged sheets or elements.
- 3.16 **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.
- 3.17 **REMOVE**
Remove debris, unused materials and elements from the site.
- 3.18 **LEAVE**
Leave work to the standard required by following procedures.

4. SELECTIONS

- 4.1 **GIB DRY ZONE®**
To apply in the areas shown on the drawings or as scheduled. Refer to **GIB Aqualine® Wet Area Systems book (October 2002 v2)**

Wall lining - painted areas

Wall lining: 1 layer 10 mm GIB Aqualine®
Fixing: 25 mm GIB® Grabber™ screws
Adhesive: GIBFix® Wood Bond or GIB Fix® All Bond adhesive

Wall lining - tiled shower areas

Lining: 10 mm GIB Aqualine®
Fix horizontally where weight of tiles does not exceed 32 kg/m².
Fixing: 32 mm GIB® Grabber™ screws (No adhesive fixing)
Note: Wall Tile adhesive **over** waterproofing membrane including splash areas

Waterproof membrane systems - tiled areas

Meet the requirements of AS/NZS 4858.

Skirtings

Floor coverings covered minimum 75 mm high

Laundry drier/kitchen range hood

Vented to exterior

Paint systems

Walls

1 st coat:	Resene Sureseal alkyd primer
2 nd coat:	Resene Lustacryl water-based enamel (semi-gloss)
3 rd coat:	Resene Lustacryl water-based enamel (semi-gloss)

Ceilings

1 st coat:	Resene Sureseal alkyd primer
2 nd coat:	Resene Lustacryl water-based enamel (semi-gloss)
3 rd coat:	Resene Lustacryl water-based enamel (semi-gloss)

Trims

1 st coat:	Resene Sureseal alkyd primer
2 nd coat:	Resene Lustacryl water-based enamel (semi-gloss)
3 rd coat:	Resene Lustacryl water-based enamel (semi-gloss)

5230 INTERIOR DOORS

1. GENERAL

This section relates to the supply and installation of interior doors.

1.1 RELATED SECTIONS

Refer to GLAZING for glass type and thickness

1.2 DOCUMENTS

Documents referred to in this section are:

NZS 3602	Timber and wood-based products for use in building
NZS 3604	Timber framed buildings
NZS 3610	Specification form profiles of mouldings and joinery

2. PRODUCTS

2.1 TIMBER

To NZS 3602.

2.2 INTERIOR DOORS, TIMBER VENEER

Solid/hollow core doors as scheduled complete with matching 6mm clashing strip to both sides and to the exposed edge of cavity slider doors.

2.3 INTERIOR CAVITY SLIDER

Solid/hollow core door hung within a proprietary cavity slider frame and complete with brand-matched sliding door gear.

2.4 DOOR HINGES

Size and gauge to carry door. 3 hinges per door.

2.5 INTERIOR SLIDING DOOR GEAR

To suit door/sash size and glazed weight and as detailed.

3. EXECUTION

3.1 SITE MEASURE

Confirm framed openings on site for dimension, plumb and straightness prior to fabrication or ordering of timber joinery. Confirm lintel head and sill deflection for sliding or bi-fold door systems is within the manufacturer's specified tolerances. Provide not less than 10mm unless otherwise required.

3.2 EXECUTION GENERALLY

Manufacture to the methods, practices and processes contained in the unit standards for the National Certificate in Carpentry and the National Certificate in Joinery (cabinetry, exterior joinery, stairs).

3.3 FACTORY FIT HARDWARE

Factory fit the following where specified: -

- Hinges

3.4 FACTORY FINISHING

Before delivery to site: -

- Brace square and provide protection to assemblies during delivery to site. Where factory glazed, indicate the presence of transparent glasses with whiting, tape or signs compatible with the glass type.

Internal doors

3.5 INTERNAL JOINERY FRAMES

Fabricate as detailed. Wedge and rigidly fix in place without distortion, plumb, and true to line and face. Pre drill for fixings through frame. Countersink and plug frames scheduled for clear finish.

- 3.6 **INTERNAL DOOR LINERS, EXTENDED**
Heads and jambs finished 30mm, rebated for wall linings and extended a minimum of 10mm. 10mm planted door stops. Hang doors on hinges, sliding and bi-fold gear to the door manufacturer's requirements and to operate freely. Countersink and plug frames scheduled for clear finish. Fit hardware.
- 3.7 **INTERNAL CAVITY SLIDERS**
Install in accordance with the door manufacturer's requirements, allowing for removal of top trim for maintenance.
- Completion**
- 3.8 **CHECK**
Check and adjust operation of all sashes, doors, hardware and furniture.
- 3.9 **TEMPORARY PROTECTION**
On completion remove any temporary protection and leave ready for following work.

5510 JOINERY AND PROPRIETARY FIXTURES

1. GENERAL

This section relates to custom joinery fixtures and proprietary fixtures including:-

- fabrication, including off site finishing and installation of cabinetwork and joinery items
- assembly, placing, installation of proprietary fixtures
- fitting out of specialty spaces and cupboards

1.1 DOCUMENTS

Documents referred to in this section are:

- AS/NZS 1859.2 Reconstituted wood based panels - Dry processed fibreboard
- AS/NZS 1860.1 Particleboard flooring - Specifications
- NZS 3602 Timber and wood-based products for use in building

2. PRODUCTS

2.1 TIMBER BOARDS AND FRAMES

Carefully sawn to minimise the inherent warping, twisting and bowing of the selected species and to give a finish suitable for clear finishing.

2.2 MEDIUM DENSITY FIBRE BOARD

Urea-formaldehyde resin bonded wood fibre sheet to AS/NZS 1859.2.

2.3 MEDIUM DENSITY FIBRE BOARD, MELAMINE

Urea-formaldehyde resin bonded wood fibre sheet to AS/NZS 1859.2 overlaid both sides with melamine resin impregnated sheet.

2.4 BACKING BOARD

Urea-formaldehyde resin bonded very fine wood fibre sheet to AS/NZS 1859.2.

2.5 PRE-FINISHED BACKING BOARD

Urea-formaldehyde resin bonded fine wood fibre sheet to AS/NZS 1859.2, veneered one side with melamine sheet.

2.6 BENCHTOPS

As detailed on the drawings and as required for specified fittings and appliances.

2.7 CARCASE CONNECTORS

One-piece steel, straight deep-cut thread, fibre board screws with press fit plastic trim cap or tight joint connectors.

2.8 CARCASE FASTENERS

Knock down type centric sphere zinc alloy connectors with connecting bolts, sleeves and dowels, to suit each particular fastening location.

2.9 BUTT HINGES

Butt, broad butt, flush butt or overlay, steel, zinc-plated steel, stainless steel, or brass, to suit the location, or as detailed.

2.10 CONCEALED HINGES

All-metal zinc alloy with automatic spring and screw-fixed. Plastic button door stops.

2.11 DRAWER RUNNERS

Single action under mounted or side mounted powder coated runners or groove mounting type, precision running ball-mounted single-stage extension, bright steel finish system.

2.12 GLUES AND ADHESIVES

As approved by the manufacturer for the timber, timber product, or pre-finished timber product joint being used.

2.13 MEDIUM DUTY COATING SYSTEM

Two pack, clear or pigmented acid catalysed coating.

3. EXECUTION

3.1 JOINERY FIXTURES GENERALLY

Execution to include those methods, practices and processes contained in the current syllabus for the National Certificate in Carpentry and the National Certificate in Joinery (cabinetry, exterior joinery, stairs). Take responsibility for the completed joinery fixtures including fittings included within fixtures and the on site installation.

3.2 SITE MEASURE

Site check and confirm dimensions after wall linings have been fixed. Verify positions of electric power outlets, wiring to light fittings included in joinery fixtures, water supplies and waste pipe locations.

3.3 FABRICATION QUALITY

Carry out machining within the practices required for the particular timber, wood product or pre-finished wood product being used. Machine drill and cut holes and recesses and form joints to the componentry manufacturer's requirements. Ensure work is accurate, square and true to line and face.

3.4 FABRICATE JOINERY FIXTURES

Carry out jointing, dowelling and other operations necessary for the proper assembly of the fittings as detailed, with fixings concealed unless otherwise detailed. Use glue joints where provision for shrinkage is not required, with contact surfaces, glueing and pressure all applied to the glue manufacturer's requirements. Locate and drive connectors and fasteners to the bolt manufacturer's requirements. Scribe fit adjustable shelves with 4 shelf pins and locate force fit pin holes at 50mm maximum centres in solid cheeks. Hang doors on concealed hinges.

3.5 MAKE CUT OUTS FOR APPLIANCES AND FITTINGS

Obtain fitting templates from the appliances and other fittings to be installed within joinery fixtures and bench tops. Ensure appliances and fittings can be installed with the required tolerances and clearances. Where bench tops are being provided under other work sections, provide templates and confirm dimensions to others.

3.6 FABRICATE DRAWERS

Construct drawers as detailed, using proprietary metal section drawer runners. Fit drawers with 3mm clearance into the drawer space.

3.7 TRANSIT AND DELIVERY

Load, transport and unload fittings without distortion or damage and keep covered to protect from the weather. Do not deliver fittings until floor, wall and ceiling surfaces are in place and the fittings can be placed in their final location.

3.8 ASSEMBLE PROPRIETARY ITEMS

Check all components are included. Assemble to manufacturer's instructions and to achieve finished item.

3.9 INSTALL JOINERY FIXTURES

Scribe fit on site and install level, square, plumb and true to line and face.

3.10 WARDROBE AND COAT CUPBOARD

Fit out with 300mm or 250mm wide plastic coated wardrobe system.

3.11 STORAGE CUPBOARD

Fit out with 400mm wide plastic coated system.

3.12 LINEN CUPBOARD

Fit out with 500mm wide plastic coated system.

3.13 COATING SYSTEM, PREPARATION

- Fill timber defects with proprietary wood filler. (e.g. cracks, holes, etc)
- Sand timber to a smooth even finish using 180 grit paper.

- Remove all sanding dust using air guns and tack rags.
- Ensure substrate is free from dust, grease, dirt and other contaminants.
- Ensure moisture content of the timber is less than 15% immediately before commencing coating operations.

3.14

COATING SYSTEM, APPLICATION

To coating manufacturer's requirements.

6411 VINYL SURFACING

1. GENERAL

This section relates to the supply and installation of:

- PVC sheet including skirtings, trims and edgings.

Documents

1.1 DOCUMENTS REFERRED TO

Documents referred to in this section are:

NZBC D1/VM1	Access routes
NZBC D1/AS1	Access routes
NZS/AS 1884	Floor coverings - Resilient sheet and tiles - Laying and maintenance practices
AS/NZS 4586	Slip resistance classification of new pedestrian surface materials
BRANZ BU 330	Thin flooring materials - 2 Preparation and laying

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

Requirements

1.2 QUALIFICATIONS

Vinyl laying to be carried out by competent, experienced layers familiar with the materials and techniques specified.

Warranties

1.3 WARRANTY

Warrant this work under normal environmental and use conditions against failure.

Warrant period - materials: 1 year

Warrant period - execution: 1 year

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

Performance

1.4 SLIP RESISTANCE FOR ACCESS ROUTES

Slip resistance for vinyl to comply with NZBC D1/AS1: 2.1, Level access routes and 3.1: Ramps.

- when in place on a level access route, to have a mean coefficient of friction (μ) not less than 0.4 when tested in accordance with AS/NZS 4586 Slip resistance classification of new pedestrian surface materials.
- when in place on a sloping access route, to have a coefficient of friction (μ) not less than $0.4 + 0.0125S$ (S = slope of surface expressed as a percentage).

1.5 PROVIDE EVIDENCE

Provide evidence that the vinyl complies with the standard of performance specified.

1.6 CERTIFY

Provide certificates and any other evidence at the time of selection/supply that the vinyl complies with NZBC D1/VM1 and NZBC D1/AS1: Access routes.

2. PRODUCTS

Materials

2.1 VINYL SHEET

High vinyl content homogeneous monolayer flexible PVC sheet flooring.

- 2.2 **COVINGS**
Domestic applications: Pencil or fillet cove method.
- 2.3 **WALL AND FLOOR VINYL JOINING STRIP**
White PVC floor to wall finishing strip.
- 2.4 **TRIMS AND EDGING**
PVC as supplied by the sheet manufacturer to complete the work.

Accessories

- 2.5 **ADHESIVE**
Standard acrylic adhesive to suit the material and substrate and to the vinyl manufacturer's requirements.
- 2.6 **PRIMER AND SEALER**
To the adhesive manufacturer's requirements for the particular substrate.

3. EXECUTION

Conditions

- 3.1 **STORAGE**
Maintain rolls of sheet, packages of tiles and accessories undamaged and dry. Store rolls upright with other material on level surfaces in non-traffic, non-work areas that are enclosed, clean and dry.
- 3.2 **HANDLING**
Avoid distortion, stretching, marking and damage to edges while shifting, unrolling and handling sheet, tiles and accessories. Inspect for any faulty material. Do not use faulty or damaged material.
- 3.3 **BEFORE COMMENCING WORK**
Ensure that the building is enclosed, wet work complete, doors hung and lockable, finishes and trim complete, and good lighting available, before starting work.
- 3.4 **INSPECT**
Inspect the substrate to ensure it is of the standard required for work in this section.
- 3.5 **LAYING**
Carry out the whole of the work to NZS/AS 1884, BRANZ BU 330 and to the flooring manufacturer's requirements.
- 3.6 **LAYOUT**
Before beginning the installation confirm the proposed layout of material, location of seams and other visual considerations of the finished work.

Preparing substrate

- 3.7 **NEW CONCRETE**
Clear substrate of debris, clean off surface contamination and carry out surface repairs using a proprietary levelling compound. Carefully feather out at perimeters of repaired areas. Grind level, then vacuum to remove all dust. Check for moisture content by hygrometer to BRANZ BU 330 and do not commence laying vinyl until readings for the whole area show 75% relative humidity or less.

Vinyl floor laying

- 3.8 **PREPARATION**
Check that each colour supplied is from the same batch. Follow the vinyl manufacturer's requirements for conditioning of rolls and the working temperatures and conditions

before, during and after laying. Protect work from solar heat gain and switch off under-floor heating during and for 48 hours either side, of the work period.

3.9 ADHESIVE APPLICATION

Apply approved adhesive as required by the vinyl manufacturer and without trowel marks after setting. Follow requirements for open time, taking note of substrate porosity, ambient temperature and relative humidity. Remove excess adhesive as the work proceeds using required techniques.

3.10 LAYING VINYL SHEET

Roll out, cut, leave to condition and install sheet vinyl to the vinyl manufacturer's requirements. Ensure there are no air bubbles or twisting, that the seams are kept clear of adhesive, and immediately the sheet is adhered roll with a 68 kg roller.

3.11 THERMO-WELDING VINYL SHEET

Machine groove and thermo-weld all seams in specified areas, heating the sheet and weld rod to a sufficient temperature to melt and fuse them together into a single mass. Trim the weld to leave a smooth, flush surface with the sheet.

3.12 CROSS JOINS

Plan and allow cuts to avoid cross joins. Obtain written approval of the owner before proceeding if cross joins are unavoidable. Cross joins are not acceptable in wet areas.

3.13 COVE VINYL

Pencil cove flooring to the specified height and finish off as detailed.

3.14 MITRES

Perform butterfly method to internal and external mitres. Thermo-weld mitres.

3.15 FIT VINYL SKIRTINGS

Fit skirtings in accordance with the skirting manufacturer's requirements.

3.16 FIT VINYL EDGING

Fit tapered vinyl edging to all borders, except where abutting carpet.

3.17 CLEAN

Leave vinyl flooring surfaces free of adhesive, dirt and debris. Vacuum off, damp mop with a low foam neutral detergent, with a pH level of 7 to 8. Allow to dry and finally buff with a rotary machine using suitable pads at 300 rpm. Polymer polishes to be used only where approved by the vinyl manufacturer and accepted by the owner.

Completion

3.18 REPLACE

Replace damaged or marked elements.

3.19 CLEAN AND POLISH

Vacuum off, damp mop with a low foam neutral detergent, with a pH level of 7 to 8. Allow to dry and finally buff with a rotary machine using suitable pads at 300 rpm. Use polymer polishes only where approved by the manufacturer. Leave vinyl flooring surfaces free of adhesive, dirt and debris and to the standard required by following procedures.

3.20 REMOVE

Remove debris, unused materials and elements from the site.

3.21 PROTECT

Protect completed work from damage for the period between completion of laying and completion of the contract works.

6700 PAINTING GENERAL

1. GENERAL

This section relates to the general matters related to painting work

Documents

1.1 DOCUMENTS REFERRED TO

Documents referred to in this section are:

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	

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.

1.2 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

Requirements

1.3 NO SUBSTITUTIONS

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

1.4 QUALIFICATIONS

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

1.5 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.

1.6 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.

- 1.7 **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

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

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

Performance

- 1.9 **MANUFACTURER'S INSPECTION**
Allow the paint manufacturers to inspect the work in progress and to take samples of their products from site if requested.
- 1.10 **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

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

Preparation - unpainted linings

3.20 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.

3.21 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

3.22 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.

3.23 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.

3.24 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.

Preparation - painted surfaces in good condition

3.25 PREPARING SURFACES
Wash down surfaces with either:
- a chlorine based solution; or
- 5-10 millilitres of ordinary household detergent to 1 litre of warm water; or
- a solution of 30 grams of trisodium phosphate to 1 litre of water
Replace solutions frequently and finally wipe over a second time with a clean absorbent cloth.

For surfaces containing heavy smoke and grease deposits, wash down with either:

- mineral turpentine; or
- a 5% solution of ammonia; or
- a 1:40 solution of sugar soap and water

as necessary to remove the deposits. Wipe over with a clean absorbent cloth.

Prepare coatings which have chalked by sanding, brushing, waterblasting or other methods as appropriate.

Lightly sand glossy surfaces to ensure good adhesion of the coatings.

Preparation - painted surfaces in poor condition

3.26 PREPARING PAINTED TIMBER

Completely remove blistered, flaked, excessively chalked and cracked (due to exposed end grain and knots) paint to give a sound base for repainting. Scrape out damaged or decayed timber and where the area is extensive, arrange to cut out and replace with treated timber, primed (including end grain) before fixing.

Scrape clean loose or soft material, holes and depressions in timber due to damage or defects such as resin or gum pockets, knot holes and surface splits. Remove and replace sprung or loose corroded nails.

Where necessary strip paint back to the original timber surface, using the most appropriate of the following methods:

- burning off using a blowtorch to soften paint without charring, before scraping off with a broad knife
- using an electrically heated hot air stream to soften paint, before scraping off with a broad knife
- sanding using orbital and/or belt sanders
- paint removers used to the manufacturer's requirements
- hand scraping.

Follow OSH guidelines for minimising the hazards of stripping.

3.27 PREPARING PAINTED GYPSUM PLASTER

Remove flaked paint completely from powdery, loose and other unsatisfactory plaster surfaces. Treat powdery surfaces with a solution of 150 millilitres of concentrated phosphoric acid and clean water to make 1 litre. Apply the solution, allow to stand 10 minutes and wash down with clean water. Remove loose, weak and drummy plaster and replaster. Allow to cure before proceeding with coatings as for unpainted work.

Confirm that the cause of any efflorescence has been eliminated before wiping it away with a dry rag and making good the damaged surface.

Fill small cracks and damaged surfaces with gypsum plaster or cellulose gypsum compound to just proud of the surface and lightly sand smooth and flush when dry.

3.28 PREPARING PAINTED PLASTERBOARD AND FIBROUS PLASTER

Fill cracks, pores, irregularities and damaged surfaces with the appropriate filler to the paint manufacturer's requirements, trowelled smooth, allowed to dry and lightly sanded to a smooth flush surface. Treat any staining of paint films on plaster as required by the coating manufacturer.

Application - before applying final coatings

3.29 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.

- 3.30 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.
- 3.31 CONCEALED JOINERY SURFACES**
Apply off-site coatings to all surfaces including those which will be concealed when incorporated into the building.
- 3.32 CONCEALED METAL SURFACES**
Apply primer to suit the coating system to all metal surfaces which will be concealed when incorporated into the building.
- 3.33 DOORS**
Prime or seal and paint all six faces of doors before hanging.
- 3.34 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.
- 3.35 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**
- 3.36 PAINTING GENERALLY**
Comply with the paint manufacturer's requirements and any additional requirements in this specification.
- 3.37 MIXING**
Thoroughly mix paints. Lift any settled pigment and ensure the paint is homogenous.
- 3.38 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
- 3.39 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
- 3.40 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.
- 3.41 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.

- 3.42 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.
- 3.43 DEFECTIVE WORK**
Correct defective work immediately and re-coat as required, following precisely the paint system specified.
- 3.44 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**
- 3.45 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.
- 3.46 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.
- 3.47 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.
- 3.48 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.
- 3.49 REPLACE HARDWARE**
Replace hardware without damage to it or the adjoining surface. Leave properly fitted and in working order.

6751 WALLPAPER FINISHES

1. GENERAL

This section relates to linings adhered to walls:

- papers
- paper-backed PVC
- lining paper

Requirements

1.1 QUALIFICATIONS

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

2. PRODUCTS

Materials

2.1 PAPER BACKED PAPER

Pre-pasted, pre-trimmed.

2.2 LINING PAPER

Plain, off-white.

Accessories

2.3 SIZE

PVA type size or the specified adhesive thinned, both to the wall covering manufacturer's requirements.

2.4 SEALER

Alkaline resistant pigmented, applied to the wall covering manufacturer's requirements.

2.5 PRIMER

Alkaline resistant oil base, applied to the wall covering manufacturer's requirements.

2.6 ADHESIVE, PAPER ON PAPER

To the wall covering manufacturer's requirements.

2.7 ADHESIVE, PAPER BACKED VINYL

To the wall covering manufacturer's requirements.

3. EXECUTION

Conditions

3.1 STORE MATERIALS

Store materials on site. Protect from discoloration, staining and damage.

3.2 SUBSTRATE

Ensure that backgrounds and adjoining surfaces, after the preparation called for in this section, will allow work of the required standard.

3.3 COMMENCEMENT

Do not start this work until the building is enclosed, doors are hung and lockable, wet work is complete and a well lit, dust free environment is available.

3.4 FIXTURES

Remove cover plates, light fittings and other fixtures as the work proceeds. Replace plumb, square and true to line and face as the work is completed.

Application - preparing new surfaces

- 3.5 **PREPARING PLASTERBOARD**
Check to ensure that joints and stopping are prepared to a smooth finish and are dry and dust free. Seal with a solvent thinned or water based wallboard sealer to the wall treatment manufacturer's requirements.
- 3.6 **PREPARING FIBROUS PLASTER**
Check to ensure that joints and stopping are prepared to a smooth finish, are free of excessive amounts of release and other agents and are dry and dust free. Seal with a wallboard sealer to the wall treatment manufacturers requirements.
- 3.7 **PREPARING GYPSUM PLASTER**
Treat and fill any cracks and crevices. Treat powdery surfaces with a phosphoric acid solution. Replaster 'drummy' areas. Ensure surfaces are smooth, dry and dust free. Seal with a wallboard sealer to the wall treatment manufacturers requirements.

Application - hanging

- 3.8 **CHECK SHADING**
Use only rolls from the same batch number in any one area. Check each drop for colour match before hanging. Reverse alternate drops only if required by the manufacturer.
- 3.9 **CHECK PATTERN**
Before beginning hanging, confirm the set-out for each area and review any mismatch location. Correctly align and accurately match patterned papers. Use only full length drops.
- 3.10 **APPLY ADHESIVE**
Apply adhesives to the wall covering manufacturer's requirements for location, method and timing before hanging. Keep surfaces free of adhesive and remove any surplus immediately as the work proceeds, to avoid surface damage.
- 3.11 **PAPER JOINTS**
Hang drops vertically with butt joints tight fitting, flush and not obviously visible. Do not overlap joints.
- 3.12 **TRIM EDGES**
Trim neatly to a true line and edge where edges meet other material or surfaces.

Completion

- 3.13 **REPLACE**
Replace damaged or marked elements.
- 3.14 **LEAVE**
Leave work secure and smooth and free of air bubbles, wrinkles, gaps, stains and blemishes and to the standard required by following procedures. Clean adjoining surfaces of any adhesive.
- 3.15 **REMOVE**
Remove debris, unused materials and elements from the site.

7120 HOT AND COLD WATER SYSTEM

1. GENERAL

This section relates to potable water supply connection to the project, and the installation of hot and cold water supply pipework, hot water cylinders and isolation valves.

Related work

1.1 RELATED SECTIONS

Refer to 7151 SANITARY FIXTURES, TAPWARE & ACCESSORIES for sanitary fixtures and tapware selections.

1.2 DOCUMENTS

Documents referred to in this section are:

NZBC B2/AS1	Durability
NZBC G12/VM1	Water supplies
NZBC G12/AS1	Water supplies
NZBC H1/AS1	Energy Efficiency
AS/NZS 2642.1	Polybutylene (PB) plumbing pipe systems - Polybutylene (PB) pipe extrusion compounds
AS/NZS 2642.2	Polybutylene pipe fittings Polybutylene pipe systems - Polybutylene (PB) pipe for hot and cold water applications
AS/NZS 2642.3	Polybutylene pipe systems - Mechanical jointing fittings for use with polybutylene pipes for hot and cold water applications
AS/NZS 2845.1	Water supply - Backflow prevention devices - Materials, design and performance requirements
AS/NZS 3500.5	National plumbing and drainage - Domestic installations
NZS 3501	Specification for copper tubes for water, gas and sanitation
NZS 4617	Tempering (3-port mixing) valves
Plumbers, Gasfitters and Drainlayers Act 2006	

1.3 QUALIFICATIONS

Plumbers to be experienced competent workers, familiar with the materials and the techniques specified. Carry out all work under the direct supervision of a certifying plumber under the Plumbers, Gasfitters and Drainlayers Act 2006.

Warranties

1.4 WARRANTY

Warrant this work under normal environmental and use conditions against failure of materials and execution.

Warranty period: 2 years

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

2. PRODUCTS

2.1 COPPER PIPE

To NZS 3501 complete with copper-alloy compression fittings or cross type joints and seal ring compression joints complete with fittings and accessories brand matched to the pipe manufacturer's requirements with durability to NZBC B2/AS1 Durability, Table 1 and NZBC G12/AS1 Water supplies Table 1.

2.2 POLYBUTYLENE PIPE

Polybutylene tubing to AS/NZS 2642.1, AS/NZS 2642.2 and AS/NZS 2642.3 complete with fittings and accessories brand-matched with durability to NZBC B2/AS1 Durability, table 1 and NZBC G12/AS1 Water supplies table1.

2.3 WATER METER

To the requirements of the network utility operator.

- 2.4 **VALVES**
Pressure reducing or limiting valve, filter, non-return valve, cold water expansion valve, pressure relief or temperature valve, pressure relief valve and isolating valves to NZBC G12/AS1: Water supplies.
- 2.5 **BACKFLOW PREVENTION DEVICES**
Provide backflow prevention devices to AS/NZS 2845 where it is possible for water or contaminants to backflow into the potable water supply. Refer to NZBC G12/AS1 3.4 Backflow protection, and table 2, Selection of Backflow Protection.
- 2.6 **TEMPERING VALVE**
Tempering valve to NZS 4617 to NZBC G12/AS1: Water supplies.
- Materials - hot water heating appliances**
- 2.7 **ELECTRIC HOT WATER CYLINDER, MAINS PRESSURE**
To NZS 4305, ceramic-coated steel thermal storage cylinder, insulated and complete with required fittings.
Components
- 2.8 **INSULATION**
Pre-formed pipe sections complete with bends and fittings, with fixing tape to the manufacturer's requirements and to NZBC H1/AS1.
- 2.9 **PROTECTIVE TAPE**
Plasticised PVC tape system with primer, mastic fixing and outer coating.
3. **EXECUTION**
- 3.1 **HANDLE AND STORE**
Handle and store pipes, fittings and accessories to avoid damage. Store on site, under cover on a clean level area, stacked to eliminate movement and away from work in progress.

Store tapware in a shelved, dry and securely locked area. Retain tapware in the manufacturer's original packaging, complete with all fixings and installation instructions. Label each unit separately with its space/fixture number to match.
- 3.2 **EXECUTION GENERALLY**
Generally carry out the whole of this work and tests to NZBC G12/VM1 or G12/AS1: Water supplies.
- 3.3 **CORE HOLES AND SLEEVES**
Review location and fit core holes and sleeves as needed throughout the structure in conjunction with the boxing, reinforcing and placing of concrete. Strip core holes and make good after installation of pipework.
- 3.4 **CONCEAL**
Conceal pipework within the fabric of the building unless detailed otherwise. Satin finish chrome plate exposed work, complete with matching ferrule at the surface penetration.
- 3.5 **CORROSION**
Separate all metals subject to electrolytic action from each other and from treated timber, concrete and other lime substances by space, painting of surfaces, taping, or separator strips.
- 3.6 **THERMAL MOVEMENT**
Accommodate movement in pipes resulting from temperature change by the layout of the pipe runs, by expansion joints and by sleeving through penetrations.

- 3.7 **PIPE SIZE**
Flow rates to each outlet to be no less than those given in NZBC G12/VM1 or G12/AS1: Water supplies, table 3, Acceptable flow rates to sanitary fixtures. Pipe size as determined in table 4, Tempering valve and nominal pipe diameters.
- 3.8 **ELECTROLYTIC ACTION**
Avoid electrolytic action by eliminating contact or continuity of water between dissimilar metals.
- 3.9 **EXCAVATE**
Excavate for the water main to a firm, even trench base in straight runs. Allow to backfill.

Application - jointing

- 3.10 **JOINTING COPPER PIPE**
Braze pipe, fit alloy compression fittings, crox type joints and seal ring compression joints to NZBC G12/AS1: Water supplies.
- 3.11 **JOINTING POLYBUTYLENE PIPE**
Aluminium clamped, seal ring compression or push fit "O" ring seal jointing to pipe system manufacturer's requirements.

Application - pipework installation

- 3.12 **WATER SUPPLY CONNECTION**
Arrange with the network utility operator for a connection to the water main and from there through a water meter and gate valve. Provide back flow prevention to NZBC G12/AS1: Water supplies.
- 3.13 **POTABLE WATER SUPPLY PIPEWORK INSTALLATION**
From connection point, run pipes complete with all fittings, support and fixing, joints and install to manufacturers specifications. Size the pipes and branches in straight runs to deliver the acceptable flow rate to NZBC G12/VM1 or G12/AS1: Water supplies, table 3, Acceptable flow rates to sanitary fixtures at each outlet. Allow for the expected concurrent use of adjoining fixtures and size the piping layout to eliminate loss of pressure at any point by simultaneous draw-off. Pipework support spacing to be firmly fixed and buffered to eliminate noise and hammer, with preformed tee-connection take-offs and branches, with machine made 3 diameter bends, complete with necessary valves and fittings. Conceal pipework and pressure test before the wall linings are fixed.
- 3.14 **HOT WATER PIPEWORK**
Use a take-off spigot to give separate branches to each fitting, lay out pipes with support spacing to NZBC G12/VM1 or G12/AS1: Water supplies, table 7 Water supply pipework support spacing. Fix firmly and buffer to eliminate noise and hammer, with preformed tee-connection take-offs and branches, and preformed 3 diameter bends, complete with all necessary valves and fittings.

Lag all pipes with rigid insulation to the manufacturer's requirements and G12/VM1 or G12/AS1: Water supplies.
- 3.15 **EQUIPOTENTIAL BONDING**
Earth metallic water supply pipe and metallic sanitary fixtures to NZBC G12/AS1: Water supplies: 9.0.
- 3.16 **IN-LINE FILTER**
Install an in-line filter immediately adjacent to the main isolating valve at the point of entry to the building, in an accessible position to allow for easy cleaning.

Application - hot water systems

- 3.17 **INSTALLING HOT WATER PIPE INSULATION**
Insulate all hot water pipes to NZBC H1/AS1 Energy Efficiency, AS/NZS 3500.5, 3.11.7 Insulation of piping and to the insulation manufacturer's instructions. Cut insulation sections tight between timber framing and tight between the webs of steel studs.
- 3.18 **INSTALL ELECTRIC HOT WATER CYLINDERS**
Install where shown complete with all the necessary fittings to the cylinder manufacturer's requirements and in accordance with NZBC G12/AS1: 6.11. Valve-vented systems to NZS 4607.
- 3.19 **INSTALL HOT WATER CYLINDER OVERFLOW TRAY**
Install drained overflow tray to hot water cylinder to NZBC G12/AS1: Energy Efficiency.
- 3.20 **INSTALL TEMPERING VALVE**
Install 1 metre minimum from outlet of hot water cylinder and to manufacturer's instructions. Install copper pipework for 1 metre minimum downstream of tempering valve prior to connection of non-metallic pipework.
- 3.21 **PENETRATIONS**
Provide and fit collars and escutcheon plates to match the pipework at all penetrations through constructions.

Installation - valves

- 3.22 **INSTALLING BELOW GROUND ISOLATING VALVE**
Install all below ground items such as main isolating valves and water meters in preformed concrete pits or approved equivalent.
- 3.23 **INSTALLING APPLIANCE ISOLATING VALVES - CONCEALED**
Install isolating valves for appliances in accessible positions. Locate in adjacent cupboards and position to allow for easy connection and operation.
- 3.24 **INSTALLING BACKFLOW PREVENTION DEVICE**
Provide and install backflow prevention device as near as practicable to the potential source of contamination, and in an accessible position for maintenance and testing to AS/NZS 2845.3.

Completion

- 3.25 **LABEL**
Label all pipework with permanent adhesive markers at 3 metre minimum intervals.
- 3.26 **CLEAN IN-LINE FILTER**
Clean all in-line filters on completion of works.
- 3.27 **REPLACE**
Replace damaged or marked elements.
- 3.28 **LEAVE**
Leave work to the standard required by following procedures.
- 3.29 **REMOVE**
Remove debris, unused materials and elements from the site.

4. SCHEDULES

- 4.1 **WATER PIPE**
Brand Type Dux Secura
Material Polybutylene
Nominal Bore 20mm & 15mm
- 4.2 **HOT WATER PIPES**
Brand Type Polybutylene & Dux Secura

Inside Diameter

15mm & 20mm

7151 SANITARY FIXTURES, TAPWARE & ACCESSORIES

1. GENERAL

This section relates to the supply and installation of sanitary fixtures, tapware and sanitary accessories.

1.1 RELATED WORK

Refer to glazing section/s for frameless shower and bath screens not included in this section.

Refer to the electrical section/s for electrical connection of accessories.

Refer to 7123 HOT AND COLD WATER SYSTEM for hot water cylinders.

Refer to 7421 SANITARY SYSTEMS for the supply and fitting of waste disposal pipework

Documents

1.2 DOCUMENTS REFERRED TO

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

NZBC E3/AS1	Internal moisture
NZBC F2/AS1	Hazardous building materials
NZBC G1/AS1	Personal hygiene
NZBC G12/VM1	Water supplies
NZBC G12/AS1	Water supplies
NZBC G13/AS1	Foul water
AS/NZS 1730	Washbasins
AS/NZS 2023	Baths for ablutionary purposes
AS/NZS 3500.1	Plumbing and drainage - water services
AS/NZS 3500.2	Plumbing and drainage - sanitary plumbing and drainage
AS/NZS 3662	Performance of showers for bathing
NZS 4223.3	Glazing in buildings - Human impact safety requirements

Plumbers, Gasfitters and Drainlayers Act 2006

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

Requirements

1.3 QUALIFICATIONS

Plumbers to be experienced competent workers, familiar with the materials and the techniques specified. Carry out all work under the direct supervision of a Certifying Plumber under the Plumbers, Gasfitters and Drainlayers Act 2006.

1.4 SAMPLES

Submit samples on request of nominated tapware, along with the relevant manufacturers' technical literature for review.

1.5 SUPPLIER

A specialist in the supply of tapware, and employing experienced architectural representatives available to assist during the course of the installation.

2. EXECUTION

Conditions - sanitary fixtures

2.1 DELIVERY

Only deliver to the site fixtures or fittings that can be immediately unloaded into suitable storage or be placed for direct installation.

2.2 **STORAGE AND HANDLING**
Take delivery of and store components complete with protective casings and coverings in areas that are enclosed, clean and dry and where no work is being done. Remove protection only to the extent that will allow installation.

2.3 **QUALITY STANDARDS**
Installation work to comply with NZBC G1/AS1, NZBC G12/VM1, NZBC G12/AS1, NZBC G13/AS1 and the fixture manufacturer's requirements.

2.4 **SUBSTRATE**
Ensure substrate and fixings will allow work of the specified standard.

2.5 **CO-ORDINATION**
Do not proceed if the points of supply and drainage services do not match the points of the fixtures without force or distortion.

2.6 **INSTALLATION REQUIREMENTS**
Install to NZBC G1/AS1, NZBC G12/VM1, NZBC G12/AS1, NZBC G13/AS1, NZBC E3/AS1 and to the fixture manufacturer's installation requirements for each component.

2.7 **PROVIDE SUPPORT**
Confirm fixing points needed for each unit and provide solid blocking at each fixing bracket location.

Conditions - tapware

2.8 **RETAIN**
Retain tapware in the manufacturer's original packaging and ensure that units are complete with fixings and installation instructions. Label each unit separately with its fitting name and space number.

2.9 **STORE**
Store tapware packages in a shelved, dry and securely locked area. Provide supervision when the secure area is unlocked and packages and cartons are being distributed; signing off each package from the schedule as released.

Conditions - sanitary accessories

2.10 **RETAIN**
Retain fixtures, fittings and hardware in the manufacturer's original packaging and ensure that units are complete with associated fixings and installation instructions. Label each unit separately to match the submitted and approved schedule.

2.11 **PACKAGE**
Package fixtures, fittings and hardware units required in clear plastic and label each to match the drawings and the submitted schedule. Place packages in cartons selected for 'level', 'location', and/or 'sector' and label the packages and the cartons similarly.

2.12 **STORE**
Store items in a shelved, dry and securely locked area. Provide supervision when the secure area is unlocked and packages and cartons are being distributed; signing off each package from the schedule as released.

2.13 **INSPECTION**
Before starting the installation of proprietary items, check relevant spaces and wall and floor finishes for any condition that would not allow the proper installation of any unit. Do not proceed until such conditions have been remedied.

Installation - sanitary fixtures

- 2.14 **INSTALLING VITREOUS CHINA FIXTURES**
Install to NZBC G1/AS1: Part 3, G12/AS1, G13/AS1 and AS/NZS 3500.2. Carry out preparatory and assembly work, including connections to supply and drainage services and the application of slurries and sealants in sequence. Fit the toilet pan in position, plumb, level, flush and rigid without stressing the attachment points of the component.
- 2.15 **INSTALLING CISTERNS**
Fit firmly in place and connect the specified cisterns from the supply services through the flush pipes to the relative fixtures in the positions as detailed all plumb and level.
- Installation - Basins**
- 2.16 **INSTALLING WASHBASINS**
Install to NZBC G1/AS1, AS/NZS 1730. Set basins firmly to walls or vanities as detailed and to comply with NZBC E3/AS1. Connect through trap to the drainage system.
- 2.17 **INSTALLING VANITIES**
Install in accordance with the manufacturer's requirements. Seal top and upstand to wall surface to comply with NZBC E3/AS1.
- Installation - Showers**
- 2.18 **INSTALLING SHOWER FITTINGS**
Shower waste, mixer and rose to be install to NZBC G1/AS1 and to AS/NZS 3662.
- 2.19 **INSTALLING SHOWER CABINETS**
Install to NZBC G1/AS1 and to NZS 3662 and in accordance with cabinet manufacturer's details and requirements. Ensure that doors fit closely and accurately. Test for water egress around sides and base. Lining materials and finishes to comply with NZBC E3/AS1.
- 2.20 **INSTALLING SHOWER DOOR AND SCREEN**
Install to NZBC F2/AS1 and NZS 4223.3 and to the product manufacturer's requirements. Set units level, plumb and true to line and required location, with moving parts and actions freely and easily operating.
- Installation - Sinks**
- 2.21 **INSTALLING SINK BENCHES**
Install in accordance with manufacturer's/supplier's requirements. Connect to supply and drainage services.
- 2.22 **INSTALLING TUB UNITS**
Install in accordance with manufacturer's requirements. Connect to supply and drainage services.
- Installation - Miscellaneous**
- 2.23 **INSTALLING STAINLESS STEEL FIXTURES**
Carry out preparatory work and fit elements in position plumb, level, flush and rigid without stressing the attachment points in sequence. Connect to supply and drainage services.
- 2.24 **INSTALLING SANITARY FIXTURES & ACCESSORIES - PEOPLE WITH DISABILITIES**
Install fixtures to NZBC G1/AS1: Part 3 and Part 4 and to comply with the relevant layouts shown in Figures 5,6,7,8 and 9. Provide number of facilities in accordance with NZBC G1/AS1 tables 1, and 2.
- Application - tapware**
- 2.25 **GENERAL**
To AS/NZS 3500.1 and in accordance with the manufacturer's requirements. Maintain safe water temperatures to comply with NZBC G12/AS1.

Application - sanitary accessories

- 2.26 **INSTALLING ACCESSORIES**
Fit specified fittings firmly in place at required dimensions relative to floor and adjoining sanitaryware fittings, all plumb and level.
- 2.27 **LOCATE**
Locate units at heights and/or locations shown on the drawings, or as required to comply with NZBC G1/AS1. For any dimension not shown or known, request direction before proceeding.
- 2.28 **CUTTING AND FITTING**
Where cutting and fitting of the substrate is necessary for installing any unit, carry out this work before the painting or finishing of that surface. Remove any hardware when required for painting, placing it in the packaging or carton originally supplied and returning it to the secure store until ready for re-installation.
- 2.29 **INSTALLING UNITS**
Install each unit in accordance with the proprietary fixture manufacturer's requirements, using the templates and tools supplied or recommended by them. Set units level, plumb and true to line and required location, with moving parts and actions freely and easily operating. Do not make any modifications to supplied units.
- Completion**
- 2.30 **REPLACE**
Replace damaged or marked elements.
- 2.31 **PROTECTIVE COATINGS**
Leave fixtures, fittings and accessories clean and unblemished with stickers and protective coatings removed, with supply and drainage connections and all parts fully operating and working. Leave the whole of this work free of blemishes, undamaged and to the standard of finish required for following work.
- 2.32 **REMOVE**
Remove debris, unused materials and elements from the site.

7411 RAINWATER SPOUTING SYSTEMS

1. GENERAL

This section relates to rainwater disposal systems including spouting and downpipes:

- metal
- PVC

Documents

1.1 DOCUMENTS REFERRED TO

Documents referred to in this section are:

NZBC E1/AS1	Surface water
AS 1273	Unplasticised PVC (uPVC) downpipe and fittings for rainwater
MRM	NZ Metal roof and wall cladding - Code of practice

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.

1.2 ABBREVIATIONS AND TERMS

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

BMT	Base metal thickness
MRM	New Zealand Metal Roofing Manufacturers Inc
Spouting	Roof gutter bracketed off the roof edge or fascia.
Gutter	Internal gutter or gutter formed as integral part of the roof fabric.

Requirements

1.3 QUALIFICATIONS

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

Warranties

1.4 WARRANTY

Warrant this work under normal environmental and use conditions against:

3 years:	For weatherproofing by substandard workmanship:
From:	Commence the warranty from the date of completion of installation
Form:	Installers standard warranty form

Refer to the general section WARRANTIES for details of when completed warranty must be submitted.

1.5 WARRANTY - MATERIAL

Warrant this work under normal environmental and use conditions:

10 Years	For failure of coating adhesion
10 Years	For weatherproofing by material penetration

Form:	Manufacturer's standard warranty form
From:	Commence the warranty from the date of completion of installation

Refer to the general section WARRANTIES for details of when completed warranty must be submitted.

Performance

- 1.6 TEST
Test the completed rainwater disposal system with water to ensure spoutings are laid to correct falls, that both spouting and downpipes are unobstructed and that no ponding occurs in spoutings.

2. PRODUCTS

Materials - fascia/barge system

- 2.1 EXTERNAL FASCIA/BARGE SPOUTING SYSTEM
Fascia/barge type complete with jointing, brackets, fittings and accessories, brand matched and complete to the manufacturer's requirements. Refer to DRAWINGS for type.

Components

- 2.2 FASTENERS GENERALLY
Minimum Class 4 durability and not less than the roofing material being fixed.
- 2.3 RIVETS
Sealed aluminium, minimum diameter 4mm.
- 2.4 SEALANT
MS Polymer sealant.

3. EXECUTION

Conditions

- 3.1 HANDLE AND STORE
Handle and store downpipes, spouting and accessories to avoid damage. Store on site under cover, on a clean level area, stacked to eliminate movement and away from work in progress. Avoid exposure to sunlight if strippable film is still on the product.
- 3.2 SUBSTRATE
Check that fascias, barges or cladding are level and true to line and face and will allow work of the required standard without distortion to the product alignment. Do not proceed until they are up to standard.
- 3.3 THERMAL MOVEMENT
Make adequate provision in the fixing and jointing of the spouting for thermal movement in the length of the spouting. Provide an expansion joint in spouting over 18 metres in length for steel gutter.
- 3.4 CORROSION
Separate metals subject to electrolytic action from each other and from treated timber, concrete and other lime substances by space, painting of surfaces, taping, or separator strips. Do not allow copper downpipes to discharge onto lower galvanized or zinc aluminium coated steel roofs.

Application - uPVC

- 3.5 INSTALL uPVC DOWNPIPES
Assemble downpipes, solvent welded complete, fit to outlets, galvanized screw fix with pipe clips to rigidly stand 25mm off the wall, plumb and discharging into the stormwater gully or pipe inlet to the downpipe manufacturer's required practice.

Application - metal

- 3.6 INSTALLATION GENERALLY
Install to MRM NZ Metal roof and wall cladding - Code of practice recommendations where not otherwise specified.

3.7 INSTALL VALLEY GUTTERS

Attach valley gutters to valley boards by clips allowing for thermal movement to MRM NZ Metal roof and wall cladding - Code of practice, clause 8.4.5 Valley gutters. Separate valley gutter from valley boards with a layer of bituminous building paper.

3.8 INSTALL EXTERNAL FASCIA/BARGE SPOUTING SYSTEM

Install concealed fascia brackets to rafters with either screws or nails and fit fascia to a level line. Fit gutter brackets to fall to outlet. Cut and form corner junctions and barge junctions and fit spouting rigidly to brackets. Cut out neatly for and fit pre-formed downpipe droppers. Silicone seal and pop-rivet all lap joints. All installation to MRM NZ Metal roof and wall cladding - Code of practice recommendations.

7420 SANITARY SYSTEMS

1. GENERAL

This section relates to above ground gravity flow sanitary systems;

- for foul water
- from sanitary fixtures to first underground drain connection
- including system wastes, floor wastes, floor waste gullies, traps, vents and valves
- with associated components and accessories to make the system work

1.1 RELATED SECTIONS

Refer to 7151 SANITARY FIXTURES, TAPWARE & ACCESSORIES for sanitary fixtures tapware and accessories.

Refer to 7430 DRAINAGE for underground drains.

1.2 DOCUMENTS

Documents referred to in this section are:

NZBC G1/AS1	Personal hygiene
NZBC G13/AS1	Foul water
AS 2887	Plastic waste fittings
AS/NZS 1260	PVC-U pipes and fittings for drain, waste and vent applications
AS/NZS 2032	Installation of PVC pipe systems
AS/NZS 3500.2	Plumbing and drainage - Sanitary plumbing and drainage
Plumbers, Gasfitters and Drainlayers Act 2006	

1.3 QUALIFICATIONS

Carry out all work under the direct supervision of a certifying plumber under the Plumbers, Gasfitters and Drainlayers Act 2006.

2. PRODUCTS

2.1 PVC-U WASTE, DISCHARGE AND VENT PIPES

PVC-U pipe to AS/NZS 1260 complete with fittings brand-matched to the pipe manufacturer's requirements.

2.2 EXPOSED PIPES AND TRAPS

Chrome plate on copper pipes and associated copper and brass fittings.
White polybutylene or PVC, including all associated fittings.

3. EXECUTION

3.1 EXECUTION GENERALLY

Carry out this work and complete all tests to AS/NZS 3500.2.

3.2 ELECTROLYTIC ACTION

Avoid electrolytic action by eliminating actual contact or continuity of water between dissimilar metals.

3.3 INSTALL TRAPS, WASTE AND VENT PIPES

Connect waste outlets to traps and run waste pipes and back vents concealed, sized and fixed to AS/NZS 3500.2 /NZBC G13/AS1 and AS/NZS 2032. Discharge wastes into the drainage system stack, soil pipe, or gully trap as shown. Bird proof mesh to all roof vents and vermin proof mesh to all untrapped waste pipes.

3.4 PENETRATIONS

At penetrations through constructions provide and fit collars and escutcheon plates to match pipework.

3.5 TEST

Test soil and waste disposal systems to ensure no leakage exists and leave in proper working order.

3.6

CLEAN UP

Remove labels and clean fittings. Remove unused materials from the site.

7430 DRAINAGE

1. GENERAL

This section relates to the supply and laying of gravity foul water (sewage), stormwater and field drains.

1.1 DOCUMENTS REFERRED TO

Documents referred to in this section are:

NZBC B1/AS1	Structure - general
NZBC E1/AS1	Surface water
NZBC E2/AS1	External moisture
NZBC G13/AS2	Foul Water
AS/NZS 1254	PVC-U pipes and fittings for Stormwater and Surface Water applications
AS/NZS 1260	PVC-U pipes and fittings for drain, waste and vent applications
AS/NZS 2032	Installation of PVC pipe systems
AS/NZS 2033	Installation of Polyethylene pipe systems
AS 2439.1	Perforated Plastics Drainage and Effluent Pipes and Fittings - Perforated drainage pipe and associated fittings
AS/NZS 2566.1	Buried Flexible Pipelines - Structural Design
AS/NZS 2566.2	Buried Flexible Pipelines - Installation
NZS 3104	Specification for concrete production
AS/NZS 3500.2	Plumbing and drainage - Sanitary plumbing and drainage
AS/NZS 3500.3	Plumbing and drainage - Stormwater drainage
AS/NZS 4671	Steel reinforcing materials
AS/NZS 5065	Polyethylene and polypropylene pipes and fittings for drainage and sewerage applications

Plumbers, Gasfitters and Drainlayers Act 2006

1.2 AS-BUILT DRAWINGS

Supply a 1:100 scale as-built drawing of drains and fittings to the territorial authority and to the owner on completion.

1.3 QUALIFICATIONS

Drainlayers to be experienced, competent and familiar with the materials and techniques specified. Carry out all work under the direct supervision of a certifying drainlayer under the Plumbers, Gasfitters and Drainlayers Act 2006.

2. PRODUCTS

2.1 CONCRETE

17.5 MPa prescribed mix to NZS 3104.

2.2 REINFORCEMENT

Plain round and/or deformed steel bars, Grade 300 to AS/NZS 4671.

2.3 PVC-U PIPES

PVC-U pipes bends, junctions, fittings and joints to AS/NZS 1254 and AS/NZS 1260.

2.4 INSPECTION COVERS

Cast iron frame with screw-down cover.

2.5 DRAINAGE AND FILLING MATERIALS

Granular: Clean gravel or crushed stone or a blend of these. Particle size from minimum 7mm to maximum 20mm.

Selected: Fine grain soil or granular material suitable for bedding; excluding topsoil.

Ordinary: Top soil or other excavated materials.

3. EXECUTION

- 3.1 EXCAVATE**
Excavate for drains to a firm even base with correct gradients set in straight runs.
- 3.2 MANUFACTURER'S REQUIREMENTS**
All drainage installations to the pipe and fitting manufacturer's requirements.
- 3.3 DRAINAGE GENERALLY**
Carry out drainage work and tests to AS/NZS 3500.2 (sanitary drainage) AS/NZS 3500.3 (stormwater drainage) as modified by NZBC B1/AS1: 6.0. Lay uPVC pipe systems to relevant sections of AS/NZS 2032, NZS 2566.1 and AS/NZS 2566.2. Lay polyethylene pipes and fittings to relevant sections of AS/NZS 2033 and NZS 2566.1.
- 3.4 LAY FOUL WATER DRAINS**
Lay drains in straight runs to correct gradients, to discharge into the network utility operator's sewer. Set inspection fittings on a concrete base.
- 3.5 LAY STORMWATER DRAINS**
Confirm the required location of downpipes and finished ground levels before commencing pipework. Set downpipe bends in concrete with the concrete brought up to protect the top of the bend from damage. Lay drains in straight runs to correct gradients to discharge into the network utility operator's stormwater system.
- 3.6 INSTALL STORMWATER INSPECTION CHAMBERS**
To NZBC E1/AS1, with a 75mm fall across the chamber and with channels to form a cascade where necessary. Channel top should be 100mm above the pipe soffit. Bench from channels at 1V on 10H. Benching should be made of 17.5 MPa concrete vibrated to smooth finish. Plastering is not allowed. Fit a cast iron cover and frame.
- 3.7 INSTALL FOUL WATER INSPECTION CHAMBERS**
To NZBC G13/AS2, with ceramic channels to form a 75mm fall across the chamber. Channel top should be 100mm above the pipe soffit. Bench from channels 1V on 10H. Benching should be made of 17.5 MPa concrete vibrated to smooth finish. Plastering is not allowed. Fit a cast iron cover and frame.
- 3.8 CONCRETE ENCASUREMENT**
Concrete encase shallow drains and drains under driveways, on a 100mm deep 17.5 MPa concrete bed reinforced with three 10mm mild steel bars. Surround pipes with a polythene membrane to allow movement and encase in 100mm 17.5 MPa concrete.
- 3.9 FIELD TEST**
Field test drains for watertightness (PVC-U to AS/NZS 2032 or AS/NZS 2566. 2 Appendix N) to the satisfaction of the territorial authority inspector.
- 3.10 BACKFILL**
Backfill drain lines in 150mm layers, well tamped but without disturbing the drains. Finish off with 150mm of topsoil, slightly mounded above the finished ground line.

7701 ELECTRICAL BASIC

1. GENERAL

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

- power
- lighting

1.1 ABBREVIATIONS AND DEFINITIONS

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

The following abbreviations apply specifically to this section:

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

1.2 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 G4/AS1	Ventilation
NZBC G9/AS1	Electricity
AS/NZS 1125	Conductors in insulated electric cables and flexible cord
AS/NZS 1768	Lightning protection
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
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)

Warranties

- 1.3 **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

- 1.4 **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.
- 1.5 **QUALIFICATIONS**
Carry out work under the supervision of an electrical licensed supervisor.
- 1.6 **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.
- 1.7 **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 |
| 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.
- 2.8 **HOT WATER SYSTEM SWITCH**
One way 20 amp switch complete with cable clamp for flexible PVC conduit to element enclosure.
- 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.
- 2.12 **BATTEN HOLDERS**
Standard white plastic bayonet cap, with cap angled where wall mounted. Brass liners.
- 2.13 **DOOR BELL SYSTEM**
Complete with transformer for mounting on distribution board.
- 2.14 **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.
- 2.15 **EXHAUST FANS**
Ceiling, wall or duct mounted exhaust fans for ventilation to NZBC G4/AS1, and compliant with AS/NZS 3350.1.

- 2.16 **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.
- 2.17 **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.
- 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.

3.18 ELECTRIC HOT WATER SYSTEM

Wire as a separate circuit through a wall-mounted isolating switch, with the cable from switch to element encased in flexible PVC conduit, clamp fixed at each end. Hot water cylinders, thermostats and 3000 watt element supplied and fitted under the hot and cold water system section.

3.19 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.

3.20 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.

3.21 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
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- Exhaust fans: Install exhaust fans to manufacturer requirements. Installed in accordance with AS/NZS 3000 and NZBC G4/AS1.

3.22

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.

Memorandum from licensed building practitioner: Memorandum of Design Section 45 and section 30c, Building Act 2004

Please fill in the form as fully and correctly as possible.

If there is insufficient room on the form for requested details, please continue on another sheet and attach the additional sheet(s) to this form.

THE BUILDING	
Street address: Type 2 units - Brown Acre Village, 53 Parker Ave	
Suburb: Motueka	
Town/City: Tasman	Postcode:

THE OWNER(S)	
Name(s): RJ Ker	
Mailing address: PO Box 155	
Suburb: Paraparaumu	PO Box/Private Bag: PO Box 155
Town/City: Kapiti Coast	Postcode: 5252
Phone number: 04 298 4227	Email address: ron@rjker.co.nz