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SPECIFICATION

FOR

NEW RESIDENCE

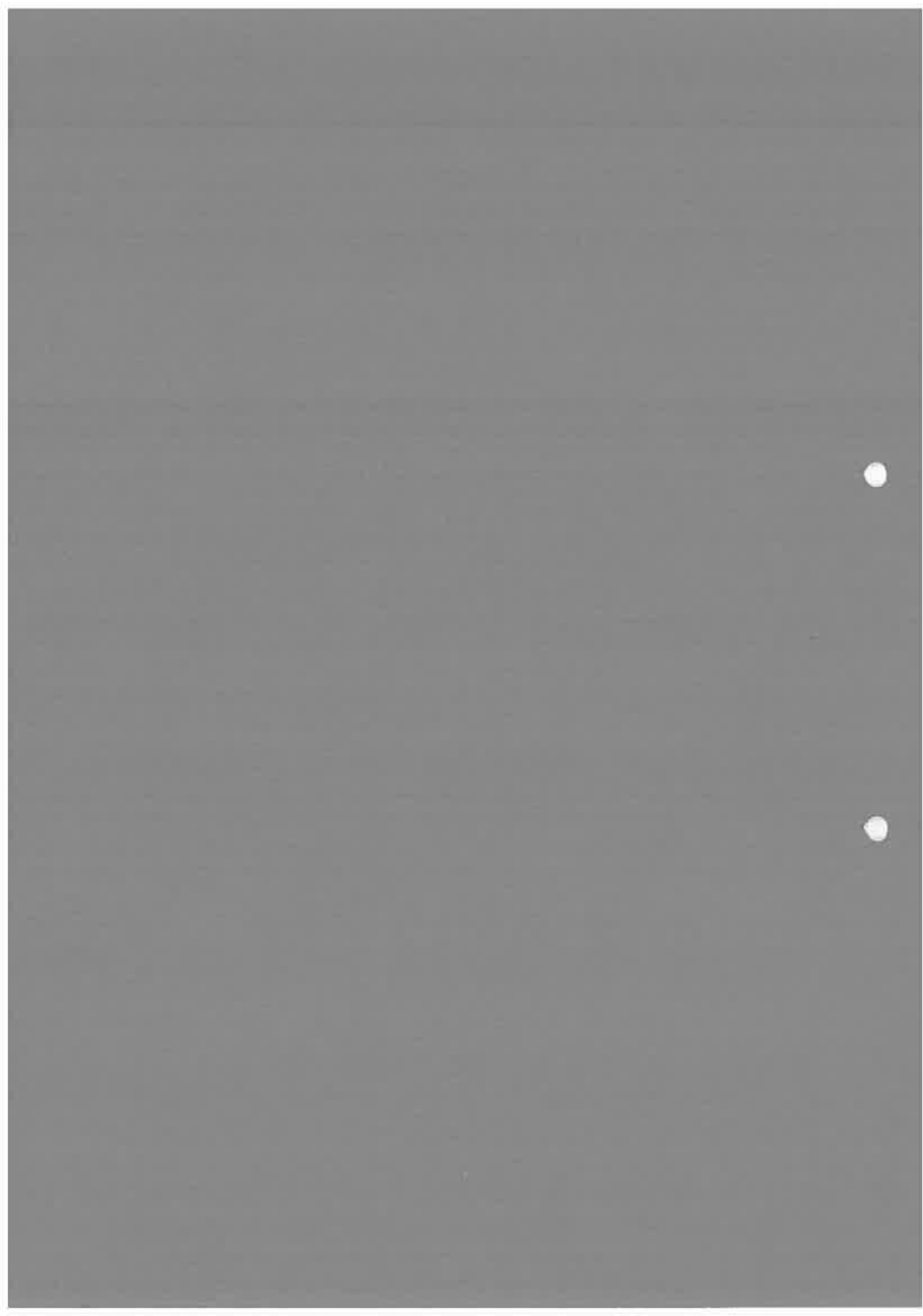
AT

CULLEN ROAD WAIPU

FOR

MR & MRS M. GOLDSMITH

Date: Dec 2015



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CONDITIONS OF CONTRACT

1. AGREEMENT

- 1.1. This Specification is for the erection of a new dwelling and associated works

At: Cullen Road Waipu

For: Mr & Mrs M. Goldsmith

- 1.2. This is the Specification referred to as "The Agreement" (1.2) between:

Owner: Mr & Mrs M. Goldsmith

Contractor:

2 CONDITIONS OF CONTRACT

- 2.1 The agreement referred to and a suitable form of contract (Conditions of Contract) shall be provided by the:

Owner:

or Contractor:

and is to be completed by all parties before the work on site is commenced.

- 2.2 All additions, omissions, and deletions made in this Specification prior to the signing of the agreement shall [be] dated not later than the date of the agreement. Any subsequent additions, omissions or variations to the contract shall be authorized in writing and an agreed upon price stated.

- 2.3 All subcontractors shall be engaged on New Zealand Master Builders SCL Conditions of Contract which creates a back to back contract incorporating the head contract provisions into the subcontract agreement.

PRELIMINARY AND GENERAL

1. SCOPE

- 1.1. The specification, conforming with the attached agreement (1.1) and Conditions of Contract (1.2), describes the work to be done and the materials to be used in the construction of the residence shown on the working drawings.
- 1.2. The Contractor and all Subcontractors shall be familiar with the particulars of the site, the working drawings, and all relevant sections of this specification.
- 1.3. Relevant 'Approved Documents', N.Z. Standards and/or overseas Standards mentioned in this Specification shall be included in the Contract document and kept on site for purposes of supervision and to ensure NZBC compliance. The Contractor shall especially provide copies of NZS 3604 and NZS 4229 for the above purposes by the owner or owner's agents.

2. BUILDING CONSENTS

- 2.1. The owner or owner's agent shall apply to the Territorial Authority (TA) for a BUILDING CONSENT, for inspections by the TA during construction and pay all bonds and fees incurred.

3. ACCEPTABLE SOLUTIONS

- 3.1. All work shall be equal to (or better than) 'Acceptable Solutions' given in the NZBC Approved documents complying with the Building Act 2004 and all building regulations.

4. HEALTH AND SAFETY

- 4.1. As directed by the owner, the contractor shall be responsible in complying with the Health and Safety in Employment Act 1992, effectively operating a safety management programme for the duration of the contract.

5. INSURANCE

- 5.1. The Contractor shall take out an Employers Liability Policy to cover all employees against accidental on site injury equal to the full amount of the contract sum.
- 5.2. Also, in the joint names of the Owner or Owners agent and the Contractor, arrange fire and insurance of the building.
- 5.3. Both policies shall remain in force until the building is occupied by the owner. **This is a wise precaution.**
- 5.4. The Conditions of Contract shall be approved, or include "Special Conditions of Contract" issued by Master Build Services or by private insurance.

6. INTERPRETATION

- 6.1. Work or materials shown on the Working Drawings but not specified (or vice versa), shall be supplied as though both shown and specified. Materials shown but not specified must be of the kinds commonly employed for the service they are intended to perform.
- 6.2. **All figured dimensions shall be taken into preference over scale.** The Contractor shall be held responsible for the setting out of work and he shall make good at his own expense any errors that occur through his lack of checking, or faulty workmanship. Unless written as *provide only* or *fix only*, the words *provide* and *fix* shall mean provide **and** fix.
 - 6.2.1. This Specification is divided into trade sections for convenience and reference only. No claims will be admitted from subcontractors for work specifically mentioned in a trade section, but is provided for elsewhere in a specification schedule or on the Working Drawings
 - 6.2.2. Should any tradesperson consider that the work of other trades or the condition of any surface is not in the condition to ensure satisfactory proper finish to his work, he shall report immediately to the Owner, or Owners agent and shall not proceed until the necessary alterations or improvements have been completed. Where this clause is not conformed with, no extra will be paid for redoing work.
 - 6.2.3. This document is a general specification and is to be read in conjunction with the Working Drawings and the Building Contract. Where there is any contradiction the Building Contract, the Working Drawings and the specification, then the Building Contract shall take first preference, the Specification Schedule second preference, the Working Drawings third preference and the General Specification fourth preference.

7. STABILITY DURING CONSTRUCTION

- 7.1. The Contractor shall carefully brace and support all parts of his work against damage by wind and protect work from the elements as necessary during construction.

8. PROTECTION OF PROPERTY

- 8.1. The Contractor shall protect adjoining properties during the contract period and shall make good all damaged at his own expense.

9. DAMAGE

- 9.1. The Contractor shall make good at his own expense and to the satisfaction of all controlling authorities, any damage at his own expense.
- 9.2. Each trade shall take care to prevent damage or disfigurement of the work of other trades and will be responsible for costs of restoring the same.

10. MAINTENANCE

- 10.1. Owners not familiar with building procedures and standards, are advised to employ an independent consultant to undertake an inspection and compile a list of matters that may require attention at the commencement of the 30 day period. Issue of a Code Compliance Certificate shall not cancel the need for the Contractor to remedy matters listed in the maintenance schedule.

11. MATERIALS

- 11.1. Any materials specified that are unprocurable when required, thus slowing the progress of the Contract, may be submitted with other similar materials, providing that the substituted materials conform to the NZBC and permission is given by the Owner. The Contractor is first to notify the owner of any change proposed and at the completion of the Contract, adjust any difference in cost. The Contractor must also inform the council and provide any necessary amendments to the building consent.

12. CONTINGENCIES

- 12.1. Provision shall be made by the Contractor and Owner to meet any contingencies that may arise due to the fluctuations in the price of various materials or labour. Should there be either a rise or a fall in the price of labour or materials, from the date that the tender is submitted until final payment, an adjustment to the Contract price, is to be made accordingly provided that the Contract price has been affected by such rise or fall in prices.
- 12.2. The sum of [] is allowed in the Contract price as a contingency fund. The Owner will expect the Contractor to submit proof in the form of receipts of any increases of price claimed for.

13. SITE VISIT

- 13.1. All Tenderers shall visit the site and ascertain the nature and extent of the work and the rights and interests that may be interfered with and any other matter that may influence the making up of the Tender, or the carrying out of the Contract in it's entirety. Levels shown on the Working Drawings are approximately correct, but Tenderers shall verify these as no claims for extra will be allowed on the basis of incorrect level shown.

14. WORKMANSHIP

- 14.1. All work shall be carried out in accordance with the best trade practice, in strict accordance with Working Drawings and Specification to the satisfaction of the Owner. All defective or damaged work is to be removed and made good at the Contractor or Subcontractors expense.

15. CLEANING

- 15.1. The Contractor, at the conclusion of the Contract, shall have all walls, ceilings, and woodwork carefully dusted and wiped down. Windows washed and glass free from scratches, floors brushed and wiped down and the entire building left in a perfectly clean condition.



EXCAVATION

1. GENERAL

- 1.1. Accord with preliminary and general clauses applying to this section and
 - 1.1.1. Means of compliance to relevant NZBC requirement
 - 1.1.2. Excavation code of practice, occupational health and safety department.
 - 1.1.3. Regional / territorial authority requirements for silt control from excavation.

2. ALLOWANCE FOR TENDERING

- 2.1. Allow for foundation depths as shown on drawings (450mm below cleared ground level as if in expansive clay). Any variations from dimensions shown to be adjusted in terms of clause 1.2.2 of the general conditions of contract.

3. SETTING OUT

- 3.1. Set out work as shown or implied on drawings. Check accuracy in terms of positions, levels and square.

4. CLEAR SITE

- 4.1. Remove vegetation, trees, roots and 150mm top soil* within area to be covered by the building, driveway, paths, terraces and steps. Do not remove any other trees without owners consent.

* **NOTE:** Alternatively, with consent from the owner and TA. Leave topsoil in place where excavation may cause ponding under timber floors. (see clause 3.4.1 of NZS 3604 Deposit soil in a heap as directed and avoid covering with subsoil subsequently excavated

5. LEVELLING AND BULK EXCAVATION

- 5.1. Excavate for all site levelling, foundation walls and /or piles, underground services and subsoil drains etc. To correct levels, to firm bearing or to obtain sufficient frictional resistance to satisfy T.A. **NOTE: clause [3.5.1] allows driven timber piles to NZS 3604.**

6. FOUNDATION TRENCHES

- 6.1. Take out trenches straight, level, to the proper width and free of water and loose material.
- 6.2. Concrete shall not be placed until the excavations are approved.

- 6.3. If other than clause [3.2.1] of this section, trenches are dug too deeply then such excess depth shall be filled with concrete, as specified for foundations, at the Contractor's expense.

7. HARDFILL

- 7.1. Use only approved fill not less than 100mm thick and well compacted under concrete ground floors and wherein otherwise specified. Blind surface fill with not less than 5mm of sand.

8. DRAINAGE TRENCHES

- 8.1. Take out seepage land drainage where indicated to adequate depth and falls to prevent dampness under building. Provide novaflow draincoil bedded in scoria or similar free draining material. Backfill with clean graded scoria from 50mm to find. See 11.0 DRAINLAYING for foul water and stormwater drainage.

9. BACKFILL AND TOPSOIL

- 9.1. Backfill and well consolidate in 100mm layers to the foundation walls, pile footings, and service trenches. Spread previously excavated topsoil as directed. Do not damage any waterproof coatings or polythene protecting foundation walls from ground water entry.

CONCRETE AND REINFORCING

1. GENERAL

- 1.1. Accord with Preliminary and General clauses applying to this section and means of compliance to relevant NZBC requirements.

2. EXTENT OF WORK

- 2.1. Comprises the setting out boxing and placing of the concrete in the foundations, floor slabs, walls, beams and bands and any other concrete work shown in the Working Drawings.

3. MATERIALS

- 3.1. Ordinary grade concrete shall comply with NZS 3019. Builders mix may be use if agreed to by Owner providing a minimum crushing strength of 17.5MPa at 28 days is obtainable.

4. FORMWORK

- 4.1. Formwork shall be so constructed that the concrete thickness and shapes required are obtained as detailed without the removal causing damage. Methods of construction and pouring and curing of concrete and times of removal of formwork shall be set down in NZS 3109.

5. CONCRETE AND FOUNDATION WALLS

- 5.1. Foundation footings, walls and reinforcing shall be to the sizes shown on the Working Drawings in accordance with the relevant clauses of NZS 3604, supporting a single story, 2 or 3 story as appropriate. Such walls shall finish not less than 225mm above finished ground level but not measure more than 2 m above the bottom of the footings.

NOTE: A full (2.4m) story concrete (or masonry) foundation walls is outside the scope of NZS 3604 but is permissible by either of the following.

- 5.1.1. Construction to NZS 4229 for example using concrete block masonry, or
- 5.1.2. Specific design using concrete or masonry.
- 5.2. It is then permissible to erect one or more stories to NZS 3604 on top of such foundation walls.
- 5.3. Reinforcing steel shall be lapped at least 40 rod diameters for plain rods and not less than 30 rod diameters for deformed bars in concrete.

~~6. CONCRETE PILES~~

- ~~6.1. Ordinary concrete piles to NZS 3604 shall be precast piles imbedded into in situ footings of the depth specified on the Working Drawings. All other concrete piles, i.e., Anchor piles, Braced piles, and Cantilever piles shall be formed in~~

situ where indicated on the Working Drawings, reinforced and to depths in accordance with NZS 3604.

7. CONCRETE FOOTINGS FOR IMBEDDED TIMBER PILES

- 7.1. The minimum plan dimension of square or circular footings, thickness of pile footings and embedment of the irrespective timber piles into such footings shall all accord with NZS 3604 for Ordinary, Anchor, Brace and Cantilever piles with any ends cut on site uppermost and brush treated according to Timber Preservation Council requirements. Refer to the drawings for any engineered designed poles or piles and provide footings as shown on the drawings and in the engineers calculations check that engineer may be required to inspect footing excavations before the placement of foundations.

8. CONCRETE SLAB ON GROUND FLOORS

- 8.1. Floors for carport or terrace slabs unless otherwise shown need not be reinforced provided that shrinkage control joints are provided at 3m spacings for 75mm thick slabs or 4m spacings for 100mm thick slabs.
- 8.2. In all other cases concrete slab floors and porches shall not be less than 100mm thick on well compacted granular fill and reinforced with layer 668 welded reinforcing mesh lapped 225mm at joins (or 665 mesh if cast more than 15mm maximum dimension in one operation).
- 8.3. Reinforcing slab on ground porches may be cast separately from foundation walls but shall be securely anchored to them with R6 bars at 600mm cns lapped not less than 300mm with the slab reinforcing.
- 8.4. Floor slabs to habitable rooms shall have 0.25mm thick polythene under: either welded into one continuous sheet or with joins lapped not less than 150mm and sealed with a self adhesive tape to manufacturers instructions. Any damage done to the vapour barrier during provision of underslab or in-the-slab services shall be made good before placing the concrete.
- 8.5. Form step detail, waterproof and provide weepholes at external edges of slabs supporting masonry walls. All as shown in NZS 3604.

9. SUSPENDED CONCRETE FLOORS

- 9.1. Precast pre-stressed suspended concrete floor decking shall be those manufactured by a reputable firm of the Owner/Owners Agents choice.
- 9.2. All junctions with external walls shall include adequate tying in as per manufacturers detail, and where there is masonry above, provide for a solid minimum 100mm deep step detail treated with a bitumen waterproofing compound to ensure freedom from rainwater entry.
- 9.3. All insitu concrete placed over units and at ends to be of strength at standard 28 days cure prescribed by the manufacturer.

- 9.4. Where metal trough sections supporting concrete floors are shown, erect sections and place concrete all as details and instructions provided by manufacturer.

10. **BUILD – IN BOLTS ETC**

- 10.1. Provide in concrete for openings for vents or as required by other trades and for holding down bolts in accordance with NZS 3604.
- 10.2. Timber grounds were required for fixing door frames etc. shall be of heart Totara dovetailed and where required water bars shall be of brass or galvanized iron. Powder powered tool fixings can be used where appropriate.

11. **PATHS**

- 11.1. Where shown on drawings, paths shall be laid not less than 75mm thick reinforced with 668 mesh. The surface shall be graded evenly to provide suitable drainage and left with a uniform finish using a wooden float.

12. **COMPLETION**

- 12.1. Make good any defective work, leave all clean and stain free.



CONCRETE BLOCK WORK

1. GENERAL

- 1.1. Accord with Preliminary and General clauses applying to this section and means of compliance to relevant NZBC requirements.

2. EXTENT OF WORK

- 2.1. Refer to drawings for layout and extent of work. Build the whole of the reinforced and un-reinforced 200mm concrete blockwork. Build in as the work proceeds all reinforcing steel, bolts and all other lugs, conduits, sleeves and openings for vents etc., required for the work of other trades. Keep surface clean and free from mortar, perpeneds true and faces true to line and vertical. Blocks are to be kept dry before laying.

3. BOND

- 3.1. Blocks shall be laid in stretcher or stack bond as shown. All joints shall be full and struck to provide a fair faced finish to both faces. Complete bond shall be secured between all blocks and mortar. Ensure that bond is not broken by making adjustments to blocks after mortar has taken a set.

4. MORTAR

- 4.1. The mortar for all blockwork shall be composed and mixed according to all NZS clauses. Water shall be of drinking quality. Sand shall comply with NZS 3103 for mortar and NZS 3109 for grout filling of masonry cavities.
- 4.2. All cement shall comply with NZS 3122 and shall be properly stored at the site and adequately protected from dampness.

5. MINIMUM REINFORCING STEEL REQUIREMENTS

- 5.1. Minimum reinforcing steel requirements in concrete masonry on this contract shall, relative to the height of the masonry, accord with clause [5.2] above.



STONEMWORK

1. GENERAL

- 1.1. Accord with Preliminary and General clauses applying to this section and means of compliance to relevant NZBC requirements and engineers details and calculations.

2. RELEVANT STANDARDS

- 2.1. All work to be in accordance with NZS 3604 and NZS 4229 as appropriate.

3. MATERIALS

- 3.1. (a) Stone: For external veneers and foundation walls shall be of the colour and type selected. All fair face stone work shall be laid with their best face outwards.
- (b) Cement: Shall be ordinary Portland Cement and at the time of use shall comply with NZS 3122.
- (c) Plasticizers: Shall be used in conjunction with these materials. On no account will further additions be made at the time of retempering mortars.
- (d) Water: Shall be of drinking quality.
- (e) Sand: Shall comply with the relevant clauses of NZS 3103.

4. PREPARATION OF MORTAR

- 4.1. Mix in an approved mixer. Measure materials by volume using suitable containers. Mix until a homogenous mass is obtained by t not for less than five minutes. All mortar, whether on boards or left in the mixer shall be used within 90 minutes. Mortar not used in this time shall be discarded.

5. STONE LAYING

- 5.1. Stone shall be laid in stretcher bond true to line and level and plumb and in accordance with the best trade practice. All work shall be laid from the lowest corner and no corner shall be raised more than 900mm above wall line. Corners shall be raked back. On no account will toothing be permitted.
- 5.2. All joints will be completely filled with mortar and the bricks shall be distributed as little as possible after initial positioning. Joints shall, unless otherwise specified, be not more than 9.5mm thick and shall be tooled as directed as work proceeds.

CARPENTRY AND JOINERY

1. GENERAL

- 1.1. Accord with Preliminary and General clauses applying to this section and means of compliance to relevant NZBC requirements.

2. EXTENT OF WORK

- 2.1. The work of this section shall include all labour, materials, equipment necessary to carry out and complete the carpentry as shown, or as further required by this specification. Any work that is intended or implied but not specifically shown but necessary for the property completion of the building shall be included.

3. ATTENDANCE AND PROTECTION

- 3.1. Arrange and attend upon all works by other trades in a logical sequence e.g., as in the section to allow early closing in. Provide all blockings, fixings, trims, noggin as necessary for the full completion of their respective works and make good all trades. Provide all temporary supports. Provide for temporary protection from adverse weather and damages and ensure closing in of the building as soon as possible.

4. MATERIALS AND WORKMANSHIP

- 4.1. All timber and wood based products shall conform to the criteria laid down in NZS 3603, "Code of Practice for Specifying Timber and Wood Based Products for use in Building". Timbers shown in the schedule of timbers to be treated with an approved preservative process in plants licensed by the Timber Preservation Council. Any materials which in the opinion of the Owner/Owners Agent, Loan body or territorial Authority are not up to standard, to be removed immediately from the site. All work shall be carried out in accordance with best trade practice.

5. COMPLIANCE WITH THIS SPECIFICATION

- 5.1. Do any works under specific design in accordance with the details provided. The Contractor and Carpenter shall do all other work in accordance with NZS 3604. In particular complying with the whole of SECTION 2 – GENERAL of ZS 3604. The requirement here shall be to meet NZBC Approved Documents B1 – Structure and B2 – Durability.
- 5.2. All fixings of materials to be the equal of that in Appendix A of NZS 3604. Including sheet lining and cladding materials for walls and ceilings that are not wood based, e.g., Gibraltar Board, Fibrous Plaster or Wood Cellulose sheet; especially when used as diaphragms and for wall bracing.
- 5.3. Mild steel structural components used in subfloor spaces, exposed to the weather or in a position where condensation or dampness will occur shall be hot dipped galvanized after forming and shall provide the necessary "Capacities" called for by NZS 3604 dependent on function and location.

6. SUB FLOOR FRAMING

- 6.1. *Embedded timber piles* shall be provided as shown and in accordance with Section 3 and 4 of NZS 3604. Driven timber piles if included in this section of the work and all driving, testing, sizes and spacing of piles shall accord with Appendices C and D of NZS 3604 and the Working Drawings. Refer to the drawings for any engineered designed poles or piles and provide sizes and spacings as shown on the drawings and in the engineer's calculations.
- 6.2. Bearers shall be sizes as shown on the drawings supported on piles at centres shown and fixed as shown. Brace with 100mm x 75mm as required or as otherwise shown.

Floor joists shall be gauged over plates to uniform levels lapped no less than the depth of joist and well spiked. Nail plates may be used in place of lapping fix in accord with NZS 3604. Provide double joists under all bearing walls.

- 6.3. Plates shall be as shown on drawings and to comply and fixed according to NZS 3604.

7. FLOORING

- 7.1. Timber joisted ground floors shall be insulated as shown on drawings and insulation fixed as per manufacturers instructions before laying flooring.
- 7.2. Ply flooring shall be 19mm H 3.1 All aspects of handling, storage, sheet layout and fixing shall be to the manufacturer's recommendations.

Nailing of pre-laid Ply flooring shall be done in two (2) stages to reduce the risk of floors squeaking. First secure at perimeter of floor, along the bottom plate positions for internal walls and sufficient elsewhere to hold the sheets flat during construction. Complete remainder of fixing to manufacturers instructions after the house is totally closed in and just prior to sanding. The Contractor shall be responsible for any damage done and for the cost of repair or replacement of the flooring if not closed in sufficiently early (normally within two months of laying), or if the floor is not otherwise adequately protected up to the completion of the house.

Heads of fixings shall be punched to allow a reasonable depth of stopping, unless otherwise stated. Ceilings below ply or any other flooring, shall not be secured until all nailing above has been done.

7.3. Finishing ply flooring

Contractor to follow manufacturers instructions and sequence of sanding, sealing, stopping and application of coatings to provide a minimum 3 coat flat. smooth hard wearing polyurethane finish. Contractor should also follow manufacturers instructs for floor areas to be covered with vinyl flooring or carpeting as advised by Owner and such finish of the ply to be approved before either is laid.

8. **TIMBER TERRACES**

- 8.1. If shown on plan, construct to detail or best practice. All fixings to be galvanized nails and bolts. All timber to be treated as specified by the Timber Preservation Council. (e.g., to MP 3640)

9. **GENERAL FRAMING**

- 9.1. All framing sizes and spacings shall be as described on the drawings and to comply with NZS 3604. Top and bottom plates to be the same size as studs in long lengths, halved or nail plated at wall junctions and joints over studs.

10. **WALL BRACING**

- 10.1. Provide all wall bracing as shown on the Working Drawings and wall bracing calculation sheets as is intended to satisfy the Territorial Authority. Keep strictly to the "Type", lengths and location shown on the plans and elevations.

11. **POSTS AND BEAMS**

- 11.1. Where within the maximum permitted by NZS 3604 secure in equivalent manner and with equivalent materials as in clauses 7.1 – 7.3 thereof. Owner/Owner's Agent to provide "Specific Design" for all other posts and beams and contractor to fix as per details given.

12. **EXTERIOR WALL COVERINGS**

- 12.1. See EXTERIOR WALL COVERINGS 9.0.

13. **EXTERIOR JOINERY**

- 13.1. All windows shall be to NZS 4211 to suit location. Flashing to be in accordance with the NZBC clause [E2 AS1].

Aluminium Joinery:

Provide provisional sum of \$[] for windows and glazed doors to size, type and location shown on the Working Drawings. Obtain joinery from [], complete with glazing, frictional restraints and catches, and fix plumb both ways and in correct alignment and flash all in accordance with manufacturers instructions. Sliding partition doors shall be safety glazed and fixed to timber sub-frames as per code.

NOTE: Owner should check with the manufacturer regarding manner or type of safety glazing (also in shower screens). Also seek advice on satisfying the need for simple secure means of achieving ventilation at night or when the house is empty. Options may include substituting double spur catches for single, fixing security fasteners or provision of small sliding panes, or louvers or grills at high level.

14. **DAMP PROOFING**

- 14.1. All timber to be protected from dampness with 3-ply bituminous felt or other approved damp proofing material when in contact with concrete or brickwork or as clause 2.1.4 of NZS 3604.

15. **PRIMING**

- 15.1. All exterior finishing timber, all timbers in contact with concrete blockwork and all external faces, rebate, etc, of all doors, windows, frames and all woodwork of sashes, shall be primed before fixing unless otherwise specified.

16. **ROOF CONSTRUCTION**

~~16.1. Trussed Roofs: Drawings showing clearly the type, pitch, span, spacings and overhangs of roof trusses and details of roof cladding shall be provided to the Truss Manufacturer to allow him to comply with clause 10.2.3 of NZS 3604. Thereafter the Contractor shall be responsible for matching the construction to the details and drawings provided by the Truss Manufacturer throughout all stages of placing, fixing and bracing. The Contractor shall comply with the Manufacturers instructions for tying down where overhangs exceed 750mm. In all cases, anchorage of all trusses to plates shall be not less than 2/100mm skew nails plus 2/4.9mm wire dogs.~~

- 16.2. Framed Roofs: Roof to be framed up to pitch indicated on the Working Drawings and to detail properly checked, bird mouthed and well fixed. Fix valley boards, ridge, etc. Fix both underpurlins and collars and ties where shown and where rafters exceed 10 degrees in pitch. Collar ties are to be at 18m cnrs, max. or at every third set of rafters, which ever is the closest.

Ceiling joists generally to be 100mm x 50mm spaced as required and to be well spiked to all plates. Provide adequate ceiling runners to spans of 2400mm and over.

- 16.3. Monopitch: Monopitch, Skillion and Exposed Rafter roofs to be constructed as per Working Drawings and in accordance with NZS 3604.

17. **PURLINS, EAVES, GABLE ENDS**

- 17.1. Size of framing, spacing, overhangs and sheathing type as per the Working Drawings.

18. FASCIA BOARDS ETC.

- 18.1. Fix fascia, barge, frieze, etc. to suit roofing selected (See ROOF COVERINGS, ROOF PLUMBING AND DRAINAGE – Section 8).

19. THERMAL INSULATION

- 19.1. All roofs, walls and floors are to be insulated in accordance with NZS 4214 and NZS 4218P. No insulation materials shall be used that do not comply with NZS 4222. All insulation materials are to be installed in accordance with the manufacturer's recommendations. The insulation described on the drawings shall take precedence

20. MOISTURE CONTROL

- 20.1. **Where a vapour barrier is required in the form of foil or polythene film, this barrier shall be fixed** in accordance with the manufacturers instructions. Foil or polythene film shall not be used as a substitute for building paper. Building paper shall be properly fixed to bottom plates, especially in veneer construction, to prevent entry of subfloor air into the stud cavities. Any brick veneer cavities shall be closed off at and by means of a soffit so as not to connect with roof cavities. There should be no unsealed openings for service pipes and wiring etc. There should be no discharged from cooking extractors or clothes dryers to any roof, wall or floor cavity. Linings shall not be fixed until moisture content of framing has been tested and approved.

A proper solvent based paint or varnish finish must be used on plasterboard (Gibraltar board or fibrous plaster) linings to 'wet' rooms such as kitchens, bathrooms and laundries. Water based emulsion paints must not be used in such rooms.

21. CEILINGS

- 21.1. Gibraltar Board: Fix to manufacturers instructions. Fixer and stopper to be approved. All nail fixing and joints to be finished to a true, plumb and even smooth surface. In particular fix all ceilings serving as a structural ceiling diaphragm under terms of NZS 3604 (See Winstone Wallboards Ltd. Tapped joint system). Check that each wall under or connected to has adequate bracing for a diaphragm.
- 21.2. Pinex: First quality tiles or planks as directed by Owner to be fixed to the manufacturers instructions. In particular note where dragon ties have been specified on the Working Drawings and refer to NZS 3604 for their proper fixing. Also check that each wall relative to the dragon ties has the appropriate bracing values.
- 21.3. Fibrous Plaster: Do all as under the Gibraltar Board above but referring to an appropriate manufacturer (e.g., a member of the NZ Fibrous Plaster Manufacturing Association).

22. MANHOLE

- 22.1. Provide a manhole in the ceiling a minimum of 600mm x 600mm where directed.

23. WALL LININGS

See "INTERNAL WALL LININGS" section

- 23.1. Generally shall be of 9.5 Gibraltar Board and shall be fixed to external walls only after placement of thermal insulation (bulk insulants). As per Appendix A of NZS 3604 or manufacturers instructions and stopped to manufacturers instructions; in particular where contributing to wall bracing.

24. DOORS AND FRAMES (TIMBER)

- 24.1. External door frames shall be of 40mm full width material with rebate and internal shall be 30mm rebated or 18-25mm material with 12mm planted stops. Doors shall comply with NZSS 1158, with external timber or glass panel as shown on the Working Drawings, all properly constructed with stiles and rails out of 50mm material.

Internal doors shall not be under 30mm hollow core, faced with plywood or hardboard with clashing strips fixed to lock stiles. All timber core material shall be treated and doors shall be of approved manufacturer. Solid doors and all doors over 2m high shall be hung on one and one half pairs of 90mm x 30mm butt hinges.

25. WARDROBES

- 25.1. Construct full height as shown. Fit doors, shelves etc to owners approval.

26. PANTRY AND OVERHEAD KITCHEN CUPBOARDS

- 26.1. Construct units to sizes shown on the working drawings, with doors and shelves to the owner's approval.

27. WORKBENCH / SINK UNIT ETC.

- 27.1. Units to have standard 450mm x 300mm stainless steel sink. Fix on unit either indicated on plan or to owner's final approval. Units to be generally 900mm high and 600mm deep, 100mm toe space. Provide flush cupboard doors to front and shelving to approval. Timber used in doors to be approved by owner. Carefully set out all units but do not secure until sink/s, oven, cook tops, dishwasher etc, have been correctly located and approved by owner. (see 'sanitary plumbing', and 'electrical'). Any need to trim or remake units or damage to taps, doors, drawers etc, shall not be at extra cost to the owner. **NOTE:** For clauses 7.25-7.31, allow for doors of full height and full width to give better access to wardrobes, pantries, linen cupboards, etc. Then consider provision of adjustable shelving, drawer and banded fittings as budget allows. This will minimize future alterations.

28. HOT WATER CUPBOARD

28.1. To be considered where shown and fitted with slat shelving above the cylinder spaced at 15mm apart. Provide two flush doors with thermostat boxed in.

29. ARCHITRAVES, SKIRTINGS, ETC.

29.1. Finish all windows internally, door openings and wherever required as described on the drawings. Where required fix cornice at ceiling junction and skirting at floor junction as described supply and fix beads, half rounds, and all trim as required to complete the work.

30. BATHROOM : ENSUITE, SHOWER AREAS

30.1. All wall linings to be fixed to the manufacturer's specification with adequate capillary gaps or flashings/trim or sealant to prevent leakage. Provide for all sanitary fittings shown on plan.

31. LAUNDRY AND TOILETS

31.1. Fit out as shown on plan.

32. METER RECESS

32.1. Add and provide flashing to meter box to comply with NZBC E2AS1.

33. HARDWARE

Is not included in p 7.33.1.

33.1. Allow the provisional sum of \$[] for the supply of all the hardware required. Door handles, locks, window fittings, door and drawer pulls, stops, angles, vents, towel rails etc. Allow to take delivery and fix or refer to the owner for supply but allow for installation and fitting. The supply of hinges and butts for all doors and windows.

34. INTERNAL WOOD STAIRS

34.1. Consult with owner on construction of internal wooden stairs (Also see MISCELLANEOUS section).

35. CLEANSING AND COMPLETION

35.1. The Contractor at the conclusion of the contract shall have all ceilings, walls and woodwork carefully cleaned and wiped down. Windows washed and glass free from scratches and paint. Floors brushed and the entire building and site left in a clean condition for occupation.



ALUMINIUM JOINERY

1. GENERAL

- 1.1. Refer to Preliminary and General section of this Specification plus any Special Condition sections which shall apply to all work of this section.
- 1.2. The work described under this section of the Specification includes the fabrication, supply, glazing, hardware and installation of aluminium windows and doors as shown on the drawings. Work also includes accessories, headflashings, sill flashings and weather seals as required plus all miscellaneous items not expressly shown or specified but obviously needed for the satisfactory completion of the building.
- 1.3. The work shall be coordinated with Carpenter and with that in other trade sections of this Specification.
- 1.4. Related Documents
This section makes reference to various standards and the NZ Building Code which shall form part of this Specification unless otherwise qualified by this or other Contract Documents.

NZBC	Clause E2AS1 for Installation and Flashings
NZS 2258	Recommendations for glass and glazing
NZS 3503	Anodic oxide coatings on wrought aluminium for external architectural applications
NZS 3504	Specifications for Aluminium Windows
NZS 4211	Specifications for Performance of Windows to suit location
- 1.5. Setting Out
The Contractor shall be responsible for the setting out of all aluminium framed and glazing in this contract. All measurements, horizontal or vertical, shall be checked or verified on the job before fabrication is commenced.
- 1.6. Shop Drawings
Submit for approval shop drawings sufficient to show the set out and full installation details and fittings to be supplied for all. Allow four weeks for inspection of shop drawings as required in the Preliminaries section of this Specification.

2. MATERIALS

- 2.1. Aluminium Frames
 - 2.1.1. All sections shall be extruded from either B60363-T5 or KE45 aluminium alloy, depending on required finish.
 - 2.1.2. Pressed metal louvers shall be allow N.S.2 (half hard) anodising quality.
 - 2.1.3. Sections shall have a minimum wall thickness of 1.6mm.

2.1.4. All screws used in the construction of the windows shall be stainless steel or other non-corrosive material compatible with aluminium.

2.1.5. Aluminium extrusions shall be either satin anodised to 15 microns. Alternatively, if so specified on the drawings, extrusions shall be either bronze or black anodised to 25 microns, or powder coat baked spray finish to 15 microns and the colour nominated.

2.2. Hardware

2.2.1. Opening sashes shall be fitted with approved friction stays, Interlock or similar, and wedge fasteners. All hardware shall be manufactured from non-ferrous materials and be of the same colour anodised as the frames or as shown on the drawings or as directed by the owner.

2.2.2. Aluminium doors shall be fitted with push/pull handles of the same colour anodised as the frames. Supply complete with face mounted closers, brass butt hinges satin chrome plated and double cylinder narrow backset locksets with lever furniture.

2.2.3. All locksets shall be master keyed.

2.3. Glazing

2.3.1. All frames shall be supplied with the specified weight glass.

2.3.2. Frames supplied factory glazed shall have the glass set on neoprene setting blocks. Window glass shall be retained either with PVC stripping or glazing gaskets or alternatively by means of snap-on glazing beads using a non hardening glazing compound. All door glass shall be retained with PVC stripping in snap-on beads.

2.3.3. All sheet glass shall be guaranteed by the supplier as being selected first quality, clear sheet glass, free from any blemish.

2.3.4. All glass shall comply with Glazing standards NZS 4223 1993 and NZS 4102 1990 for glass sizes thickness and fixing.

3. **WORKMANSHIP**

3.1. Construction

3.1.1. The corners of all frames shall be mechanically butt jointed and assembled with stainless steel screws into integral screw traces in the sections. The corner of sashes shall be mitre cut and assembled with stainless steel screws into nylon corner blocks mechanically crimped within the section giving a neat tight fixing joint.

3.1.2. All shop front intersection joints shall be square cut and assembled with stainless steel screws into integral screw traces.

3.1.3. Door corner joints shall be square cut, rails contained within stiles and mechanical fixed with high tensile screw caps in the corners.

- 3.1.4. All joints shall be well caulked with a thin joint sealant to prevent leakages in accordance with Manufacturer's recommendations.

3.2. Weather-stripping

- 3.2.1. All opening parts of sashes shall have a PVC weatherstripping gasket to form a continuous seal between sashes and the frame. This gasket is to act as interior glazing on fixed lights also.
- 3.2.2. All doors shall be weathersealed with silicone impregnated pile or PVC weatherstripping

3.3. Installation

- 3.3.1. Windows shall be supplied with extruded aluminium with all necessary flashings and weather seals giving a fully weathertight installation. All in accordance with the Manufacturers instructions.
- 3.3.2. Shopfronts shall be installed plumb and level on full length extruded sill flashings bedded in non-hardening mastic. Fixings shall be plated woodscrews into timber and dynabolts or tap-it fasteners into concrete. Sill fixings shall not penetrate drainage area of sill flashings.
- 3.3.3. Doors shall be set true and square in the opening in accordance with the Manufacturer's details and instructions.

3.4. Cleandown

- 3.4.1. After installation the frames and glazing shall be cleaned down and left ready for other trades. The General Contractor shall be responsible for protection up to completion and for final cleaning down.

4. **GUARANTEE**

- 4.1. In accordance with the Preliminaries section of this specification the Contractor shall provide the Employer with a Guarantee on all Aluminium Joinery for a period of 2 years.



ROOF COVERINGS, ROOF PLUMBING AND DRAINAGE

1. GENERAL

- 1.1. Each Tenderer for the work in this section shall liaise with the Contractor to allow work to be effectively programmed with that by others; within sensible start and completion dates. (Aiming to close in the structure as soon as possible). Each shall also confirm all the following aspects with the Contractor.
 - 1.1.1. Preliminary and General clauses and NZBC requirements that apply to the work shown and/or specified.
 - 1.1.2. Means of compliance to the NZBC, and if wanting to use a different means to that in the listed Means of Compliance, indicating such means.
 - 1.1.3. Provision of a GUARANTEE regarding NZBC requirements; BEFORE a progress payment is sought for the work in this section.

2. ROOF COVERING SYSTEMS

- 2.1. The Contractor, Carpenter, Roof Covering Fixer and Plumber shall note that: -
 - 2.1.1. Clause 11.1.1 of NZS 3604 gives good definition of a roof covering system and lists NZBC clauses to be met (e.g., B1, B2, E2 and E3).
 - 2.1.2. E2 – External moisture may be met via Acceptable Solution E2/AS1 from NZBC E2 Approved Document. Table 1 of E2/AS1 gives minimum roof pitches for many types of coverings and Table 2 appropriate NZ Standards. Section II of NZS 3604 provides an alternative acceptable solution for a more limited range of roof coverings.
 - 2.1.3. Different requirements within B1, B2 and E3 shall be met using e.g., detail in other Approved Documents and/or other sections of NZS 3604, other NZ Standards and/or BRANZ Bulletins.

3. TYPES OF ROOF COVERINGS

- 3.1. Coverings to the main areas of roofs shall consist of – Colour steel Long iron as detailed on the drawings.
- 3.2. Other roof areas (or deck coverings required to prevent rain entry) shall consist of
- 3.3. The Roof Covering Fixer and Plumber shall advise on substructure/substrate needs. Inspect and have defects or omissions remedied AND do adequate preparatory work.

4. SUBSTRUCTURE AND SUBSTRATES

- 4.1. Timber substructure work shall be to NZS 3604, section 10 – ROOFS, or to specific design, meeting NZBC B1 and B2 requirements. Purlin (roof

batten) size and spacing and sarking/sheet substrates to approval in writing by covering manufacturer and to be to NZS 3602.

- 4.2. Purlin size to allow for thermal insulation to meet the NZBC or to greater thickness. Agree with owner. End to end joints in purlins shall be staggered (not to occur in line on a single rafter or truss). Provide for closer spacing at ridges and eaves for better fixing against wind uplift. Generally refer to the drawings for sizes and details.
- 4.3. Ensure adequate provision of sheet sarking, hit and miss sarking, or anti-ponding boards where necessary, including at points of access onto roofing to minimise risk of indentation and damage.

5. ROOF UNDERLAYING/CLOSING-IN WORK

- 5.1. Fix gutters and downpipes (even if temporary). Fix valleys at least 300mm wide with turned in edges and base projecting into gutters.
 - 5.2. When all in four are satisfactory and unless otherwise stated, fix breather type building paper ex NZS 2295 to recommendations of roof covering manufacturer. Properly support, lap, turn up at upstands and projections through roof and turn down into gutters.
 - 5.3. Roof Covering Fixer and Plumber to agree alternative early closing in procedures with Contractor when: -
 - 5.3.1. Adhesive fixing of membrane covering or sprayed, roller or brush applied systems prevent use of building paper.
- OR**
- 5.3.2. Ceiling linings/sarking and thermal insulation in Skillion roofs are provided BEFORE underlay and covering is fixed.

6. PREPARATORY WORK

- 6.1. Roof Covering Fixer shall co-ordinate preparatory and installation aspects with Plumber and Contractor shall ensure the following: -
 - 6.1.1. Temporary bracing of the roof and walls below if some stacking of covering is require: keeping loads on timber to a minimum and not localized on to a few members.
 - 6.1.2. Good in-plane alignment of purlins and/or sarking and adequate support and fixings for all ridgings, cappings and overflashings and all projections through the roof.
 - 6.1.3. Neat setting out of work to all roof planes; avoiding any covering or flashing being cut too short, too narrow or in any manner that will prevent secure fixing and long term resistance to rain penetration. Tile, slate and shingle work to be set out to give full course both at eaves and ridges.

- 6.1.4. Corrosion protection is given to galvanized steel where difficult to paint after fixing. e.g., prime and top coat laps in the roof covering and where lapped by cappings and flashings. Also to bottom underside at projections over gutters.

7. INSTALLATION

- 7.1. Roof covering Fixer shall follow all relevant recommendations of the covering manufacturer and preferably be approved by the manufacturer. Roof flashing and drainage work shall be of a quality expected of work done by Craftsmen/Registered Plumbers.
- 7.1.1. Fixer, Plumber and others to wear soft soled shoes to prevent damage to pre-finished metal, membrane and any other special brush, spray, or trowel applied coverings.
- 7.1.2. Fixing of coverings, accessories and flashings shall allow for differential movement. Laps or joints shall, where possible, face away from the prevailing wind. **SEALANTS SHALL NOT BE USED EXCEPT WHERE PRIOR APPROVED.**
- 7.1.3. Take care of all roofing materials. Any damaged at time of delivery or during construction to be removed from site. Colour match making good of face fixings and minor damaged. Each day remove rivet stems, metal scraps and debris from roof and any runs of metal flux.
- 7.1.4. Where indicated, bird proof and draught proof eaves with purpose-made bitumen impregnated foam profiled to match contour of metal roofing.

8. ROOF PLUMBING AND DRAINAGE

- 8.1. Arrange with Contractor to fix valley gutters (if any), normal gutters (or spoutings) and downpipes for earliest possible closing in of building (provisions to include temporary spouting and downpipes and temporary drainage trenches if required by Contractor to prevent localized flooding in adverse weather).
- 8.2. Sizing of gutters/spoutings and downpipes and downpipe spacings shall accord with Acceptable Solutions E1/AS1 – SURFACE WATER. Materials to be used shall be as shown on drawings in accord with NZS..... (nominate from table 4 of E1/AS1). Plumber also to provide for thermal movement when fixing as determined from table 7 of E1/AS1 and avoid large local discharged from high roof to lower roof by use of a spreader pipe.
- 8.3. Rainwater collected from roofing shall discharge:
- 8.3.1. Into an approved... litre cold water storage tank when required for drinking and household purposes.

8.3.3. To an approved soak pit or overflow.

8.3.4. Obtain ridgings, cappings and overflashings etc.. from the roof covering manufacturer; to suit colour, profile and compatibility – reduced corrosion risk. If not available use next best alternative. Paint and/or keep dissimilar metals from contact. Thickness of material unless otherwise state shall not be less than 0.7mm aluminium, 0.6mm galvanized steel, 0.6mm copper, 2mm lead, 1.7mm lead to small diameter vent pipe flashing with PVC flashing cone.

8.3.5. Prime and top coat both contact surfaces at laps of cappings, flashing, etc. with galvanised steel. Adequately and neatly fix same wherever needed for long-term durability and resistance to rain entry.

9. ON COMPLETION

9.1. Remove all traces of flux after brazing or soldering, swarf, snapped rivet stems, metal wastes and all other debris from roof surfaces and gutters.

9.2. Fit plastic mesh balloons into the top of downpipes.\

9.3. Advise Owner/Owners Agent, Contractor and others on need and how to protect roofing from damage from other trades and preferred access points onto roof.

10. GUARANTEE

10.1. Each Roof Covering Fixer and Plumber is advised to note 'Life to first maintenance' suggested by the manufacturer of the coverings. This with reference to clause 1.01. and Table 1 of Acceptable Solutions B2/AS1 should enable each Roofing Fixer and the Plumber to each sign and present a sensible guarantee regarding the work done covering NZBC requirements, B2, E1, E2 and E3.

In this instance the guarantee required is for years running from the date of completion of the building contract; with normal limitations/exclusions for damage arising from actions from others over which the Fixers and Plumber have no control.

Owner/Owner's Agent or Contractor may formulate a suitable 'guarantee form' or require the guarantor to provide and complete a suitable form.

Table 21: Compatibility of materials in contact

This table shall be read in conjunction with Table 20 and Table 22.

Refer relevant *cladding* and *flashings* paragraphs for material and coating specifications.

Paragraphs 2.2, 4.2.2, 4.5.2, 8.2.4, 8.4.11, 8.4.11.1 and 9.6.7

	Aluminium, anodised or mill-finish	Aluminium, coated (1)	Butyl rubber & EPDM	CCA-treated timber (2)	Cedar	Cement plaster (uncoated)	Ceramic tiles (cement grout)	Clay bricks (cement mortar)	Concrete old (unpainted)	Concrete green (unpainted)	Copper/brass	Glass	Glazed roof tiles	Lead (including lead-edged) unpainted	Plastics	Stainless steel	Steel, galvanised coil-coated	Steel, galvanized (unpainted)	Zinc	Zinc/aluminium coated (1)	Zinc/aluminium, (unpainted)
Aluminium, anodised or mill-finish	✓	✓	✓	×	✓	×	×	×	✓	×	×	✓	✓	×	✓	B	✓	✓	✓	✓	✓
Aluminium, coated (1)	✓	✓	✓	B	✓	×	×	×	✓	×	×	✓	✓	B	✓	B	✓	✓	✓	✓	✓
Butyl rubber & EPDM	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CCA-treated timber (2)	×	B	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	B	×	×	B	×
Cedar	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	×	×	✓	×
Cement plaster (uncoated)	×	×	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	×	✓	✓	✓	✓	✓	✓	×
Ceramic tiles (cement grout)	×	×	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	×
Clay bricks (cement mortar)	×	×	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	×
Concrete old (unpainted)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Concrete green (unpainted)	×	×	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	×	✓	✓	×	×	×	×	×
Copper/brass	×	×	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	B	✓	B	×	×	×	×	×
Glass	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Glazed roof tiles	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Lead (including lead-edged) unpainted	×	B	✓	✓	✓	×	✓	✓	✓	×	B	✓	✓	✓	✓	B	B	B	B	B	×
Plastics	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Stainless steel	B	B	✓	✓	✓	✓	✓	✓	✓	✓	B	✓	✓	B	✓	✓	B	×	×	B	B
Steel, galvanised coil-coated	✓	✓	✓	B	✓	✓	✓	✓	✓	×	×	✓	✓	B	✓	B	✓	✓	✓	✓	✓
Steel, galvanized (unpainted)	✓	✓	✓	×	×	✓	✓	✓	✓	×	×	✓	✓	B	✓	×	✓	✓	✓	✓	✓
Zinc	✓	✓	✓	×	×	✓	✓	✓	✓	×	×	✓	✓	B	✓	×	✓	✓	✓	✓	✓
Zinc/aluminium, coated (1)	✓	✓	✓	B	✓	✓	✓	✓	✓	×	×	✓	✓	B	✓	B	✓	✓	✓	✓	✓
Zinc/aluminium (unpainted)	✓	✓	✓	×	×	×	×	×	✓	×	×	✓	✓	×	✓	B	✓	✓	✓	✓	✓

LEGEND:

✓ Materials satisfactory in contact.

× Contact between materials is not permitted. Minimum gap of 5 mm is required to prevent moisture bridging.

B Avoid contact in sea-spray zone or corrosion zone D.

NOTES:

(1) Coated – includes factory-painted, coil-coated and powder-coated.

(2) Includes copper azole and copper quaternary salts.

Amend 2
Jul 2005

Amend 5
Aug 2011

Table 22: Compatibility of materials subject to run-off

This table shall be read in conjunction with Table 20 and Table 21.

Refer relevant *cladding* and *flashings* paragraphs for material and coating specifications.

Paragraphs 2.2, 4.2.2, 4.5.2, 8.2.4, 8.4.1 and 9.8.5

Material that water flows onto	Material that water flows from	Aluminium, anodised or mill-finish	Aluminium, coated (1)	Butyl rubber & EPDM	CCA-treated timber (2)	Cedar	Cement plaster (uncoated)	Ceramic tiles (cement grout)	Clay bricks (cement mortar)	Concrete old (unpainted)	Concrete green (unpainted)	Copper/brass	Glass	Glazed roof tiles	Lead (including lead-edged) unpainted	Plastics	Stainless steel	Steel, galvanised coil-coated	Steel, galvanized (unpainted)	Zinc	Zinc/aluminium coated (1)	Zinc/aluminium, (unpainted)
Aluminium, anodised or mill-finish		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Aluminium, coated (1)		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Butyl rubber & EPDM		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CCA-treated timber (2)		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cedar		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cement plaster (uncoated)		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Ceramic tiles (cement grout)		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Clay bricks (cement mortar)		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Concrete old (unpainted)		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Concrete green (unpainted)		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Copper/brass		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Glass		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Glazed roof tiles		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Lead (including lead-edged) unpainted		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Plastics		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Stainless steel		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Steel, galvanised coil-coated		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Steel, galvanized (unpainted)		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Zinc		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Zinc/aluminium, coated (1)		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Zinc/aluminium (unpainted)		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

LEGEND:

✓ Materials satisfactory with water run-off as indicated.

✗ Water run-off is not permitted as indicated.

A Etching or staining of glass may occur with run-off.

NOTES:

(1) Coated – includes factory-painted, coil-coated and powder-coated.

(2) Includes copper azole and copper quaternary salts.

Amend 2
Jul 2005

EXTERNAL WALL COVERINGS

1. GENERAL

- 1.1. Accord with Preliminary and General clauses applying to this section and means of compliance to relevant NZBC requirements.

2. MAIN AREAS

- 2.1. The main areas of walling shall be as shown and described on the drawings and in the schedule of materials.

3. SMALLER AREAS

- 3.1. The smaller areas of walling shown shall be as shown and described on the drawings and in the schedule of materials.

4. WORKMANSHIP

- 4.1. The Contractor/Carpenter shall straighten all studs and nogs in external walls to the satisfaction of the Owner/Owner's Agent and Cladding Fixer and Wall Lining Fixer BEFORE fixing any building paper, bracing panels, (sheathings or rigid backings). All to tolerances given in table 1 of NZS 3604. Also provide thermal insulation between groups of studs at corner of the building BEFORE fixing building paper (areas that cannot be insulated from the inside).

5. FIXING AND FINISHING OF WALL CLADDING

- 5.1. Refer to section 8 of NZS 3604. Procure and accord with NZ Standards and Manufacturers instructions relating to the types of cladding shown on the drawings and specified above. (Also see 'BRICKWORK' section for brick and masonry veneer).
NOTE: NZS 3602 gives advice on widths of timber weather boarding and finishing. Should the Owner/Owner's Agent specify over-wide boards and any finish other than paint and not ensure adequate maintenance, the responsibility for any poor performances should not be apportioned to the Contractor.

6. ON COMPLETION

- 6.1. Leave all work and adjoining surfaces in a clean, stain free state and remove all rubbish.

7. GUARANTEE

- 7.1. Refer to clause 1.01. and table 1 of B2/AS1 and then present to the Contractor a signed sensible guarantee covering NZBC clauses B1, B2, E1, E2 for years running from the completion of the contract. With the normal limitations/exclusions arising from actions of others over which the Fixer has little or no control.



SANITARYWARE / FITTINGS

1. GENERAL

- 1.1. The Sanitaryware Plumber shall be a Craftsman/Registered Plumber and may also be a Registered Drainlayer and shall operate in full accordance with the following: -
 - 1.1.1. Preliminary and General clauses and NZBC requirements B2, E3, G1, G2, G3, G4, G12, G13 and AS/NZS 3500 Part 1 that generally apply to the work shown and/or specified.
 - 1.1.2. Use of Acceptable Solutions G12/AS1, and G13/AS1, G13/AS2 (with separate Registered Drainlayer if necessary) to meet the above NZBC requirements. OR 'alternative acceptable solutions' given in G12, G13 and AS/NZS 3500 Part 1. Approved documents if WANTING COST ADVANTAGES of a 'single stack' system.
 - 1.1.3. Provisions of a guarantee relating to the NZBC requirements BEFORE a progress payment is sought for work in this section.

2. DESIGN AND TENDERING ASPECTS

- 2.1. Visit the site before tendering in order to better assess site contours, ground conditions and depth and length of excavations to run a cold water supply pipe from main to the house. (Extra costs cannot be claimed later for aspects that should have been noted in such a visit or on which advice could have been obtained via study of a PIM issued by the T.A.).
- 2.2. Study the plumbing and drainage proposals shown on the Working Drawings. Discuss and resolve with the Owner/Owner's Agent concerns (if any) on matters such as pipe sizing, pipe runs, back flow prevention devices, types of valves shown (or not shown), venting and anti-siphonage needs. Also outline where earth – bonding conductors and equipotential bonding is required if not indicated.
- 2.3. Plumber shall sign the BUILDING CONSENT application and arrange connection and testing fees.

3. COLD WATER SUPPLY

- 3.1. Tap off from the mains service pipe in 20 Ømm Cooper or 20 Ømm Polybutylene or 20 Ømm Run pipe not less than 450mm below the Finished Ground Level to the house with entry through or under the foundation wall. Supply and fix a Water Meter, Toby Box and Cover as required by the T.A.

If required check with Fire Sprinkler supplier that mains service pipe size is adequate.
- 3.2. Provide 15 Ømm pipe to hose taps at front and rear of building and to all fittings including hot water cylinder and washing machine. All branches to be as short, straight and at even gradient as possible with easybends used throughout (NOT BELOW FITTINGS). Use only approved fittings throughout.

All pipes are to be adequately supported, well secured and where possible, concealed.

WHEN USING ANY TYPE OF PLASTIC PIPING, PLUMBER TO DISCUSS AND PROVIDE MEANS OF ELECTRICAL EARTHING WITH ELECTRICIAN.

4. HOT WATER SUPPLY

- 4.1. Supply one (1) mains pressure electrical hot water cylinder of 180 litre capacity of approved make and type and install and connect all pipes and valves to the approval of the T.A.
- 4.2. Provide 15 Ø [and] 20 Ø mm Copper or 15 Ø [and] 20 Ø mm Polybutylene hot water supply pipes and branches to all fittings including washing machine.

5. SANITARY FITTINGS ETC

- 5.1. Provide the provisional sum of \$[] for all items in the SANITARYWARE/FITTINGS category. Carefully note dimensions and install where shown on the Working Drawings and to Owners approval. OR Refer to owners for supply of fittings but allow for installation and fitting.

6. TAPS, FAUCETS AND VALVES

- 6.1. Consult with the Owner on choice of brands and fixing locations of all taps, faucets, and mixing valves and allow for fixing. Provide and fix all other water supply fittings as necessary e.g., approved types as in Table 4 of G12/AS1.

7. WASTES AND VENTS

- 7.1. Provide all necessary traps, waste pipes, soil stacks, back vents and terminal vent pipes. Provide cleaning eyes to all waste pipes at junctions and all necessary overflow pipes.

8. OTHER MEANS OF HEATING WATER

- 8.1. Consult with Owner on choice of free standing fireplace with wet back, or stove with wet back, or solar water heating panels to supplement the water heating system.

9. ON COMPLETION

- 9.1. Clean all fixtures, fittings and sanitary appliances.

10. GUARANTEE

- 10.1. Refer to clause 1.0.1 and Table 1 of B2/AS1 and then present to the Contractor a signed sensible guarantee regarding the work under NZBC requirements B2, G12 and G13, e.g., for years running from the date of completion of the building and with normal limitations/exclusions arising from actions of others over which the Plumber has little or no control.

DRAINLAYING

1. GENERAL

- 1.1. Read all clauses under Preliminary and General of this Specification as they apply to this trade. All work shall be in accordance with the means of compliance Table 1 ex Approved Document G13/2.

2. EXTENT OF WORK

- 2.1. Work in this section of the Contract comprises all surface and foul water drainage up to above ground level to connect to Plumbers work. Include all PVC drainage pipes and special fittings, construction of manholes, all gully traps, and connections for terminal vents, soil and waste pipes. The Drainlayer shall confer with the Plumber and shall arrange with the Contractor before the foundations are laid to fix the exact position of all connections of wastes and drains.

3. CONNECTION TO EXISTING DRAINAGE

- 3.1. The Drainlayer is responsible for verifying the position and depth of the connection and commence laying his drains from this point.

4. DRAIN TRENCHES

- 4.1. The excavation of trenches for drains shall be accurately made with base clear and true to grade so that no necessary filling is required. Adequate width shall be allowed in accordance with the depth of drain to enable laying and jointing to be properly carried out. Trenches shall be kept firm and dry and shall be opened up only in lengths that can be protected, utilized and refilled within a reasonable time.

5. LAYING OF DRAINS

- 5.1. All drains to be adequately supported by firm trench bottom with additional pocket excavations to avoid sockets etc. bearing on the ground. Backfill to be 150mm layers and foot tamped only. If drains are to be encased in concrete, pre-wrap in polythene to allow movement after concreting.

6. FITTINGS

- 6.1. The plan shows the layout of the system. Additional fittings that are normally required, such as inspection points and inspection bends, etc., that may be required but are not specifically shown must be allowed for by the Drainlayer to comply with normal practice under the regulations or special requirements of NZBC.

7. JOINTING AND BEDDING OF PIPES

- 7.1. The pipes are to be jointed in accordance with G13/2 and each and every junction or change of direction is to have removable cover plates for inspection.

8. **FALL IN DRAINS**

- 8.1. The whole of the soil and stormwater drains are to be laid to a regular and even fall.

9. **GULLY TRAPS**

- 9.1. Supply all gully traps and securely bed and build up 5:1 concrete surround 150mm above finished ground levels. Form large and deep dishings and trowel smooth. All gully traps are to be fitted with large gratings and also a grating or perforated plate above the waste discharging into it.

10. **SEWER AND STORMWATER CONNECTIONS**

- 10.1. Arrange with the T.A. to connect drain to sewer and stormwater where provided and pay all relating fees etc.

11. **MISCELLANEOUS**

- 11.1. Septic tanks shall comply with the performance criteria of NZBC G14. Constructed and installed in accord with NZS 4610 and also comply with the Resource Management Act.

12. **COMPLETION**

- 12.1. Properly backfill all trenches, consolidate as filling proceeds and leave in a tidy state.

13. **GUARANTEE**

- 13.1. Refer to clause 1.0.1 and Table 1 of B2/AS1 and then present to the Contractor a signed sensible guarantee regarding the work under NZBC requirements B2, G12 and G13, e.g., for years running from the date of completion of the building and with normal limitations/exclusions arising from actions of others over which the Plumber has little or no control.

ELECTRICIAN

1. GENERAL

- 1.1. Read and note all clauses under Preliminary and General of this specification where they apply to this trade. All work to be in accordance with Acceptable Solution G9 shown in Table 1 via work to Electrical Safety Regulations and associated Codes of Practice. (specifically NZECP51 and NZECP52).

2. FEES

- 2.1. Pay all fees and charges and obtain all necessary permits for this trade.

3. MATERIALS AND WORKMANSHIP

- 3.1. All materials used under this Contract shall be to approved New Zealand or overseas Standards. Allow for materials necessary to complete the Contract, whether specified or not. All work shall be carried out by a Registered Electrician holding a current practicing license in accordance with regulations and best trade practice and in a manner which will cause minimum inconvenienced to other workmen and the work as a whole. Do all cutting away, drilling, etc., and with timber cut the minimum only for the entry of cables.

4. MAINS SUPPLY

- 4.1. Arrange with the Electric Supply Authority, allow for and pay all fees for the connection of *underground* or *overhead* mains supply to the residence. Visit site to assess costs of obtaining supply, before submitting tender for the work.

5. METER BOX

- 5.1. Provide and install recessed Meter Box where shown on the plan. Confer with the Carpenter for trimming same.

6. MAIN SWITCHBOARD

- 6.1. Provide and install in recess mains switchboard complete with all necessary control and auxiliary equipment.

7. WIRING

- 7.1. Run new 2 and 3 core TPS cable for sub-circuit wiring to lights, power outlets, switches and for installation of appliances shown in the Working Drawings.
- 7.2. Locate cable runs in centres of timber framing members so that nailing or screwing of linings can be done without damaging the cables. Holes made should just be sufficient in size to pull cables through – not adversely affect the strength of the framing.
- 7.3. Ensure wiring is to locations agreed with the Owner without fouling installations by other trades e.g., to required mounting height of switches and

power outlets above floor or above work tops and to required alignment of lights along and across ceilings.

8. INSPECT, TEST, CERTIFY

- 8.1. Inspect, test, certify and connect to the mains when wiring and installation has been completed. Alternatively, if requested arrange an independent testing and certification and give a copy of the Compliance Certificate (Energy Work Certificate) to the Owner to forward to the T.A. **NOTE:** that that the later serves the purpose of a guarantee. Delay in issuing the certificate shall result in a delay of the final payment.

CEILING LININGS AND SARKINGS

1. GENERAL

- 1.1. Accord with all Preliminary and General clauses applying to work and materials shown on the Working Drawings. Linings to be fixed after Plumber has set out pipe runs and set locations of traps, etc. And after electrical wiring has been run to power and lighting outlets. All lining work shall accord with the relevant sections in all applicable NZ Standards. (also see Carpentry and Joinery section)

2. MAIN AREAS

- 2.1. The main areas of ceiling lining shall consist of ~~12~~mm ply grove fixed over framing in accord with manufacturers instructions.

3. SMALLER AREAS

- 3.1. Small areas of ceiling linings shown shall consist of ~~10~~mm Gib Board fixed under framing in accord with manufacturers instructions or as shown on the drawings.

4. WORKMANSHIP

- 4.1. The Contractor/Carpenter shall erect and straighten ceiling frames to the satisfaction of the Owner and Ceiling Lining Fixer. All tolerances given in Table 2.1 of NZS 3604 (Remember: Thermal insulation needs to be provided for the roof – ceiling space. The work needs to be coordinated with other trades and care taken to avoid rain wetting).

5. FIXING AND FINISHING OF CEILING LININGS

- 5.1. Refer to SECTION 13 – CEILINGS in NZS 3604. Procure and accord with NZ Standards and Manufacturers instructions relating to the lining indicated on the Working Drawings and listed above.

6. ON COMPLETION

- 6.1. Leave all work and adjoining surfaces in a clean, stain free state and remove all rubbish.

7. GUARANTEE

- 7.1. Provide the Contractor with a written 5 year guarantee covering NZBC requirements B1, B2, E2 and E3.



INTERNAL WALL LININGS

1. GENERAL

- 1.1. Accord with all Preliminary and General clauses applying to work and materials on the Working Drawings. Linings to be fixed after Plumber has set out pipe runs and set locations of traps etc. And after electrical wiring has been run to power and lighting outlets. All lining work shall accord with the relevant sections in all applicable NZ Standards (also see Carpentry and Joinery section).

2. MAIN AREAS

- 2.1. The main areas of wall linings shall consist of 10mm Gibraltar Board and Gibraltar Board Brace Line..

3. SMALLER AREAS

- 3.1. In small areas defined on the drawings the internal wall lining shall consist of Gibraltar Board Aqualine to wet areas.

4. WORKMANSHIP

- 4.1. The Contractor/Carpenter shall erect and straighten all studs and nogs to the satisfaction of the Owner and Wall Lining Fixer. All to tolerances given in Table 2.1 of NZS 3604. (Remember: Thermal insulation needs to be provided for the wall space. The work needs to be coordinated with other trades and care taken to avoid rain wetting).

5. FIXING AND FINISHING OF WALL LININGS

- 5.1. Refer to SECTION 12 – WALL LININGS in NZS 3604. Procure and accord with NZ Standards and Manufacturers instructions relating to the lining indicated on the Working Drawings and listed above.

6. ON COMPLETION

- 6.1. Leave all work and adjoining surfaces in a clean, stain free state and remove all rubbish.

7. GUARANTEE

- 7.1. Provide the Contractor with a written 5 year guarantee covering NZBC requirements B1, B2, E2 and E3.



MISCELLANEOUS

1. BARRIERS

- 1.1. Construct barriers to decks as shown. All to height with required balusters, top rails, bottom rails and fixings in accordance with NZBC Acceptable Solution B1/AS2 or F4/AS1.
- 1.2. Construct barriers as shown to a minimum height of 1m from deck surface
- 1.3. Fence and provide gates to swimming pool all in accordance with the Fencing of Swimming Pools Act 1987.
- 1.4. Staircase and landing shall be constructed in timber to NZBC Acceptable Solutions D1/AS1. With handrail and balustrading also to D1/AS1.

2. SMALL OPEN FIREPLACE AND CHIMNEY

- 2.1. Decide materials and format to be used from NZBC Acceptable Solution B1/AS3 and provide drawn details and specification to suit. Or refer to drawings and engineers calculations.

Remember to provide the necessary details of hearth and chimney restrains (floor and roof brackets). BRANZ type bracing calculations will need to take account of EXTRA Bracing Units ex Table 2 of B1/AS3 required in each storey. Refer to engineers calculations.

3. CHIMNEY

- 3.1. Chimney to be stone to Owners preference. All reinforced to NZBC B1/3 requirements and adequately braced. Cast in C.I. tip grade to floor hearth. Construct fireplace with jambs in 230mm work. Line with firebrick, with slanting sides and a tilted back giving a 75mm max. throat opening, finished 150mm above soffit of fireplace opening. Fill behind tilted back with mortar, with concave finish to top. Gather stonework into flue liner and parge stonework. Cast concrete lintel with 100mm bearing, reinforced with two 12mm diameter rods tied with 4mm wire at 150 centres. Slope back face of lintel into throat. Construct flue with internal dimensions of 500mm x 500mm and build in 320mm diameter stainless steel flue liner for full height.

Chimney to be 2.4 maximum height above roof. Refer to details on drawings which will take precedence.

4. FREE STANDING SOLID FUEL FIREPLACES AND STOVES

- 4.1. Install free standing fireplace manufactured by including hearth and steel flue (specify type and thickness) where indicate on plan. The installer shall be approved by the manufacturer and install in full accordance with the manufacturer's recommendations and approval of the Territorial Authority. Installation shall generally accord with NZS 7421.

5. **GAS FIRED APPLIANCES**

5.1. Installation of pipework and appliances shown only be done by a Registered Gasfitter who shall notify the T.A. and sign the BUILDING CONSENT application at least 2 days before commencing installation.

5.1.1. Pipework and installation shall be to NZS 5261: Part 1. Alternatively:-

5.1.2. Pipework shall be to NZBC G10/AS1 and installation and appliances to NZBC G11/AS1.

5.1.3. Oven and cook top shall be manufactured by

5.1.4. Gas ~~—~~ fired heater (or heaters..... (Number)) shall be manufactured by

5.1.5. Gas ~~—~~ fired hot water cylinder shall be manufactured by
.....

SOLID PLASTER

1. PRELIMINARY AND GENERAL

- 1.1. Read and note all clauses under Preliminary and General of this specification where they apply to this trade.

2. MATERIALS

- Cement - shall be as specified under "Concrete".
- Sand - shall be to NZS 3103 Sands for Mortars, Plaster and external Renderings.
- Hydrated Lime - shall be mill hydrated of an approved brand.
- Bonding Agents - if used shall be in accordance with maker's instructions.

3. MIXES

- 3.1. Single, two (2) or three (3) coatwork shown on drawings shall be in accord with NZS 4251 with mix strength varying from: -
- (a) 1 part cement : 3 sand
 - (b) 1 part cement : 0.5 lime : 4.5 sand
 - (c) 1 part cement : 1 lime : 6 sand
- or chosen to suit background and finish required.

4. FINISHES

- 4.1. Float finish, pebble dash or roughcast as directed by Owner.

5. WORKMANSHIP

- 5.1. Backgrounds should be adequately mechanically keyed or the plasterer should use chemical bonding agents to ensure freedom from drumminess (poor bond).
- 5.2. Agree tolerance in straightness of walls, etc, with Owner before commencing work.
- 5.3. Any surface plastered will be deemed accepted as suitable by the plasterer and he will be held responsible should defect occur.

PAINTER AND GLAZIER

1. GENERAL

- 1.1. Refer to Preliminary and General section of this Specification plus any Special Condition sections which shall apply to all work of this section.
- 1.2. The work described under this section of the Specification includes all paint finishes to surfaces as hereunder specified, and all work normally done by this trade.
- 1.3. Related Documents

This section makes reference to various standards, which shall form part of the Specification unless otherwise qualified by this or other Contract Documents.

NZS 7703 Painting of Buildings

- 1.4. Guarantee

In accordance with the preliminaries section of this specifications provide the Employer with the Guarantee on all Painting for a period of 3 years..

2. MATERIALS

- 2.1. All materials shall be of the best of their respective kinds, conforming to the relevant British Standards and NZ Standards. They shall be delivered to the site in unbroken sealed packages bearing the Manufacturers name.
- 2.2. Allow for different colours in the different spaces, but obtain instructions from the Owner or Designer before proceeding with any colour work. A colour schedule to the Painter prior to commencement of the finish coats. Give at least 7 days notice to the Owner or Designer prior to the colour schedule being required. Samples of colours and paint finishes may be required.

3. WORKMANSHIP

- 3.1. General

The whole of the work shall be executed by competent tradesmen in accordance with sound trade practice, using tools and equipment suitable for ensuring a first class job. Treatments and finishes of a special nature shall be done by men experiences and competent in such work.

- 3.2. Manufacturer's instructions shall be strictly adhered to.
- 3.3. All locksets and other fittings shall be removed before painting and shall be replaced on completion. Knuckles of hinges and butts must not be painted.
- 3.4. No external work shall be one during frosty or inclement weather.
- 3.5. Any work damaged by dust, rain or other causes shall be rubbed down and recoated.

4. **PREPARATION OF SURFACES**

- 4.1. Notwithstanding provisions in other sections of this Specification, it shall be the responsibility of the Painter to ensure that all surfaces, including the surfaces of all successive undercoats, are in a suitable condition to enable a first class finish to be obtained.
- 4.2. Wash, dust, scrape, sand or otherwise clean down all surfaces, including undercoats, and remove all imperfections by filling, sandpapering and the like, and apply such sealer, neutralisers or other materials as are necessary, and in accordance with sound trade practice. This work is subject to the provisos as to adherence to any one Manufacturer's paint system, and to the proviso that any one paint system, including the cost of such materials, shall be deemed to be included in the contract.

5. **PRIMING**

- 5.1. Priming coat shall be thoroughly brushed onto all surfaces, filling in small openings or pores and not flowed or sprayed on.
- 5.2. Co-operate with Carpenter and prime all external timber work to be painted before installation and fixing. Carefully cover all laps, backs, edges, butts and ends. Re-prime as directed immediately prior to application of the undercoat.
- 5.3. Should more than two months elapse between priming and undercoating, the whole of the work shall be repainted.
- 5.4. Priming must be carried out by painting tradesmen and not delegated to Carpenters or other trades.
- 5.5. Immediately after first priming, stop all nails, holes and defects in external work.

6. **PAINT APPLICATION**

- 6.1. Apply coatings in accordance with Manufacturer's recommendations.
- 6.2. Immediately before commencing work, all materials shall be thoroughly mixed or re-mixed.
- 6.3. Paint shall be well worked out of brushes, cross brushed and laid off evenly and left free of brush marks, runs and other blemishes.
- 6.4. Carefully and accurately cut all edges of colour.
- 6.5. Rub down between coats for all work with fine glass paper.
- 6.6. Each coat shall be finished over all surfaces before the next is applied.
- 6.7. The Painter shall not apply consecutive coats of the same colour except white. Each successive coat shall be of a distinctive and different tint.

- 6.8. No driers or thinners shall be allowed between coats and no second coat shall be commenced until the previous coat is thoroughly dry.

7. COLOUR SCHEME

- 7.1. The owner will select from standard colour charts, colours he will require and the Contractor is to allow for picking out sashes, doors, porches and other reasonable colour change required.

8. STOPPING

- 8.1. After priming, all nail holes or joints are to be stopped and cleaned off before undercoating for painted work and for varnished work, holes, etc., are to be stopped with matching putty after first coat or sealer.

9. PAINTING OF EXTERNAL WOODWORK

- 9.1. After priming all external woodwork and adjacent metal work such as flashings, spouting and downpipes is to be given one good coat of undercoat followed by two finished coats of high gloss paint. Priming coat before painting shall be well brushed in and all faces shall be covered, ends of laps and tops and sides of sashes, doors, etc.

10. PAINTING OF INTERIOR SURFACES

- 10.1. Walls and ceilings as required to be given one coat of sealer and finished with two coats of approved paint finishing satin or semi-gloss as required. Where full gloss is required such as kitchen and bathroom, finishing coat shall be full gloss enamel.

11. VARNISHING

- 11.1. Where varnishing is required such as doors, architraves and skirtings give one coat of approved P.V.A. sealer followed by two coats of clear varnish finishing egg-shell gloss and lightly sanding between coats.

12. CONCRETE

- 12.1. To concrete base walls or concrete block work apply two coats of exterior quality P.V.A. paint of an approved type finishing semi-gloss or as described on the drawings.

13. ROOF

- 13.1. Roof – if corrugated iron prime all laps before fixing. For corrugated iron or galvanised trough section roofing after fixing prime roof with calcium plumbate galvanised iron primer and then apply one good coat of approved roof paint.

14. PAPERHANGING

- 14.1. All rooms to be prepared shall have paper hung to a value of \$[] per roll. Wall shall be properly prepared by sizing, paper hung straight and true with butt joints, and paste used shall have a fungicide incorporated.

15. **GLAZIER**

- 15.1. Glaze all window sashes, doors or screens and overhead screens, if shown, with appropriate weight glass and safety glasses or safety plastics properly fixed and puttied or beaded into rebates or gasket glaze. All glazing shall be clear including bathrooms and WC's and comply with glazing standards W2S 4223 1993 and NZS 4102 1990 for glass sizes, thicknesses and fixing.

16. **MIRROR**

- 16.1. Provide a 6mm polished plate glass mirror and mount on bathroom wall with fixings as required.

17. **COMPLETION**

- 17.1. The Painter and Glazier are to do all that is required of their trades to leave the work complete and all must be left clean including all glass on completion.

SCHEDULE OF MATERIALS

1. MANUFACTURERS DETAILS AND FIXING INSTRUCTIONS

- 1.1. Metal longrun roofing
- 1.2. Metal wall cladding
- 1.3. Thermacraft roofing underlay
- 1.4. Timber weather boards
- 1.5. Watergate plus building wrap
- 1.6. Plywood flooring
- 1.7. Rosolatic waterproofing membrane
- 1.8. Flintknote waterproofing membrane
- 1.9. Koolthem K17 insulated plasterboard
- 1.10. Wood fire
- 1.11. Altherin aluminium balustrade
- 1.12. Coutour aluminium balustrade

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THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

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JULY 15, 1933

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4.1 PROFILE METAL LONG RUN ROOFING

The following is a full copy (excluding guidance notes) of the master spec® specification for Dimond Roofing Systems.

4311D DIMOND PROFILED ROOFING

1. GENERAL

Related work

1.1 RELATED SECTIONS

Refer to 4312D DIMOND PROFILED GRP NATURAL LIGHTING for natural lighting sheeting

Refer to 7413 RAINWATER SYSTEMS for rainwater disposal

Documents

1.2 DOCUMENTS REFERRED TO

Documents referred to in this section are:

AS/NZS 1170.2	Wind actions
AS 3566	Screws - Self-drilling - For the building and construction industries
NZS 3604	Timber framed buildings
NZS 4203	General structural design and design loadings for buildings
AS/NZS 2728	Prefinished/pre-painted sheet metal products for interior/exterior building applications - performance requirements

NZ Metal Roofing Manufacturers Inc: NZ metal roofing & 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.

1.3 MANUFACTURER'S DOCUMENTS

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

Dimond Roofing and Cladding Systems Manual, September 2001

Copies of the above literature are available on the Dimond website www.dimond.co.nz or by phoning Dimond on 0800 DIMOND (0800-346 663).

Requirements

1.4 QUALIFICATIONS

Roofers to be Dimond Certified Commercial Installer, or experienced, competent roofers familiar with Dimond products.

1.5 MAINTENANCE DATA

Provide two bound copies of all relevant Dimond maintenance information on completion of the roofing work.

Guarantees

1.6 WARRANTY

Warrant this work under normal environmental and use conditions against:

Failure of coating adhesion: Manufacturers standard warranty

Weatherproofing by material penetration: Manufacturers standard warranty

Weatherproofing by substandard workmanship: 5 years

From: Date of completion of installation

Refer to the PRELIMINARIES AND GENERAL section for details of when completed warranty must be submitted.

Performance

- 1.7 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, or by wind loads given by NZS 4203 or AS/NZS 1170.2. Allow for specific loadings at corners and the periphery of the roof, where localised pressure factors apply.
- 1.8 COORDINATE**
Coordinate to ensure substrate and preparatory work is complete and other work programmed in the order required for access and completion of the roof.
- 1.9 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.

2. PRODUCTS

Materials - General

- 2.1 WIRE NETTING**
Galvanised hexagon 75 mm mesh, 1 mm diameter galvanised steel wire.
- 2.2 SAFETY MESH**
Aus Mesh galvanised wire mesh.
- 2.3 UNDERLAY**
Breather type kraft paper laminates.
- 2.4 DIMOND ROOFING**
Refer to 4. SCHEDULES / drawings.
- 2.5 FLASHINGS GENERALLY**
Formable grade 0.55 mm BMT for galvanised, Zinalume® and pre-coated steel, and 0.90 mm BMT for aluminium to the same standards as the profiled sheets, notched where across profile or provided with a soft edge.
- 2.6 FLASHINGS TO VERGE, RIDGE AND HIP**
Supplied by **Dimond** to match or to suit the roofing.

Components

- 2.7 FASTENERS GENERALLY**
Durability of all fasteners not less than the roofing material being fixed.
- 2.8 FIXING CLIPS TO TROUGH SECTION ROOFING**
Galvanised steel (powder coated for aluminium) to suit the material and profile of the rigid sheet and location as required by **Dimond** for **Dimondek 300** and **Dimondek 400**. Fix to steel with 16 mm x 10 gauge galvanised wafer head self-drilling screws and to timber with 50 mm long galvanised spiral rolled flat head nails.

Fix **Dimondek 630** clips to steel with 20 mm x 12 gauge hex screws and to timber with 50 mm long galvanised spiral rolled flat head nails.
- 2.9 FIXING SCREWS**
To AS 3566. Screws appropriate to the roofing material and the supporting structure, and wind load as required by **Dimond**, and with a durability not less than the material fixed.
- 2.10 RIVETS**
Sealed aluminium, minimum diameter 4.8 mm.

Accessories

- 2.11 SEALANT**
Neutral curing silicone or polymer sealant as required by **Dimond** and used as directed.

2.12

CLOSURE STRIPS

Non-bituminous compressible, profiled closed cell foam strips to fit the sheet profile.

Brand: Ecofoam

Profile: To suit selected cladding profile

3.

EXECUTION**Conditions**

3.1

INSPECTION

Inspect the roof framing and supporting structure to ensure that it is complete and fully braced ready for roofing and free from any misalignments or protrusions that could damage the roofing.

3.2

STORAGE

Take delivery of and accept packs of roofing dry and undamaged on delivery. Reject all damaged material. Store on a level firm base clear of the ground, with packs well ventilated and completely protected from weather and damage. Do not allow moisture to build up between sheets.

3.3

HANDLING

Avoid distortion and contact with damaging substances, including cement. Do not drag sheets across each other or other materials. Protect edges and surface finishes from damage. Use soft, flat sole shoes when fixing and for all other work on the roof.

3.4

SEPARATION

Isolate dissimilar materials in close proximity as necessary by painting the surfaces or fitting separator strips of compatible materials. Place isolators between metals and treated timber and cement based materials. Do not use unpainted lead sheet in contact with or allow water run-off onto galvanised steel or Zinalume®.

Application

3.5

SET OUT & LAYING

Carefully set out to allow cover flashings of equal width at the ends of the building. Lay sheets with side laps away from the line of sight ensuring ends of sheets are true to line. Check during fixing to eliminate creep or spread and use string lines along purlin centres to keep fastenings in line.

3.6

FORMING

Form stop-ends and downturns to **Dimond** recommendations.

3.7

SEAL CUT EDGES

Seal cut edges of pre-coated steel sheet with edge protection lacquer before fixing to **Dimond** requirements.

3.8

END LAPS

End laps are not permitted, except where specifically detailed to **Dimond** requirements.

3.9

THERMAL MOVEMENT

Roof fixing and jointing to conform with **Dimond** requirements for thermal movement.

3.10

FIXING GENERALLY

Install and fix in accordance with the NZ Metal Roofing Manufacturers Inc: NZ metal roofing & wall cladding code of practice and to **Dimond** required fixing patterns and details for each area of the building roofing. Use only screws as required by **Dimond**. Paint colour matched fixings and accessories before installation.

3.11

FIX UNDERLAY

Fix wire netting where specified, drawn tight and nailed or screwed to purlins with edges butted and wired together to form a complete net. Fit and lap roofing underlay over the netting to suit roofing sheets, with 20 mm oversail into gutter, to the underlay manufacturer's requirements.

3.12

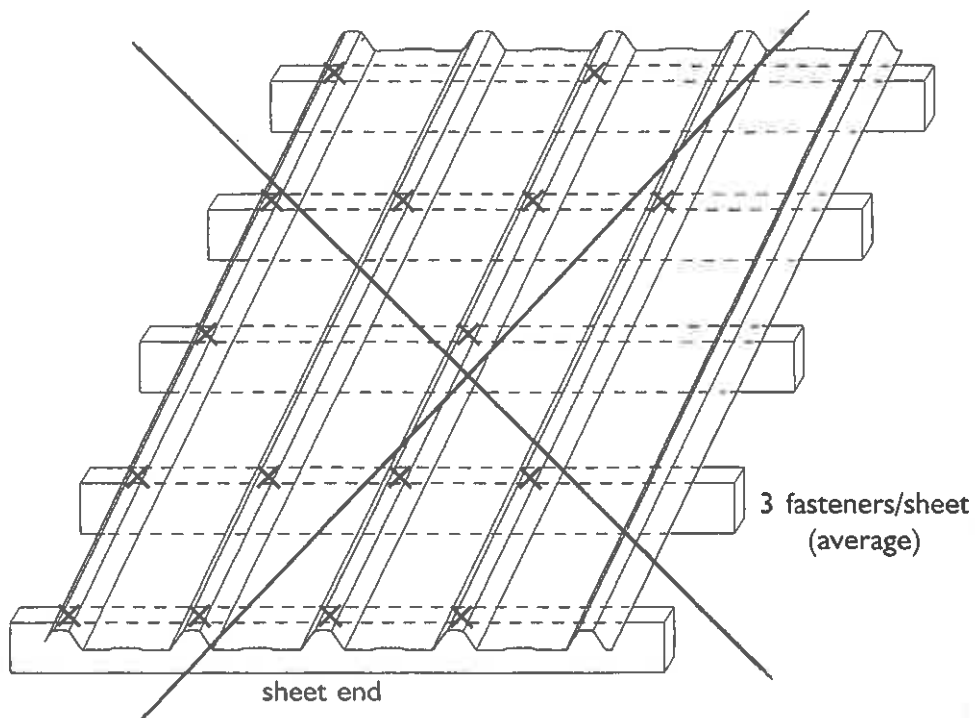
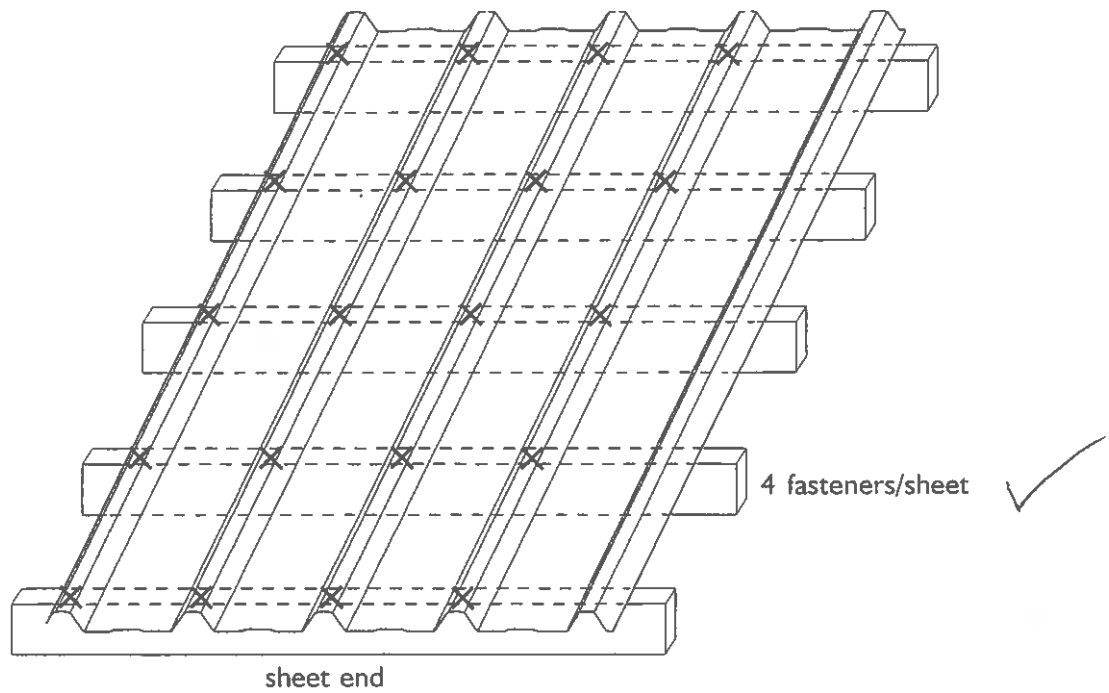
FIX INSULATION

Run and fix insulation blanket as detailed and to the insulation manufacturer's requirements.

- 3.13 MARKING AND CUTTING**
Cut only by shearing tools. Do not use black lead pencils for marking Zincalume®, Colorsteel® or ColorCote® products.
- 3.14 FIX SHEETS**
Fix sheets in place using the fastening system required by **Dimond** for specified profiles, making due allowance for dynamic local wind pressures on the building and thermal movement in the sheet.
- 3.15 FLASH**
Flash roof to parapets, walls and penetrations to detail, to the New Zealand Metal Roofing Manufacturer's Association Inc: NZ metal roofing & wall cladding code of practice and **Dimond** requirements. Cut accurately and fix using sealant and rivets to detail and to **Dimond** requirements to form a weatherproof cover. Ensure flashings are designed and installed to avoid water ponding.
- 3.16 FIX RIDGES AND HIPS**
Cut accurately and fix using primary fasteners to the purlins. Join using sealant and rivets to detail and to the New Zealand Metal Roofing Manufacturers Inc: NZ metal roofing & wall cladding code of practice. Ensure flashings are designed and installed to avoid water ponding.
- 3.17 FIX VERGE AND CAP FLASHINGS**
Cut accurately and fix using primary fasteners to the purlins. Join using sealant and rivets to detail and to the New Zealand Metal Roofing Manufacturers Inc: NZ metal roofing & wall cladding code of practice. Ensure flashings are designed and installed to avoid water ponding.
- 3.18 PENETRATIONS**
Flash and overflash all penetrations through the roof.
- 3.19 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).
- Completion**
- 3.20 REPLACE**
Replace damaged or marked elements.
- 3.21 LEAVE**
Leave this work complete with all necessary flashings, undercloaks, valleys, ridges and hips all properly installed as the work proceeds so the finished roof is completely weathertight.
- 3.22 REMOVE**
Remove all trade rubbish, swarf and unused materials from the roof and surrounds daily during the work. Sweep down at the end of each day, and clean out spoutings, gutters and rainwater pipes on completion of the roof. Remove debris, unused materials and elements from the site.
- 3.23 PROTECTION**
Protect the completed work from damage for the remainder of the construction period. If access is given to the roof for later work, provide properly constructed walkways or platforms to eliminate damage.

2.1.4.5 Continued

DIMOND STYELINE AND TRIMDEK FASTENER LAYOUT OPTIONS





4.2 PROFILE METAL CLADDING

The following is a full copy (excluding guidance notes) of the master spec® specification for Dimond Cladding Systems.

4241D DIMOND PROFILED CLADDING

1. GENERAL

Related work

1.1 RELATED SECTIONS

Refer to 4312D DIMOND PROFILED GRP NATURAL LIGHTING for natural lighting sheeting.

Refer to 4719 THERMAL INSULATING MATERIALS for insulation.

Documents

1.2 DOCUMENTS REFERRED TO

Documents referred to in this section are:

AS/NZS 1170.2	Wind actions
AS 3566	Screws - Self-drilling - For the building and construction industries
NZS 3604	Timber framed buildings
NZS 4203	General structural design and design loadings for buildings
AS/NZS 2728	Prefinished/pre-painted sheet metal products for interior/exterior building applications - performance requirements

NZ Metal Roofing Manufacturers Inc: NZ metal roofing & 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.

1.3 MANUFACTURER'S DOCUMENTS

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

Dimond, Roofing and Cladding Systems Design Manual, September 2001

Copies of the above literature are available on the Dimond website www.dimond.co.nz or by phoning Dimond on 0800 DIMOND (0800-346 663).

Requirements

1.4 QUALIFICATIONS

Roofers to be **Dimond** Certified Commercial Installer, or experienced, competent roofers familiar with **Dimond** cladding products.

1.5 MAINTENANCE DATA

Provide two bound copies of all relevant **Dimond** maintenance information on completion of the cladding work.

Guarantees

1.6 WARRANTY

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

Coating adhesion:	Manufacturer's standard warranty
Weatherproofing by material penetration:	Manufacturers standard warranty
Weatherproofing by substandard workmanship:	5 years
From:	Date of completion of installation

Refer to the PRELIMINARIES AND GENERAL section details of when completed warranties must be submitted.

Performance

1.7 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, or by wind loads given by NZS 4203 or AS/NZS 1170.2.

2. PRODUCTS

Materials - general

- 2.1 BUILDING PAPER
Heavy weight fire retardant breather type kraft paper laminates.
- 2.2 CLADDING
Refer to 4. SCHEDULES
- 2.3 FLASHINGS GENERALLY
Formable grade 0.55 mm BMT for galvanised, Zinalume[®] and pre-coated steel, and 0.90 mm BMT for aluminium to the same standards as the profiled sheets, notched where across profile. Flashings around wall openings or at joints in cladding to **Dimond** approved detail.
- 2.4 WALL AND PARAPET FLASHINGS
Supplied by **Dimond** to match or to suit the cladding.

Components

- 2.5 FASTENERS GENERALLY
Durability of all fasteners not less than the cladding material being fixed.
- 2.6 FIXING CLIPS TO TROUGH SECTION CLADDING
Galvanised steel (powder coated for aluminium) to suit the material and profile of the rigid sheet and location as required by **Dimond** for **Dimondek 300** and **Dimondek 400**. Fix to steel with 16 mm x 10 gauge galvanised wafer head self-drilling screws and to timber with 50 mm long galvanised spiral rolled flat head nails.
- Fix **Dimondek 630** clips to steel with 20 mm x 12 gauge hex screws and to timber with 50 mm long galvanised spiral rolled flat head nails.
- 2.7 FIXING SCREWS
To AS 3566. Screws appropriate to the cladding material, the supporting structure and the wind load as required by **Dimond** and with a durability not less than the material fixed.
- 2.8 RIVETS
Sealed aluminium, minimum diameter 4.8 mm.

Accessories

- 2.9 SEALANT
Neutral curing silicone or polymer sealant as required by **Dimond** and used as directed.
- 2.10 CLOSURE STRIPS
Non-bituminous compressible, profiled closed cell foam strips to fit the sheet profile.
Brand: Ecofoam
Profile: To suit selected cladding profile

3. EXECUTION

Conditions

- 3.1 INSPECTION
Inspect the wall framing and supporting structure to ensure that it is complete and fully braced ready for cladding and free from any misalignments or protrusions that could damage the cladding.
- 3.2 STORAGE
Take delivery of and accept packs of cladding dry and undamaged on delivery. Reject all damaged material. Store on a level firm base clear of the ground with packs well ventilated and completely protected from weather and damage. Do not allow moisture to build up between sheets.
- 3.3 HANDLING
Avoid distortion and contact with damaging substances, including cement. Do not drag sheets across each other or other materials. Protect edges and surface finishes from damage.

3.4

SEPARATION

Isolate dissimilar materials in close proximity as necessary by painting the surfaces or fitting separator strips of compatible materials. Place isolators between metals and treated timber and cement based materials. Do not use unpainted lead sheet or copper in contact with or allow water run-off onto galvanised steel or Zinalume®.

Application

3.5

SET OUT

Set cladding to vertical plumb lines and maintain verticality. Carefully set out to allow cover flashings of equal width at the ends of the building. Lay sheets with side laps away from the line of sight ensuring ends of sheets are true to line. Check during fixing to eliminate creep or spread and to keep fastenings in line. Ensure all exposed fastenings are set to a line.

3.6

FORMING

Form stop ends to **Dimond** recommendations.

3.7

SEAL CUT EDGES

Seal cut edges of pre-coated steel sheet with edge protection lacquer before fixing to **Dimond** requirements.

3.8

THERMAL MOVEMENT

Fixing and jointing to conform with **Dimond** requirements for thermal movement.

3.9

FIXING GENERALLY

Install and fix in accordance with the NZ Metal Roofing Manufacturers Inc: NZ metal roofing & wall cladding code of practice and to **Dimond** required fixing patterns and details for each area of the building cladding. Use only screws as required by **Dimond**. Paint colour matched fixings and accessories before installation.

3.10

FIX UNDERLAY

Run and fix underlays where specified in accordance with the underlay manufacturer's requirements.

3.11

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).

3.12

MARKING AND CUTTING

Cut only by shearing tools. Do not use black lead pencils for marking Zinalume®, ColorCote® or Colorsteel® products.

3.13

FIX SHEETS

Fix sheets in place using the fastening system required by **Dimond**, making due allowance for dynamic local wind pressures on the building and thermal movement in the sheet.

3.14

FIX FLASHINGS AND CAPPINGS

Flash to penetrations, cap corners and edges, using sealant and fasteners to detail and to **Dimond** requirements. Ensure flashings are designed and installed to avoid water ponding.

Completion

3.15

REPLACE

Replace all damaged or marked elements.

3.16

LEAVE

Leave this work complete with all necessary flashings and cappings all properly installed as the work proceeds so the finished cladding is completely weathertight.

3.17

REMOVE

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

2.1.1.5 WARRANTY

Warranties for commercial applications are issued on a job by job basis. It is imperative that care is taken during the planning process to choose the Roofing, Wall Cladding and Fastener system that will provide the life expectancy in the environment in which it will be installed, as incorrect selection could result in no warranty being available.

To assist you in determining the system that will best meet your warranty expectations Dimond have in place a Warranty Inquiry Service. Your design decisions on product type, material thickness, profile, paint coating type and colour, along with site details including address, distance from sea and degree of exposure will be required to enable us to provide a meaningful warranty. To access the service, please contact your Dimond Key Account person or phone 0800 DIMOND.

All warranties will carry a required maintenance clause, which must be complied with to ensure the warranty remains valid. Often aspects of design such as roof shape and roof pitch can influence the maintenance requirements. Due consideration of these factors during the design process is wise.

As a general guide, provided the materials are correctly selected from Table 2.1C for the environment, and building design does not impact on durability, it is reasonable to expect the following warranty terms will be available to your roofing and wall cladding. Please note that no warranty is available for Galvsteel material regardless of which environmental category it is used in.

Steel and Aluminium based materials.

15 years to perforation of substrate and fastener strength.

15 years resistance to flaking, peeling and excessive fade.

Duraclad

20 years to fibre show through

20 years to perforation

Routine Maintenance

Washing

All metal surfaces must be kept clean for best durability. Warranty conditions require regular washing either by natural rainwater or by manual washing and scrubbing with a soft bristle brush.

The frequency of washing must be sufficient to prevent build up of debris, dirt or salt deposits and will vary depending on location and degree of protection from rainfall.

As a general guide the following frequencies can be used as a starting point.

Environment	Washing Frequency
Moderate / Marine	Every 6 – 12 months
Severe Marine	Every 3 – 6 months
Very Severe Marine	Every 3 months

Continued on next page ...

Dimond

2.1.1.3 Continued

The need to wash can be reduced by building design that avoids the creation of metal roof or wall surfaces that are sheltered from natural rainfall.

Overpainting

Substrate in Good Condition

Clean the surface and overpaint with an acrylic * roof paint system, following the paint manufacturer's instructions.

Substrate Requires Refurbishment


Clean the surface and coat any surface corrosion with a suitable conversion treatment and primer, then overpaint with an acrylic * roof paint system, following the paint manufacturer's instructions. Check and replace any fasteners exhibiting advanced corrosion.



COVERTEKTM 407

MEMBRANES OF THE FUTURE

**FIRE RETARDANT SELF SUPPORTING ABSORBENT BREATHABLE
SYNTHETIC NON-WOVEN ROOF UNDERLAY**



STRENGTH

BREATHER SHEET

WATER RESISTANCE

FLAMMABILITY
FLAMMABILITY INDEX OF ≤5
AS1530 PART 2

BRANZ Appraised
Appraisal No. 951 (2008)

 **Thermakraft**

APPLICATION AND INSTALLATION

Product Description COVERTEKTM407 is a five layer polymer structure that is designed to prevent water penetration without impeding the passage of water vapour.

COVERTEKTM407 consists of a microporous water resistant film, sandwiched between two layers of mould and shrink resistant spun-bonded polyolefin.

COVERTEKTM407 is manufactured with an upper layer of tear resistant synthetic spun-bond, and a lower layer of tear resistant synthetic spun-bond facing down. Both layers are designed to protect the inner water resistant microporous membrane.

Flammability COVERTEKTM407 has a flammability index ≤ 5 and therefore meets the requirements of NZBC Acceptable Solutions C/AS1 Part 6 Table 6.2 for surface finish requirements for suspended flexible fabric, and therefore it may be used without restrictions in all buildings.

Product Advantages COVERTEKTM407 is a unique five layer membrane with these important features:

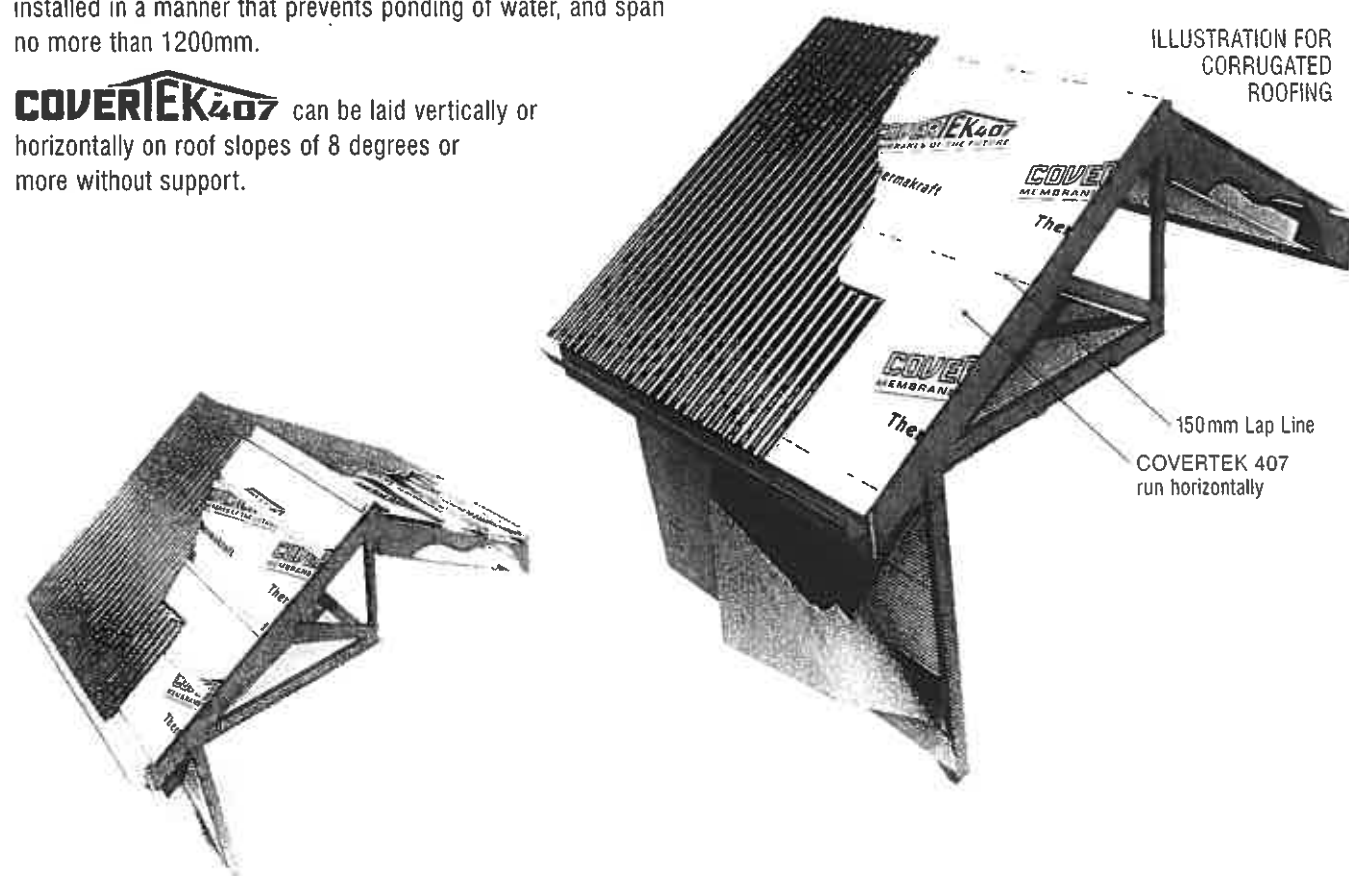
- can be used in direct fix or cavity fix for roof and wall construction
- is more stable and more shrink resistant than kraft based products
- may be installed during adverse conditions (rain) without affecting its durability and performance
- will not increase risk of condensation as compared with comparable kraft underlays
- has an edge tear greater than 300N
- has a 150mm lap line printed on each edge.

Application LONG-RUN METAL ROOFING / VERTICAL OR HORIZONTAL INSTALLATION METHOD

COVERTEKTM407 can be direct fix or cavity fix and must be installed in a manner that prevents ponding of water, and span no more than 1200mm.

COVERTEKTM407 can be laid vertically or horizontally on roof slopes of 8 degrees or more without support.

ILLUSTRATION FOR
CORRUGATED
ROOFING



APPLICATION AND INSTALLATION . . . contd

LONG-RUN METAL ROOFING . . . contd

COVERTEK407 Fix using stainless steel 8-12mm staples or 20mm flat head clouts, or appropriate proprietary fastenings. Between 3° and 5° pitched roofs, **Thermakraft** recommends supporting **COVERTEK407** on **Thermakraft Safety Mesh** 300mm x 150m, or hexagonal netting 50mm or 75mm, and or **Thermakraft Arctic White Thermastrap 203**, or **Thermastrap 201**. Fix horizontally at 300mm centres.

If required to achieve a lap seal (refer to NZ Metal Roofing Code of Practice 4.3.8 and 4.3.9), use **Thermakraft Window Sealing Tape ALUBAND**.

COVERTEK407 may be unwound to the full length from the gutter to the ridge. However, when ridge ventilation is required **COVERTEK407** must be terminated at the ridge purlin to allow a free passage of air.

Flue penetrations must have a minimum distance of 50mm from the **COVERTEK407** (refer to NZ Metal Roof and Wall Cladding Code of Practice 4.3.8).

COVERTEK407 must be free of tears and punctures, fit tightly and be lap taped around all penetrations (except flue penetrations), to provide drainage for any condensation, or surface water from leaks.

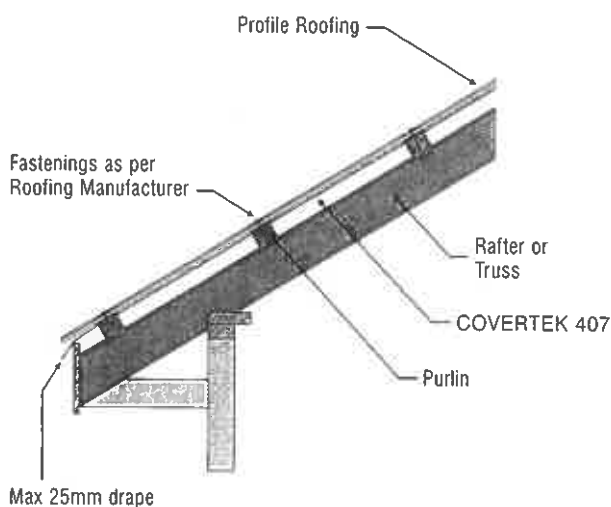
NOTE: Do not use **ALUBAND** on penetrations where Polybutene water pipes have been installed.

Refer Pipe Manufacturers for instructions on sealing penetrations.

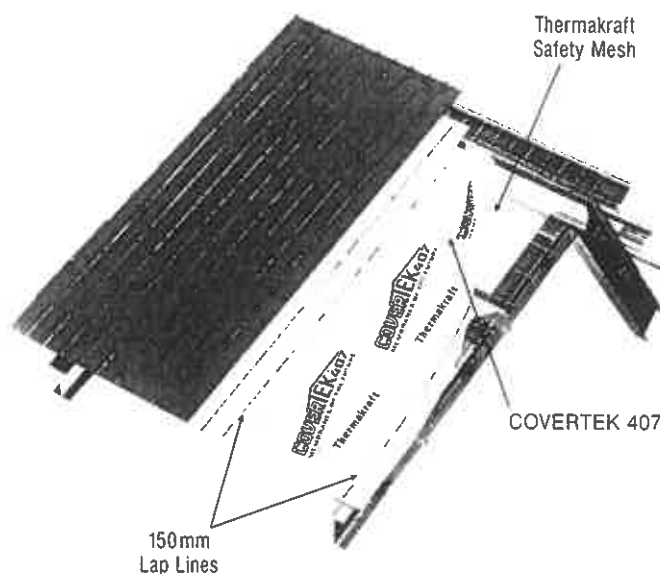
NOTE: Commercial Buildings may require the use of **Thermakraft Safety Mesh** under **COVERTEK407**.

COVERTEK407 can be installed above the battens or purlins for profiled metal roof claddings and otherwise in accordance with NZBC E2/AS1.

LONG-RUN METAL ROOFING Wooden Construction



LONG-RUN METAL ROOFING Steel Construction



Horizontal Fix
the outer face.

COVERTEK407 upper sheet lapped over lower sheets (shiplap) to ensure water is shed to

NOTE: **COVERTEK407** can move downwards. To prevent this it must be "Captured" by the fastenings at each purlin.

Horizontal fix must not be used on purlin distance greater than 1100mm to allow for 150mm laps.

TECHNICAL SPECIFICATIONS

COVERTEKTM407 FIRE RETARDANT SELF SUPPORTING ABSORBENT BREATHABLE SYNTHETIC NON-WOVEN ROOF UNDERLAY can be used as a roof underlay on buildings within the following scope:

- the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1 with regards to building height and floor plan area; and,
- with masonry tile roof cladding; and,
- with metal tile and profiled metal roof cladding; and,
- situated in NZS 3604 Building Wind Zones up to, and including "Very High".

Product Specifications **COVERTEKTM407** installation must always be carried out in accordance with:

- Thermakraft "Application and Installation Guidelines"
- Installed by or under the direct supervision of a licensed Building Practitioner or qualified Roofer
- NZBC Acceptable Solution E2/AS1 Paragraph 8.0 - 8.4
- NZ Metal Roofing Manufacturers Roof and Wall Cladding - Code of Practice
- Metal Roof / Tile Manufacturers specifications

COVERTEKTM407 must not be left exposed to direct sunlight or UV light sources during its serviceable life;

COVERTEKTM407 must not be left exposed to the elements on the roof for more than **7** days before being covered;

COVERTEKTM407 The design application and installation of **COVERTEKTM407** must follow sound condensation management principles, making use of ventilation and vapour control layers where necessary.

Durability Requirements **COVERTEKTM407** will meet the Performance Requirements of NZBC:

- Clauses B2 Durability B2.3.1 (a) not less than 50 years, B2.3.1 (b) 15 years and B2.3.2
- Clause C Part 6 Table 6.2: Flammability Index ≤ 5
- Clause E2 External Moisture: Performance E2.3.2 when used as part of the Roof Cladding System
- Clause F2 Hazardous Building Materials: Performance F2.3.1 will not present a health hazard to people.

TABLE 1: NZBC E2/AS1 ALTERNATIVE SOLUTION TO TABLE 23 AS A ROOFING UNDERLAY REQUIREMENT

NZBC E2/AS1 TABLE 23 ROOF UNDERLAY PROPERTIES	PROPERTY PERFORMANCE REQUIREMENT	ACTUAL PROPERTY PERFORMANCE
Absorbency	$\geq 100 \text{ g/m}^2$	$\geq 150 \text{ g/m}^2$
Vapour Resistance	$< 7 \text{ MN.s/g}$	Pass
pH of Extract	> 6 and < 9	Pass
Shrinkage	$< 0.5\%$	Pass
Water Resistance	$\geq 100\text{mm}$	Pass

Storage

COVERTEKTM407 should be stored on end in dry conditions.
Protect from the weather and direct sunlight.

Roll Dimensions

COVERTEKTM407 1250mm x 40.0m = 50m² • 1250mm x 20.0m = 25m²

TIMBER WEATHERBOARD CLADDING

5.1 Manufacture

Timber weatherboards, fixed to framing, have been used for centuries as effective cladding. They can be fixed vertically or horizontally depending on the board profile, but diagonally fixed weatherboards are not recommended. Experience indicates that horizontally fixed weatherboards, especially bevelbacked profile weatherboards, offer the most effective weather resistance.

Good weatherboards are generally:

- no wider than 200 mm, to reduce the risk of cupping and splitting (quarter-sawn boards resist cupping best)
- have sufficient thickness to accommodate weathergrooves (more than 19 mm)
- are fixed with adequate overlaps to prevent water penetration.

Timber weatherboards are generally available in pre-run profiles (but may be run to special profiles specified by designers). Timber used is generally radiata pine, douglas fir, macrocarpa, beech species, or imported western red cedar or redwood. Other timbers (grown locally or imported) are used in New Zealand, though less commonly. Selection depends on:

- durability
- availability
- environment, exposure, wind zone, corrosion zone
- grade
- profile
- appearance/colour
- surface finish
- applied finishes.

Care is required with weatherboard selection, because if either pre-run or designed profiles do not comply with the dimensions and profiles in NZBC E2/AS1, or materials are not those specified in NZS 3602, then data to prove weathertightness of the profiles and durability of material may be required.

5.2 General information

Refer to Section 1 of this specification guide.

5.3 Documents

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

BRANZ Bulletins

BRANZ Weathertight Solutions Volume One: Horizontal Weatherboards

Various manufacturers' and suppliers' trade literature.

5.4 Durability

Traditional use of timber weatherboards shows they can easily last the life of a building — well beyond the 15 years' minimum durability required by the NZBC if they are properly maintained. Their service life will depend on the type of timber used, preservative treatment, method of fixing, applied finishes, environmental conditions and degree of maintenance.

To enhance durability:

- keep vegetation well clear
- keep boards more than 175 mm clear of natural ground, more than 100 mm clear of paved ground, and more than 50 mm clear of waterproof deck surfaces
- use light-coloured paints
- avoid dark stains and paints on north and west facing walls (heat gain causes undue board movement).

5.5 Materials

The following table gives the timber species, grade and preservative treatments for commonly available timber weatherboards.

End sealing is used to preserve the integrity of the face coating by preventing moisture from soaking into the end grain and wetting the substrate. It is not intended to prolong durability of the substrate itself. It is also recommended that the end grain of weatherboards that are left natural should also be sealed to minimise water absorption that would cause unsightly water staining.

Cut-ends of weatherboards may require end coating with preservative to preserve the integrity of the treatment. This is a separate matter from end sealing for painting and will depend on the preservative chemicals specified. For advice on preservative treatment of cut-ends, refer to manufacturers' literature.

5.5.1 Timber trim

Timber trim that forms part of the cladding system, including fascias, cover boards, barge boards and scribes must have the same grade, treatment and coating protection as described for weatherboards.

Table 5.1 Commonly used timber weatherboards

Species	Grade	Treatment	Minimum finish required
Pinus radiata	Dressing*	H3.1 H3.2	Painted (3 coats)** Unpainted***
Cypress species: Macrocarpa, Lawson's cypress, etc.	Dressing heart*		
Larch	Dressing heart*		NZS 3602:2003 requires paint protection (3 coats)**
Western red cedar	Dressing heart*	CCA treated material available	
Redwood	Dressing heart*		
Plywood	To AS/NZS 2269	H5	

* See NZS 3631 for grading requirements.

** Prime all faces, including cut-ends, before fixing. Apply a minimum of two further coats of exterior grade paint to all exposed surfaces in accordance with AS 3730.

*** While H3.2 pinus radiata can be left uncoated, painting is recommended.

5.6 Wall underlays

Refer to the Section 1.5, Wall underlays, for a specification of the wall underlays to be used behind weatherboard claddings, fixed both directly to framing and over cavities.

5.7 Weatherboard profiles

Typical profiles include the following:

5.7.1 Horizontal

- bevelback
- rebated bevelback
- rusticated
- splay cut (skew cut).

5.7.2 Vertical

- board and batten
- shiplap.

NZBC E2/AS1, Table 3, outlines the conditions under which different types of weatherboard claddings may be used, e.g. shiplap profile weatherboards may only be used in situations of lowest risk.

NZBC E2/AS1 includes bevelback, rusticated, shiplap and board and batten (with prescribed dimensions) as profiles for Acceptable Solution E2/AS1. Other weatherboard profiles should conform to the critical dimensioning of Acceptable Solution profiles for requirements of weathertightness. Otherwise, separate verification of weathertightness may be required. Table 5.2 sets out critical dimensions for weatherboards.

Notes

1. Weatherboards should be installed in the longest lengths practicable. Vertical boards should be installed in single lengths from top to bottom of the wall panel.
2. Vertical weatherboards are not suitable for installation over cavities (because of the need for horizontal battens restricting the cavity). For this reason, their use is restricted to low and medium-risk applications in E2/AS1.

Weatherboard profiles are specifically intended for either horizontal or vertical application. An example of this is shiplap profile, which is intended for vertical application only and should not be fixed horizontally.

Table 5.2 Critical dimensions (minimum) for timber weatherboards

	Thickness	Rebate/overlap dimension	Weathergrooves
Horizontal profiles			
Bevelback*	19 mm (10 mm thin end)	32 mm overlap	Yes**
Rebated bevel back	19 mm (10 mm thin end)	25 mm overlap plus 2 mm tolerance	Yes**
Rusticated	19 mm	25 mm overlap plus 2 mm tolerance	Yes**
Splay cut*	19 mm (9 mm thin end)	32 mm overlap	Yes**
Vertical profiles			
Board and batten	19 mm	30 mm overlap	Yes**
Shiplap	19 mm	25 mm overlap plus 2 mm tolerance	Yes**

* Profile not specifically included in E2/AS1, but can be produced to thin and thick edge dimensions as for bevelback profile.

** Refer to Detail 5.6 for size and position of primary weathergrooves.

5.8 Flashings, sealants and seals

All flashings and weathering details must be shown on the drawings and dimensioned for overlaps with claddings. Ensure that flashing materials are compatible with other cladding materials and window or door frames.

5.8.1 Metal flashings

For metal flashings use either:

- formable grade, 0.55 BMT for all steel base metal flashings, Z450 galvanising for unpainted flashings, Z275 galvanising for factory painted flashings
- stainless steel, 0.45 mm min. 304 or 316 grade
- uncoated aluminium flashings, use 0.9mm, 5052 or 5552 alloy (H16 temper recommended); for factory-coated aluminium flashings, use grade 3000 or 5000.

Weatherboards that are left uncoated, especially H3.2 treated radiata pine, cedar and redwood species may cause early failure of galvanised (less than Z275 coating) zinc/aluminium and aluminium flashings. Pre-painted flashings will delay deterioration. Alternatively use a plastic or stainless steel flashing manufactured for the purpose.

Do not use steel sheet with less than Z400 galvanised coating or unpainted zinc/aluminium flashings in concealed locations.

Other metals for consideration, though less often used, include copper, lead and zinc. Careful consideration must be made before introducing copper to a cladding system because of compatibility issues with zinc or zinc-coated metals and the risk of copper staining. Refer to NZS 3604, Table 4.5.

5.8.2 Synthetic rubber flashings

Use:

- single-ply membrane from butyl or EPDM, 1.5 mm thick.

5.8.3 Sealants and seals

Sealants and seals should not be relied on for primary weather protection. They are useful in assisting with weathering at joints and laps along with primary flashings and overlaps. Where they are included, use:

- a properly designed sealant joint with backing rod and thickness of sealant approximately 2:1 width to depth, with no dimension less than 6 mm
- sealant selection depending on the role required of the sealant. For most calking applications, acrylic latex or modified silicon sealants to ISO 11600 will be suitable; for sealants requiring greater movement ranges or bonding to the weatherboard, refer to manufacturer's

recommendations, especially for bonding to resinous timbers such as cedar, redwood and some New Zealand native species

- closed cell self-adhesive tape (select size for maximum 10 percent compression to finish dimension).

Materials for sealants and seals to be either:

- silicon or polyurethane sealants recommended by the manufacturer for use with the timber species
- closed cell, 3 mm x 16 mm (or other size specified), self-adhesive tape.

Sealant joints for penetrations through weatherboard claddings must be properly designed to accommodate movement and weather resistance.

5.8.4 Painting/staining

Before fixing the weatherboards, apply sealer to:

- cut edges
- edges exposed to the weather, including on the reverse sides of timber, 150 mm up from the bottom of the exposed edge.

Sealers should be:

- a finish matching that is applied to the board surface when clear finishing or staining
- priming paint, compatible with paint finishes
- applied in two coats.

5.9 Compatibility with other materials

Timber is relatively inert, except some resinous species and those treated with copper-bearing and solvent-based preservatives. H3.2 treated timber, cedar and redwood weatherboards should not be used in direct contact with (or give water run-off onto):

- uncoated galvanised steel
- uncoated zinc/aluminium-coated steel
- zinc.

Pre-painting metal surfaces should provide adequate protection but will depend on good maintenance of the coating. Refer to NZS 3604, Table 4.6, for a more complete list of compatibility of materials.

5.10 Site handling

The care afforded to weatherboards and materials in general, at delivery and during construction, will reflect the quality of finished construction.

Damaged boards must not be used. To help ensure that materials remain undamaged, check that they are:

- ordered for delivery at the time they are required
- delivered as new and are undamaged
- stored out of the weather
- protected from physical damage, contact with other materials and construction processes (such as cement splashing)
- stored on a level, firm base on packers (remove strapping and turn top board face down for protection as required), lay fillets between each layer of boards
- not dragged across one another or other materials.

5.11 Cladding installation tips

To help achieve best results:

- ensure the timber framing tolerances do not exceed those outlined in NZS 3604, Table 2.1, governing support of timber board claddings
- check that boards are dry (less than 18 percent moisture content)
- reject boards that are cupped or bowed and, where possible, select quarter-sawn boards for use on north and west faces
- boards that are to be paint or stain finished must be primed or have one coat of stain, including backs of boards before fixing
- prime or stain all cut-end cuts as work proceeds, two coats recommended
- fix with one nail per board at fixing points to allow for board movement
- splay cut-end joints of horizontal weatherboards over framing (vertical weatherboards boards must be a full storey height)
- carefully determine the set-out before commencing so that board laps occur at the required positions (if any)
- as work proceeds, check that boards are at a constant height on all walls, are fixed true to horizontal/vertical and that boards have constant lap/exposed face dimensions
- pre-drill for all fixings where splitting is likely, especially near the ends of boards
- install back flashings, before installing weatherboards — soakers can be installed progressively with weatherboards
- where paint finishes are required, apply final coats soon after all installation is completed (priming left exposed for more than one month should be re-primed)
- install 12 mm polystyrene strips (or equivalent) as thermal breaks when direct-fixing to steel framing.

5.12 Fixings

Recommended fixing types for exposure zones in accordance with NZS 3604, Table 5.2.

Table 5.3 Material selection guide for nails and screw fixings for weatherboards

	Zone 1 and sea spray zone, to NZS 3604	Zones 2 and 3 to NZS 3604	Zone 4 (geothermal) and corrosive industrial zones
Hot-dip galvanised*	Fixings for plywood and timber battens to be punched, stopped and paint finished with cladding	Fixings may be left exposed**	
Silicon bronze and stainless steel	Suitable for zones 1 (including sea spray zone), 2, 3, and 4		

* Zinc-plated fixings are not suitable for cladding fixings in any exposure zone.

** Not suitable for use in association with cedar, redwood or copper-treated timber trim where timber is left unpainted.

Table 5.4 Nail fixings for timber weatherboards (sizes in mm)

	Nail positions	Nail size*
Bevelback	one nail within 10 mm above lap line at each stud	75 x 3.15 mm
Rebated bevelback	one nail within 10 mm above lap line at each stud	75 x 3.15 mm (unpunched) 60 x 2.8 mm (punched)
Rusticated	one nail within 10 mm above lap line at each stud	60 x 2.8 mm
Splay (skew) cut	one nail within 10 mm above lap line at each stud	75 x 3.15 mm
Board and batten	one nail each in centre of boards and battens and at 480 crs. max.	60 x 2.8 mm for boards 75 x 3.15 mm for battens
Ship lap	one nail within 10 mm of side of lap and at 480 crs. max.	60 x 2.8 mm

* Nails should be jolt heads or rose heads. Because gun-applied nails or staples are unlikely to have sufficient galvanised coatings and tend to 'bruise' surface finishes, they are unlikely to be suitable for attaching finished claddings. Annular grooved shanks are recommended for silicon bronze and stainless steel fixings.

5.12.1 Nails and screws

Use nail sizes and positions as outlined in the following table.

Note: E2/AS1 requires fixings to penetrate through cavity battens into framing. For 20 mm drained cavities, increase the length of fixings by 20 mm. An alternative is to structurally fix the battens, allowing normal sized cladding fixings to be used — refer to Clause 1.5.2.3.

5.13 Maintenance

Refer to Section 1.6, Maintenance, for a specification of the maintenance recommended for weatherboard claddings to preserve weathertightness and ensure continuing good appearance.

including edges (which may have sealant in the vertical gaps between sheets).

1.5.4 Non-rigid underlays (wall wraps and building papers)

Material selections and practices for installing non-rigid underlays include:

- flexible underlay (kraft paper or synthetic building wrap) to be manufactured to AS/NZS 4200: pt 1
- run underlays horizontally across framing members and lap (to drain away from framing) a minimum of 150 mm at all joints
- fix underlay taut to framing with fixing heads suitable for resisting tearing under wind loads
- repair tears by inserting flaps (of same material)
- turn the edges into framing reveals around window and door openings and tape 'V' cut corners using self-adhesive construction tapes.

1.6 Maintenance

Most claddings will deteriorate when exposed to the ravages of weather. While NZBC Clause B2 Durability requires claddings to be maintained "as necessary" for continuing weathertightness (by regular washing, coating replacement and mechanical repairs), such maintenance will also ensure the cladding's continuing good appearance.

Maintenance is recommended to be carried out every 12 months generally, and every six months in corrosive atmospheres such as coastal areas or where subject to industrial or geothermal atmospheres.

The following list outlines minimum recommended maintenance for claddings:

- follow any manufacturer's maintenance recommendations
- wash down to remove salt deposits, dirt build-up and insect traces
- check sealants and replace them if they are showing signs of loss of edge adhesion or surface cracking
- check sheets or flashings, and replace any that have been damaged to the point of allowing water entry
- check for missing attachments and tighten loose fixings
- maintain and, where necessary, reapply paint finishes and surface coatings in accordance with paint manufacturer's recommendations.

Paint colours have an effect on cladding performance. Colours with a reflectivity above 40 percent (measured to ASTM C1549 or ASTM E903) help to prevent heat build-up and distortion of cladding parts.



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Thermakraft

WATERGATE^{PLUS}

WATERGATE

FIRE RETARDANT ABSORBENT BREATHABLE
COMPOSITE NON WOVEN WALL UNDERLAY

WATERGATE

FIRE RETARDANT ABSORBENT BREATHABLE
COMPOSITE NON WOVEN WALL UNDERLAY

WATERGATE^{PLUS}

PLUS

THE ULTIMATE WRAP

FIRE RETARDANT ABSORBENT BREATHABLE
COMPOSITE NON WOVEN WALL UNDERLAY

CAN BE USED WITH:



✓ ABSORBENT / NON ABSORBENT



✓ METAL / NON METAL



✓ STEEL FRAME / TIMBER FRAME



FLAMMABILITY INDEX OF 5.0
ASTM E 1363



**FIRE RETARDANT ABSORBENT BREATHABLE
COMPOSITE NON WOVEN WALL UNDERLAY**

APPLICATION AND INSTALLATION

Product Description **WATERGATE^{Plus}** Fire Retardant Absorbent Breathable Composite Non Woven Wall Underlay is a coated, non woven polyolefin, specifically designed as a wall underlay behind exterior wall claddings.

Product Advantage



FLAMMABILITY INDEX OF ≤5
AS1530: PART 2 1993

WATERGATE^{Plus} can be used as a wall underlay on timber and steel framed buildings with absorbent and non-absorbent wall claddings direct fixed to framing.

WATERGATE^{Plus} can be used as a wall underlay on timber and steel framed buildings with absorbent and non-absorbent wall claddings installed over an 18mm minimum drained cavity.

NOTE: WATERGATE^{Plus} MUST NOT BE USED AS A ROOF UNDERLAY

WATERGATE^{Plus} can be used as an **Air Barrier** where walls are not lined e.g. attic spaces at gable ends, and is suitable for use in all Building Wind Zones of NZS 3604 up to, and including, "Very High".

WATERGATE^{Plus} will provide temporary weather protection during construction. Translucency of the underlay will enable work to proceed during inclement weather.

WATERGATE^{Plus} can be used as a non-rigid backing material for Stucco Plaster in accordance with the requirements of NZBC Acceptable Solution E2/AS1 Paragraph 9.3.5.1. The Underlay must be supported with 75mm galvanized mesh, or **Thermakraft Stud Strap**, or wire at 150mm centres run across cavity battens to limit deflection to a maximum of 5mm in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 9.3.5.2.

WATERGATE^{Plus} may also be used as a slip layer over rigid backing for Stucco Plaster in accordance with the requirements of NZBC E2/AS1 Paragraph 9.3.3(b).

WATERGATE^{Plus} is unaffected by LOSP treated timber.

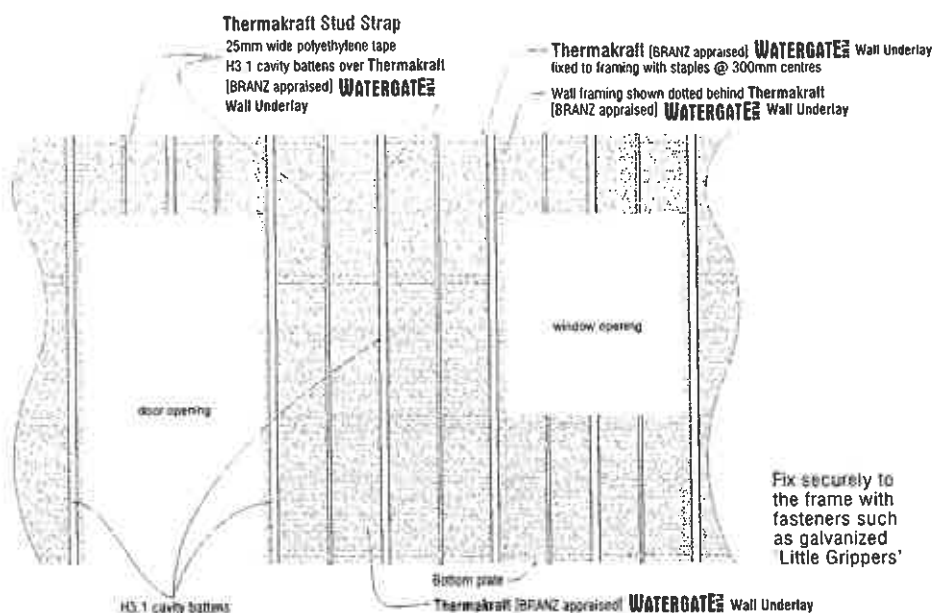
FLAMMABILITY

WATERGATE^{Plus} has a AS1530:Part 2 Flammability Index of ≤5 and meets the requirements of NZBC Acceptable Solutions C/AS1 Part 6 Table 6.2 surface finish requirements for suspended flexible fabrics.

Application

WATERGATE^{Plus} must be fixed with printed side out and the non-printed side to the frame.

1. WATERGATE^{Plus} is applied to all exterior walls from below bearers to the top plate. Fix securely to the frame with fasteners such as galvanized Little Grippers, 6mm-8mm staples or 20mm large head galvanized clouts at 300mm centres horizontally and vertically. Additional fasteners should be used around each opening to be cut out.



APPLICATION AND INSTALLATION . . . contd

Application - continued ...

NOTE: Fastenings behind Brick Veneer Cladding must have an equivalent service life to that of Brick Veneer (50 years). Refer to NZBC E2/AS1 Table 20.

IMPORTANT NOTE: Drained Cavity System; In accordance with NZBC Acceptable Solution E2/AS1 Paragraph 9.1.8.5, where stud spacings are greater than 450mm centres, an intermediate means of restraining the building underlay and insulation from bulging into the drained cavity shall be installed. An acceptable means of achieving this is **Thermakraft Stud Strap** fixed horizontally at 300mm centres.

2. WATERGATE^{PLUS} if using either 2740mm or 1370mm width, a minimum of 150mm lap is required at joints and all vertical laps must be made over studs. Make good repairs on any forced tears with **Thermakraft PVC Tape** or **Thermakraft AUBAND** Window Sealing Tape.

3. WATERGATE^{PLUS} is wide enough to cover the height of a standard wall from below the bottom plate to the top plate. Initially, cover all windows and door openings. Use extra fastenings around each window or door opening to be cut out. It is recommended that the wall underlay is not cut and prepared for window installation until the arrival of the windows.



Fix securely to the frame with fasteners such as galvanized Little Grippers



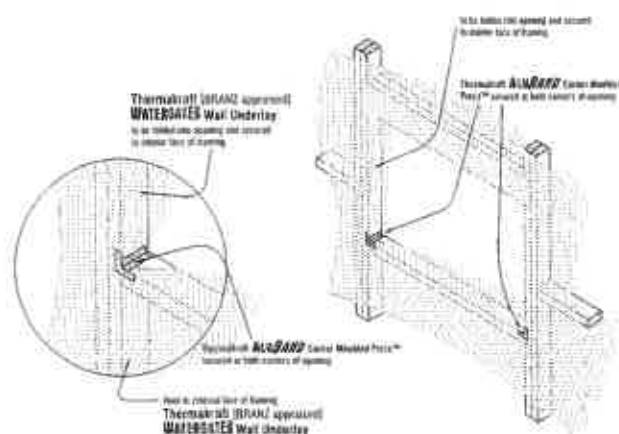
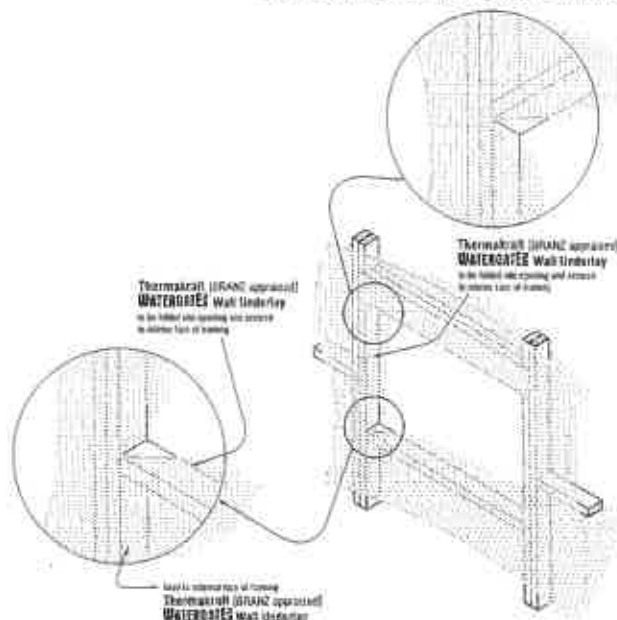
On arrival of doors and windows, cut the **WATERGATE^{PLUS}** at each opening on a 45° angle away from each corner. Pull the **WATERGATE^{PLUS}** flaps inside and fasten to inside of frame.



Application of **Thermakraft Stud Strap** for cavity construction where studs spaced > 450mm.



4. Thermakraft AUBAND Window Sealing System is applied prior to fitting windows.



Storage

WATERGATE^{PLUS} must be stored in clean dry conditions and not in an area with direct sunlight.

Roll Dimensions

2740mm x 30m = 82m²

1370mm x 37m = 50m²

1370mm x 18.5m = 25m²

For more information regarding **Thermakraft AUBAND** Window Sealing System (BRANZ no.614 (2008)) refer to the "APPLICATION and INSTALLATION GUIDELINES" or contact **Thermakraft Customer Services** on **0800 806 595**.



**FIRE RETARDANT ABSORBENT BREATHABLE
COMPOSITE NON WOVEN WALL UNDERLAY**

TECHNICAL SPECIFICATIONS

WATERGATE_{Plus} Fire Retardant Absorbent Breathable Composite Non Woven Wall Underlay can be used as a wall underlay on timber framed buildings within the following scope:

- the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1; and,
- with absorbent wall and non-absorbent wall claddings directly fixed to framing; and,
- with absorbent and non-absorbent wall claddings installed over an 18mm minimum drained cavity; and,
- with masonry veneer in accordance with NZS 3604; and,
- situated in NZS3604 Building Wind Zones up to, and including 'Very High'.

WATERGATE_{Plus} can be used as a wall underlay on steel framed buildings within the following scope:-

- the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1; and,
- with absorbent and non-absorbent wall claddings; and,
- with masonry veneer in accordance with NZS 3604; and,
- situated in NZS3604 Building Wind Zones up to, and including 'Very High'.

WATERGATE_{Plus} has an AS1530: Part 2 Flammability Index of ≤ 5 and meets the requirements of NZBC Acceptable Solution C/AS1 Part 6 Table 6.2 surface finish requirements for suspended flexible fabrics.

NZBC E2/AS1 TABLE 23 AS A WALL UNDERLAY REQUIREMENTS

NZBC E2/AS1 TABLE 23 WALL UNDERLAY PROPERTIES	PROPERTY PERFORMANCE REQUIREMENTS	PROPERTY PERFORMANCE
Absorbency	≥ 100 gsm	Pass
Vapour Resistance	≤ 7 MN.s/g	Pass
pH of Extract	≥ 6 and ≤ 9	Pass
Shrinkage	$\leq 0.5\%$	Pass
Water Resistance	≥ 20 mm	Pass
Air Resistance	≥ 0.1 MN.s/m ³	Pass Watergate Plus can be used as an air barrier

Durability

WATERGATE_{Plus} meets the Performance Requirements of NZBC Clauses B2 Durability B2.3.1(a) 50 years, B2.3.1(b) 15 years and B2.3.2, C/AS1 Part 6 Table 6.2 Flammability ≤ 5 , E2 External Moisture, and F2 Hazardous Building Materials F2.3.1., providing:

- it is not damaged
- installed in accordance to the "APPLICATION and INSTALLATION GUIDELINES"
- it is not left exposed for more than 60 days
- installed by or under guidance of Licensed Building Practitioners
- is compatible with cladding system used

NOTE: WATERGATE_{Plus} MUST NOT BE USED AS A ROOF UNDERLAY

The recommendations contained in Thermakraft's literature are based on good building practice, but are not an exhaustive statement of all relevant information and are subject to any conditions contained in the Warranty. All product dimensions and performance claims are subject to any variation caused by normal manufacturing process and tolerances. Furthermore, as the successful performance of the relevant system depends on numerous factors outside the control of Thermakraft (for example quality of workmanship and design), Thermakraft shall not be liable for the recommendations in that literature and the performance of the Product, including its suitability for any purpose or ability to satisfy the relevant provisions of the Building Code, regulations and standards.

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Advantages of Ecoply Flooring

Superior strength

- Stiffness of Ecoply is nearly three times that of particle type boards of the same thickness. This means thinner Ecoply Panels are cost effective floor panels. A single layer of Ecoply Flooring can do the same job as two layers of other wood based boards.
- High load performance for commercial use. Strength properties are published in engineering standards. Backed by a third party quality assurance programme, Ecoply can be designed to high industrial load criteria in building codes.
- Sheet diaphragm bracing for use in bracing against horizontal wind and earthquake forces in conjunction with steel or timber framing.
- Ecoply is made using veneers that are sonically Metriguard graded for reliable strength and stiffness.

Superior durability

- Ecoply can be used in conditions where other panel materials would deteriorate.
- The durability and strength of Ecoply can be used for wet areas, garage floors and commercial flooring.
- Ecoply can be treated H3 for extra resistance to water splash and decay for wet areas and garage floors.
- Exposure to weather during construction periods will not affect structural properties in the (re-dried) plywood.
- Ecoply can be used in heated floors.

Description and Purpose

Ecoply plywood is a strong, stiff, stable panel particularly suited for high performance flooring. The veneers are glued with heat and boil resistant Type A phenolic (exterior, marine) adhesive. Uses include house floors, garages, commercial floors, floors for factories, offices, schools and other applications like stages, sports stadiums, truck decks and transportable homes. The Ecoply range includes BD, CD, and DD grade panels with square edges for general use, and Ecoply CD Flooring which is a specially constructed panel for specific flooring applications. See Table 1.

Ecoply BD, CD, DD

- Sanded surface, B, C, or D grade face.
- D grade cross band under the face veneer contains knot holes.
- Can be used for underlay under rigid coverings like ceramic tiles, parquet, or other use where surface indentation from concentrated loads is shielded by the covering. Standard Ecoply is not recommended under flexible coverings (linoleum, rubber).
- Edges have no tongue and groove (T&G) and require blocking support at all edges.

Ecoply CD Flooring

- Sanded surface C grade face.
- Solid cross band for additional support of the face veneer.
- Can be used for flexible coverings like rubber, linoleum, cork tiles, thin tiles as well as rigid coverings.
- Plastic tongue and grooved long edges, no blocking needed under edge joints. reduces squeaking.

The C grade face may contain knots, filled holes or splits. Higher grade B face veneers are available to special order. As radiata pine is soft, the surface should be protected from indentation, paint spills, water damage etc where clear or stained finishes are required.

For a description of the full product range and structural design properties see the Innovation "Ecoply Structural Manual".

Table 1: Ecoply plywood for flooring uses

PRODUCT	THICKNESS (mm)	SHEET SIZE (mm)	EDGES	ENDS
Ecoply BD, CD, DD	15, 17	2400 x 1200 2700 x 1200	square	square
Ecoply CD flooring	15, 17, 19, 21, 25	2400 x 1200 2700 x 1200	both grooved one plastic tongue	square

Ecoply Flooring or Standard Ecoply

Ecoply Flooring T&G sheets are made with a solid cross band veneer under the face. This provides extra support for high heeled shoes, fridge feet and the like, compared with standard square edged Ecoply that is made with D grade cross band under the face.

Where overlays of carpet or parquet can hide indentations that could occur over holes in a D grade cross band, standard Ecoply may be used BUT:

- Use Ecoply Flooring when tongue and grooved edges are required to save the cost of blocking between the joints, and to reduce squeak problems.
- Use only Ecoply Flooring under flexible coverings like linoleum or rubber (decking), to avoid surface identification and bubbling. (See Ecoply Roofing and Decking manual for more information).
- Use Ecoply Flooring where avoidance of surface indentation is critical.

Identification

Ecoply Flooring and Ecoply structural plywoods are manufactured and branded to the joint Australian/New Zealand Standard AS/NZS 2269:1994 "Plywood – Structural", by Ecopine, a Carter Holt Harvey business.

Limitations

Subject to the limitations and conditions in this brochure, the design thickness and frame spacings for Ecoply Flooring and Ecoply Structural plywoods, meet the requirements of the New Zealand Building Code Section B1 Structure, B2.3(a) Durability.

All statements in this manual shall be read subject to the Ecoply being properly stored, handled, installed, used and maintained as appropriate to each application in accordance with specifications and instructions provided in this brochure, product specific brochures and Innovision technical notes, and subject to governing codes of practice.

Storage and Handling

- Keep dry.
- Store under cover (avoid tight cover and potential condensation).
- Handle and stack with care to avoid damage.
- Stack flat clear of ground on at least three evenly spaced bearers.

Performance and Building Code Compliance

Structure

For houses, Ecoply is acceptable under clause 2.3.1 (a) or clause 7.2.3 of NZS 3604:1999 "Timber Structures", and the relevant sections of AS 1684:1999 "Residential Timber Framed Construction".

Maximum spacings for floor joists for different plywood thicknesses in a dry environment are in Table 2. The table includes spacings for a range of different loads and uses. Spacings may be decreased if required, but not increased. The plastic tongue has been tested for basic point live loads up to 2.7 kN in thinner panels and 7.5 kN for panels 25 mm and thicker.

Durability

The durability of structural plywood is in excess of 50 years when installed in accordance with instructions and limitations set out in this brochure.

Soil: Plywood (untreated or H3 treated) must not be allowed to come in contact with soil.

Rain wetting and construction time: Some materials used in floors will not withstand exposure to weather. Untreated plywood will withstand rain and exposure during construction. Some discolouration and minor checking of the surface can be expected if plywood is exposed for extended periods. For floors uncovered for long periods use H3 treated plywood to reduce the risk of decay. Return the plywood to less than 18% moisture content before installing moisture sensitive materials. Where a high quality visual finish is required, protect the plywood with a cover or sealer. See note on visual finish on Page 4.

Wet area flooring: Floors in bathrooms, laundry spaces, kitchens and garages are exposed to water occasionally. Use H3 treated plywood where the exposure is likely to be regular or uncontrolled. For rental accommodation, motels and commercial residential floors. H3 treated Ecoply is recommended.

Decking: Plywood for decking must be preservative treated to at least H3 level, however structural plywood is not normally recommended for decks or floors that are permanently exposed to the weather. A properly detailed barrier material such as butynol or Nuralite can be used to protect plywood decks from moisture exposure. Refer to the "Ecoply Roofing and Decking Manual".

High humidity and condensation: In uses where the moisture content of wood may exceed 18% for prolonged periods, plywood must be H3 treated to resist decay hazard. This includes excessive ground dampness and plywood that may be subject to condensation. Appropriate building detailing and ventilation is recommended.

Heated floors: The adhesive and solid wood veneer in Ecoply plywood will withstand floor heating systems. Tight moisture content control during construction is recommended to avoid shrinkage problems in both framing and plywood. Refer to Technical Note 96/05/33 "Floor Heating: Ecoply Flooring."

Visual finish: The C grade veneer is medium density radiata pine and is not suited to heavy wear without protection. It may contain sanded filler. For more information, refer to the Innovision "Durability Statement" 01/11/10.

Ventilation

Ground floors must be ventilated at least in accordance with Clause 4 of Approved solution E2/AS1 of the New Zealand Building Code. Use H3 treated Ecoply where moisture levels in subfloor regions are high.

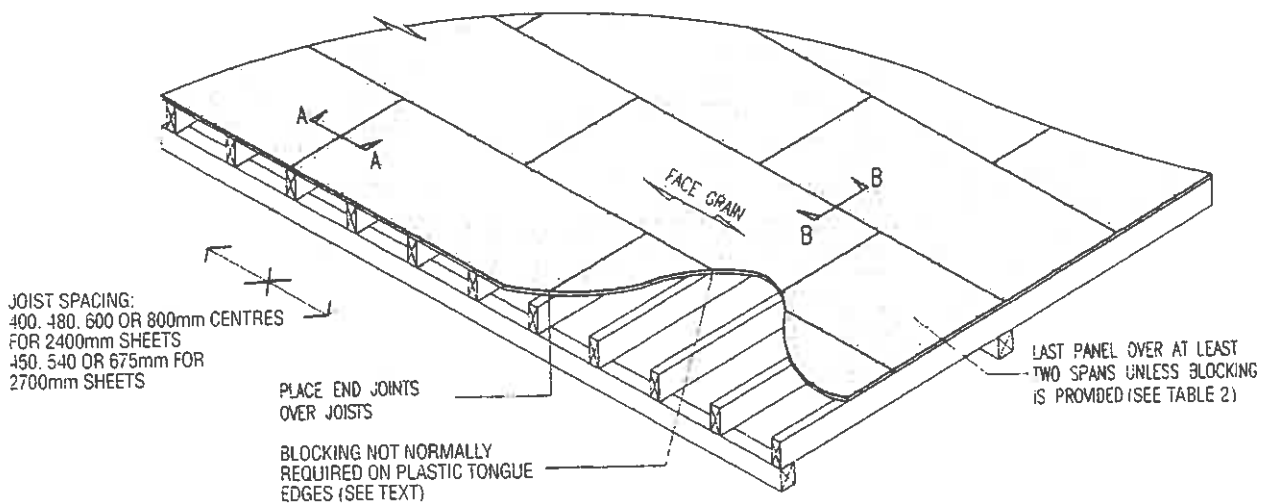
Table 2 Floor joist spacings for Ecoply plywood floors

New Zealand loading code descriptions NZS 4203*	Domestic (Housing)	Office General	Retail Shop Floors	Office Banking	Resid't'l Assembly Educat'n Rest'rants Institut'l	Assembly Industrial Access	Resid't'l Education Institut'l	Assembly Industrial Access Storage	Domestic Garage floors	Comm'l Parking Access & Service Corridors
Plywood thickness (mm)	Maximum joist centres (mm), plywood continuous over two spans, face grain across joists. Adjust to suit 2400 or 2700 sheet length.									
12	400	300	300	300						
15	480	450	400	300	300	300	300	300		
17	540	480	450	400	400	300	300	300	300	240
19	600	600	540	480	480	450	400	400	300	300
21	600	600	600	540	600	480	450	450	400	300
25	800	800	800	600	800	675	600	600	480	400
Design basis	Limit states design to NZS 3603. Concentrated loads were distributed across an effective panel width using: $b_{eff} = \text{load width} + \text{spacing} \times (E_{\perp}/E_{\parallel})^{0.25}$ according to analysis from Hearmon (1948) to take account of the crossbanded layup of the plywood. Sag limit was span/400 on concentrated loads on 300 mm x 300 mm pads in accordance with NZS 4203.									
Short term factor ψ_s	0.7	0.7	0.7	0.7	1.0	1.0	1.0	1.0	0.7	1.0
Long term factor ψ_l	0.4	0.4	0.4	0.4	0.6	0.6	0.6	0.6	0.4	0.6
Maximum basic distributed live load (kPa)										
	2.0	3.0	4.0	4.0	3.0	4.0	3.0	5.0	2.5	5.0
Maximum basic concentrated live load (kN)										
	1.8	2.7	3.6	4.5	2.7	3.6	4.5	4.5	9.0	9.5

* NZS 4203:1992 "General Structural Design and Design Loadings for Buildings".

For highly loaded forklift wheels and other applications contact Innovision, on 0800 INNOVISION.

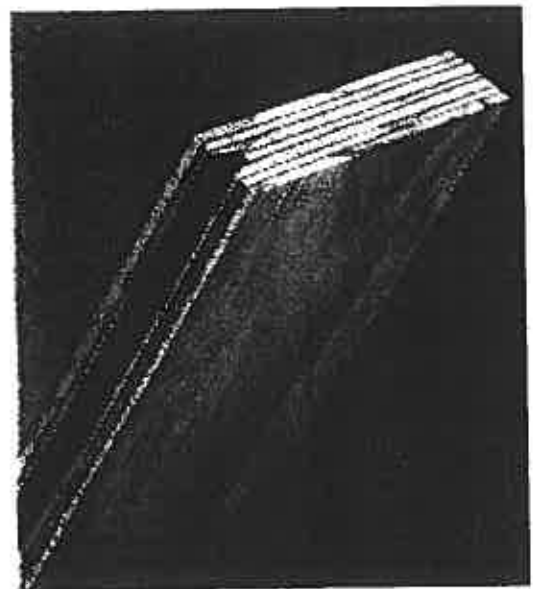
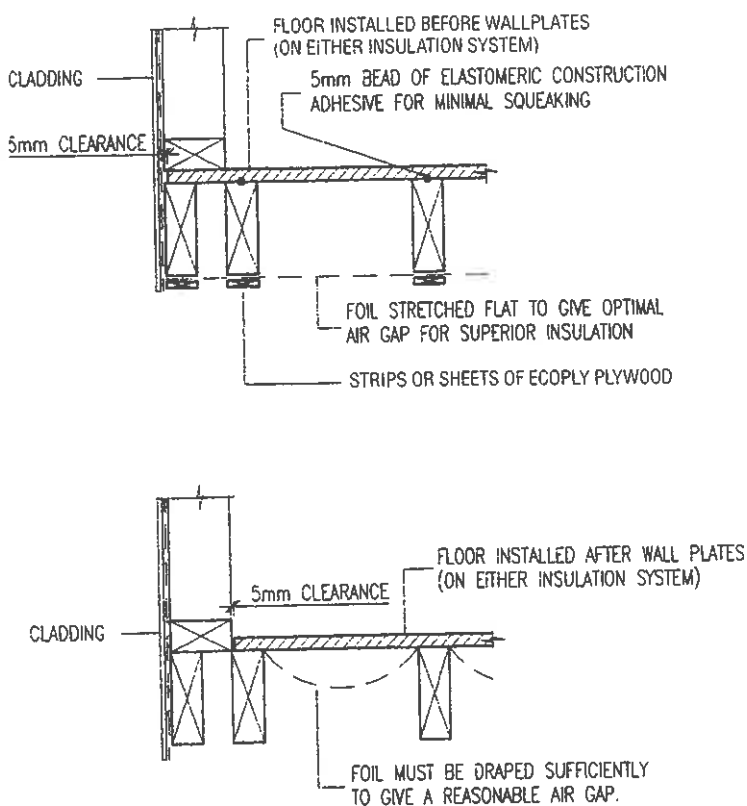
Figure 1: Ecoply Flooring layout



FOIL INSULATION

For ground floors requiring insulation foil, draped foil prevents the use of adhesive, and increases the quantity of foil required to achieve insulation performance. In practice, gaps provided by the draped foil are often inadequate. The best performing solution is to nail-glue the floor to increase stiffness and minimize squeaking, and stretch the foil flat under the joists. Use battens or sheets or strips of a low grade of plywood (7 mm Ecoply) to fix the foil to the underside of the floor. Alternatively, use foil backed panels under the floor or a different type of insulation such as fibreglass.

Figure 2: Ecoply Flooring and insulation options



Plastic tongue and groove edge of Ecoply Flooring.

Installation

Framing

- Use timber or steel frame joist spacings in Table 2 to suit plywood thickness.
- Ensure top edges of joists are properly aligned.
- Use kiln dry Laserframe framing, hyBEAM or hySPAN joists
 - to lower moisture level in inter-storey floor spaces.
 - to reduce differential joist deflections.
 - to minimise shrinkage in the depth of the floor (avoids cracking in exterior finishes and fittings).
 - to minimise head popping.
- Blocking (nogs, dwangs)
 - block all edges of standard "square edge" Ecoply structural plywood.
 - block if the floor is being used as a diaphragm for lateral wind and earthquake resistance with fixings to transfer shear across the joints. In this case, details should be specified on drawings.
 - use blocking "on the flat" to provide gaps where air flow is needed for ventilation.
- Blocking within the body of the floor is not required for tongue and grooved edges, unless specified for diaphragm action, or joist stability.

Sheet layout

- Ensure Ecoply sheets are dry before installation.
- Place face grain at right angles to the supports.
- Sheets must be continuous over at least two spans (three framing members).
- Lay the sheets in a staggered pattern.
- With square edge sheets, allow a 2 to 3 mm expansion gap between sheets.
- Butt tongue and groove panels at the tongues because the machined edges can accommodate the movement. Allow a 2 to 3 mm expansion gap at the ends.
- Allow 5 mm clearance inside confining structure such as concrete or brick walls adjacent to the floor. In large floors designers should make extra allowances in detailing the plywood. Consult Innovision on 0800 INNOVISION, for more details.
- Allow clearance for ventilation as required.

Fixing of sheets

Ecoply may be fixed to different types of framing with nails or screws or a combination of fasteners and elastomeric adhesives (refer Table 3).

- Do not over-drive gun nails or screws.
- Fix at least 7 mm or 3 fastener diameters from the sheet edges or behind tongues.
- Fix no more than 15 mm from sheet edges.
- Space fasteners at 150 mm centres on all edges, and 300 mm centres in the body of the sheet.
- Fasteners should be corrosion resistant to a level appropriate to the end use, life expectancy (15 or 50 years) and expected exposure to moisture during construction and service. Galvanised fasteners are the minimum recommendation and are normally satisfactory in dry wood. Where plywood or framing may become damp or is H3 treated, use stainless steel screws or annular grooved nails for maximum durability. Follow the recommendations of the fastener manufacturer.

Fixing to timber:

- Use flat head nails. Do not use jolt or bullet head nails.
- Galvanised nails or annular grooved nails have better holding power than smooth nails.
- Ring shank nails or annular grooved nails or screws are recommended for additional holding power.
- Stainless steel nails must be annular grooved.
- Punch nails and apply floor sealant before filling holes with a suitable putty.

Figure 3: Fastening plywood

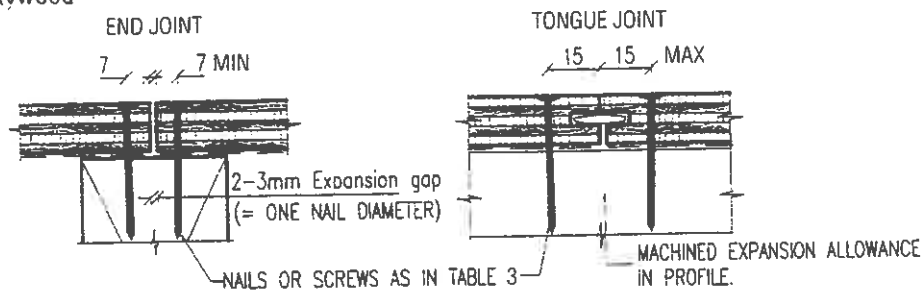


Table 3: Fasteners and characteristic shear loads

Plywood Thickness (mm)	7 & 9	Load*	12 & 15	Load	17	Load	19 & 21	Load	25	Load
Minimum Nail size in timber	40 x 2.5 mm	570	50 x 2.8 mm	710	60 x 2.8 mm	710	60 x 2.8 mm	710	75 x 3.15 mm	883
Screw size in timber	No. 8 x 30 mm	1230	No. 8 x 40 mm	1230	No. 10 x 40 mm	1650	No. 10 x 45 mm	1650	No. 10 x 50 mm	1650
Screw size in 1.15 mm steel*	10-24-35 [†]	1300	10-24-40	2000	10-16-45	2100	10-16-45	2100	10-16-45	3100
Screw size in 2.80 mm steel*	10-24-35 [†]	1200	10-16-40	1200	14-20-45	3000	14-20-45	4000	14-20-45	5000

* Self tapping, self countersinking screw Screw numbers indicate: Gauge · Threads per inch · Length (mm)

† The load is the characteristic load (N) for one fastener in single shear

Note • Steel thickness, screw sizes, characteristic loads, refer to assemblies actually tested.

• Other screw sizes may be used. Screw properties vary between screw suppliers and the suitability of a particular size should be verified by the designer for performance under changing physical conditions and cyclic loading.

Fixing to steel:

- Fix directly to roll formed steel (up to 2 mm thick) with self drilling, self tapping screws. If plywood gets damp and expands, screws in thicker steel may break. Keep plywood dry or use larger screws or:
- Bolt or screw battens to the steel and apply plywood as above for timber. Ensure that battens have adequate thickness for the minimum nail or screw length.

Adhesives:

Elastomeric (Construction) adhesives should be used with nails to minimise floor squeaking.

- Use a bead of structural elastomeric adhesive in accordance with the manufacturer's instructions.
- Apply pressure using the standard nail pattern above.
- Elastomeric adhesives must meet American Plywood Association (APA) specification AFG 01 (e.g. MaxBond, Sturdibond, Nortons Floormate, 4000 Enviroline etc.)

For full structural bonds with permanent loads use factory applied phenolic glue to NZS 3606:1987 "Specification for the Manufacture of Glue Laminated Lumber", or similar.

Finishing

Paints and coatings should be applied following the manufacturer's instructions. Avoid heavy sanding that may remove the critically important structural face veneer. For floor coverings and roofing, adhesives must be compatible with CCA (Copper Chrome Arsenic) treatment salts in H3 treated sheets. Compatibility can often be improved by lightly washing, scrubbing and drying the plywood surface prior to fixing. EcoPLY Flooring is manufactured using radiata pine softwood Grade C face veneers and is suitable for cover-grade floors. Where clear or stained finishes are desired, designers should select sheets and protect the floor during construction, or install after the floor is protected from the weather and construction activities.

References and Sources of Information

- Innovision "Ecoply Structural Manual".
- Innovision "Durability statement", 01/11/10.
- Innovision Technical Note 96/03/14 "Plywood, Fire and the Building Code".
- Innovision Technical Note 96/05/33 "Floor Heating: Ecoply Flooring".
- Innovision Technical Note 96/05/34 "Ecoply Plywood for Roofing or Cladding Substrates".
- PAA Structural Plywood for commercial and industrial flooring, Design Manual.

Standards

AS 1684:1999 "Residential Timber Framed Construction"

AS/NZS 2269:1994 "Plywood - Structural"

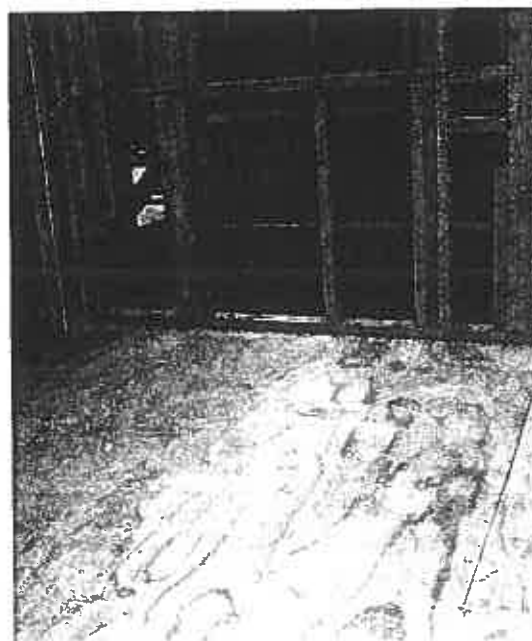
NZS 3604:1999 "Timber Framed Buildings"

NZS 3606:1987 "Specification for the Manufacture of Glue Laminated Lumber"

NZS 4203:1992 "General Structural Design Loadings for Buildings"

Supply

Available from stockists, merchants and agents throughout New Zealand, Australia, Pacific Islands and some Asian countries.



Ecoply Flooring reduces squeaking and provides superior strength and durability.

innovision

A Carter Holt Harvey Business

The information contained in this document is based on data available at the time of writing, which we believe is accurate and reliable. Innovision reserves the right to change the information without prior notice.

© Innovision, September, 2002.

Supersedes all previous Carter Holt Harvey Ecoply Flooring information.

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rasolastik

10/09 150



RASOLASTIK

Two-pack flexible cement-based
skimming plaster with waterproofing
and carbonation inhibiting properties.

waterproofing

TECHNOKOLLA





rasolastik



ASPECT

Comp. A: grey powder
Comp. B: white liquid

STORAGE

12 months in a dry place, protected against freezing

FIELDS OF USE

- Waterproofing the walls and floors of swimming pools, bathrooms or places where there is a lot of moisture before the laying of ceramic walltiles
- Waterproofing tanks or cisterns (concrete used to hold drinking water)
- Waterproofing terraces, balconies prior to fixing ceramic tiles.
- Particularly suitable for raised floors
- Restoring the waterproofing properties to old terraces without demolishing the existing floor surface.
- Levelling cracked plaster or concrete
- Protecting concrete from the effects of carbonation or aggression from saline atmospheres or ones containing sulphates
- As bonding primer on old ceramic floors before skimming with self-levelling products

SUBSTRATES

Cement plaster, cement-lime mortar, cement, concrete, ceramic, plasterboard and nautical wood can be treated with RASOLASTIK.

NATURE OF THE PRODUCT

Comp. A consists of high-strength cements, selected silicon/quartz mineral charges, synthetic fibers and specific additives

Comp. B contains copolymers of organic nature in watery dispersion and specific additives

Ask our technical department for the safety brief for further information

AMOUNT REQUIRED

1.8 Kg/m² for every mm of thickness

OPERATIONS PRIOR TO APPLICATION

It is very important to make sure that there is no rising humidity in the walls or screeds. In this case, RASOLASTIK can only be applied after the relative cause has been eliminated and when the saline bloom has been removed from the wall

waterproofing



Veneta
Engineering
0505-CPD-1093



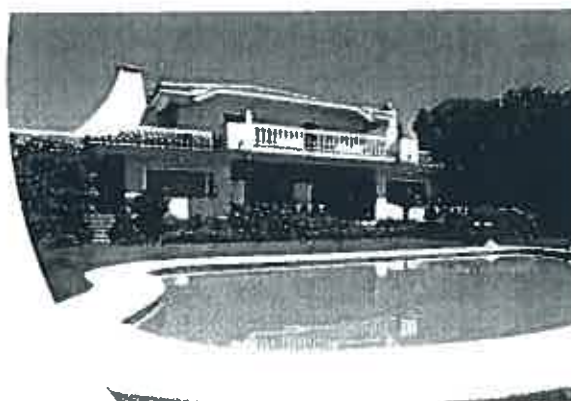
MFPA:

Cert. n. P-SAC 02/2 2/06 295

ARPA:

Fitness for containing
drinking water

Cert. N. 14293-02



RECOMMENDED ACCESSORIES



TKW 407
Blender 1200



TKW 155
Trowel 28x12



TKW528
RASOLASTIK NET



TKW 518
Strip RL80



TKW 520
Strip RL120

SURFACE	MINIMUM TIME TO WAIT BEFORE APPLICATION	MAX RESIDUAL HUMIDITY %
Kronos screeds	5 days	6
Screeds in TIMER-2	24 h	6
Cementitious screeds	28 days	6
Cement plaster	3 weeks	5
Concrete	3 months	5

If the surface is new, it is very important to know exactly how it has been weathered and the degree of humidity. The more frequent cases with their relative ageing periods are listed in the table below. When both the number of days and the humidity rate are indicated remember that both conditions must be complied with. If the substrate has been weathered but has been subject to abundant rainfall, wait until its humidity rate has returned to within the value given in the table before applying RASOLASTIK.

HOW TO PREPARE THE SUBSTRATES

The first thing to do is to apply adhesive strip RL 80 S in all the wall/floor and wall/wall corners. The strip should also be applied on a level with all the technical service points, such as drains, lights, delivery ports, etc. Expansion joints should be treated with strip RL 120.

HOW TO PREPARE THE MIXTURE

Mix the powder (25 kg bag) with the latex (8.35 l can) until a homogeneous, lump-free mixture is obtained. It is advisable to use a blender at low speed (approx. 500 rpm).

The mixture obtained can be used immediately. It is inadvisable to prepare the product by hand unless small quantities are required (4-5 kg).

APPLICATION OPERATIONS

Apply the product with a smooth steel knife. Press the mortar well down on to the substrate to ensure a perfect bond. However, remember that if the temperature is higher than 15°C or if surface is very absorbent, this latter must be wetted with water to prevent the mortar from drying out and failing to adhere well. Apply two coats of the product, each 1.5-2 mm thick, the second coat about 2-5 h after the first, in any case not before the first coat has set. Bury RASOLASTIK NET in the first coat, overlapping the various sheets by at least 1 cm. PRIMERGUM must be used if the product must be applied on top of bituminous sheathing, something that can only be done on small areas. Proceed by briefly stirring until the product becomes perfectly homogeneous, then apply a coat with a brush, roller or airless method. 24 h prior to applying RASOLASTIK, 250-350 g/m² of primer is required.

WARNINGS AND RECOMMENDATIONS

- cracked or split cementitious screeds must be pretreated with REPAIR
- protect the levelled surface from the rain for at least 24 hours
- thoroughly rinse out tanks or cisterns that must be used to hold drinking water before filling them
- wait at least 21 days after applying the last coat before filling tanks or cisterns
- In order to obtain the highest performances when ceramic tiles are applied on Rasolastik in swimming-pools, use: TECHNORAP-2 or TECHNOLA mixed with TC-LAX; when glass mosaic is applied on Rasolastik in swimming-pools, use TECHNOMOS mixed with TC-LAX diluted with water in a ratio of 50%.

Do not apply straight on to:

- bitumen or bituminous sheathing (apply PRIMERGUM at least 2 h prior to application)

Do not apply:

- to substrates subject to rising damp
- in layers more than 4 mm thick
- to hold counterthrusting water (see TECHTONIKO)
- do not add anything to the product that is not specified in this brief

rasolastik

TECHNICAL SPECIFICATIONS

Aspect

Apparent specific mass

Mixing Ratio

Storage

COMPONENT A

grey powder

approx.1400 kg/m³

3

12 months in a dry place,
protected against freezing

COMPONENT B

white liquid

approx.1050 kg/m³

1

12 months in a dry place,
protected against freezing

FINAL PERFORMANCES

Initial bond

Bond after immersion in water

Bond after the action of heat

Bond after immersion in limewater

Bond after freezing/thawing cycles

Bond after immersion in chlorinated water

Crack Bridging ability

Crack Bridging ability at low temperatures (-20°C)

Water pressure resistance no humidity passes at 1.5 bar for 7 days

Fitness for containing drinking water

Permeability to vapour

Absorption by capillarity and permeability to H₂O

Adhesion strength through direct traction

Permeability to CO₂

Fire reaction

VALUE

≥ 0,5 N/mm²

≥ 0,5 N/mm²

≥ 0,5 N/mm²

≥ 0,5 N/mm²

≥ 0,5 N/mm²

≥ 0,5 N/mm²

≥ 0,75 mm

≥ 0,75 mm

waterproof

cert. Fitness

"class I" passed test

< 0,1 kg·m⁻²·h^{-0,5}

≥ 1,0 N/mm²

S_D > 50

C (s1;d0)

STANDARD

≥ 0,5 N/mm²

≥ 0,5 N/mm²

≥ 0,5 N/mm²

≥ 0,5 N/mm²

≥ 0,5 N/mm²

≥ 0,5 N/mm²

≥ 0,75 mm

≥ 0,75 mm

< 5 S_D

< 0,1 kg·m⁻²·h^{-0,5}

≥ 0,8 N/mm²

S_D > 50

value declared by the producer

NORM

EN 14891

EN 14891

EN 14891

EN 14891

EN 14891

EN 14891

EN 14891

EN 14891

EN 14891

EN 14891

EN 14891

EN 14891

EN 14891

EN 14891

EN 14891

APPLICATION SPECIFICATIONS

Application

Pot life

Minimum thickness per coat

Maximum thickness per coat

Time to wait between 1st and 2nd

Amount required

Temperature during application

Can be tiled after

Minimum operating temperature

VALUE

smooth stainless steel trowel

*50 min

1,5 mm

2 mm

*3-5 h

about 1,8 Kg/m² for every mm of thickness

min.+5°C, max.+35°C

*2-4 days

-20°C

* these times refer to a temperature of 23°C-50% U.R.

SPECIFICATION

Surfaces to which ceramic tiles must be applied must be waterproofed with a waterproofing, two-pack cement-based skimming plaster such as TECHNOKOLLA's RASOLASTIK

Technokolla reminds you to examine the "notes" document that completes the information in this data sheet.

The document can be downloaded in the pdf format.

The advice about technical matters and applications in the technical data sheets, or given verbally or in writing by our personnel as part of our customer assistance service, are the result of our best and most up to date experience. Since we are unable to personally modify the conditions in the building site or the way the work is carried out, this information is purely indicative and, thus, binds us neither legally nor in any other way in relation to third parties. This information does not relieve the end user from being responsible for testing our products so as to make sure they are fit for the required use. We therefore strongly advise the customer/user to subject Technokolla's products to preventive tests in order to ensure that they are suitable. The end user is also responsible for checking to make sure that this technical data sheet is not obsolete and that more recent editions have not replaced it. Thus, before using our products, you are advised to download the most up to date version of the technical data sheet from our web site www.technokolla.com.



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BRANZ Appraised
Appraisal No.541 [2007]

BRANZ Appraisals

Technical Assessments of products
for building and construction

**BRANZ
APPRAISAL
No. 541 (2007)**

Amended 31 January 2012.

**RASOLASTIK
WATERPROOFING
MEMBRANE**

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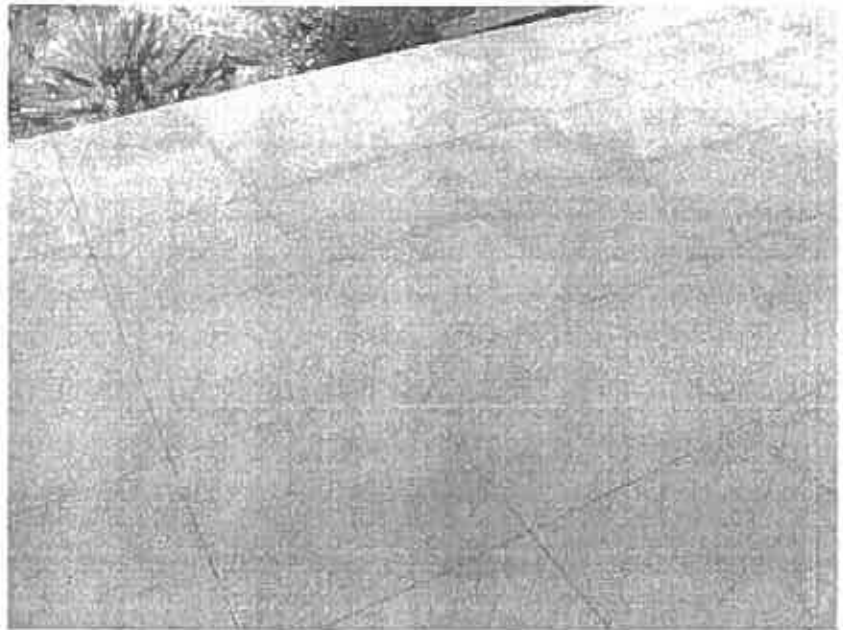


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1.1 **TECHNOKOLLA** Rasolastik Waterproofing Membrane is a liquid applied waterproofing membrane for use under ceramic or stone tile finishes on external decks and balconies.



2.1 Rasolastik Waterproofing Membrane has been appraised for use as waterproofing membrane for buildings within the following scope:

- scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1; and,
- with timber supporting structures designed and constructed in accordance with the NZBC; and,
- with substrates of plywood and fibre cement compressed sheet; and,
- with decks that have a maximum size of 40m².

2.2 Rasolastik Waterproofing Membrane has also been appraised for use as waterproofing membrane for external reinforced concrete pedestrian decks and balconies for buildings within the following scope:

- up to 3 storeys with a maximum height from ground to eaves of 10 m and with a floor plan area limited only by seismic and structural control joints; and,
- with the reinforced concrete structure designed and constructed in accordance with the NZBC.

2.3 This Appraisal is limited to decks and balconies within the following scope:

- constructed to suitable falls (Refer Paragraph 12.3); and,
- with the membrane continually protected from exposure to UV (ultra violet) light and from physical damage by ceramic or stone tile finishes; and,
- with decks and balconies designed and constructed such that deflections do not exceed 1/360th of the span; and,
- with no steps within the deck level, no integral roof gardens and no down pipes discharging directly onto the deck.

2.4 Movement and control joints in the substrate must be carried through to the tile finish. The design and construction of the substrate and movement and control joints is specific to each building, and therefore the responsibility of the building designer and building contractor. These joints have not been assessed and are outside the scope of this Appraisal.

2.5 Ceramic or stone tile finishes are outside the scope of this Appraisal.

2.6 The membrane must be installed by Protective Surfaces Ltd Approved and Trained Applicators.

Readers are advised to check the validity of this Certificate by referring to the Valid Certificates listing on the BRANZ website, or by contacting BRANZ.

New Zealand Building Code (NZBC)

3.1 In the opinion of BRANZ, Rasolastik Waterproofing Membrane, if designed, used, installed and maintained in accordance with the statements and conditions of this Appraisal, will meet the following provisions of the NZBC:

Clause B2 DURABILITY: Performance B2.3.1 (b) 15 years. Rasolastik Waterproofing Membrane meets this requirement. See Paragraph 9.1.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.1 and E2.3.2. Decks and balconies incorporating Rasolastik Waterproofing Membrane meet these requirements. See Paragraphs 12.1 – 12.9.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. Rasolastik Waterproofing Membrane meets this requirement and will not present a health hazard to people.

This is an Appraisal of an **Alternative Solution** in terms of New Zealand Building Code compliance.

4.1 Materials supplied by Protective Surfaces Ltd are as follows:

Rasolastik

- A two-part, elastic, cementitious, liquid applied membrane. It is supplied as a Part A, grey powder in 25 kg multi-wall bags and a Part B, white latex liquid in 8.35 l plastic containers. When dry, the membrane is grey in colour.

Strip RL 80 S

- A cold adhesive strip made from a viscoelastic layer covered with a non woven fabric made from 30 g/m² polypropylene. This strip is used for reinforcing all floor/wall joints, wall/wall joints, fractionizing joints and floor joints. It is available as a roll 85 mm wide and 10 m long.

Fibre Glass Netting

- A 100% glass fibre netting used for extra strength in an exterior application and as a thickness gauge to ensure the correct thickness is applied in both interior and exterior applications. It is supplied as a 50 m² roll with a glass weight of 92 g/m².

Handling and Storage

5.1 All materials must be stored inside, up off concrete floors, in dry conditions, out of direct sunlight and out of freezing conditions. The materials in the original unopened packaging have a shelf life of 12 months from date of manufacture. Once opened, the materials must be used within 3 months.

6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for the Rasolastik Waterproofing Membrane. The Technical Literature must be read in conjunction with this Appraisal. All aspects of design, use, installation and maintenance contained in the Technical Literature and within the scope of this Appraisal must be followed.

General

7.1 Rasolastik Waterproofing Membrane is for use on decks and balconies where an impervious waterproof membrane is required to prevent damage to building elements and adjoining areas.

7.2 The membrane must be protected from exposure to UV light and from physical damage by ceramic or stone tile finishes.

7.3 The effective control of internal moisture must be considered at the design stage due to the impermeability of the membrane. Refer to the BRANZ publication 'Good Practice Guide to Membrane Roofing'.

7.4 Movement and control joints may be required depending on the shape and size of the deck and the finish specified. Design guidelines for control joints for tiles can be found in the 'BRANZ Good Practice Guide to Tiling'.

7.5 Timber framing systems must comply with NZS 3604, or where specific engineering design is used, the framing shall be of at least equivalent stiffness to the framing provisions of NZS 3604, or comply with the serviceability criteria of AS/NZS 1170. In all cases, framing must be provided so that the maximum span of the substrate as specified by the substrate manufacturer is met and that all sheet edges are fully supported. Timber framing systems supporting the substrates must be constructed such that deflections do not exceed 1/360th of the span. Where NZS 3604 is used, the allowable joist spans given in Table 7.1 shall be reduced by 20%.

Substrates

Plywood

8.1 Plywood must comply with NZBC Acceptable Solution E2/AS1 Paragraphs 8.5.3 and 8.5.5 and must be treated to H3.2 (CCA treated). **LOSP treated plywood must not be used.**

Fibre Cement Compressed Sheet

8.2 Fibre cement compressed sheet must be manufactured to comply with the requirements of AS 2908.2 and must be specified by the manufacturer as being suitable for use as an external decking substrate. The fibre cement sheet must be of a thickness to meet specific structural design requirements and must be secured to the structure to resist wind uplift and all other forces acting on the deck or balcony, such as deflection from gravity and live loads. Installation must be in accordance with the instructions of the manufacturer.

Concrete

8.3 Concrete substrates must be to a specific engineering design meeting the requirements of the NZBC, such as concrete construction to NZS 3101.

Durability

Serviceable Life

9.1 Rasolastik Waterproofing Membrane, when subjected to normal conditions of environment and use, is expected to have a serviceable life of at least 15 years and be compatible with ceramic or stone tiling finishes with a design service life of 15-25 years.

Maintenance

10.1 No maintenance of the membrane will be required provided significant substrate movement does not occur and the tile finish remains intact. Regular checks must be made of the tiling to ensure it is sound and will not allow moisture to penetrate. Any cracks or damage must be repaired immediately by repairing the tiling and any grout or sealant.

10.2 In the event of damage to the membrane, the tiling must be removed and the membrane repaired by removing the damaged portion and applying a patch as for new work.

10.3 Drainage outlets must be maintained to operate effectively, and tile finishes must be kept clean. Cleaning materials that may affect polymer based membranes must not be used.

Outbreak of Fire

11.1 The membrane must be protected from heat sources such as flues and chimneys in accordance with the requirements of NZBC Acceptable Solution C/AS1 Part 9 for the protection of combustible materials.

External Moisture

12.1 Decks and balconies must be designed and constructed to shed precipitated moisture. They must also take account of snowfalls in snow prone areas. A means of meeting code compliance with NZBC Clause E2.3.1 is given by the Technical Literature which gives details aligned with NZBC Acceptable Solution E2/AS1.

12.2 When installed in accordance with this Appraisal and the Technical Literature, Rasolastik membrane will prevent the penetration of water and will therefore meet code compliance with Clause E2.3.2. The membrane is impervious to water and will give a weathertight deck or balcony.

12.3 The minimum fall to decks and balconies must be 1 in 40 and gutters must be 1 in 60 and all falls must slope to an outlet. Inadequate falls will allow moisture to collect and increase the risk of deterioration of the membrane and tiling finish.

12.4 Rasolastik membrane is impermeable, therefore a means of dissipating construction moisture must be provided in the building design and construction to meet code compliance with Clause E2.3.6.

12.5 Deck and balcony falls must be built into the substrate and not created with mortar screeds applied over the membrane.

12.6 Allowance for deflection and settlement of the substrate must be made in the design of the deck or balcony to ensure falls are maintained and no ponding of water can occur.

12.7 Drainage flanges must be used for any outlet and must be fitted with a grate or cage to reduce potential sources of blockages. An overflow must be provided where the deck or balcony does not drain to an external gutter or spouting.

12.8 Penetrations and upstands of the membrane must be raised above the level of any possible flooding caused by blockage of deck and balcony drainage.

12.9 The design of details not covered by the Technical Literature is subject to specific weathertightness design and is outside the scope of this Appraisal.

Installation Skill Level Requirement

13.1 Installation of the membrane must be completed by Protective Surfaces Ltd Approved and Trained Applicators that have experience in the application of waterproofing membranes and understand waterproofing principles.

13.2 Installation of substrates must be completed by tradespersons with an understanding of deck and balcony construction, in accordance with instructions given within the Protective Surfaces Ltd Technical Literature and this Appraisal.

Preparation of Substrates

14.1 Substrates must be dry, clean and stable before installation commences. Surfaces must be smooth and free from nibs, sharp edges, dust, dirt or other materials such as oil, grease or concrete formwork release agents. All surface defects must be filled to achieve an even and uniform surface.

14.2 Concrete substrates can be checked for dryness by using a hygrometer, as set out in BRANZ Bulletin No. 424. The relative humidity of the concrete must be 75% or less before membrane application.

14.3 The moisture content of a timber substructure must be a maximum of 20% and fibre cement and plywood sheet substrates must be dry to touch at the time of membrane application. This will generally require plywood and fibre cement sheets to be covered until just before the membrane is laid to prevent rain wetting.

14.4 Substrates must be primed and allowed to cure before the membrane is installed.

Membrane Installation

15.1 Installation must not be undertaken where the substrate surface temperature is below 5°C or above 35°C.

15.2 Rasolastik liquid and Rasolastik powder must be mixed and left to stand for 5 minutes before re-mixing, then applying.

15.3 The membrane must be applied in a minimum of two coats at the rates set out in the Technical Literature. Subsequent coats must be applied in an opposite direction to the previous coat. The total finished system thickness of the Rasolastik membrane must be a minimum of 2 mm.

15.4 Application can be made by roller (medium/long nap), brush (long bristle), or a notched steel trowel (finished with a flat steel trowel).

15.5 Strip RL 80 S reinforcement is laid onto the substrate before the first coat is applied to provide movement protection at wall/wall and wall/floor junctions, or any other areas such as joints in the flooring substrate, floor cracks, or around penetrations in the membrane. In all other situations, reinforcement provisions as set out in this Appraisal and the Technical Literature apply.

15.6 It is strongly recommended that the membrane is protected with temporary covers until it is fully cured in case of mechanical damage or rain wetting.

15.7 Clean up may be undertaken with water.

Tiling

16.1 The membrane must be fully cured before tiling. The cured membrane must be protected at all times to prevent mechanical damage, so may require temporary covers until the finishing is completed.

16.2 The membrane must not be left exposed to ultra-violet (UV) for any longer than two months prior to tile application.

16.3 Tiling must be undertaken in accordance with AS 3958.1 and the 'Good Practice Guide to Tiling'. The compatibility of the tile adhesive must be confirmed with the adhesive manufacturer or Protective Surfaces Ltd.

Inspections

17.1 Critical areas of inspection for waterproofing systems are:

- Construction of substrates, including crack control and installation of bond breakers and movement control joints.
- Moisture content of the substrate prior to the application of the membrane.
- Acceptance of the substrate by the membrane installer prior to application of the membrane.
- Installation of the membrane to the manufacturer's instructions, particularly installation to the correct thickness and use of reinforcement.
- Membrane curing and integrity prior to the installation of tiles, including protection from moisture, frost and mechanical damage during curing.

Health and Safety

18.1 Safe use and handling procedures for the membrane system is provided in the Technical Literature. The product must be used in conjunction with the relevant Material Safety Data Sheet.

The following is a summary of the technical investigations carried out:

Tests

19.1 The following testing has been undertaken for Technokolla S.p.A by Saurefliesner-Vereinigung E.V (SFV) Burgwedel, Germany:

- Rasolastik in accordance with; EN 14891 for strength as a function of heat aging, water immersion, exposure to chlorinated water, exposure to alkali, freeze-thaw, static head, water vapour permeability, crack bridging and joint strength.

19.2 Test methods and results were reviewed by BRANZ and found to be satisfactory.

Other Investigations

20.1 An assessment was made of the durability of the Rasolastik Waterproofing Membrane by BRANZ technical experts.

20.2 Site visits have been carried out by BRANZ to assess the practicability of installation, and to examine completed installations.

20.3 The Technical Literature has been examined by BRANZ and found to be satisfactory.

Quality

21.1 The manufacture of the membrane has not been examined by BRANZ, but details regarding the quality and composition of the materials used were obtained by BRANZ and found to be satisfactory.

21.2 The quality management system of the membrane manufacturer has been assessed by BRANZ and found to be satisfactory.

21.3 The quality of manufacture of the membrane material is the responsibility of the manufacturer.

21.4 The quality of supply of the membrane system to the market is the responsibility of Protective Surfaces Ltd.

21.5 Quality on site is the responsibility of the Protective Surfaces Ltd Approved and Trained Applicators.

21.6 Designers are responsible for the substrate design, and building contractors are responsible for the quality of construction of substrate systems in accordance with the instructions of the substrate manufacturer, Protective Surfaces Ltd and this Appraisal.

21.7 Building owners are responsible for the maintenance of the tiling systems in accordance with the instructions of Protective Surfaces Ltd.

Sources of Information

- AS/NZS 1170: 2002 Structural design actions.
- AS 2908.2: 2000 Cellulose-cement products – Flat sheet.
- AS/NZS 2269: 2008 Plywood-Structural
- AS 3958.1 Guide to the installation of ceramic tiles.
- EN 14891 March 2003 Liquid applied waterproofing membranes for use beneath ceramic tiling – Definitions, specifications and test methods.
- NZS 3101: 2006 The design of concrete structures.
- NZS 3604: 2011 Timber-framed buildings.
- Compliance Document for New Zealand Building Code External Moisture Clause E2, Department of Building and Housing, Third Edition July 2005 (Amendment 5, 1 August 2011).
- New Zealand Building Code Handbook Department of Building and Housing, Third Edition (Amendment 12, 10 October 2011).
- The Building Regulations 1992.
- Good Practice Guide to Tiling, BRANZ, March 2004.
- Good Practice Guide to Membrane Roofing, BRANZ, reprint October 2003.



BRANZ

In the opinion of BRANZ, Rasolastik Waterproofing Membrane is fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided it is used, designed, installed and maintained as set out in this Appraisal.

The Appraisal is issued only to the Appraisal Holder, Protective Surfaces Ltd, and is valid until further notice, subject to the Conditions of Certification.

Conditions of Certification

1. This Appraisal:
 - a) relates only to the product as described herein;
 - b) must be read, considered and used in full together with the technical literature;
 - c) does not address any Legislation, Regulations, Codes or Standards, not specifically named herein;
 - d) is copyright of BRANZ.
2. The Appraisal Holder:
 - a) continues to have the product reviewed by BRANZ;
 - b) shall notify BRANZ of any changes in product specification or quality assurance measures prior to the product being marketed;
 - c) abides by the BRANZ Appraisals Services Terms and Conditions.
3. The product and the manufacture are maintained at or above the standards, levels and quality assessed and found satisfactory by BRANZ.
4. BRANZ makes no representation as to:
 - a) the nature of individual examples of, batches of, or individual installations of the product, including methods and workmanship;
 - b) the presence or absence of any patent or similar rights subsisting in the product or any other product;
 - c) any guarantee or warranty offered by the Appraisal Holder.
5. Any reference in this Appraisal to any other publication shall be read as a reference to the version of the publication specified in this Appraisal.

For BRANZ

P Robertson
Chief Executive

Amendment No. 1, dated 31 January 2012.

This Appraisal has been amended to update clause changes as required by the introduction of NZS 3604: 2011 and NZBC Acceptable Solution E2/AS1 Third Edition, Amendment 5.

Date of issue: 9 February 2007



Flintkote Applications

TYPICAL APPLICATION RATES

The table below describes typical application rates. Note that these are only a general guideline. The recommended coverage for specific applications is detailed in the relevant section.

Function	Product Name	Coverage per Coat litres per m ²
Priming (Alternative)	Waterproofing Sealer	0.20 (undiluted)
	Penetration Primer	0.20
Top Coats (Alternative)	Waterproofing Sealer	0.75
	Dual Purpose Sealer	0.75
Protective Coat (Alternative)	Colourcoat	0.20
	Bituminous Aluminium Paint	0.20

GENERAL GUIDELINES ON FLINTKOTE APPLICATION

These guidelines should be read in conjunction with the section describing the particular application concerned.

- 1: Always ensure the coat applied is thoroughly dry before applying the next. A simple test is to lightly rub a clean damp cloth onto the surface - if staining appears, allow more time.
- 2: If rain is likely before complete curing, use a solvent based grade.
- 3: Flintkote is usually applied by brush. However, ensure that Flintkote is spread at the correct application rate. Do not brush the coating out as you would a decorative paint.
- 4: Flintkote must always be applied to the external face of the surface; i.e the side that is in contact with incoming moisture.
- 5: Flintkote will adhere to most surfaces. The surface should be thoroughly clean and free from loose or flakey material.
- 6: To obtain the most effective result, apply Flintkote in a uniform layer. To achieve this, fill joints, cracks and other deformities with a Flintkote mastic mix or alternatively Shell Tixophalte.
- 7: On joints and other areas where excessive movement is anticipated, it is recommended an open-weave fibreglass membrane be laid into the Flintkote to provide greater reinforcement. Marglass 250 is specified in this manual but equivalent products may be used.
- 8: When Flintkote is exposed to sunlight, apply a light reflective coating using either Colourcoat or Bituminous Aluminium Paint. (Do not use conventional oil based or acrylic paints).
- 9: If Flintkote is to be sprayed on, use an airless industrial sprayer at approximately 3000psi, or an "Air Atomiser", with a nozzle size of 0.032 inches. This provides a 6 - 8 inch spray width. A follower plate needs to be placed in the drum.



Waterproofing of Blockwork and Concrete

GENERAL DESCRIPTION

For waterproofing of concrete structures. This can be achieved by using either waterbased or solvent based Flintkote products, the former being preferred unless rain is likely before complete curing.

1.0 PREPARATION

A clean even surface is required. Remove dirt, dust, and any flakey material using a wirebrush, then wash or waterblast off any remaining loose material.

2.0 REPAIR OF CRACKS AND GAPS

These need to be filled to avoid over application of Flintkote which could result in incomplete curing. Such areas may blister subsequent coats thereby rendering them ineffective as a waterbarrier.

- 2.1 For smaller cracks, apply a primer coat of Waterproofing Sealer diluted with equal parts clean water onto all cracks, extending 75mm either side. Allow to dry. Then apply a heavy brush coat of Waterproofing Sealer over the area already primed and while this coating is still wet, lay in an open-weave fibreglass membrane (Marglass 250). Allow to dry.
- 2.2 For larger cracks, scrape and wash out, and apply a primer coat as in 2.1. and allow to dry. Then apply an undiluted coat of Waterproofing Sealer, and while it is still wet, caulk with a mastic comprised of equal volumes of Waterproofing Sealer and sand. After the mastic has cured, apply a heavy brush coat of Waterproofing Sealer over the caulked area and while this coating is still wet, lay in an open-weave fibre-glass membrane (Marglass 250). Allow to dry.
- 2.3 Alternative. Tixophalte can be used as an alternative joint and crack sealer. However it is not recommended if the gaps to be filled are deeper than 25mm. (refer page 34).

3.0 PRIMING

- 3.1 Apply a generous coat of Waterproofing Sealer diluted with equal parts of clean water to the entire surface including patched areas. Allow to dry.

4.0 WATERPROOFING

- 4.1 Apply an undiluted coat of Waterproofing Sealer in one direction. Allow to dry. (Lightly rub a clean damp cloth onto the surface - if staining appears, allow more time).
- 4.2 Apply a second coat of Waterproofing Sealer at right angles to the first. Allow to dry.

5.0 LIGHT REFLECTIVE COATING

Although durable, Flintkote is susceptible to damage from ultra-violet light. If exposed to sunlight for prolonged periods, a reflective coating should be applied. Either Colourcoat or Bituminous Aluminium Paint is recommended.

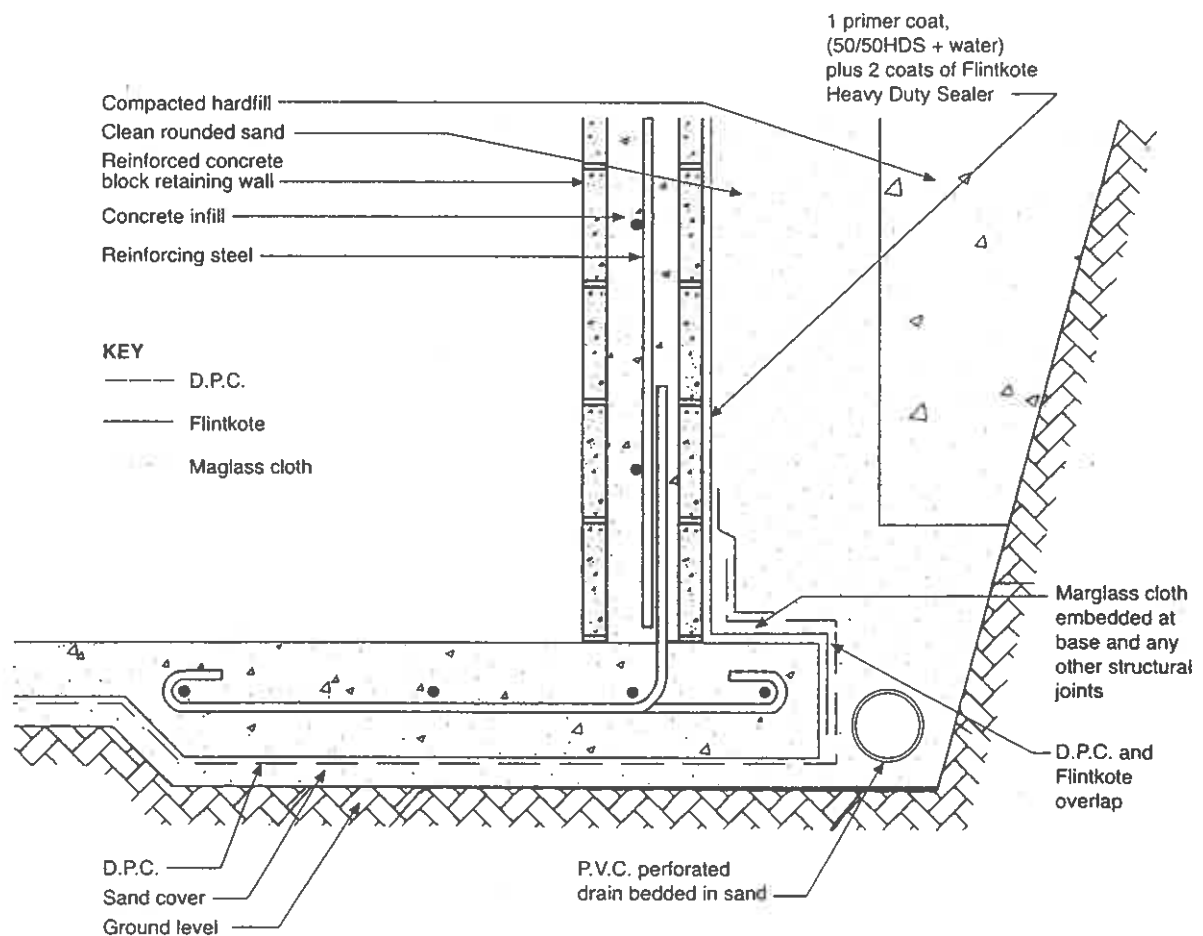
Note: Conventional acrylic, oilbased or PVC paints should not be used on Flintkote.

- 5.1 Allow at least three weeks curing of the waterproofing layer before applying.
- 5.2 Colourcoat: Apply two undiluted coats at 0.2 litre per sqm allowing 1 - 3 hours drying time between each. (Refer page 36)
Bituminous Aluminium Paint: Apply one coat at 0.2 litres per sqm (Refer page 35).



6.0 BELOW - GROUND APPLICATIONS

- 6.1 Follow steps 1.0 to 3.0 on page 8, but use Heavy Duty Sealer rather than Waterproofing Sealer.
- 6.2 Apply an undiluted coat of Heavy Duty Sealer in one direction. Whilst still wet, lay Marglass cloth at base of wall and any other structured joints. Allow to dry.
- 6.3 Apply a second coat of Heavy Duty Sealer at right angles to the first. Allow to dry.
- 6.4 Wrap the damp proof course over the dried Flintkote surface and adhere to the wall by applying one coat of Heavy Duty Sealer over the end of the D.P.C. ensuring the top edge is sealed. (see diagram below).
- 6.5 Lay a drain below floor slab or foundation level ensuring it allows for free drainage along its entire length.
- 6.6 Cover with free-draining sand, ensuring the entire face of the wall has only clean, rounded sand against it. (See diagram below).



Flintkote Waterproofing Sealer

PRODUCT SPECIFICATION SHEET

Description	A non-fibrated, stable, bitumen emulsion of a thick creamy consistency. It is dark brown in colour and dries to a black flexible coating.
Applications	A general purpose product for waterproofing most surfaces, in particular concrete, masonry, roofing felt and mastic asphalt. When diluted with water it can be used as a primer coat.
Typical Product Density	1.0 kg/litre
Application Temperature	Between 5°C and 40°C Limits
Service Temperature Limits	Approx -10°C to +85°C depending on operating conditions.
Application	By brush or suitable spray equipment
Rate of Application	Approx 0.75 litre/m ² per coat
Setting or Drying Time	In average conditions, 10 to 12 hours.
Chemical Resistance	Resistant to, alcohol, most salt solutions, some dilute acids (up to 2% dilution) and some alkalis. Not resistant to Oils, solvents, some detergent solutions.
Moisture Vapour Transmission	0.10 perms at 1.5mm thickness (25°C and 75% relative humidity) 0.075 perms at 1.5mm thickness (38°C and 90% RH) Test Method: British Standard No 3177:1959
Fire Resistance	Non-flammable. Will not support combustion.
Heat Flow Resistance	The cured coating will not flow or sag, even on a vertical surface.
Shrinkage Factor	Approx 45 % wet to dry state.
Storage Life	18 to 24 months if stored in good conditions in suitable containers
Containers	200 litre steel drums, 20 litre plastic pails, 4 litre plastic pails.



Flintkote Heavyduty Sealer

PRODUCT SPECIFICATION SHEET

Description	A stable, bitumen emulsion containing synthetic fibre. It is dark brown in colour and dries to a black flexible coating.
Applications	Used in-below ground applications, or where surface is subject to traffic, and other situations where additional re-inforcement is required.
Typical Product Density	1.0 kg/litre
Application Temperature	Between 5°C and 40°C Limits
Service Temperature Limits	Approx -10°C to +85°C depending on operating conditions.
Application	By brush or suitable spray equipment
Rate of Application	Approx 0.75 litre/m ² per coat
Setting or Drying Time	In average conditions, 10 to 12 hours.
Chemical Resistance	Resistant to, alcohol, most salt solutions, some dilute acids (up to 2% dilution) and some alkalis. Not resistant to Oils, solvents, some detergent solutions.
Moisture Vapour Transmission	0.10 perms at 1.5mm thickness (25°C and 75% relative humidity). 0.075 perms at 1.5mm thickness (38°C and 90% RH) Test Method: British Standard No 3177:1959
Fire Resistance	Non-flammable. Will not support combustion.
Heat Flow Resistance	The cured coating will not flow or sag, even on a vertical surface.
Shrinkage Factor	Approx 45 % wet to dry state.
Storage Life	18 to 24 months if stored in good conditions in suitable containers
Containers	200 litre steel drums, 20 litre plastic pails, 4 litre plastic pails.





5175F FORMAN KOOLTHERM INSULATED PLASTERBOARD

1. GENERAL

Masterspec sections must be customised to suit the project being specified, by removing irrelevant information and adding project-specific information and selections.

This section relates to the supply, fixing and finishing of Kingspan **Kooltherm**® K17 and Kingspan **Kooltherm**® K18 Insulated Plasterboard and accessories;

- to timber and steel framed walls,
- brick, block, stone or concrete walls.

Modify / expand this clause to suit requirements of this specification section.

This is a pre-insulated system comprising composite lining and insulation boards. Kooltherm Insulated Plasterboards are backed with phenolic foam and have either glass tissue back facing (Kooltherm® K17) or aluminium foil back facing (Kooltherm® K18) depending on the fixing medium application (plaster dab/adhesive bonding or mechanical fixing) and substrate type. The tapered edge to the plasterboard enables a flat seamless surface

1.1 RELATED WORK

Refer to ~ for ~

Include cross references only to other work sections where they include directly related work.

Documents

1.2 DOCUMENTS

Refer to the general section *** 684 ***. The following documents are specifically referred to in this section:

	NZBC H1/AS1	Energy efficiency
AS 1397	Steel sheet and strip - hot-dip, zinc-coated, or aluminium/zinc-coated	
AS/NZS 2589	Gypsum linings - Application and finishing	
	NZS 4218:2004	Energy efficiency - Small building envelope
NZS 4243	Energy efficiency - Large buildings - Building thermal envelope	
AS/NZS 4600	Cold-formed steel structures	
	AS/NZS 4859.1	Materials for the thermal insulation of buildings - General criteria and technical provisions
	BS EN ISO 9001	Quality management systems - Requirements - Technical Corrigendum 1

NZS 4218:2004 Energy Efficiency - Small Building Envelope, is recognised by NZBC, NZS 4218:2009 Thermal Insulation - Housing and Small Buildings, has not at the time of writing been recognised by NZBC. Consult with the BCA as to their requirements.

Delete from the DOCUMENTS clause any document not cited. List any additional cited documents.

The following are related documents and if referred to in the work section need to be added to the list of DOCUMENTS.

NZBC H1/VM1 Energy efficiency

BS 8212 Code of practice for dry lining and partitioning using gypsum plasterboard

NZCEP 54 is available on www.energysafety.govt.nz.

1.3 MANUFACTURER/SUPPLIER DOCUMENTS

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

Kingspan **Kooltherm**[®] K17 Insulated Plasterboard brochure

Kingspan **Kooltherm**[®] K18 Insulated Plasterboard brochure

Manufacturer/supplier contact details

Company: **Forman Building Systems**

Web: www.forman.co.nz

Email: info@forman.co.nz

Telephone: 0800 45 4000

It is important to ensure that all personnel on site have access to accurate, up to date technical information on the many products, materials and equipment used on a project. In most cases individual products are not used in isolation, but form part of a building process. Also a particular manufacturer's and/or supplier's requirements for handling, storage, preparation, installation, finishing and protection of their product can vary from what might be considered the norm. Access to technical information can help overcome this potential problem.

Warranties

1.4 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

10 years: For **Kooltherm**[®] K17 Insulated Plasterboard

10 years: For **Kooltherm**[®] K18 Insulated Plasterboard

- Provide this warranty on the manufacturer/supplier standard form.
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section *** 687 *** for additional requirements.

Modify or expand the clause to suit project or manufacturer/supplier requirements, options include:

- Change the standard form to be used (check with the manufacturer/supplier, use the general section *** 2 *** if required)
- Commence the warranty from the date of purchase (check with the manufacturer/supplier)

1.5 WARRANTY - INSTALLER/APPLICATOR

Provide an installer/applicator warranty:

~ years: For **Kooltherm**[®] K17 Insulated Plasterboard installation

~ years: For **Kooltherm**[®] K18 Insulated Plasterboard installation

- Provide this warranty on the installer/applicator standard form.
- Commence the warranty from the date of practical completion of the contract works.

Refer to the general section *** 687 *** for additional requirements.

Modify or expand the clause to suit project or installer/applicator requirements, options include:

- Change the standard form to be used (check with the installer/applicator, use the general section *** 2 *** if required)
- Commence the warranty from the date of installation (check with the installer/applicator)

Requirements

1.6 QUALIFICATIONS

Plasterboard installers and stoppers to be experienced competent workers, familiar with materials and techniques specified. Submit evidence of experience on request. For example:

- National Certificate of Interior Systems; or
- Certified Business member of AWCINZ.

1.7 NO SUBSTITUTIONS

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

Performance

1.8 ENERGY EFFICIENCY

Maintain the energy efficiency requirements to NZBC H1/AS1: **Energy efficiency, 2.0 Building thermal envelope**. Install to NZS 4218 for small buildings, to NZS 4243 for large buildings and to the **Kooltherm[®]** plasterboard technical requirements.

Modify to suit requirements, particularly if using NZBC H1/VM1. NZBC H1 requires that the building performance index (BPI) of the complete envelope does not exceed a set figure. NZBC H1 sets the minimum requirements. NZS 4218 and NZS 4243 provide a schedule, a calculation and a modelling method for determining insulation. Ensure SELECTIONS reflect this.

2. PRODUCTS

Materials

2.1 KOOLTHERM[®] K17 INSULATED PLASTERBOARD

Kingspan **Kooltherm[®]** K17 Insulated Plasterboard to AS/NZS 4859.1, comprising fibre free rigid thermoset insulation core, sandwiched between a 10mm front facing of tapered edge gypsum based plasterboard and a reverse tissue based facing autohesively bonded to the insulation core during manufacture. The glass tissue back facing facilitates plaster dab bonding. Manufactured under quality control systems approved to BS EN ISO 9001.

Applied using a variety of traditional or modern dry-lining techniques. These include traditional plaster dab bonding and proprietary adhesive bonding methods.

NOTE: The particular system employed will depend on the construction or design of the wall **Kooltherm[®]** K17 is to be fixed to.

2.2 KOOLTHERM[®] K18 INSULATED PLASTERBOARD

Kingspan **Kooltherm[®]** 18 Insulated Plasterboard to AS/NZS 4859.1, comprising fibre free rigid thermoset insulation core, sandwiched between a 12.5mm front facing of tapered edge gypsum based plasterboard and a reverse aluminium foil based

facing autohesively bonded to the insulation core during manufacture. The aluminium foil back facing facilitates mechanical fixing. Manufactured under quality control systems approved to BS EN ISO 9001.

Applied using mechanical fixing techniques. These include fixing to metal furring systems and timber framing/battens.

WARNING: The aluminium foil is a vapour barrier. Refer to Forman for advice on where to install Kooltherm[®] 18 due to condensation risks.

2.3 CORNICE

Plasterboard, scotia pattern.

Components

Mutually exclusive clauses follow depending on Kooltherm[®] Insulated Plasterboard type, substrate type and the fixing medium. Delete components not applicable to the project specified.

2.4 GYPSUM ADHESIVE - PLASTER DAB

Gypsum adhesive around perimeter wall, ceiling junctions and openings to provide a seal.

Use with Kooltherm[®] K17 for application to brick, concrete block or concrete masonry walls which are free from moisture penetration. Delete when using another application.

2.5 PLASTER ADHESIVE - PLASTER DAB

Plasterboard adhesive applied progressively in the background.

Use with Kooltherm[®] K17 for application to brick, concrete block or concrete masonry walls which are free from moisture penetration. Delete when using another application.

2.6 ACRYLIC SEALANT ADHESIVE - ADHESIVE BONDING

Acrylic sealant adhesive applied to the wall or back of the board.

Use with Kooltherm[®] K17 for application to sound, plane concrete (tilt-up) or plastered wall surfaces which are free from moisture penetration. Delete when using another application.

2.7 FIXINGS - VERTICAL TIMBER - MECHANICAL FIXING

Plasterboard screws long enough to allow a minimum 25mm penetration of the framing.

Use with Kooltherm[®] K18 for mechanical fixings to vertical timber framing/battens/ metal stud and track stud.

2.8 FIXINGS - METAL FURRING SYSTEMS - MECHANICAL FIXING

Self drilling and tapping, countersunk, surface coated screws placed at 150 centres, to screw fix Kooltherm[®] K18 to each metal framing section.

Use with Kooltherm[®] K18 for mechanical fixings to vertical timber framing/battens/ metal stud and track stud.

2.9 SECTIONS AND TRIM MATERIAL

Form from galvanized steel of a coating class not less than ZM275 to AS 1397 and fix

with 30mm x 2.5mm galvanized clouts.

2.10 EXTERNAL ANGLE
Perforated.

2.11 INTERNAL REINFORCING ANGLE
Perforated.

2.12 CONTROL JOINT
With plastic protective tape.

2.13 TAPE ON EDGE TRIMS
Tape-on paper tape and galvanized steel trims and edges.

2.14 EDGE PROFILES
Pre-formed aluminium profiles, with perforated edge trims.

Accessories

2.15 NAIL ANCHOR - PLASTER DAB
Masonry nail anchor to be applied after the adhesive to compliment the plaster dab.
For Kooltherm[®] K17 Insulated Plasterboard.

2.16 JOINTING COMPOUNDS
System match bedding compound and finishing compound. Refer to the sheet manufacturer's literature and follow their requirements on which compounds to use with which accessory and in which location, to achieve the required level of finish.

2.17 JOINTING TAPE
System match reinforcing tape.

Finishes

2.18 SKIMCOAT PLASTER
Proprietary spray-on surface finish.
Used to achieve a Level 5 finish over a plasterboard surface prepared to AS/NZS 2589 Level 4. Can be applied by roller, although best applied by airless spray. Proprietary surface sealers are also available to use here or in the painting section/s.

3. EXECUTION

NOTE: The fixing medium employed will depend on the construction or design of the wall Kooltherm[®] Insulated Plasterboards is to be fixed to.

Conditions

3.1 DELIVERY, STORAGE AND HANDLING

Take delivery of Kooltherm[®] Insulated Plasterboards and accessories; store on site and protect from damage 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.

The general section *** 693 *** describes how deliveries are to be managed and the

goods stored.

3.2 SUBSTRATE

Do not commence work until the substrate is dry, plumb, level and to the standard required by the sheet manufacturer's requirements.

3.3 LEVELS OF PLASTERBOARD FINISH

Provide the selected plasterboard surfaces to the pre decorative levels of finish specified in AS/NZS 2589.

The levels of finish range from "3" the lowest, up to "5." In specifying the installed orientation of plasterboard sheets, the aim should be to install linings such that directed light falls parallel to jointed areas and not across. Therefore the relevant EXECUTION clauses on levels of finish and lining method must be included. Specify the moisture content of framing in 3821 TIMBER FRAMING.

Note that specifying Level 5 finish will result in an additional cost. Only specify this level of finish when circumstances justify this.

3.4 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 plasterboard prior to the application of a range of decorative finishes under various lighting conditions. Refer to AS/NZS 2589.

Use this clause with the LEVELS OF FINISH clause. Do not use this clause if the earlier INSPECTIONS AND ACCEPTANCE clause has been included. It shall not be assumed that visual comparison of a decorated wall or ceiling against a reference sample area when illuminated by one light source is an adequate test. Colours may match under one light source but appear quite different under another. High intensity 500 or 1000 W quartz halogen floodlights are commonly used to provide light for work areas or application purposes but are not deemed suitable for performing a subjective visual inspection of interior surfaces for the purpose of acceptance/rejection after decoration. There is a likelihood of uncertainty and dispute about colour and finish quality unless a test light source is specified and an agreed inspection procedure is adopted. In the first instance, there is a need to assess the finish of a wall and ceiling prior to decoration against the level of finish criteria specified. Subsequently there is a need to subjectively assess the acceptability or otherwise of the final decorated wall or ceiling, or both, against a sample reference area or against alternative agreed standards. The visual inspection procedure must aim at providing a standardised approach for all parties and may be called up in contract documents.

While the method may rely on an artificial light source, it is intended to provide a standardised method of inspection for surfaces which may be subjected to either natural or artificial lighting.

3.5 TIMBER FRAME MOISTURE CONTENT

Maximum allowable moisture content to AS/NZS 2589 for timber framing at lining is 18% or less for plasterboard linings.

3.6 METAL FRAMING

Metal framing, to which **Kooltherm[®] Insulated Plasterboard** is fixed, shall comply with AS 1397 or AS/NZS 4600, as applicable. Where adhesion of gypsum linings is required, surfaces shall be free of oil, grease, dust and other foreign materials. Refer to the metal framing manufacturers specifications where high density gypsum linings (>800 kg/m³) are specified for fixing to light gauge steel framing.

Application - general

3.7 PREPARATION

Ensure ceiling lining in position before wall lining commences.

Wall mounted fittings such as electrical sockets to be fitted to take into account the additional wall thickness. Heavy surface mounted fittings require provision for the fixing load to be applied direct to the supporting wall and not to the **Kooltherm[®] K18 Insulated Plasterboard** in isolation.

Modify the clause to suit project specified.

NOTE: Ensure fire stopping details meet the fire rating requirements of the wall.

3.8 EXISTING SUBSTRATES

On existing constructions all surfaces to be clean and free of loose or flaking materials. Wallpaper to be stripped and surface mounted fittings removed.

3.9 WINDOW/DOOR REVEALS AND SOFFITS

Where plasterboard is returned into the opening, narrow widths of board to be cut and rebated to allow a plasterboard / plasterboard joint at the angle. Fixing to employ the same method as is used for the plain wall areas.

Ensure the cavity in cavity wall constructions is not bridged by the board or fixing medium in such a manner that would allow the passage of water through to the inner leaf.

Where adhesives are employed, soffit boards and boards at window heads should be temporarily supported.

3.10 CUTTING

Cutting to be carried out using either a fine toothed saw, or a sharp knife to cut through the insulation and paper backing of the plasterboard, then snapping the board face down over a straight edge and cutting the paper facing of the plasterboard on the other side. Ensure accurate trimming to achieve close butting joints and continuity of insulation.

Application - Kooltherm[®] K17

Applied using a variety of traditional or modern dry-lining techniques. Select the fixing medium clause to suit project requirements and delete the other.

3.11 PLASTER DAB BONDING

Fix **Kooltherm[®] K17** to manufacturer's fixing instructions. Set out a continuous fillet of gypsum adhesive around perimeter wall and ceiling junctions, and around any openings to provide a seal. Apply dabs of gypsum adhesive to the wall. The number, size and lay out of the dabs will depend on the chosen gypsum adhesive manufacturer's recommendations.

Locate **Kooltherm**[®] K17 against the adhesive dabs and tap back to align with predetermined guidelines on the floor and ceiling.

Use mechanical fixings to complement the plaster dab bond. Apply at a rate of 2 per board after the plaster dabs have set, positioned 15mm in from the board edge and at mid height with a nominal 25mm embedment into the solid wall, excluding plaster dab thickness to manufactures instructions.

Position mechanical fixings in the tapered edge of the boards to ensure they are covered when the board is finished, (e.g. joints taped and skim coating) at mid height. Fit boards tight to the ceiling/joist.

Delete when using proprietary adhesive bonding option below. This method is for applications to brick, block or concrete masonry cavity walls.

3.12 PROPRIETARY ADHESIVE BONDING

Fix **Kooltherm**[®] K17 to manufacturer's fixing instructions. Gun apply blobs of acrylic sealant adhesive to wall or back of the board approximately 25mm in diameter (single squeeze), at 300mm centres in both directions or to specific adhesive manufacturer's instructions. Ensure that the blobs adjacent to a board joint are approximately 25mm in from the edge to avoid bridging the joint.

Tap the board back firmly using a straightedge, ensuring that the vertical edge is plumb. Apply fixings in the same manner as Traditional Plaster Dab Bonding.

Delete when using plaster dab bonding option above. This method is for application to sound, concrete tilt-up or plastered wall surfaces which are free from moisture penetration.

Application - Kooltherm[®] K18

Applied using mechanical fixing techniques. Select the fixing medium clause to suit project requirements and delete the others.

3.13 MECHANICAL FIXING TO VERTICAL TIMBER FRAMING/BATTENS

Fix **Kooltherm**[®] K18 to manufacturer's fixing instructions to timber framing/battens set at maximum 600mm centres and positioned horizontally at floor and ceiling level. Ensure the timbers are run vertically and wide enough to offer a minimum 20mm support to all four edges of board.

Place drywall screws, long enough to allow a minimum 25mm penetration of the timber, at 150 mm centres and not less than 10mm from the edges of the board. Ensure screws are driven straight, with heads embedded just below surface of the board. Do not to overdrive nails/screws.

This method is for application to be used on timber frame constructions or on any dry masonry walls that will support and retain the battens and associated fixings.

3.14 MECHANICAL FIXING TO METAL FURRING SYSTEMS

Ensure the metal frame is fixed to the masonry or concrete wall to the manufacturer's instructions providing a true and level base for the board. Ensure the frame is set vertically at a maximum of 600mm centres to coincide with board joints and midpoint of board. Ensure short lengths of metal framing are fixed horizontally between the vertical pieces at skirting level, at the midpoint of the board and just below the ceiling or soffit level. Ensure provision for horizontal services behind the board, using two pieces of metal framing set no more than 300 mm apart.

Fix **Kooltherm**[®] K18 to manufacturer's fixing instructions by screw fixing to each metal framing section with self drilling and tapping, countersunk, surface coated, screws placed at 150 mm centres.

Site screws no less than 10mm from the edges of the board. Drive screws straight until heads are slightly below the paper surface of the plasterboard facing. Do not to overdrive screws.

This method is for application to proprietary metal framing systems to brick, block, stone or concrete walls.

3.15 MECHANICAL FIXING TO TIMBER JOISTS OR RAFTERS

Fix **Kooltherm**[®] K18 to line ceilings to manufacturer's fixing instructions. Ensure boards are placed with the long edge running across the joists, rafters or battens and with all edges supported.

Ensure timbers offer a minimum 20mm support to all four edges of the board. Ensure noggings placed between the joists/rafters coincide with the long edges of board.

Fix board with dry wall screws. Ensure screw have a minimum 25mm penetration of the supporting timber, are placed not less than 10mm from the edges of the board and are spaced at 150mm intervals along all supporting timbers.

This method of installation is similar to that of standard plasterboard to line ceilings.

3.16 MECHANICAL FIXING DIRECT TO MASONRY SUBSTRATES

Ensure the wall is sound, dry and level, as surface irregularities may impede fixing of the board. Fix **Kooltherm**[®] K18 to manufacturer's fixing instructions and fully restrain using mechanical fixings.

Ensure the number and type of such fixings comply with the fixing supplier's recommendations and are evenly distributed over the whole area of the board. Fixings must not overlap board edges.

This method is for application to fair finished brick, block and concrete cavity walls where Kingspan **Kooltherm**[®] K18 Insulated Plasterboard is to be finished with gypsum plaster.

Application - finishing sections and trim

3.17 FIX EXTERNAL ANGLE

Fix full length to external corners with clouts at 100mm centres each side staggered to the sheet manufacturer's details and requirements.

3.18 FIX INTERNAL REINFORCING ANGLE

Fix full length to internal corners with clouts at 100mm centres each side staggered to the sheet manufacturer's details and requirements.

3.19 FORM CONTROL JOINTS

Provide at maximum 9 metre centres in long unbroken walls and 12 metre centres to ceilings to the sheet manufacturer's details and requirements. Fix control joint section into joint by staples at 150mm both sides. Fill gap in voids with sound rated sealant. Remove plastic tape after stopping.

3.20 FIX CORNICE

Fix with adhesive required by the sheet manufacturer and joints mitred to the sheet manufacturer's details and requirements

3.21 FORM SQUARE STOPPED CORNERS

Form taped reinforced square stopped ceiling-to-wall angles to the sheet manufacturer's requirements.

3.22 INSTALL TAPE-ON TRIMS

Install in accordance with the trim manufacturer's requirements.

Finishing - stopping

Some special finishing plasters do not require sanding. Refer to the sheet manufacturer's specifications.

3.23 FORM JOINTS

Fill recess with bedding compound, centre the reinforcing tape, apply a second coat of bedding compound followed by a coat of finishing compound. Allow to dry and lightly sand off, to the sheet manufacturer's details and requirements.

3.24 STOPPING NAILS AND SCREWS

Apply two successive coats of bedding compound and a coat of finishing compound to the sheet manufacturer's requirements.

3.25 SQUARE STOPPED CORNERS

Fill with bedding compound, centre reinforcing tape into internal angle and apply a coat of finishing compound and complete to the sheet manufacturer's details and requirements.

3.26 EXTERNAL ANGLES

Apply two coats of bedding compound followed by a coat of finishing compound to the sheet manufacturer's requirements.

3.27 END BUTT JOINTS

Fill, tape and coat as for tapered edge joints except that each stage is doubled in width.

3.28 APPLYING SKIMCOAT PLASTER

Apply spray-on surface finish in accordance with the sheet manufacturer's requirements.

Used to achieve a Level 5 finish over a plasterboard surface prepared to Level 4. Can be applied by roller, although best applied by airless spray. Proprietary surface sealers are also available to use here or in the painting section/s.

Completion

3.29 REPLACE

Replace damaged sheets or elements.

3.30 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 to the standard required for following trades.

3.31 REMOVE

Remove debris, unused materials and elements from the site.

4. SELECTIONS

For further details on selections go to www.forman.co.nz.

Substitutions are not permitted to the following.

Select the options to suit the project and delete options not specified.

Materials

4.1 INSULATED PLASTERBOARD

Location/substrate: ~/~

Type/ product: **Kingspan Kooltherm® K17**

Fixing method: ~

Size: 2400mm x 1200mm (2.88m²)

Board thickness: ~mm

R value: ~

Options:

Fixing method: Plaster dab bonding

Proprietary adhesive bonding

Board thickness (includes plasterboard): 35mm, 40mm, 50mm, 60mm, 70mm, 80mm

R value:

Product thickness (including plasterboard)	Product R-value
35mm	R1.3
40mm	R1.5
50mm	R2.0
60mm	R2.6
70mm	R3.1
80mm	R3.6

The R-value is the product R-value; refer to www.forman.co.nz for Total R-value depending on wall application.

4.2 INSULATED PLASTERBOARD

Location/substrate: ~/~

Type/ product: **Kingspan Kooltherm® K18**

Fixing method: ~

Size: 2400mm x 1200mm (2.88m²)

Board thickness: ~mm

R value: ~

Options:

Fixing method: Mechanical fixing to vertical timber framing/battens

Mechanical fixing to metal furring systems

Mechanical fixing to timber joists or rafters

Mechanical fixing direct to masonry substrates

Board thickness (includes plasterboard): 35mm, 40mm, 50mm, 60mm, 70mm, 80mm

R value:

Product thickness (including plasterboard)	Product R-value
35mm	R1.3
40mm	R1.5
50mm	R2.0
60mm	R2.6

70mm

R3.1

80mm

R3.6

The R-value is the product R-value; refer to www.forman.co.nz for total R-value depending on wall application.

4.3 INSULATED PLASTERBOARD FINISH

System: ~

Finish: Level ~

Options:

System: Wall, ceiling

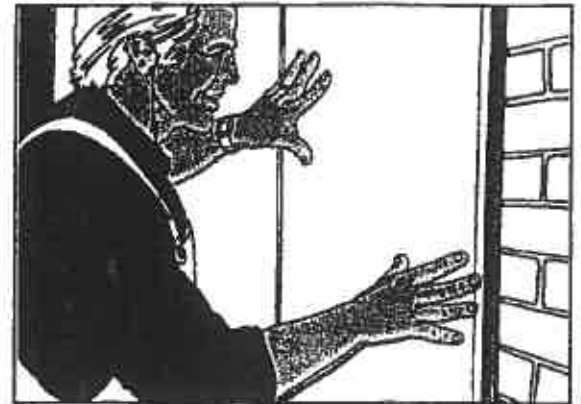
Finish: The default Level of Finish is Level 4 with Level 5 for where a very high quality is required.

FORMALINER INSULATED LINING BOARD



Product Description

Formaliner is a factory laminated, pre-insulated Gypsum Plasterboard. Combining expanded polystyrene sheet, laminated to gib board, it gives effective thermal control, prevention of moisture penetration, a durable internal lining system with ease on installation and cost effective.



PRODUCT ADVANTAGES

Suitable for stud, brick and masonry and ceilings. Formaliner offers the advantage of one easy installation, elimination the need for battens, ramsetting the separate insulation applied individually and thus speeding up construction time.

Product Properties

- Nominal Board Sizes: 1200 wide, 2400, 2700, 3000 x 3600mm long
- Nominal Thickness: Std 35mm overall
- Nominal Plasterboard Thickness: Std 9.5mm
- Nominal Polystyrene Thickness: Std 25mm
- Nominal Polystyrene Density: 26kg/m³
- **Thermal Resistance: RM²k/m .76
- Water Absorption:

Moisture Gain (% WT)	R Value Loss (%)
Extruded P/S .45	3.8%

FIXING DETAIL

To ensure on site fixing of walls Formaliner to the highest standards, the following recommendations should be followed.

Fix with HB Fullers Maxbond to ensure a good clean bond between Formaliner and the substrate, (which should be clean and dry) in conjunction use 6 Hilti HPS 6/40 mechanical fixing tappets per 2400 x 1200 sheet, spaced 200mm in from top, base and sides of each board, ie; two at the top, two in the middle, and two at the base.

Quality and Durability

To ensure the best possible on site fixing and quality finishing ask for "Formaliner" by name with recommended rebated edging.

Edge Designs

To avoid cold bridges and moisture breaks as well as simply fixing, Formaliner has a rebated (shiplapped) edge detail.

** The above data was tested on 50mm specimens after 120 days exposure to 21°C, 40% RH on warm side and -7°C on cold side.

Also available in a variety of thicknesses, in both plasterboard and polystyrene and alternative facing boards.

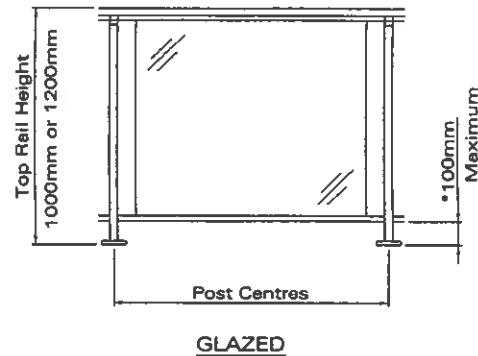
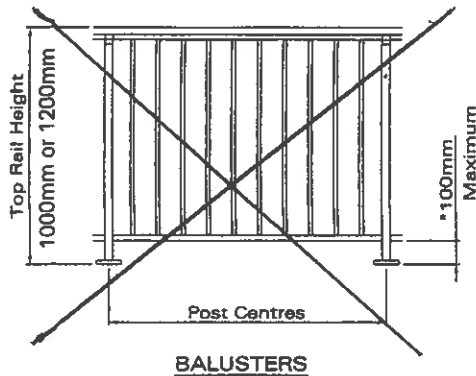
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WELLINGTON: 5 Barnes Street, P.O. Box 38 581 Seaview, Lower Hutt. Phone 0-4-568 7132. Facsimile 0-4-568 3413
CHRISTCHURCH: 9 Stanley Street, P.O. Box 22 132 Christchurch. Phone 0-3-379 9329. Facsimile 0-3-365 6118
THERMAL INSULATION, ACOUSTIC INSULATION AND PASSIVE FIRE PROTECTION.



PROFILE BALUSTRADE **A900RS AS/NZS 1170.1 COMPLIANCE SPECIFICATIONS** **TYPE 1 BALUSTRADE**

Cad Ref. APBA02-0 Scale NTS Date 01.01.09



Type 1 Balustrade

*Distance is from the bottom of the bottom rail to the lowest point on the floor level.

Maximum baluster length is 1075mm

POST CENTRES TABLE					
HEIGHT OF TOP RAIL		1000mm		1200mm	
TOP RAIL		ELLIPTICAL OR ROUND		ELLIPTICAL OR ROUND	
BOTTOM RAIL		01966 or 01951	01964	01966 or 01951	01964
LIVE LOAD (Refer P1.2.1)	CASE A	1400mm	1650mm	1400mm	1650mm
	CASE B	1370mm	1530mm	1370mm	1530mm
WIND CASE (Use for glazed balustrades only)	LOW	1800mm	1800mm	1800mm	1800mm
	MEDIUM	1780mm	1750mm	1690mm	1660mm
	HIGH	1590mm	1560mm	1220mm	1220mm
	VERY HIGH	1340mm	1340mm	940mm	940mm

Choose minimum post centres from wind and live load case which applies to the situation

Example 1 : Internal Balustrade
1200mm Height Top Rail
01964 Bottom Rail
(Wind does not apply)

Live Load Case B = 1530mm Post Centres - Use 1530mm Post Centres

Example 2 : External Balustrade
1000mm Height Top Rail
01951 Bottom Rail ,
Very High Wind

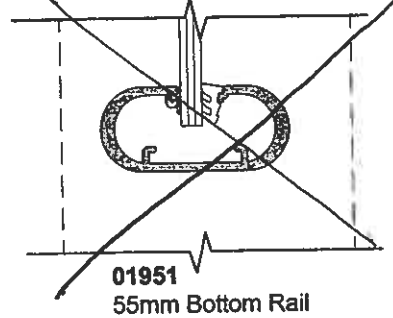
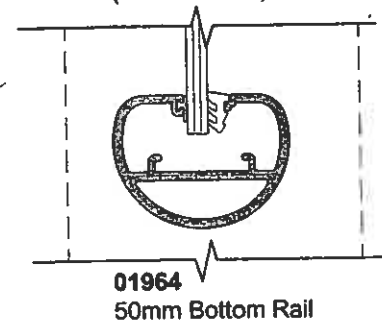
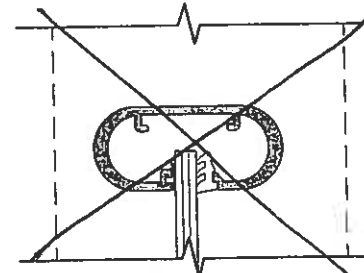
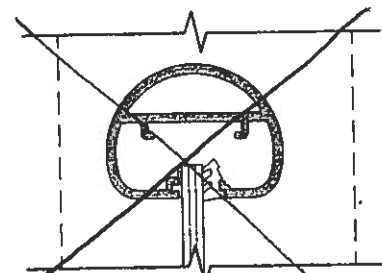
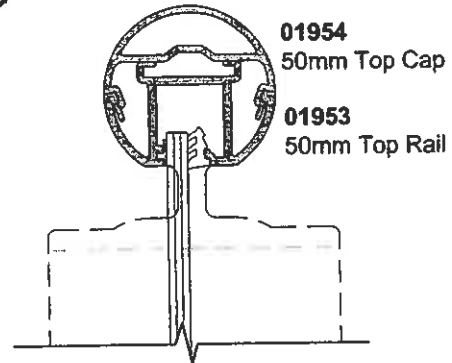
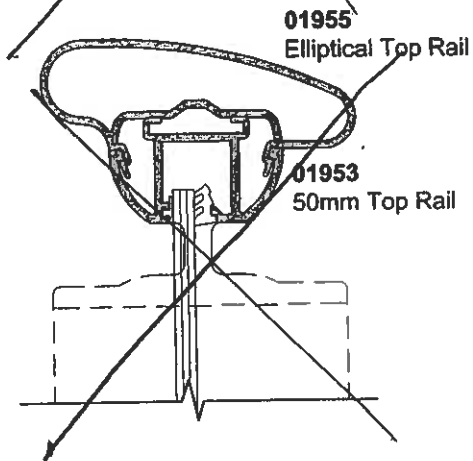
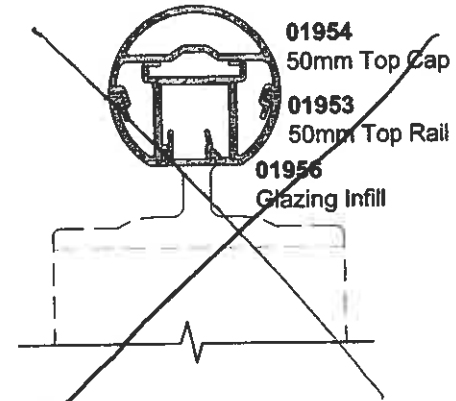
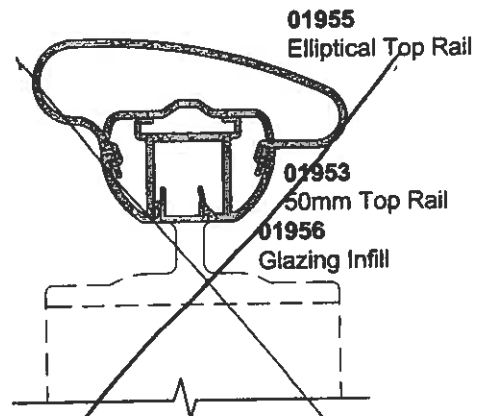
Live Load Case B = 1370mm Post Centres
Wind Load Case = 1340mm Post Centres - Use 1340mm Post Centres

A900RS PROFILE BALUSTRADE RAIL OPTIONS GLAZED

Cad Ref. APBA05-0

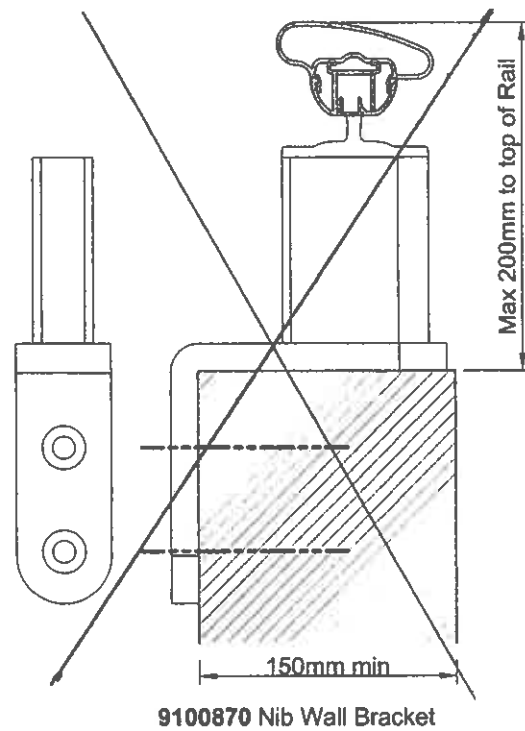
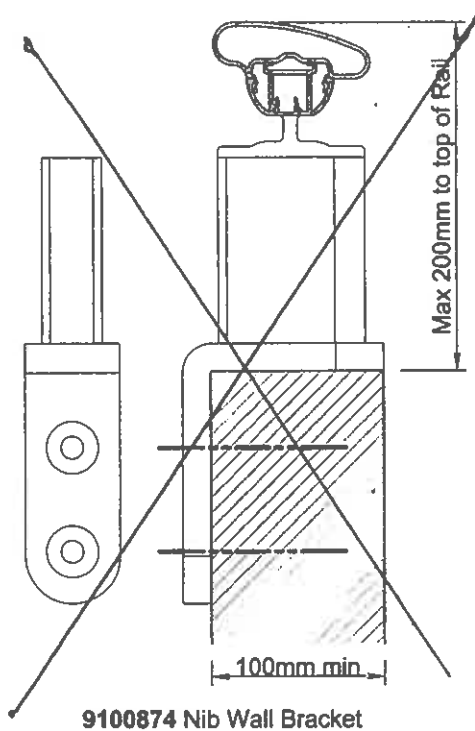
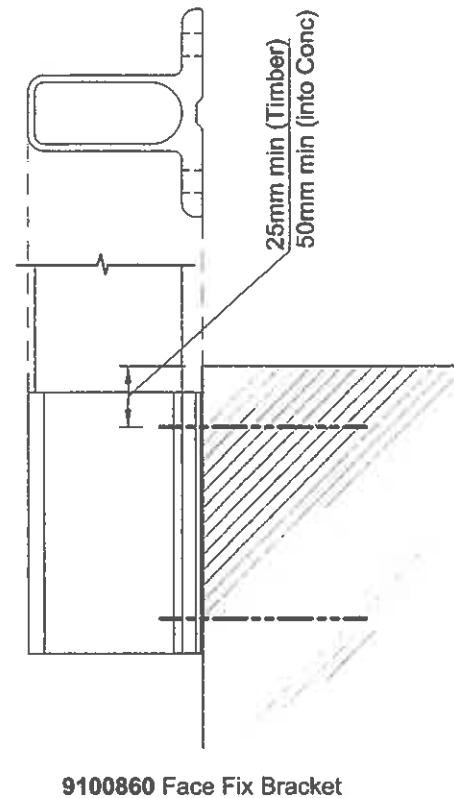
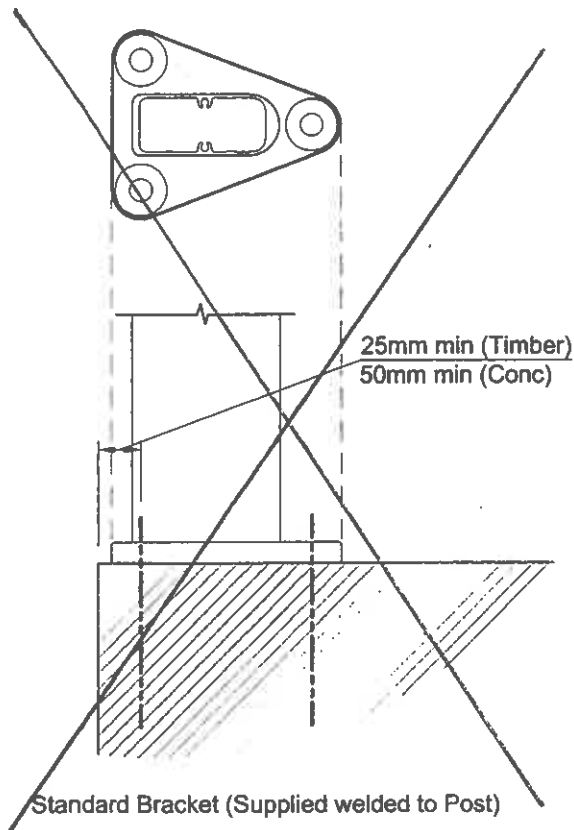
Scale 1:2

Date 01.01.09



A900RS PROFILE BALUSTRADE POST FOOTING OPTIONS

Cad Ref. APBA09-0 Scale 1:4 Date 01.01.09



PROFILE BALUSTRADE COMPLIANCE SPECIFICATIONS

Cad Ref. APBA01-0 Scale N/A Date 01.01.09

LOADING CASES

A = 0.36 kN/m

B = 0.75 kN/m

(0.5kN infill load
shared by two balusters)

AS/NZS 1170.1 TABLE 3.3

TYPE OF OCCUPANCY FOR PART OF THE BUILDING OR STRUCTURE	SPECIFIC USE	COMPLIANT	LOADING CASE
A Domestic and residential activities	All areas within or serving exclusively one dwelling including stairs, landings etc but excluding external balconies and edges of roofs (see C3)	YES	A
	Other residential, (see also C)	YES	B
B, E Offices and work areas not included elsewhere including storage areas	Light access stairs and gangways not more than 600mm wide	YES	A
	Fixed platforms, walkways, stairways and ladders for access	YES	A
	Areas not susceptible to overcrowding in office and institutional buildings also industrial and storage buildings	YES	B

C Areas where people may congregate

C1/C2 Areas with tables or fixed seating	Areas with fixed seating adjacent to a balustrade, restaurants, bars etc	NO	-
C3 Areas without obstacles for moving people and not susceptible to over-crowding	Stairs, landings, external balconies, edge of roofs etc	YES	B
C5 Areas susceptible to over-crowding	Theatres, cinemas, grandstands, discoteques, bars, auditoria, shopping malls etc	NO	-
D Retail areas	All retail areas including public areas of banks/building societies, (see C5 for areas here over-crowding may occur)	NO	-

MAIN FEATURES

- A versatile balustrade system with exceptional strength and smooth, curved shapes.
- A range of design options are available, with either aluminium balusters or glass infill panels.
- A choice of rail types is available with the emphasis on elliptical and round shapes.
- The post and rail design maximises strength and rigidity, and multiple fixings ensure secure baluster retention.
- Minimal interruption to top rail surfaces with concealed fixings for posts, and concealed welding for base plates.
- Posts and rails are made from 6060 T6 aluminium alloy, with powder coating and anodising available as surface finishes.
- Top rails are either 90mm wide (for elliptical) or 50mm wide for round.
- The main posts have a depth of 85mm and balusters are 25mm deep.
- Panels in safety glass of up to 8mm are available.
- Designed for standard heights of 1000mm on balconies and decks, and 1200mm around swimming pools. Other heights are available.

RAIL TYPES

Elliptical Top Rail (01955/01953) 90mm deep for balusters and glazing.

Round Top Rail (01954/01953) 50mm deep for balusters, glazing and gates.

Round Mid/Bottom Rail (01964) 50mm deep for balusters and glazing.

Elliptical Mid/Bottom Rail (01951) 55mm deep for balusters and glazing.

BARRIER TYPES

Baluster (01952) 25mm deep x 16mm wide.

Glazed panels (safety glass) up to a maximum thickness of 8mm.

POST TYPES

Elliptical 85mm deep x 35mm wide.

BRACKETS

Standard (top fix)

Face Fix

Nib Wall, two depth options.

FINISH / COLOUR

Powder Coated in a wide range of colours.

Anodised silver, 12 micron thickness. Other anodised colours are available.

PERFORMANCE

Profile balustrading complies with AS/NZS 1170.1 Structural Design Actions (Table 3.5.1) when installed in accordance with manufacturer instructions.

INSTALLATION

Profile balustrades are installed on site from pre-cut or site-cut profiles. Glazing is also done on site.

PRODUCER STATEMENT / WARRANTY

Our windows comply with the building code

We hereby certify that all products supplied by ALTHERM WINDOW SYSTEMS meet or exceed the requirements of the New Zealand Building Code and New Zealand Standards; NZS4211, Performance of Windows, and NZS4223, Glazing in Buildings - Parts 1-4 Incl.

This means our windows and doors have been designed and successfully tested to perform in New Zealand's most diverse conditions, and will:

- satisfy the strength and deflection requirements of the standards,
- deliver the desired levels of weathertightness appropriate to the prescribed wind zones,
- meet the air leakage requirements necessary to provide comfort and efficiency,
- include glazing of appropriate weight, strength and safety to satisfy not only the expected wind load but also accidental human impact.

NZBC CLAUSE B2 - DURABILITY.

ALTHERM WINDOW SYSTEMS products can be expected to deliver a trouble free serviceable life. Clause B2 requires that building elements such as windows and doors, including gaskets, glazing and glazing beads, must have, with normal maintenance only, a durability of not less than 15 years, and that components such as window fasteners, door rollers, weather piles and the like, with normal use, have a durability of not less than 5 years.

NZBC CLAUSE E2 - EXTERNAL MOISTURE.

Window and door units provided by ALTHERM WINDOW SYSTEMS will comply with the appropriate clauses of E2/AS1 and generally satisfy the requirements of Clause E2. Installation in accordance with either E2/AS1, or specifically prepared shop drawings, is a requirement of the Product Warranty.

In accordance with the TERMS AND CONDITIONS OF SALE a warranty for all ALTHERM WINDOW SYSTEMS products is provided, under normal conditions of use, against failure of materials and/or workmanship for a period of 5 years from the date of practical completion.

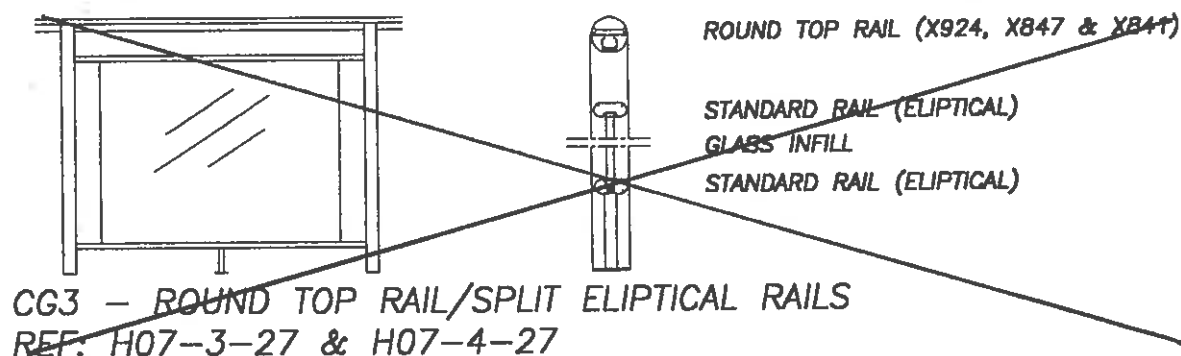
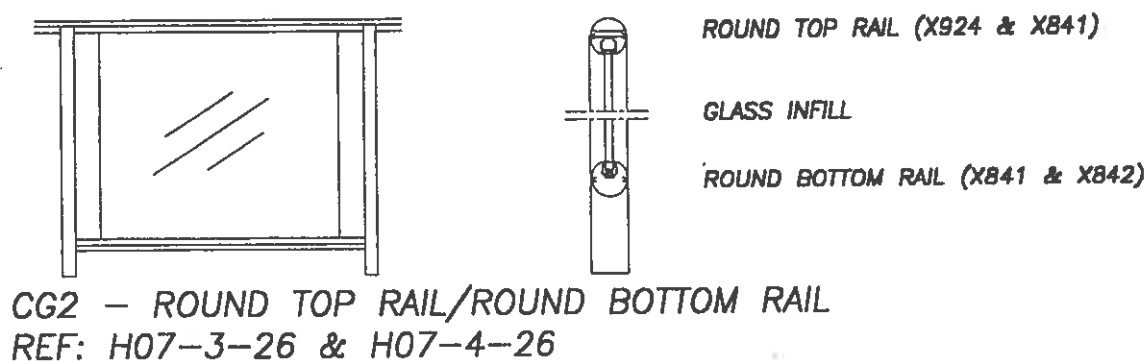
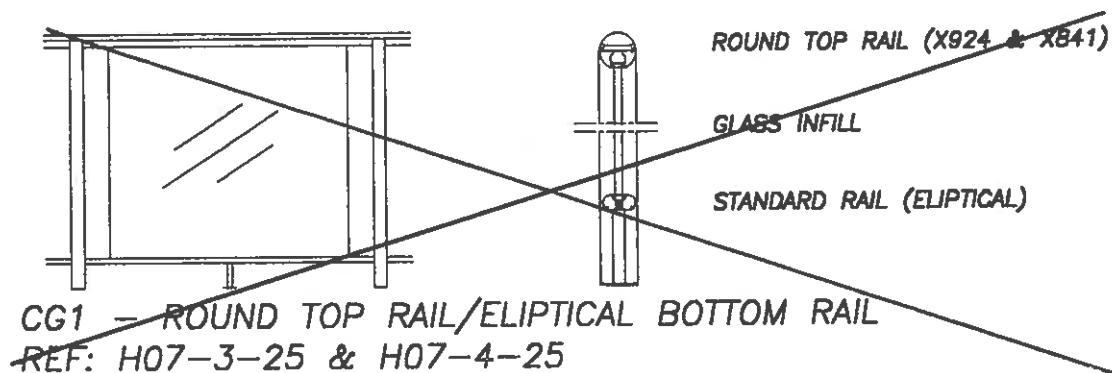
The surface finishing of the aluminium extrusion is covered by a separate Performance Warranty which is dependent on the actual finish selected.

A window and door hardware warranty protects against defects in manufacturing, functionality and surface finish for a period of 5 years, provided care and maintenance guidelines have been followed. Plated (soft) finishes are excluded from the warranty.

DRAFT ONLY

ALTHERM
WINDOW SYSTEMS

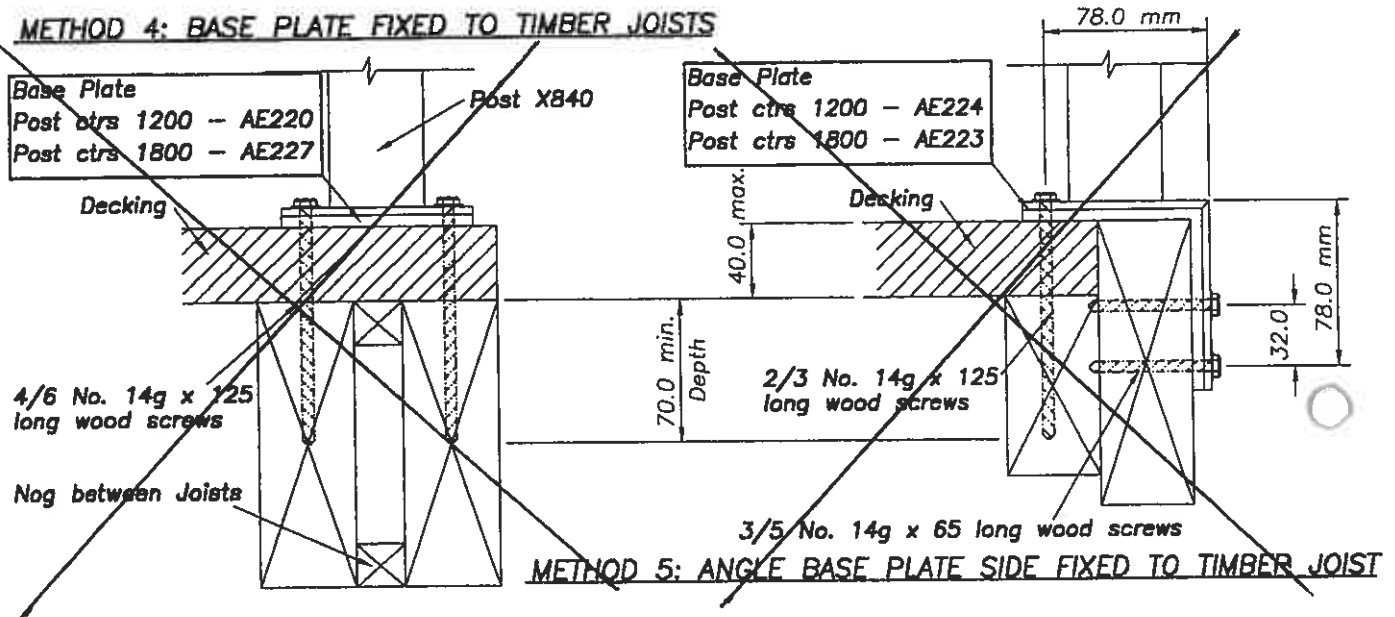
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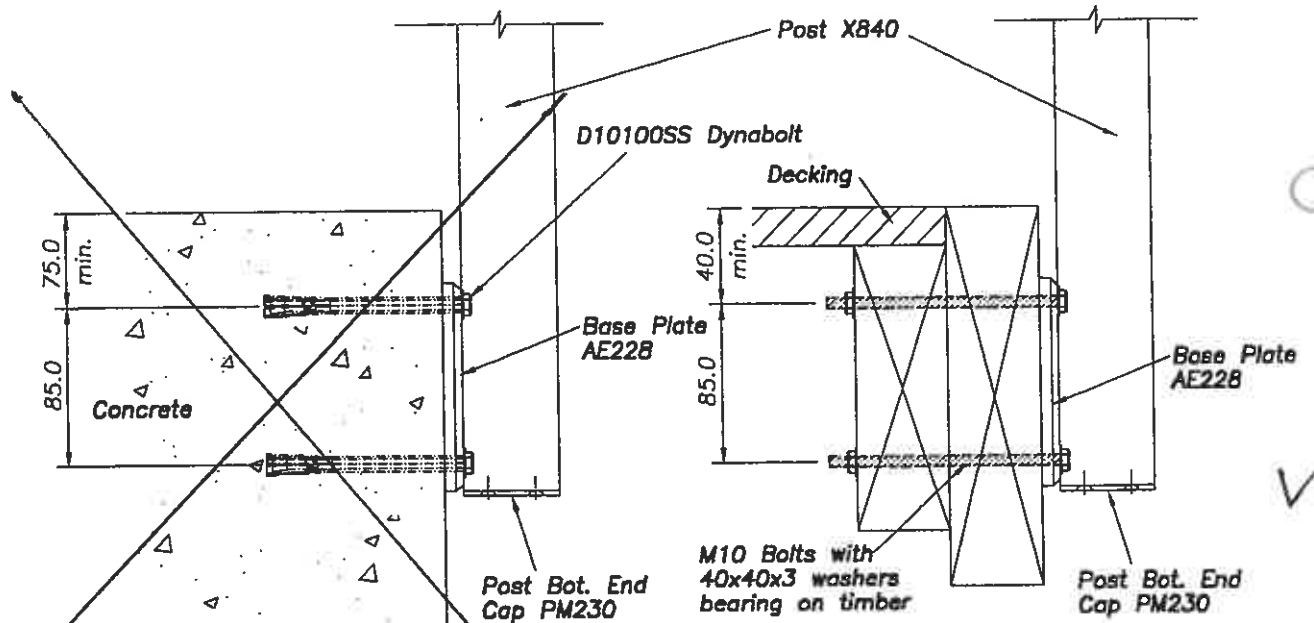
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TITLE				
CONTINUOUS HANDRAIL - GLASS OPTIONS				
DRAWN BY	DATE	SCALE	REVISION	DRG No.
K.C.W.	22-03-96	N.A.	02-04-96	H07-2-12 A

METHOD 4: BASE PLATE FIXED TO TIMBER JOISTS



METHOD 5: ANGLE BASE PLATE SIDE FIXED TO TIMBER JOIST



METHOD 6: SIDE FIXED TO CONCRETE SLAB

Max. Post Spacing is 1500mm

METHOD 7: SIDE FIXED TO TIMBER JOIST

Max. Post Spacing is 1500mm

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TITLE				
BALUSTRADING DESIGN SPECIFICATIONS POST FIXING METHODS				
DRAWN BY	DATE	SCALE	REVISION	DRG No.
K.C.W.	13-11-95	N/A		H07-0-12

BALUSTRADE DESIGN NOTES

- 1) Select the desired Balustrade Option from the Baluster/Glass Options drawings.
- 2) Select the Post Fixing Method required from Drawings H07-6-11 & H07-6-12
- 3) Appropriate Height for Top Rail are: 1000 for Floors and Landings, 900mm above Pitch Line of Stairs and Ramps, and 1200mm for Pool Fencing.
- 4) For Maximum Post Spacing for Balustrading and Fencing see Tables 3,4 and 5.
- 5) Determine all critical Post positions, where a Post must be placed:
Eg. - at changes in direction and near to changes in slope. See Figure 2 below.
- 6) Between these critical Posts, (and any other points where the Rail end is supported.
Eg. - at an existing wall); evenly space Intermediate Posts along each run.
- 7) Do not exceed the Maximum Post Spacing, Minimum Barrier Height and Acceptable Opening Sizes for Barriers. See Tables 1 and 2 below.

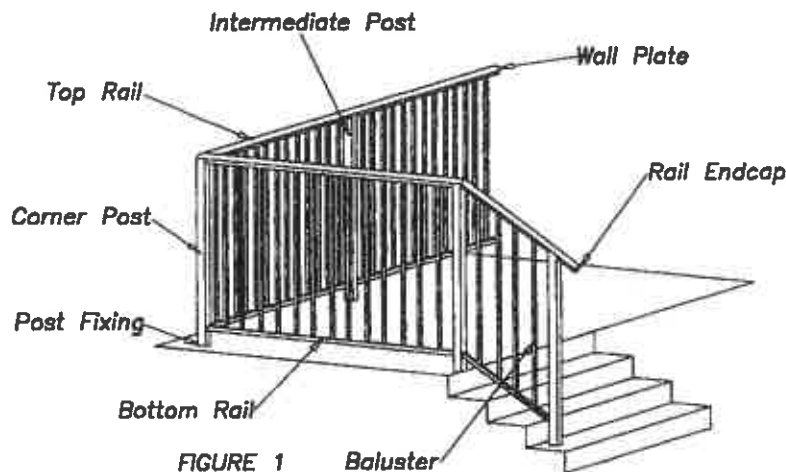


FIGURE 1 Baluster

Age group	Examples of application	Maximum spere dia (mm)
Children under 4	Household, Early Childhood Centres, shopping malls, health care facilities.	100
Children 4 to 6	Cinemas, motels, halls churches, bridges with pedestrian access.	130

NOTE:

1. Opening size restrictions are chosen on the basis of child head and chest dimensional statistics.
2. Because the barrier opening size is determined by the age and likely presence of children, and not by the classified use of the building, it is reasonable to expect different parts of a building to have different requirements. For example, in a public hall children may be expected in a public gallery, but not in a gallery reserved for lighting equipment or musicians. In shopping malls children are expected in public areas, but not in areas for the preparation of food or the unloading and reception of stock.

Building Type	Location	Barrier height (mm) (Note 1)
Detached dwellings and within household units of multi-unit dwellings	External deck or external balcony	1000
	Stairs, landings ramps or edges of internal floors	900
All other buildings & common areas of multi-unit dwellings	Stairs or ramps	900
	All locations other than stairs	1000

NOTE:

1. Heights are measured vertically from floor level on floors, landings & ramps, & from pitch line or stair nosings on stairways.
2. A landing is a platform with the sole function of providing access. A platform used as a space for people to congregate is described as a deck or balcony.

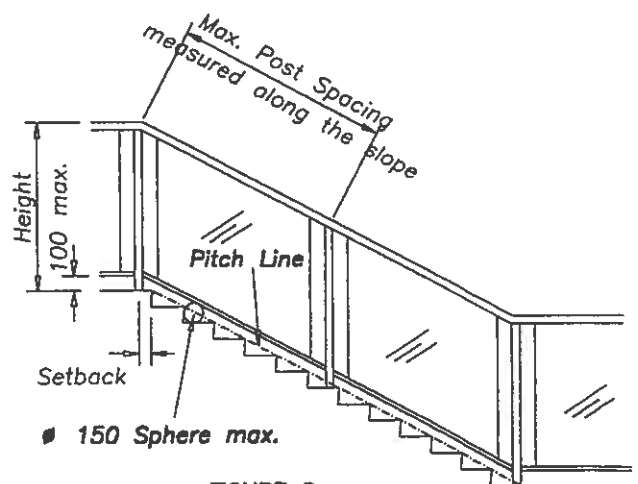


FIGURE 2

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TITLE				
BALUSTRADING DESIGN SPECIFICATIONS				
DRAWN BY	DATE	SCALE	REVISION	DRG No.
K.C.W.	14-11-95	N/A	17-05-96	H07-0-01 A

MAXIMUM POST SPACINGS: FOR BALUSTRADES

SCREW FIXED BASE: 4 OFF SS CSK 10g X 24 TPI X 2" SCREWS

	BALUSTERS (ETC.)	FULL INFILLS (I.E. GLASS)
LIGHT ACCESS STAIRS, GANGWAYS	1.8 m	1.8 m
RESIDENTIAL BUILDINGS	1.2 m	1.2 m
OTHER BUILDINGS & PUBLIC AREAS OF RESIDENTIAL BUILDINGS	0.6 m	0.6 m

TABLE 3

WELDED BASE:

	BALUSTERS (ETC.)	FULL INFILLS (I.E. GLASS)
LIGHT ACCESS STAIRS, GANGWAYS	1.8 m	1.8 m
RESIDENTIAL BUILDINGS	1.8 m	1.8 m
OTHER BUILDINGS & PUBLIC AREAS OF RESIDENTIAL BUILDINGS	0.8 m	0.8 m

TABLE 4

MAXIMUM POST SPACINGS: FOR FENCING

SCREW FIXED BASE: 4 OFF SS CSK 10g X 24 TPI X 2" SCREWS

RECOMMENDED NOT TO EXCEED 1800 mm.

TABLE 5

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TITLE				
BALUSTRADING DESIGN SPECIFICATIONS POST SPACINGS				
DRAWN BY	DATE	SCALE	REVISION	DRG No. H07-0a-01
K.C.W.	17/05-96	N.A.		

GLASS INFILL refer NZS 4223: PART 3:1993

1. FULLY FRAMED BALUSTRADES AND FENCES (TOP AND BOTTOM FRAMED ONLY)

For fully framed balustrades and fences, Grade A safety glazing of not less than 6mm thickness in accordance with the maximum areas shown in table A shall be used, except that annealed glass not less than 4mm thick may be used up to a maximum area of 0.3m².

2. UNFRAMED OR FRAMED ONE SIDE ONLY BALUSTRADES AND FENCES

For unframed or partly framed balustrades and fences, Grade A safety glass of not less than 10mm thickness is recommended.

3. STRUCTURAL SELF SUPPORTING BALUSTRADES AND FENCES

Where glass is used as a structural member to support handrail loads, Grade A safety glass shall be used. The thickness used shall be determined in accordance with the appropriate design load specified by NZS 4203 or other appropriate loadings standard, but in no case shall the thickness used be less than 10mm.

TYPE OF GLASS	THICKNESS GRADE A	MAX. AREA M ²
TOUGHENED SAFETY GLASS	6mm	4.0
	8mm	6.0
	10mm	8.0
	12mm	10.0
LAMINATED SAFETY GLASS	NOT RECOMMENDED	

TABLE A

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TITLE					BALUSTRADING DESIGN SPECIFICATIONS GLASS INFILL	
DRAWN BY	DATE	SCALE	REVISION	DRG No.		
K.C.W.	12-04-96	N.A.		H07-0-21		



P.I.M. No
Building Regulation Clause(s) B1

PRODUCER STATEMENT – PS1 – DESIGN

(Guidance notes on the use of this form are printed on the reverse side)

ISSUED BY: **A.A. Chambers**
(Suitably qualified Design Professional)

TO: **Aluminium Systems**
(Owner)

TO BE SUPPLIED TO:
(Tentative Authority)

IN RESPECT OF: **Standard Balustrade Details**
(Description of Building Work)

AT:
(Address)

OT DP SO

Chambers Consultants Ltd. has been engaged by **Aluminium Systems Ltd**
(Design Firm) (Owner/Developer/Contractor)

to provide **Structural Design** services in respect of the
(Extent of Engagement)

requirements of Clause(s) **B1** of the Building Regulations 1992 for

☐ All

☐ Part only as specified

of the building work. The design has been prepared in accordance with **B1/VM1**
(Verification Method(s)/Acceptable Solution(s))

(respectively) of the approved documents issued by the Building Industry Authority and the work is described on

Aluminium Systems Ltd drawings titled **Balustrading Design Specification**
(Design Firm)

and numbered **H07-0-11A, 12A, 13A, 14** and the specification and other documents according to which the building is proposed to be constructed

is an independent design professional covered by a current policy of Professional Indemnity Insurance to a minimum value of \$200,000. I BELIEVE ON REASONABLE GROUNDS that subject to

(i) the site verification of the following design assumptions **All structures to which balustrades are attached comply with the Building Act**

and (ii) all proprietary products meeting the performance specification requirements, the drawings, specifications, and other documents according to which the building is proposed to be constructed comply with the relevant provisions of the building code.

(Signature suitably qualified Design Professional)

Date

12 August 2005

PE FIPEUZ MIKE CEng (UK)
(Professional Qualifications)

CPEng # 002060

CHAMBERS CONSULTANTS LTD
P.O. BOX 28-641
HUNTERS CORNER
PH. 278 1072
FAX. 279 0419

Member

ACENZ

PENZ

NZIA

(Address)

This form to accompany Form 3 of the Building Regulations 1992 for the application of a Building Consent

