

SPECIFICATION

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

Urquharts House

Project Specification

43 Basil Road, Whangarei Heads, Whangarei, New Zealand

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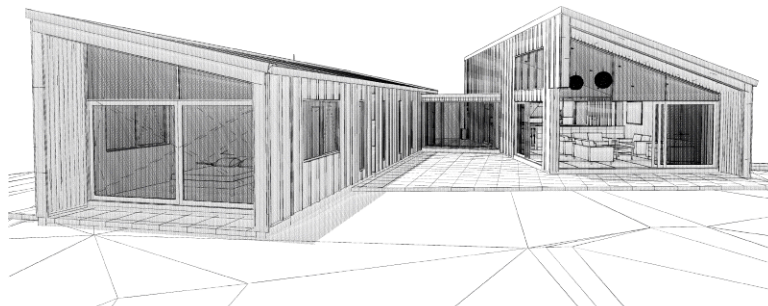


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2210 PREPARATION & GROUNDWORK

1 GENERAL

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

- ▮ footings and floor slabs
- ▮ backfilling behind basement retaining walls

Documents

1.1 DOCUMENTS

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

[NZS 3604](#) Timber-framed buildings
[WorkSafe NZ](#) [Good Practice Guidelines - Excavation Safety](#)

1.2 SITE SAFETY

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

1.3 ARCHAEOLOGICAL DISCOVERY

If fossils, antiquities and other items of value are found refer to the general section 1220 PROJECT for actions to be taken with archaeological discovery.

2 PRODUCTS

2.1 EXCAVATED CLEAN FILL

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

2.2 VOLCANIC TUFF FILL

Scoriaceous tuff of variable grading excluding excessive silt or clay material, capable of being placed and compacted as specified.

2.3 ROCK FILL

Hard material comprising rock, broken stone, hard brick, concrete, run of pit scoria, or other comparable inert material capable of being placed and compacted as specified.

2.4 SAND FILL

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

2.5 HARD FILL

Scoria or crushed rock to GAP (General All Passing) 40 grading.

2.6 GRANULAR FILL

Approved screened crushed gravel or scoria, graded in size from 20mm to 7mm, clean. When tested with a standard sieve of 4.75 opening no material is to pass.

2.7 DRESSING COURSE

Scoria to GAP 20 grading, or "dirty footpath scoria", or equivalent "all in" graded crushed metal aggregate.

2.8 FREE-DRAINING AGGREGATE

Scoria or crushed gravel graded 50 to 14 clean.

3 EXECUTION

3.1 WASHOUT BAY FOR TRUCK

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

3.2 EXCAVATION GENERALLY

Carry out excavation, using plant suitable for the purpose, to the guidelines set by the WorkSafe NZ, [Good Practice Guidelines - Excavation Safety](#).

3.3 BURNING OF MATERIALS

Burning of materials is not permitted on site.

3.4 PROTECT EXISTING WORK

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

3.5 EROSION CONTROL

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

3.6 SURFACE PREPARATION

Comply with [NZS 3604](#), section 3.5, **Site preparation**. Remove all turf, vegetation, trees, topsoil, stumps, uncontrolled fill and rubbish from the area to be built on.

3.7 STOCKPILE TOPSOIL

Stockpile excavated topsoil on site where directed. Keep separate from other excavated materials. Spread and level where directed before completion of the works.

3.8 GENERAL EXCAVATION

Trim ground to required profiles, batters, falls and levels. Remove loose material. Protect cut faces from collapse. Keep excavations free from water.

3.9 ROCK EXCAVATION

If rock is found at any level above the underside of the structural foundations, or above required base levels for site service trenches, immediately notify the owner. Obtain written instructions from the owner on the proposed approach to rock excavation, or consequent alterations to subgrade construction. Confirm any changes with the territorial authority.

3.10 FOUNDATION EXCAVATION

Take foundation excavations to depths shown. Keep trenches plumb and straight, bottoms level and free of soft spots, stepped as detailed and clean and free of water.

3.11 INADEQUATE BEARING

If bearing is not to [NZS 3604](#), 3.1.2 **Foundations** and 3.1.3 **Determination of good ground**, then excavate further and backfill with material as follows. Confirm any changes with the territorial authority.

Below slabs on grade: Hardfill compacted in 150mm layers

Below footings: 10 MPa concrete

Service trenches: Hardfill compacted in 150mm layers

If excavation exceeds the required depths, backfill and compact to the correct level with material as listed.

3.12 STANDARD OF COMPACTION

Place fill in layers of not more than 150mm and compact to achieve 95% of maximum dry density. For granular fill material, the fill shall be compacted to 80% of saturated dry density.

3.13 GRANULAR BASE FOR SLABS

To conform to [NZS 3604](#), section 7.5.3, **Granular base**. Consolidate with a vibrating roller. Blind the surface with 20mm of coarse sand or sand/cement and roll ready to receive a damp-proof membrane.

3.14 GENERAL BACKFILLING

Obtain written confirmation from the owner before using any excavated material. Compact approved backfilling in 150mm layers with the last 200mm in clean topsoil, lightly compacted and neatly finished off.

3.15 RETAINING WALLS

Backfill behind retaining walls with free draining granular material and compact in 200mm layers. Ensure any tanking membranes, protection sheets, drain coil and damp-proofing are not damaged.

3.16 SURPLUS MATERIAL

Remove surplus and excavated material from the site.

3152 PRECAST PRESTRESSED FLOOR SYSTEM

1 GENERAL

This section relates to suspended flooring systems incorporating precast, prestressed concrete units.

1.1 RELATED SECTIONS

Refer to the appropriate concrete section(s) for concrete work.
Refer to 3124 FINISHES TO WET CONCRETE for finishes.

1.2 ABBREVIATIONS AND DEFINITIONS

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

The following definitions apply specifically to this section:

ACRS Australian Certification Authority for Reinforcing Steels - An independent certification scheme for reinforcing steel and structural steel, by product and manufacturer/processor. Certifies compliance with Australia/New Zealand Standards.

ACRS Web site - www.steelcertification.com

1.3 DOCUMENTS REFERRED TO

Documents referred to in this section are:

AS/NZS 1170	Structural design actions -Parts 0,1,2,3.
AS/NZS 1170.1	Structural design actions -Permanent, imposed and other actions
NZS 1170.5	Structural design actions - Earthquake actions - New Zealand
NZS 3101.1	Concrete structures standard - The design of concrete structures
NZS 3104	Specification for concrete production
NZS 3109	Concrete construction
AS/NZS 4671	Steel reinforcing materials
AS/NZS 4672.1	Steel prestressing materials - General requirements
AS/NZS 4672.2	Steel prestressing materials - Testing requirements
AS/NZS ISO 9001	Quality management systems - Requirements
BS 5896	High tensile steel wire and strand for the prestressing of concrete
NZS 3121	Water and aggregate for concrete
NZS 3122	Portland and blended cements (General and special purpose)

Prestressed Concrete Institute: Quality control for plants and production of precast and prestressed concrete products

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

1.4 SHOP DRAWINGS

Refer to the general section 1235 SHOP DRAWINGS for the requirements for submission and review and the provision of final shop drawings.

Provide shop drawings to show the general arrangement including, but not be limited to:
Panel layouts

Submit shop drawings for review to Cook Costello

- ┆ 10 working days (at least) before fabrication is planned to commence, provide shop drawings for review.
- ┆ Complete shop drawing review before commencing fabrication.

Performance

1.5 INFORMATION REQUIRED FOR CODE COMPLIANCE

Provide the following compliance documentation: -

- ┆ Manufacturer's warranty
- ┆ Installer's warranty
- ┆ Producer Statement - Design
- ┆ Producer Statement - Construction from the installer
- ┆ Producer Statement - Construction Review from an acceptable suitably qualified person
- ┆ Other information required by the BCA in the Building Consent Approval documents.

1.6 PRODUCER STATEMENT - DESIGN

Supply two copies of structural calculations including propping requirements, shop drawings and a producer statement signed by a chartered professional engineer for approval and any other information required by the Building Consent Authority for the building consent application.

1.7 COMPLIANCE WITH CODES

All proprietary design flooring to comply with the relevant current materials codes, [NZS 3101](#), [AS/NZS 1170](#), [NZS 1170](#), [AS/NZS 1170.1](#), [NZS 1170.5](#) and [AS/NZS ISO 9001](#).

1.8 DESIGN LOADS

Design the floors for the distributed and point loading conditions supplied, with consideration of all floor penetrations.
Refer to SELECTIONS / drawings.

1.9 FIRE RATING

Design the floors for the required fire rating.
Refer to SELECTIONS / drawings.

1.10 DEFLECTIONS

Deflections due to live loadings, dead loadings, shrinkage and creep deflection to not exceed the span divided by 300.

1.11 ADDITIONAL REINFORCEMENT

Include any additional reinforcement to ensure that the specified performance is achieved, including additional continuity bars at support beams.

1.12 TESTING

Carry out sampling and concrete acceptance tests during construction to [NZS 3109](#): section 9, Concrete acceptance tests during construction, noting that concrete may be rejected for:

- ┆ Non-compliance with this specification.
- ┆ Non-compliance with [NZS 3109](#), section 9, Concrete acceptance tests during construction.
- ┆ Showing by appearance when in place that it does not comply with this specification, especially in respect of surface finish, segregation, or low density and which cannot acceptably be made good.

Conduct 7 day strength tests. After a 7 day test result of less than 60% of the specified strength, concrete placement to stop until it is shown the suspect concrete complies with the specification. Make all test records available.

1.13 CONFIRM STEEL REINFORCING COMPLIANCE

Certification from the supplier confirming that the steel reinforcing supplied complies with the grades specified on the drawings by producing test results to [AS/NZS 4671](#) reinforcing steel, or [AS/NZS 4672.1](#) and [AS/NZS 4672.2](#) for prestressing steel.

For overseas manufactured steel provide NZ S Mark or ACRS certificate details or approved equivalent.

1.14 CONTROL TESTS

Carry out slump tests, yield tests and air content tests to [NZS 3112.1](#), sections 4, 5, and 9 respectively and evaluate to [NZS 3104](#): section 2.15, Control tests and their evaluation, keeping a record of all tests at the plant and making them available on request.

1.15 STRENGTH TESTS

Carry out to [NZS 3112.2](#), section 10 and evaluate to [NZS 3104](#): section 2.15, Control tests and their evaluation, keeping a record of all tests at the plant and making them available on request.

1.16 QUALITY ASSURANCE

Carry out the whole of this work to the requirements of [NZS 3109](#) and under the regime of a quality systems model for quality assurance in production and erection to [AS/NZS ISO 9001](#).

Quality assurance procedures to include all aspects of concrete construction including:

- ┆ Formwork quality
- ┆ Reinforcing steel placing
- ┆ Cast in items
- ┆ Concrete quality
- ┆ Concrete finishes
- ┆ Construction tolerances

Advise name of the suitably experienced and qualified representative who is responsible for quality control of the concrete work. The representative is to sign a written quality control checklist for each on site concrete pour. Provide a copy to the construction reviewer in sufficient time for a pre pour inspection.

2 PRODUCTS

Materials

2.1 FLOORING UNITS

Precast prestressed concrete units designed as simple one-piece spans for floors/roofs, with a smooth off-the-steel mould soffit finish, filling holes and roughness with a cement mortar ground smooth. Remove oil and contamination and leave ready for later coating. Refer to SELECTIONS for floor unit types.

2.2 REINFORCEMENT

Refer to the appropriate concrete section for reinforcement.

2.3 PRESTRESSING STEEL

Strands of stress-relieved cold-drawn wire to AS/NZS 4762.1 and BS 5896. Ensure prestressing steel is clean and free from deleterious substances. Reject steel which displays surface pitting and corrosion.

2.4 UNIT CONCRETE

The unit manufacturer is responsible for the mix design and properties to [NZS 3104](#) with the required 28 day compressive strength. No more than 5% of tests shall fail below the compressive strength.

2.5 CONCRETE TOPPING

The topping surface shall be level under permanent loads and show a variation of less than 5mm along a 3.0m straight edge. Refer to the appropriate concrete sections.

2.6 CONCRETE

The concrete producer is responsible for mix design and properties to [NZS 3104](#).

Cement: To [NZS 3122](#)

Aggregate: To [NZS 3121](#)

Rate of sampling: For compressive strength testing - one sample per m³ but not less than one for each day of use.

3 EXECUTION

Conditions

3.1 CONFORM

Conform to [NZS 3101](#), [NZS 3109](#) and [AS/NZS ISO 9001](#) in design, materials, execution and manufacture of units and of stressing operations.

Assembly

3.2 TOLERANCES

Manufacture floor units within the following tolerances and to tolerances in [NZS 3109](#): table 5.1, Tolerances for precast components.

Length		Width	
Up to 3 metres	± 6mm	Up to 1.2 metres	+ 0, - 10mm
3 to 6 metres	± 10mm	Over 1.2 metres	+ 0, - 15mm
6 to 12 metres	± 15mm		
Over 12 metres	± 25mm		

Height and other cross-section dimensions:	0 to +10mm.
Deviation from longitudinal line:	+ 10mm or + 5mm per 3 metre length (whichever is the lesser)
Maximum variation in camber between units:	5mm.

3.3 QUALITY CONTROL

Manufacture units to the Prestressed Concrete Institute's manual: Quality Control for Plants and Production of Precast and Prestressed Concrete Products.

3.4 CASTING

Use approved compaction techniques with power driven vibrators to produce a uniform void-free concrete. Set lifting eyes and other embedded items in units at designed location to the item manufacturers design requirements.

3.5 CURING PRECAST UNITS

Cure units until release strength required by [NZS 3101.1](#) is achieved using continual moistening or low pressure steam. Steam enclosure temperature not to exceed 50°C until 5 hours after casting and not to exceed 80°C maximum.

Application

3.6 HANDLING AND LIFTING UNITS

Handle, transport and erect units so that no damage is caused to them at any stage. Take adequate precautions to avoid damage or soiling in transit. Lift units only by using lifting eyes or straps designed for and located by the precast unit manufacturer.

3.7 STACK UNITS

Stack units for storage or transport on timber dunnage under design bearing points to avoid damaging lifting eyes or other embedded items. Strap and secure units during transport. Stack units on flat areas capable of withstanding the bearing pressures involved without undue settlement and with each bearing dunnage placed vertically above the other.

3.8 PROTECT UNITS

Protect units from damage of any kind before and after placement. Do not load units until topping and curing has reached the final design strength of the floor.

3.9 DO NOT

Do not cut and drill or modify the units in any way without prior approval.

3.10 SEATING FOR UNITS

Ensure seating for units is true to line, level and of correct dimensions before starting erection. Obtain written directions for new construction if seating will not allow even, uniform bearing and the correct placement of units. Provide plastic bearing strips to all floor/support beam bearing surfaces.

3.11 SITE TOLERANCES

Lay up and prop units in position to the pre-cambers specified by the unit manufacturer and as shown on the unit layout drawings. Where necessary select units at site to ensure that camber differences between units do not specified maximum after placing. Refer to SELECTIONS.

3.12 PREPARATION

Box openings in or between units to detail and to the requirements for formwork in the appropriate concrete section and seal to prevent grout loss. Reinforce, tie into joints and connections as detailed and to the requirements of reinforcement in the appropriate concrete section. Cut off lifting eyes as directed. Remove dust, dirt, building debris. Keep clean and pre-wet before placing concrete.

3.13 HANDLING, PLACING, COMPACTION AND FINISH

Refer to the appropriate concrete section for concrete placement for concreting requirements and pour topping concrete so that the specified minimum thickness is obtained at the centre of units. Refer to SELECTIONS. Obtain written directions for new construction where unit camber is enough to cause a reduction of topping thickness. Ensure concrete surfaces are true to within 5mm under a 3.0 metre straight edge.

Finishing

3.14 CONCRETE

Refer to placement in the appropriate concrete section.

Completion

3.15 CLEAN AND DRESS

Clean and dress surfaces to leave them to the standard of finish specified for the work to follow.

3.16 CLEAN UP

Clean up surrounding areas following erection and casting of floor toppings.

3.17 REMOVE

Remove debris, unused materials and elements from the site.

4 SELECTIONS

Performance requirements

4.1 CONCRETE TOPPING

Thickness: 85mm minimum

3155FR FIRTH RIBRAFT® FLOOR SYSTEM

1 GENERAL

This section relates to the supply and installation of **Firth Industries** RibRaft® floor system.
It includes:

- ▮ a non specific design reinforced concrete waffle raft floor slab-on-ground (RibRaft®) system.
- ▮ a RibRaft® floor system incorporating an integrated thermal edging.

1.1 ABBREVIATIONS AND DEFINITIONS

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

The following definitions apply specifically to this section:

ACRS Australian Certification Authority for Reinforcing Steels - An independent certification scheme for reinforcing steel and structural steel, by product and manufacturer/processor. Certifies compliance with Australia/New Zealand Standards.
ACRS Web site - www.steelcertification.com

Documents

1.2 DOCUMENTS

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

NZBC B1/AS1	Structure
NZS 3104	Specification for concrete production
NZS 3109	Concrete construction
NZS 3114	Specification for concrete surface finishes
NZS 3604	Timber-framed buildings
AS/NZS 4671	Steel reinforcing materials

1.3 MANUFACTURER/SUPPLIER DOCUMENTS

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

Firth RibRaft® Floor System Manual*
Firth RibRaft® Technical Manual January 2012
Firth RibRaft® Flooring Solutions (Introductory brochure)
Firth RibRaft® HotEdge® installation manual
CodeMark™ [CMA-CM40015](#) - RibRaft® Floor System

* A copy of this manual must be held on site.

Manufacturer/supplier contact details

Company: **Firth Industries**

Web: www.firth.co.nz

Email: info@firth.co.nz

Telephone: 0800 FIRTH1 (0800 347841)

Further information and/or names of tradespeople who have installed Firth RibRaft® floors are available by phoning Firth Information Service 0800 347841.

Requirements

1.4 NO SUBSTITUTIONS

Substitutions are not permitted to any specified Firth RibRaft® Floor System product or component, or associated Firth products.

1.5 QUALIFICATIONS

Tradespeople to be competent, experienced and familiar with the Firth RibRaft® Floor System materials and techniques specified.

1.6 STEEL REINFORCING COMPLIANCE

Steel reinforcing materials for concrete to [AS/NZS 4671](#). Steel to be manufactured in New Zealand, or by an overseas manufacturer holding a current valid (or equivalent) NZ S Mark or ACRS certificate for that type of steel. Confirm compliance and provide evidence if requested.

1.7 QUALITY RECORDS

Keep accurate records relating to strength and quality of materials used during construction. Include records of workmanship during construction and photographs of as-built details. Make the information available to the Building Consent Authority inspector on request.

Performance

1.8 COMPLIANCE - RIBRAFT® FLOOR SYSTEM

RibRaft® Floor System meets the requirements of the CodeMark® certificate CodeMark™ [CMA-CM40015](#) when used within the conditions and limitations of its Certificate of Conformity. Achieves compliance with NZBC as follows:

- | [NZBC B1.3.1](#), 3.2, 3.3
- | [NZBC B2.3.1](#) (a)
- | [NZBC E2.3.3](#)
- | [NZBC F2.3.1](#)
- | [NZBC H1. 3.1](#) (refer to limitation c)

2 PRODUCTS

Materials

2.1 BLINDING

50mm maximum compacted GAP 7.

2.2 TIMBER FORMWORK

No. 2 framing and dressing or merchantable grade radiata pine boards to [NZS 3631](#).

2.3 DAMP-PROOF MEMBRANE

0.25mm minimum polyethylene to [NZS 3604](#): clause 7.5.4, Damp-proof membrane (DPM). Refer to SELECTIONS.

2.4 POLYSTYRENE PODS

Firth RibRaft® proprietary purpose made polystyrene pods.

2.5 REINFORCEMENT

Bars to [AS/NZS 4671](#). Grade 500E deformed, other than for ties, stirrups and spirals, unless shown otherwise on the drawings.

2.6 INTERNAL CORNER REINFORCEMENT

Minimum 2 x D10 bars Grade 300E to [AS/NZS 4671](#).

2.7 MESH

Welded reinforcing mesh to [AS/NZS 4671](#) generally, Class E, minimum to [NZBC B1/AS1](#) - Grade 500E, 2.27kg/m² (1.14kg/m² in each direction). Minimum SE62 500E mesh or the equivalent.

2.8 TYING WIRE

Mild drawn steel wire not less than 1.2mm diameter.

2.9 CONCRETE - RIBRAFT® APPLICATIONS

20 or 25 MPa 100mm slump mix in either 13mm or 19mm nominal aggregate size. Firth Raftmix™ for direct placement and Firth Raftmix™ Pump for pump applications.

2.10 NORMAL CONCRETE - NON RIBRAFT® APPLICATIONS

Normal concrete 20 MPa grade, maximum aggregate size 19mm to [NZS 3104](#) for concrete work where Firth Raftmix™ or Firth Raftmix™ Pump are not appropriate.

Components

2.11 SPACERS

Firth proprietary spacers. Refer to SELECTIONS for size.

2.12 INTEGRATED THERMAL EDGING PANELS

Firth RibRaft® HotEdge® panels, 25mm thick x 3m long pre-plastered Foamular® extruded foam sheets with ship-lapped joints at each end. Panels provide a minimum of R1.0 insulation to edge beam of RibRaft® floors. Panels are placed inside RibRaft® foundation boxing before Firth RaftMix™ concrete is poured, to form an integral part of the foundation.

RibRaft® HotEdge® components to complete the system are as follows:

- | 60mm Tornado galvanized wire screws (steel mechanical connectors, to provide regular fixed anchor points into the edge beam)
- | 45mm heavy duty powder coated external corner aluminium extrusion (length to suit the application)

1 DanDam Foam Tape.
Refer to SELECTIONS for options.

3 EXECUTION

Conditions

3.1 STORAGE

Take delivery of and accept all materials and accessories dry and undamaged. Store on timber fillets on hard ground protected from weather, contamination and damage in a secure area clear of any building operation.

Handle and store reinforcing steel and accessories without damage or contamination. Ensure reinforcement is clean and remains clean so that at the time of placing concrete it is free of all loose mill scale, loose rust and any other contamination that may reduce bonding capacity. Store steel fabric flat.

3.2 HANDLING

Avoid distribution and contact with damaging substances. Do not drag sheets across each other and other materials. Protect edges and surface finishes from damage.

Application - RibRaft® floor system

3.3 SITE CLEARANCE

Clear the slab area of any vegetation and topsoil down to the subgrade level.

3.4 BUILDING PLATFORM

Create a building platform to a level surface approximately 330mm below finished floor level. Cut and/or fill sloping sites. Confirm finished floor level.

3.5 POST-CUT INSPECTION

Inspect and confirm that the soil conditions are as anticipated by the geotechnical investigation and report and conform to the requirements of the Firth RibRaft® manual. Refer to Firth RibRaft® Floor System Manual Section 1 - Design Information, 3.5 Foundation Soils.

3.6 TEMPORARY BUILDING PLATFORM DRAINAGE

Construct suitable drainage to keep excessive ground water off the building platform during and after construction as required.

3.7 HARDFILL

Place hardfill and ensure it is spread and compacted with mechanical compaction.

3.8 UNDERGROUND SERVICES

Ensure underfloor services are installed in the subsoil or hardfill in locations as shown on the drawings and according to Firth RibRaft® floor system requirements. Refer to Firth RibRaft® Floor System Manual Section 2 - Installation Information, 3.4 Plumbing and Services.

3.9 BLINDING LAYER

Spread GAP 7 blinding layer to a minimum 500mm past the outside edge of the slab, compact to a level layer no greater than 50mm thick and no higher than 305mm below finished floor level.

3.10 FORMWORK

Construct formwork as required, well braced and tied to remain in position, straight and plumb during construction. Ensure formwork will provide for the topping depth, including rebates and the required concrete finish.

3.11 INSTALL DAMP-PROOF MEMBRANE

Apply DPM to the prepared basecourse extending to the outside of all edge beams or fold and staple up the inside of the formwork. Overlap all joints in the DPM sheets a minimum 150mm. Tape laps and penetrations with 50mm wide pressure sensitive plastic tape. Ensure DPM is not damaged during the construction process. Repair all damage to DPM before proceeding with following procedures.

3.12 PLACE POLYSTYRENE PODS

Place polystyrene pods in a regular waffle pattern using the spacers in the specified grid pattern to fit the floor plan. Cut pods on site with a saw or suitable hot wire as required. Cut holes for services and trim around piles as required on site.

3.13 INSTALL SPACERS

Install spacers and locations to the Firth RibRaft® floor system requirements.

Form standard ribs between pods using Firth 100mm spacers. Place the spacers at a minimum of one spacer along each edge of each pod or part pod. The ribs in both directions form a waffle pattern throughout the slab.

Form the edge beam using Firth 300mm spacers. Place the spacers at 1200mm centres maximum along the perimeter of the slab at least and one spacer per pod or part pod.

Form ribs to support loadbearing walls using Firth 300mm spacers. Place the spacers at a minimum of one spacer along the edge of each pod or part pod.

3.14 PLACE REINFORCING STEEL: RIB STEEL

Place rib reinforcing steel in the bottom of the internal ribs and supported in the correct position by the Firth spacers. Lap all steel 720mm minimum. At the junction with the edge beam, each rib steel bar shall sit on top of the edge beam bars and extend to the outermost bar. Allow for 75mm cover to the edge of the beam.

Place 1 x HD12 bar in each 100mm wide rib and 2 x HD12 bars in each 300mm wide rib.

3.15 PLACE REINFORCING STEEL: EDGE BEAM STEEL

Place the two edge beam reinforcing bars in the bottom of the edge beam and supported in the correct position by the Firth spacers. Tie one edge beam bar below the mesh at the perimeter of the area covered by the polystyrene pods. Lap all steel 720mm minimum. At corners, the inner bottom bars and the top bars cross each other and extend to 75mm from the outside face of the edge beam. Tie these bars together where they cross. Tying of edge beam steel is only required at corners.

3.16 PLACE REINFORCING STEEL: RE-ENTRANT CORNER STEEL

Place two HD12 bars, 1200mm in length across the corner. Tie to the top of the mesh at re-entrant corners at 200mm centres with 50mm side cover from the internal corner.

Install specified steel to Firth RibRaft® Floor System Manual Section 2 - Installation Information, 3.9 Reinforcing Steel. Ensure specified minimum cover requirements are maintained.

3.17 PLACE REINFORCING MESH AND CHAIRS

Place reinforcing mesh over the pods and support on the mesh chairs spaced at 1200mm centres minimum, with two mesh chairs minimum placed per pod and with one mesh chair minimum per part pod.

3.18 MESH LAPS

For slabs on ground the welded reinforcing mesh to be lapped and tied, such that the outermost wires overlap by the greater of:

- ┆ the spacing of the cross wires plus 50mm
- ┆ 225mm or
- ┆ manufacturer's requirements

Do not count bar extensions beyond the outermost cross wire.

3.19 FORM SLAB AND OPENING REBATES

Form rebates, as detailed on drawings.

Form a minimum 50mm rebate in slab for masonry veneer construction with a width dependent on the veneer width, cavity width and overhang. Waterproof the rebate with a bituminous sealer on both the vertical and horizontal faces.

3.20 STARTERS FOR MASONRY WALL CONSTRUCTION

Install wall starter bars in the correct position for the masonry block series being used to [NZS 4229](#) and RibRaft® manual.

3.21 TOPPING SLAB DEPTH

85mm minimum plus additional cover as required for infloor heating.

3.22 PRE-PLACEMENT INSPECTION

Arrange for excavations, formwork and reinforcement to be inspected and passed by the Building Consent Authority.

3.23 CONCRETE PLACEMENT AND COMPACTION

Ensure the rib and edge beam canals are clean, free of debris. Pour the floor in a single pour using only Firth Raftmix™ or Firth Raftmix™ Pump concrete and ensuring that the pods remain in position during placing.

Pour concrete onto the top of each pod prior to filling the ribs around the pod to help prevent them from floating and lifting.

Use Firth Raftmix™ for placement in the floor directly from the concrete truck chute or Firth Raftmix™ Pump concrete for placement in the floor by concrete pump.

Compact concrete using a suitable poker vibrator for the ribs and ground beams and into all corners of the formwork. Screed as required. Confirm levels with a laser level.

3.24 CONCRETE FINISHING

Float and trowel to provide a U3 finish to [NZS 3114](#): table 2, Classes of floor, exterior pavement and invert finishes.

3.25 CONCRETE CURING

Curing of the concrete slab must take place immediately after finishing the concrete to [NZS 3109](#) by one of the following curing methods:

- ┆ ponding or continuous sprinkling of water
- ┆ placing a wet covering or plastic membrane over the slab
- ┆ the use of liquid membrane curing compounds

3.26 SHRINKAGE CONTROL JOINTS

Cut shrinkage control joints as shown on the plans after hardening to a depth of 25mm within 24 hours in summer or 48 hours in winter.

Where shrinkage control joints have not been shown on the plans, position the shrinkage control joints to coincide with major changes in the floor plan. Agree position of shrinkage control joints with the designer.

Bay dimensions formed by the shrinkage control joints to be limited to a maximum ratio of length to width of 2 to 1 with a maximum dimension of 6 metres. Place the shrinkage control joints over the 100mm wide internal ribs wherever possible. Where a shrinkage control joint runs along the line of a 300mm wide loadbearing rib, locate the cut directly above one edge of the 300mm rib.

3.27 CLEAN OUT SHRINKAGE CONTROL JOINTS

Clean out control joints. If required fill with suitable flexible sealant.

Application - RibRaft® HotEdge® system

3.28 INSTALL RIBRAFT® HOTEDGE®

Install panels to Firth RibRaft® HotEdge® installation manual and as follows:

- ┆ Fix panels temporarily around the perimeter of the Rib Raft® slab, tied against the external boxing, prior to the concrete pour
- ┆ Fix 60mm Tornado galvanized wire screws to panel at 300mm or 600mm centres staggered top and bottom to provide secure fixing for RaftMix™
- ┆ Bond shiplap joints of end of panels with MS sealant
- ┆ Seal panel edges with DanDam 3.5 x 12mm concrete seal foam tape
- ┆ Cut, glue and seal internal corners with MS sealant
- ┆ Finish external corner with 45mm heavy duty powder coated external corner aluminium extrusion (length to suit the application)
- ┆ Pour RibRaft® RaftMix® concrete slab covering the angled top edge HotEdge® anchoring
- ┆ Remove formwork

3.29 BOTTOM PLATE ANCHORAGE - TIMBER FRAME

Fix bottom plate with 7-15 kN Uplift-Ramset Ankascrew® AS10150GH to Firth RibRaft® HotEdge® installation manual.

3.30 RIBRAFT® HOTEDGE® PANELS - FINISHING, EXPOSED SURFACES

Apply 2 coats of acrylic paint to exposed surfaces of panel once wall framing and cladding is in place.

Application - other concrete work

3.31 PLACE CONCRETE

Do not place fresh concrete against the preceding layer after more than 45 minutes, or such lesser time as required by the circumstances, to [NZS 3109](#): clause 7.4, Handling and placing.

3.32 SCREED THE SURFACE

Screed the concrete surface by straight edge or vibrating screed immediately after compaction and to tolerances in [NZS 3109](#): table 5.2, Tolerances for in situ construction.

3.33 CONCRETE FINISHING

Screed and provide a U3 finish to [NZS 3114](#): table 2, Classes of floor, exterior pavement and invert finishes.

Finishing

3.34 STRIKE FORMWORK

Strike formwork after at least 12 hours after the slab has been finished without damaging or overloading structure.

3.35 SURFACE DEFECTS

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

Completion**3.36 LEAVE**

Leave work to the standard required by following procedures.

3.37 CLEAN UP

Clean up surrounding areas following completion of the concrete placement.

3.38 REMOVE

Remove debris, unused materials and elements from the site.

4 SELECTIONS

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

Substitutions are not permitted to the following, unless stated otherwise.

Materials**4.1 DAMP-PROOF MEMBRANE**

Type: 0.25mm

4.2 FIRTH RIBRAFT® POD

Brand: Firth

Size: 1100mm x 1100mm x 220mm

4.3 FIRTH SPACERS

Brand: Firth

Size: 100mm and 300mm

Finishing**4.4 CONCRETE SURFACE FINISH - FLOORS**

Location: Polished floors in living and downstairs. Carpeted and tiled in bedroom wing

Finish class: U3 (interior)

3321F FIRTH CONCRETE MASONRY

1 GENERAL

This section relates to the laying, reinforcing and grouting of **Firth** hollow concrete masonry for observation type A or B specific design masonry using ready-mix grout for the following types:

- ┆ **Firth** hollow block masonry
- ┆ **Firth** HotBloc® self insulating masonry
- ┆ **Firth** EsiBloc® mortarless masonry
- ┆ **Firth** Architectural Masonry

1.1 ABBREVIATIONS AND DEFINITIONS

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

The following definitions apply specifically to this section:

ACRS Australian Certification Authority for Reinforcing Steels - An independent certification scheme for reinforcing steel and structural steel, by product and manufacturer/processor. Certifies compliance with Australia/New Zealand Standards.
ACRS Web site - www.steelcertification.com

1.2 DOCUMENTS

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

NZS 3104	Specification for concrete production
NZS 3109	Concrete construction
NZS 3112.1	Methods of test for concrete - Tests relating to fresh concrete
NZS 4210	Masonry construction - Materials and workmanship
AS/NZS 4455.1	Masonry units, pavers, flags, and segmental retaining wall units - Masonry units
AS/NZS 4671	Steel reinforcing materials
CCANZ CP 01	Code of Practice for Weathertight Concrete and Concrete Masonry Construction

1.3 MANUFACTURER/SUPPLIER DOCUMENTS

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

Firth Industries documents relating to work in this section are:

Firth Masonry Homes Construction Manual
Firth Cantilever Masonry Retaining Walls Manual
Firth Hollow Masonry Document
Firth EsiBloc® Mortarless Masonry Manual
Firth Energy Efficiency Masonry Construction
Firth Masonry Insulation Solutions
Firth Architectural Masonry Best Practice Guide for Specifiers and Installers
Firth Design Masonry Control Joint Specification

Manufacturer/supplier contact details

Company:	Firth Industries
Email:	info@firth.co.nz
Web:	www.firth.co.nz
Telephone:	0800 800 576
Facsimile:	0800 800 530

Requirements

1.4 NO SUBSTITUTIONS

Substitutions are not permitted to any specified **Firth** hollow concrete masonry or associated products.

1.5 QUALIFICATIONS

All work to be installed or supervised by a licensed building practitioner: Licensed for Bricklaying and Blocklaying 2: Structural Masonry.

1.6 CONSTRUCTION OBSERVATION BY ENGINEER

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

Obtain the producer statements required from the engineer relating to the masonry construction and keep with the building consent documentation.

1.7 QUALITY RECORDS

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

1.8 SELECTED MASONRY

Refer to the drawings for areas of masonry, which require select quality blocks to both sides, self-insulating masonry, water resistant masonry or mortarless masonry.

1.9 CERTIFICATION - SEALERS FOR MASONRY

Paints and clear sealers to [CCANZ CP 01](#). The sealer applicator is to certify that the sealer application is in accordance with the design and manufacturer's specification. Provide certification to the Contract Administrator.

1.10 STEEL REINFORCING COMPLIANCE

Steel reinforcing materials for concrete to [AS/NZS 4671](#). Steel to be manufactured in New Zealand, or by an overseas manufacturer holding a current valid (or equivalent) NZ S Mark or ACRS certificate for that type of steel. Confirm compliance and provide evidence if requested.

Performance - tests

1.11 TESTS

Carry out all required tests to [NZS 4210](#): appendix 2A, Compressive strength tests for mortar and grout.

1.12 RECORDS OF TESTS

To [NZS 4210](#) and kept on site:

- ┆ spread of grout tests
- ┆ grout supplier's test certificates.
- ┆ mortar

1.13 TESTING PROCEDURES

Provide advance notice of cell filling work. If requested maintain on site all equipment necessary for taking and preparing samples for test. Retain records of test results and supply on request.

1.14 SPREAD OF GROUT

If requested, carry out tests to [NZS 3112.1](#), to the requirements of [NZS 4210](#).

1.15 COMPRESSIVE STRENGTH OF GROUT

If requested, carry out tests to [NZS 4210](#): appendix 2A, Compressive strength tests for mortar and grout, with 3 specimens per test.

1.16 COMPRESSIVE STRENGTH OF MORTAR

If requested, carry out tests to [NZS 4210](#): appendix 2A, Compressive strength tests for mortar and grout, with 3 specimens per test.

1.17 EXPANSION OF GROUT

If requested, carry out tests to [NZS 4210](#): appendix 2C, Test for expansion of grout.

2 PRODUCTS

Materials

2.1 ARCHITECTURAL MASONRY

Firth Architectural Masonry 10 or 20 series advanced masonry block. Fair face, split face or honed finish. Refer to SELECTIONS for type, size, finishes and bond.

2.2 REINFORCEMENT

To [AS/NZS 4671](#), deformed mild steel except for ties in plain round mild steel.

2.3 JOINT REINFORCEMENT

Galvanized steel twin 4mm diameter rods spaced 60mm apart by a 2mm diameter lattice welded on.

Accessories

2.4 MORTAR

Dricon Trade Mortar to [NZS 4210](#): 2.2 Mortar. Refer to SELECTIONS for colour.

2.5 FINE AGGREGATE GROUT

Firth Certified ready-mixed blockfill to [NZS 4210](#): 2.3 Grout and [NZS 3104](#).

Strength: 17.5 MPa (unless subject to seaspray zone)

Aggregate: 4.75mm to 6mm maximum

3 EXECUTION

Conditions

3.1 COMPLIANCE

Comply with [NZS 4210](#).

3.2 TOLERANCES

Construct within the tolerances set out in [NZS 4210](#): clause 2.6.5, Tolerances and clause 2.7, Laying the units, unless specified otherwise on the drawings or in this specification. Lay blocks with jointing of consistent thickness throughout.

Lay masonry to an even, plane surface with no deviation exceeding 3mm in 3 metres on any surface in view in the finished work.

Where EsiBloc® mortarless masonry is used, EsiBloc® wedges are to be used to maintain levels.

3.3 CHECK BASE

Check that the base concrete on which masonry is being built is true to line and level, to ensure that work can be taken up true and plumb with 10mm thick bed and perpendicular joints. If more than 20mm thickness of mortar bed is needed to correct inaccuracies obtain written direction on remedial action.

3.4 CONSTRUCTION JOINTS

Ensure the structural integration of all masonry with adjacent concrete work by providing well roughened, retarded construction joints at all junctions.

Vertical joints between masonry and concrete to achieve full structural integration across the joints. Allow to construct concrete work first with prepared vertical construction joints at block junctions the same as for horizontal construction joints. Lay masonry so that all courses have open ends abutting the existing concrete work.

3.5 COVER

All cover shall be in accordance with [NZS 3109](#): 3.8 Cover and 3.9 Tolerances for reinforcement.

3.6 STARTER POSITIONS

Check the location of starter reinforcement before block laying commences, or by a dry trial lay up of the first course. Do not attempt to correct misplacement by cranking bars. Where misplacement exceeds the location tolerance obtain written directions before proceeding further.

3.7 MOISTURE CONTENT

Ensure that blocks are air-dry prior to laying. If necessary to reduce excess absorption of water from the mortar, some dampening of the surface is permissible but no surface water may be present at the time of placing mortar. Keep masonry on the pallet and protected from the weather prior to use.

3.8 PROTECTION

Keep fair face block walls clean of mortar droppings, grout splashes, or stains of any kind as the work proceeds and before any droppings set and protected from weathering prior to sealing to avoid instances of efflorescence and staining.

3.9 WEATHER PRECAUTIONS

When extreme temperatures prevail, either below 4°C or above 27°C, make adjustments to construction as listed in [NZS 4210](#): clause 2.18, Cold weather construction, and clause 2.19, Hot weather construction. Do not use expansive grout for filling in temperatures below 5°C.

Application

3.10 SELECTION

For fair face walls select blocks for consistent colour, texture and lack of imperfections. Refer to clause PROTECTION.

3.11 BONDING PATTERN

Unless specifically shown or described otherwise in SELECTIONS/drawings, lay masonry in stretcher bond with full masonry bonding at intersections.

3.12 OPEN-ENDED DEPRESSED WEB MASONRY

Use open-ended depressed web masonry throughout all courses in fully grouted walls.

- 3.13 CUTTING
Cut using a masonry saw to provide clean, accurate cuts.
- 3.14 FACE SHELL BEDDING
Lay masonry on full mortar beds under face shells only where fully grouted.
- 3.15 BOTTOM COURSE
For fully grouted walls use inverted open-end depressed web bond beam masonry for the first course, to permit clean-out of grout space at the base.
- 3.16 ARCHITECTURAL MASONRY
Refer to Firth Architectural Masonry Best Practice Guide prior to laying masonry. Contact sealer applicator for any requirements under CCANZ: CP01 prior to laying blocks.
- 3.17 CLEAN OUT HOLES
Use special clean-out masonry or saw off a 100mm x 200mm high section of face shell at the base of all cells containing reinforcement, to form clean out and inspection holes.
- 3.18 GROUT SPACE
Ensure that grouting cells at reinforcement locations are continuously clear by removal of projecting mortar.
- 3.19 TIE REINFORCING STEEL
Tie vertical reinforcing steel to starter bars. Lay and tie horizontal bars as the work proceeds.
- 3.20 REINFORCEMENT LAPS
Lap at 40 diameters for 300 grade and 70 diameters for 500 grade, except as noted otherwise on the drawings.
- 3.21 BRACING
Provide temporary lateral bracing to the wall where necessary to ensure stability and until final supporting construction is in place.
- 3.22 NON EXPOSED MASONRY
To be laid to the same tolerances as fair face masonry. Joints to be tooled and struck off flush.
- 3.23 TOOLED JOINTS
Finish joints on exposed masonry by tooling to produce a neat, tight joint. Refer to the drawings for details.
- 3.24 CONTROL JOINTS
Refer to [NZS 4210](#): clause 2.10, Methods of controlling wall movements, generally and to clause 2.10.2, Vertical control joints, for location; not more than 6 metres apart.
- Debond reinforcement passing through control joints 150mm each side for single walls and 300mm one side for 2 walls. Rake out and prime adhesion faces of vertical control joints between masonry and between masonry and concrete as required by the sealant manufacturer. Use masking tape to avoid over-run of sealant onto the block face. Provide a backing strip to limit sealant depth to 10mm, and insert sealant, all to the manufacturer's requirements.
- Construction of control joints to [NZS 4210](#).
- Grouting of bond beams at control joint locations to be discontinuous unless specifically noted otherwise.
- Application - grouting**
- 3.25 INSPECTION
Inspect clean-out holes prior to grouting. Ensure that cells are clean and reinforcement is correctly placed. Mortar back the clean-out hole shell. If holes are covered in the completed work, boxing across the face may replace the shell infill. Brace hole infills to prevent blowouts during grouting.
- Notify when work is ready for inspection.
- 3.26 GROUTING, HIGH LIFT WITH EXPANSIVE
Fill masonry walls using the "high lift with expansive admixture method" to [NZS 4210](#) up to a maximum height of 3600mm in a semi-continuous operation. Consolidate by rodding. Wait for expansion to take place and locally re-compact the top of the wall by trowelling, or place a weighted board on top of the wall to contain the expansion. For fair face masonry clean wall thoroughly to avoid staining.
- 3.27 GROUTING, HIGH LIFT WITHOUT EXPANSIVE

Fill masonry walls to [NZS 4210](#): clause 2.12, The high lift without expansive admixture method, up to a maximum height of 3600mm in maximum lifts of 1200mm. Consolidate by mechanical vibrator. Wait between each lift until grout settles, but before any set takes place (between 15 and 60 minutes) before pouring the next lift. Consolidate by mechanical vibrator with 300mm penetration into the previous lift. Wait after the final lift as before and reconsolidate the top 300mm by mechanical vibrator.

3.28 GROUTING, LOW LIFT

Fill masonry walls to [NZS 4210](#): clause 2.14, The low lift grouting method, up to a maximum height of 1200mm. Consolidate by rodding and then prepare a construction joint to [NZS 4210](#): clause 2.16, Horizontal construction joints, before repeating the sequence.

3.29 LIMIT RATE

Limit rate of pour to avoid hydrostatic blowouts.

Application - ancillary work

3.30 HOLES AND CUT MASONRY

Provide all necessary holes, pockets and chases. Cut blocks when non-standard shapes are required. When cut masonry units are used, ensure vertical joints in adjacent courses are no closer than 100mm. Subsequent cutting away of masonry to form holes is not permitted.

3.31 BUILT IN ELEMENTS

As the work proceeds, mortar in place elements such as sills, copings, lintels, and steps.

3.32 BUILT IN FIXINGS

Build in all necessary plugs, bolts, ties, metal flashings, dowels, fastenings and fixings required by this and other work sections. Co-operate with others to meet this requirement. Fixings only permitted into filled cells.

3.33 ELECTRICAL WORK

Ensure that provision for and fitting of boxes, conduit and pre-wiring are made and done as the work proceeds under the direction of the electrician.

3.34 SEALANT

Apply appropriate sealant where required to the manufacturer's specifications. Sealant to [CCANZ CP 01](#).

3.35 WEATHERPROOFING AROUND OPENINGS

Refer to architectural drawings for weatherproofing details around openings.

Completion

3.36 PROGRESSIVE CLEANING

Clean off mortar splashes and grout spills as they occur.

3.37 FINAL CLEANING

At completion, clean down block work, remove efflorescence and remove waste materials from adjoining surfaces and floors.

3.38 REPLACE

Replace damaged, cracked or marked elements.

3.39 REMOVE

Remove debris, unused materials and elements from the site.

4 SELECTIONS

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

Substitutions are not permitted to the following, unless stated otherwise.

4.1 FIRTH ARCHITECTURAL MASONRY

Type:	Firth Architectural Masonry
Series:	20
Type/size:	20 series
Bonding pattern:	Stretcher bond
Face finish:	Fair face Honed on site
Colour:	Onyx

4.2 MORTAR

Type/colour:	Dricon Trade Mortar colour Black
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4.3 FIRTH MASONRY BLOCKFILL

Type: **Firth Grout**
Strength: 20MPa

4.4 EXPANSIVE AGENT

Grout expansion: Refer to [NZS 4210](#)

3410 STRUCTURAL STEELWORK - BASIC

1 GENERAL

This section relates to the fabrication, erection and specialist coating of structural steelwork of a general nature.

1.1 DOCUMENTS

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

NZBC F5/AS1	Construction and demolition hazards
AS/NZS 1252	High-strength steel bolts with associated nuts and washers for structural engineering
AS/NZS 1554.1	Structural steel welding - Welding of steel structures
AS 1627.4	Metal finishing - Preparation and pretreatment of surfaces - Abrasive blast cleaning
AS 1627.9	Metal finishing - Preparation and pretreatment of surfaces - Pictorial surface preparation standards for painting steel surfaces
AS/NZS 2312:2002	Guide to the protection of iron and steel against atmospheric corrosion by the use of protective coatings
NZS 3404.1:1997	Steel Structures Standard
AS 3828	Guidelines for the erection of building steelwork
AS/NZS 4680	Hot-dip galvanized (zinc) coatings on fabricated ferrous articles
GANZ:	Galvanizing Association of New Zealand - After-Fabrication Hot Dip Galvanizing. A practical reference for designers, specifiers, engineers, consultants, manufacturers and users
HERA R4-99	Specification for the fabrication, erection and surface treatment of structural steelwork

1.2 QUALIFICATIONS

Welders to be qualified, experienced competent workers, familiar with the materials and the techniques specified.

1.3 VERIFY DETAILS AND DIMENSIONS

Refer to drawings to ensure all required details and fixings are provided for in the structural steelwork. Verify dimensions against site measurements prior to fabrication.

1.4 TEST WELDING

Non-destructive weld examination with method, extent and standards of acceptance to [AS/NZS 1554.1](#), Section 7 and [NZS 3404.1](#), Appendix D.

2 PRODUCTS

2.1 STRUCTURAL STEEL

Comply with New Zealand, Australian, British or Japanese Standards for steel as required by [NZS 3404.1](#), section 2, including, type, category, and suppression of brittle fracture.

Grade 300, except RHS sections Grade 350, unless noted otherwise on the drawings.

2.2 WELDING

Electrodes to comply with and be selected for the grade of steel being welded as required by [AS/NZS 1554.1](#).
Welding wire as required by the wire manufacturer for the materials to be joined and the welding position.
Welding flux: dry and used from sealed containers. Material for arc stud welding to comply with [AS/NZS 1554.1](#).

2.3 BOLTS, NUTS AND WASHERS

To [AS/NZS 1252](#) and to the requirements of [NZS 3404.1](#), section 2.3 **Fasteners**. Hot-dip galvanize all bolts, nuts and washers forming a permanent part of any structure subject to a protective coating, to [AS/NZS 4680](#).

3 EXECUTION

3.1 SURFACE FINISH

Grind off all burrs and sharp arrises.

3.2 TOLERANCES

Discard material showing visual defects affecting its structural integrity. Comply with the tolerances laid down for holding down bolts, columns, beams and other members in HERA R4-99 and [NZS 3404.1](#). Comply with [NZS 3404.1](#) for level and alignment of beams and alignment and plumbing of struts. Structural elements to comply for straightness, length, full contact splices and struts not prepared for full contact with [NZS 3404.1](#).

3.3 CUTTING

To [NZS 3404.1](#), and for existing steel HERA R4-99. Hand cut only where machine cutting is not possible.

3.4 CONSTRUCT

Construct the steel structure as detailed and to [NZS 3404.1](#), section 14, Fabrication and section 15, Erection.

3.5 WELDING

Carry out welding in accordance with [AS/NZS 1554.1](#) and the additional requirements of [NZS 3404.1](#). Equipment to comply with [AS/NZS 1554.1](#), clause 1.8.2.

3.6 WELDING NEAR TOUCHING STEELWORK

Shop weld together touching or near-touching steelwork all round with 5mm (one pass) continuous fillet welds unless denoted otherwise on the drawings.

3.7 HOLLING

Comply with [NZS 3404.1](#) for sizes, alignment, finishing, punching and flame cutting of holes.

3.8 BOLTING

Bolting, including high strength bolting to [NZS 3404.1](#). Ensure that at least one clear thread shows above the nut and at least one thread run out is clear beneath the thread after tightening.

3.9 THREADS EXCLUDED FROM SHEAR PLANE

Select length of bolts such that the threaded portion does not occur within the shear plane between joined parts.

3.10 START ERECTION

Start erection only when the holding down bolts and anchorages have achieved sufficient strength. Carry out the erection of the structural steel to the requirements of AS 3828. Comply with [NZBC F5](#) and [NZS 3404.1](#), section 15, Erection. Provide temporary bracing as required to achieve stability during erection.

3.11 BASE PLATES

Enlargement or site cutting of holes not permitted. Bending or displacement of holding down bolts not permitted.

3.12 COLUMNS

Plumb columns using sawn steel packs and wedges not larger than necessary for the purpose. The column base must not be raised by more than 25mm. Fill space beneath the base plate with cement-sand grout, containing a non-shrink additive, the grout having a minimum compressive strength of 30MPa at 28 days. Alternately use a dry pack of 1:2 cement with the sand mortar hammered in tight to ensure complete filling of space.

3.13 INSPECTION

Inspect all stages of fabrication and construction of the structure to [NZS 3404.1](#), sections 14, Fabrication and 15 Erection.

3.14 ENCASED STEELWORK

Clean the steelwork to be encased in concrete to remove all loose mill scale, rust, dirt and other matter affecting bond with concrete. Achieve this by wire brushing and the use of suitable solvents.

3.15 ABRASIVE BLASTING

Remove oil and grease by the use of solvents. Abrasive blast clean to a Class 2.5 finish to AS 1627.4. Clean to bright metal, but avoid producing a polished surface. Select grit type and equipment such that the cleaned surface profile between peaks and valleys does not exceed one third of the dry film thickness. Check that no burrs or sharp arrises remain which may prevent the full coating thickness being attained.

3.16 PRIMING GENERALLY

Coat steelwork, unless specifically noted otherwise, with the specified priming paint, including patch priming on site after erection.

3.17 UNPAINTED SURFACES

Do not paint:

- ┆ faying face of high strength friction grip bolted joints
- ┆ areas for site welding, keeping 75mm clear all round
- ┆ surfaces being embedded in concrete.

Where steel is only partly encased then extend priming 25mm maximum into the concrete encasement area.

3.18 PATCH PRIMING

Clean areas of damaged priming and areas left clear for site jointing to a standard comparable with that specified for shop cleaning. Wash off chemical deposits from welding fumes. Apply priming coats to the same standard as shop primers, ensuring thorough coating of bolts, nuts and connection areas. Reprime if more than 4 weeks elapse before the final coating system is applied.

4 SELECTIONS

4.1 PRIMER

Brand/type:

4.2 SHOP PRIMING

Dry film build: 100 microns

3820 CARPENTRY

1 GENERAL

This section relates to the supply and erection of timber framing, as a framed structure, or as partitioning. It includes prefabricated timber and engineered wood.

1.1 RELATED WORK

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

1.2 DOCUMENTS

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

NZBC B2/AS1	Durability
AS/NZS 1328.1	Glued laminated structural timber - Performance requirements and minimum production requirements
AS/NZS 1604.5	Specification for preservative treatment - Glue laminated timber products
NZS 3602	Timber and wood-based products for use in building
NZS 3603	Timber structures standard
NZS 3604	Timber-framed buildings
NZS 3622	Verification of timber properties
NZS 3640	Chemical preservation of round and sawn timber
AS/NZS 4357.0	Structural laminated veneer lumber - Specification
FTMA CoP	Frame and Truss Manufacturers Association Code of Practice

***A copy of NZS 3604 Timber-framed buildings, must be held on site.**

1.3 QUALIFICATIONS

Workers to be experienced, competent trades people familiar with the materials and techniques specified.

1.4 DIMENSIONS

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

2 PRODUCTS

2.1 TIMBER FRAMING, TREATED

Species, grade and in service moisture content to [NZS 3602](#), [NZBC B2/AS1](#) and treatment to [NZS 3640](#), [NZBC B2/AS1](#). Structural grade (SG) to [NZS 3604](#), [NZS 3622](#) with properties to [NZS 3603](#).

2.2 EXTERIOR CAVITY WALL BATTENS - TIMBER - NON-STRUCTURAL

H3.1 or H3.2 Radiata pine battens, minimum 20mm thickness, width and height to match timber framing studs. Temporary fix battens before being fixed into the framing with the cladding fixings. To [NZS 3602](#), table 1, reference 1D.10, Requirements for wood-based building components to achieve a 50-year durability performance.

2.3 EXTERIOR CAVITY WALL BATTENS - PROPRIETARY - NON-STRUCTURAL

Extruded polypropylene battens, size approximately 45mm wide x 18mm thickness. Temporary fix battens before being fixed into the framing with the cladding fixings. To the scope limitations of [NZBC E2/AS1](#), and [NZS 3604](#) Building Wind Zones up to, and including "Extra High".

Components

2.4 NAILS

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

2.5 BOLTS AND SCREWS

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

2.6 NAIL PLATES

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

2.7 CONNECTORS

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

2.8 CORROSION RISKS

For interior timber, treated with copper-based timber preservatives (H3.2 or higher), use a minimum of hot-dipped galvanized steel fixings and fasteners.

For exterior timber, timber in damp areas and timber subject to occasional wetting, use only stainless steel (or equivalent) fixings and connectors, when the timber is treated with; Copper Azole (CuAz, Preservative code 58), Alkaline Copper Quaternary (ACQ, Preservative code 90), Micronise Copper Azole (code 88) or Micronised Copper Quaternary (code 89).

2.9 DPC

Refer to 4161 UNDERLAYS, FOIL AND DPC section

3 EXECUTION

3.1 EXECUTION GENERALLY

To [NZS 3604](#) except as varied in this specification. Execution to include those methods, practices and processes contained in the unit standards for the National Certificate in Carpentry and the National Certificate in Joinery (cabinetry, exterior joinery, stairs).

3.2 SEPARATION

Separate all timber framing timbers from concrete, masonry and brick by: -

- ┆ a full length bituminous damp-proof membrane overlapping timber by at least 6mm; or
- ┆ a 12mm minimum free draining air space

3.3 ATTENDANCE

Provide and fix blocks, nogs, openings and other items as required by other trades.

3.4 MOISTURE CONTENT

Maximum allowable equilibrium moisture content (EMC) for non air-conditioned or centrally heated buildings for framing to which linings are attached.

Framing at erection:	24% maximum
Framing at enclosure:	20% maximum
Framing at lining:	16% maximum

3.5 SET-OUT

Set out framing in accordance with the requirements of [NZS 3604](#) and as required to support sheet linings and claddings.

3.6 FRAMING WALLS

Frame to required loading and bracing complete with lintels, sills and nogs, all fabricated and fastened to [NZS 3604](#), section 8, **Walls**.

3.7 FRAMING ROOFS

Frame to required loading and bracing complete with valley boards, ridge boards and purlins. Design and fit roof trusses complete with anchorage. All fabricated and fastened to [NZS 3604](#), section 9, **Posts** and 10, **Roof framing**.

3.8 FRAMING CEILINGS

Frame to required loading and bracing complete with runners and battens set out to support ceiling lining. All fabricated and fastened to [NZS 3604](#), section 13, **Ceilings**. Trim for openings in ceilings and hatches to [NZS 3604](#) section 13.3, **Openings in ceilings**. Provide blocking for water tanks located in the ceiling space to [NZS 3604](#), section 13.4, **Water tanks in roof space**.

3.9 INSTALLING WALL UNDERLAYS

Refer to 4161 UNDERLAYS, FOIL AND DPC section

3.10 FIT CAVITY BATTENS

Fit and fix 20mm cavity battens over wall underlay or rigid air barrier, fully nail to timber studs to the requirements of the manufacturer or to [NZS 3604](#). Fit and fix related flashings. Fit and fix cavity closers to base of walls, open horizontal (or raking) junctions and over openings (windows, meters etc.).

3.11 DPC TO LOSP TREATED TIMBER

Refer to 4161 UNDERLAYS, FOIL AND DPC section.

3.12 DPC TO TIMBER

Refer to 4161 UNDERLAYS, FOIL AND DPC section.

4 SELECTIONS

4.1 EXTERIOR WALL FRAMING - RADIATA PINE

Member	Species	Grade	Treatment
Exterior walls:	Radiata pine	SG8	H1.2
Parapets:	Radiata pine	SG8	H1.2
Enclosed decks and balconies:	Radiata pine	SG8	H1.2
Cantilevered joists enclosed decks and balconies:	Radiata pine	SG8	H3.2
Wall battens (not cavity):	Radiata pine	Merch	H1.2
Jamb battens:	Radiata Pine	Merch	H3.1

4.2 CAVITY BATTENS

Cavity battens	Species	Grade	Treatment
Timber - Non Structural:	Radiata pine	Merchantable	H3.1

4.3 ROOF FRAMING - RADIATA PINE

Member	Species	Grade	Treatment
Rafters:	Radiata pine	SG8	H1.2
Trusses:	Radiata pine	SG8	H1.2
Purlins:	Radiata pine	SG8	H1.2
Ceiling joists and battens:	Radiata pine	SG8	H1.2
Valley boards:	Radiata pine	Merchantable	H1.2
Sarking:	Radiata pine	Merchantable	H1.2
Skillion roof framing:	Radiata pine	SG8	H1.2
Enclosed flat roof framing:	Radiata pine	SG8	H1.2

4.4 INTERIOR FRAMING - RADIATA PINE

Member	Species	Grade	Treatment
Non structural walls:	Radiata pine	SG8	H1.2
Structural and braced walls:	Radiata pine	SG8	H1.2

4.5 NAILS

Location	Type	Material	Finish
External	-	Stainless steel	Stainless steel

4.6 BOLTS AND SCREWS

Location	Type	Material	Finish
External		Stainless steel	Stainless steel

4131A ARDEX SHELTERSEAL DAMPPROOF MEMBRANE

1 GENERAL

This section relates to the application of sheet membranes for damp-proof membranes:

- ┆ ARDEXShelterseal 3000X Self adhesive SBS Membrane
- ┆ ARDEXShelterseal 5000HD Self adhesive SBS Membrane

Documents

1.1 DOCUMENTS

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

[NZBC E2/AS1](#) External moisture

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

1.2 MANUFACTURER'S DOCUMENTS

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

ARDEX Waterproofing solutions manual
[BRANZ Appraisal 462](#) - Shelterseal Damp-proof Membranes
[BRANZ Appraisal 894](#) - Dunlop Shelterseal 3000X Membrane

Copies of the above literature are available at

Web: www.ardex.co.nz
 Email: ardexspec@ardexnz.com
 Telephone: 0800 2 ARDEX (27339)
 09 636 0005 Auckland
 04 568 5949 Wellington
 03 373 6900 Christchurch

Warranties

1.3 WARRANTY

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

Warranty period: 10 years
 Durability Period: 50 years

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

Requirements

1.4 NO SUBSTITUTIONS

Substitutions are not permitted to any specified Ardex materials, or associated products, components or accessories.

1.5 QUALIFICATIONS

Application to be carried out by Ardex approved applicator, and to be strictly in accordance with Ardex technical literature and to [BRANZ Appraisal 462](#) - Shelterseal 3000X and Shelterseal HD Damp-Proof Membranes.

1.6 SYSTEMS ARDEX PROJECT

Contact Ardex with any relevant key dates and for a list of approved applicators. The contractor is to contact Ardex prior to starting the contract.

Web: www.ardex.co.nz
 Email: ardexspec@ardexnz.com
 Telephone: 0800 2 ARDEX (27339)
 09 636 0005 Auckland
 04 568 5949 Wellington
 03 373 6900 Christchurch

2 PRODUCTS

Materials

2.1 ARDEX SHELTERSEAL 3000X

Peel-and-stick bituminous/asphalt membrane protected by a cross laminated high-density polyethylene film.
 Thickness: 1.5mm

2.2 SURFACE PRIMER

Primer compatible with the sheet membrane and adhesive system, formulated to prepare the substrate for optimum application of the membrane.

Primer: ARDEX Shelter Primer WPM 247, ARDEX WPM 240 or ARDEX WA98
 Adhesive.

2.3 ARDEX COREFLUTE PROTECTION BOARD

Profiled, rot proof, thermoplastic protection sheet.

Accessories

2.4 MASTIC

ARDEX CA20P multipurpose sealant.

3 EXECUTION

Conditions

3.1 COMPLY

Comply with all Ardex requirements and instructions.

3.2 STORE

Store membranes and accessory materials under conditions that ensure no deterioration or damage. Store rolls in an upright position on a smooth floor and protected from sunlight, UV radiation and moisture.

3.3 WEATHER CONDITIONS

Apply damp-proof membranes only in fair weather with air temperature above 5°C.

3.4 CHECK SUBSTRATE

Check that the substrate will allow work of the required standard. Complete any remedial work identified before commencing any work.

3.5 CURING OF NEW CONCRETE

Allow concrete and masonry to dry to Ardex requirements before applying membranes. Recommended minimum curing of new concrete: 28 days.

3.6 SAND BINDING

Ensure sand binding is a minimum of 25mm thick.

Application - Preparation

3.7 ENSURE SUBSTRATE

Ensure all surfaces are free from voids, spalled areas, loose particles, and sharp protrusions. Ensure no projections of sharp materials exist that will cause damage to membrane. Check that concrete block joints are struck off flush.

Ensure form oils or release agents and curing compounds are completely removed.

3.8 PREPARE SUBSTRATE

Remove projections, wire-brush and remove all debris, leaving the surface dust-free, oil-free and clean, with nothing that could diminish the adhesion of primers. Fill tie holes flush and smooth with mortar. Grind off steps or sharp protrusions caused by formwork joints.

3.9 TURN UPS

Where damp-proofing is turned up against hardened concrete, ensure the surface is smooth and free of all sharp projections. Fill internal corners with a fillet of latex-modified cement mortar, or epoxy mortar.

3.10 TURN DOWNS

Where damp-proofing is turned over an external corner, first grind the corner to produce a smooth 25mm radius or chamfer.

3.11 CLEAN SURFACES

Clean surfaces with a broom or oil free compressed air to remove dust, loose particles and material that could affect bonding.

3.12 REMOVE BACK FORMS

Remove back forms to ensure no vapour pressure develops beneath the membrane.

3.13 PRIMING

Ensure concrete or masonry substrates are sufficiently cured and dry to permit the intended performance of the primer. Apply Shelter primer by brush, roller or airless spray at a maximum coverage rate of 5m² per litre.

Priming not required on polystyrene blocks. Ensure that the surface is clean.

Application

3.14 SINGLE LAYER APPLICATION METHOD

Apply the damp-proofing membrane in a single layer with laps and joints to provide a waterproof construction.

3.15 INSTALLATION GENERALLY

Apply from the lowest point to allow laps to shed water. All edge and end laps must be overlapped by a minimum of 60mm. Internal and external corners shall be reinforced with an extra layer of membrane 300mm wide.

Ensure that the membrane is properly adhered to the surface at perimeters or around penetrations.

3.16 ADDITIONAL THICKNESS

Provide a double layer of membrane around pipes and penetrations and at all changes of direction. Seal edges to manufacturer's requirements.

3.17 SECTIONAL COMPLETION

As sections of the damp-proofing are completed, arrange for inspection of the work before covering with protective sheets, walls, or slabs.

3.18 TERMINATION OF MEMBRANE

Finish Shelterseal to the details in the Ardex Technical literature.

Application - protection

3.19 PROTECT VERTICAL SURFACES

After inspection protect the vertical damp-proofing from damage with protective sheets.

3.20 PROTECT HORIZONTAL SURFACES

Protect the horizontal damp-proofing from damage during laying by ensuring applicators wear soft soled shoes. Except for inspection purposes do not allow traffic on the membrane after installation and before protection sheets have been laid.

3.21 INSTALL ARDEX COREFLUTE PROTECTION SHEETS

Neatly scribe and fit sheets, spot fixing them with adhesive and taped over joints, all to the membrane manufacturer's requirements for this work, to fully protect the whole of the damp-proofing as backfill is placed.

3.22 COVER HORIZONTAL SURFACES

After laying is complete cover the damp-proofing on horizontal surfaces with a 50mm layer of 15 MPa concrete. Place by pumping or similar to limit the possibility of damage due to construction plant.

3.23 PLASTERING OVER SHELTERSEAL

Coat affected area with ARDEX WPM 179 (Retaining Wall 1 Part). Let coating dry then apply a second coat of ARDEX WPM 179 (Retaining Wall 1 Part). While still wet broadcast dry sand onto the surface. Let dry, then plaster area with normal plaster system. Limited to 300mm above grade.

Completion

3.24 CLEAN UP

Clean up as the work proceeds.

3.25 LEAVE

Leave this work in a sound, coherent, voidless and impermeable smooth condition, completely waterproof, free of any defect and with protection sheets firmly in place.

3.26 REMOVE

Remove debris, unused materials and elements from the site.

4 SELECTIONS

Substitutions are not permitted to the following, unless stated otherwise.

4.1 SHELTERSEAL 3000X - ARDEX DAMP PROOFING SYSTEM

Location: Behind Retaining walls
System: ARDEX Shelterseal 3000X Self Adhesive SBS Membrane
Layers: One

4.2 ARDEX PROTECTION SHEET

Manufacturer: Ardex
Brand: ARDEX Coreflute protection board

4161T THERMAKRAFT UNDERLAYS, FOILS & DPC

1 GENERAL

This section relates to the application of **Thermakraft Industries (NZ) Ltd**, DPC, DPM, underfloor foil insulation, wall underlays and roofing underlays.

1.1 ABBREVIATIONS AND DEFINITIONS

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

The following abbreviations apply specifically to this section:

NZMRM New Zealand Metal Roofing Manufacturers Inc.

The following definitions apply specifically to this section:

Wall underlay the same meaning as defined in [NZBC E2/AS1](#), covering kraft based and synthetic wall underlays, sometimes called, wall wraps, building wraps or building papers.

Documents

1.2 DOCUMENTS

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

NZBC C/AS1-AS7	Protection from fire
NZBC E2/AS1	External moisture
AS 1530.2	Methods for fire tests on building materials, components and structures - Test for flammability of materials
NZS 2295	Pliable, permeable building underlays
AS/NZS 2904	Damp-proof courses and flashings
NZS 3604	Timber-framed buildings
AS/NZS 4200.1	Pliable building membranes and underlays - Materials
NZS 4214	Methods of determining the total thermal resistance of parts of buildings
AS/NZS 4389	Roof safety mesh
AS/NZS 4534	Zinc and zinc/aluminium-alloy coatings on steel wire
NZMRM CoP	NZ metal roof and wall cladding Code of Practice

1.3 MANUFACTURER/SUPPLIER DOCUMENTS

Thermakraft documents relating to work in this section are:

Thermakraft product manual and technical data sheets.

BRANZ Appraisal 329	- Supercourse 500 Damp-Proof Course and Concealed Flashing
BRANZ Appraisal 651	- Thermakraft Covertex™ 407 Fire Retardant Self Supporting Roof Underlay
BRANZ Appraisal 695	- Watertight-Plus Fire Retardant Wall Underlay
BRANZ Appraisal 743	- Thermakraft Covertex 405 Plus fire Retardant Self-Supporting Roof Underlay
BRANZ Appraisal 867	- Thermakraft Steelwrap 290 Wall Underlay
BRANZ Appraisal 878	- Thermakraft Aluband Window Flashing Tape
BRANZ Appraisal 912	- Thermakraft 220 Wall Underlay
BRANZ Appraisal 917	- Thermakraft Covertex 403 Plus Roof Underlay
BRANZ Appraisal 918	- Thermakraft Covertex 403 Plus Wall Underlay

[Code Mark Certificate 30069](#) - Thermakraft Covertex 403 Plus Absorbent Breathable Roof Underlay

[Code Mark Certificate 30030](#) - Thermakraft Covertex 405 Absorbent Breathable Roof Underlay

[Code Mark Certificate 30028](#) - Thermakraft Covertex 407 Absorbent Breathable Roof Underlay

Manufacturer/supplier contact details

Company: Thermakraft Industries (NZ) Ltd

Web: www.thermakraft.co.nz

Email: info@thermakraft.co.nz

Telephone: 0800 806 595

Warranties

1.4 WARRANTY - MANUFACTURER/SUPPLIER

Warrant this work under normal environmental and use conditions against failure of materials and execution. Thermakraft Industries Ltd warrant performance of products if design and installation complies with relevant technical literature, NZBC, and recognised industry Codes of Practice. Copy of Thermakraft Product Warranty available on request.

Requirements

1.5 NO SUBSTITUTIONS

Substitutions are not permitted to any specified materials, or associated products, components or accessories.

1.6 INSTALLATION SKILL LEVELS

Installers to be experienced in the installation of Thermakraft products and familiar with Thermakraft Industries technical literature and the related documents listed in this design i.e. [NZMRM CoP](#) NZ metal roof and wall cladding Code of Practice.

2 PRODUCTS

Materials

DPC

2.1 EMBOSSED POLYETHYLENE

Supercourse 500™ hi-impact polyethylene film to [AS/NZS 2904](#) and embossed on both sides. Thickness 500 microns minimum, manufactured for use as a damp-proof course and concealed flashings around doors and windows and to [BRANZ Appraisal 329](#). Refer to SELECTIONS for type of jointing tape.

DPM

2.2 DAMP-PROOF MEMBRANE - MEDIUM DUTY, BLACK

Thermathene Black™, a minimum of 250 microns polyethylene film. Complies with [NZS 3604](#), 7.5.4, Damp-proof Membrane, to [NZBC E2/AS1](#). Refer to SELECTIONS for type of jointing tape.

Wall underlays

2.3 SYNTHETIC BREATHER TYPE SPUN BONDED WALL UNDERLAY

Thermakraft 220, absorbent breathable spun bonded non-woven polyolefin type building membrane. A fire retardant membrane, with Flammability Index of ≤ 5 , when tested to AS 1530.2. The product has a BRANZ Appraisal 912

Roofing underlays

2.4 SYNTHETIC FIRE RETARDANT SELF SUPPORTING NON-WOVEN ROOFING UNDERLAY

CoverTek™ 407, a fire retardant non-woven self supporting roofing underlay, consisting of two spun-bonded polyolefin fabric layers bonded to a micro porous inner layer, designed for use as a water absorbent, breathable, water resistant roofing underlay for sloped roofs. CoverTek™ 407 has a flammability index of ≤ 5 , tested to AS 1530.2, to [NZBC C/AS1-AS7](#), meets the requirements for suspended fabrics, [BRANZ Appraisal 651](#) and [Code Mark Certificate 30028](#). Can be used in areas exposed to view in occupied spaces.

2.5 SYNTHETIC NON-WOVEN SELF SUPPORTING ROOFING UNDERLAY

CoverTek™ 405, a non-woven self-supporting roofing underlay, consisting of two spun-bonded polyolefin fabric layers bonded to a micro porous inner layer, designed for use as a water absorbent, breathable, water resistant roofing underlay for sloped roofs. Covertek™ 405 has a flammability Index of ≤ 5 tested to AS 1530.2, to [NZBC C/AS1-AS7](#), meets the requirements for suspended fabrics, [BRANZ Appraisal 743](#) and [Code Mark Certificate 30030](#). Can be used in areas exposed to view in occupied spaces.

2.6 SYNTHETIC NON-WOVEN HEAVYWEIGHT ROOFING UNDERLAY

CoverTek™ 403 Plus, a non-woven roofing underlay, consisting of two spun-bonded polyolefin fabric layers bonded to a micro porous inner layer, designed for use as a water absorbent, breathable, water resistant roofing underlay for sloped roofs. Covertek™ 403 Plus has a flammability Index of ≤ 5 tested to AS 1530.2, and meets the requirements of [NZBC C/AS2-AS7](#), 4.17.8. (b) for suspended flexible fabrics.

Accessories

2.7 WINDOW AND DOOR SEALING TAPE

Thermakraft Aluband™ Window Sealing Tape system consists of synthetic faced reinforced bituminous window sealing tape, Thermakraft Aluband™ Corner Moulding™ piece, used in conjunction with the Thermakraft Aluband™ Hand Tool to ensure good adhesion and a tight fit into corners. Refer to Thermakraft Data Sheet for installation details and [BRANZ Appraisal 878](#).

- 2.8 **STUD STRAPS - POLYETHYLENE**
Thermastrap 201, 19mm wide polyethylene straps.
- 2.9 **WIRE NETTING**
75mm galvanized hexagonal wire netting to [AS/NZS 4534](#).
- 2.10 **GUTTER AND UNDER FLASHINGS**
Thermakraft 215™, bituminous breather type underlay to [NZS 2295](#) cut to width for use under valley, apron flashing and internal gutters.
Soffit liner cut to width from Thermakraft 215™ bituminous breather type underlay. Refer to SELECTIONS.
- 2.11 **TAPE**
Thermakraft tapes to compliment the underlay. Pressure sensitive aluminium foil tapes for joining foil insulation and vapour barriers. These include:
- ┆ Thermakraft White General Purpose Underlay Tape
 - ┆ Thermakraft Foil Tape 150
 - ┆ Thermakraft Window Sealing Tapes, used to repair damaged bituminous underlays
- 2.12 **DRAINAGE MATT**
Thermakraft Drainage Matt, an extruded 3 dimensional synthetic black mesh, used as an air separation layer between fully sarked roof and roof cladding. Used in wall applications to allow air passage and drainage where no other cavity is provided.

3 EXECUTION

Conditions

- 3.1 **GENERAL REQUIREMENTS**
Design application and installation of Thermakraft Building products to [NZBC E2/AS1](#), BRANZ Appraisals, Thermakraft Technical Literature and Industry Codes of Practice.
- 3.2 **STORAGE**
Store building underlays and accessory materials, under conditions that ensure no deterioration or damage. Store rolls in an upright position on a smooth floor and protected from sunlight, UV radiation and moisture.
- 3.3 **INSPECTION**
Before starting work, check that the building construction phase will allow work of the required standard. Carry out remedial work identified before laying underlay.

Application DPC

- 3.4 **DPC TO LOSP/CCA TREATED TIMBER**
Lay Supercourse 500™ DPC under LOSP or CCA treated bottom plate of all timber framed walls on concrete, in a single layer with 50mm overlaps at joints to provide a waterproof barrier.
- 3.5 **DPC TO TIMBER / STEEL**
Lay DPC under the bottom plate of all timber / steel framed walls on concrete, in a single layer with 50mm overlaps at joints to provide a waterproof barrier. Refer to SELECTIONS for type.
- 3.6 **DPC TO MASONRY AND BRICK VENEER**
Lay DPC along based of cavity and fix top edge to studs with galvanized clouts. Turn DPC out over concrete rebate under bottom course of veneer.

Application - DPM

- 3.7 **DPM TO CONCRETE FLOOR**
Lay DPM under concrete floor substrate over sand blinding, in a single layer with 150mm overlaps at joints to provide a waterproof barrier. Refer to SELECTIONS for type. Tape all joints and penetrations with Thermakraft White GP underlay tape.

Application - wall underlay

- 3.8 **WALL UNDERLAY**
Fix horizontally to outside face of framing in true alignment, with succeeding sheets overlapping 150mm to [NZBC E2/AS1](#), 9.1.7, Wall underlay, and refer to Thermakraft Industries for requirement for fastenings. Fix to Thermakraft Industries Technical Data specifications. Scribe neatly around penetrations and openings to leave no gaps. Tape all penetrations. Keep clean, undamaged and without visible weather deterioration until closed in.

3.9 INSTALL STUD STRAPS

Over underlay, install 19mm wide polyethylene straps horizontally at 300mm centres, draw taut and fix to studs with stainless steel staples.

3.10 METAL CLADDING ON TIMBER CAVITY BATTENS

Fix strip of Thermakraft DPC as a separator between the timber and metal cladding.

Application - roofing underlay**3.11 WIRE NETTING**

Lay 75mm galvanized wire netting at right angles across the purlins and drawn taut before fixing. Tie edges of netting together with galvanized wire clips.

3.12 ROOF UNDERLAY

Lay vertically over purlins on wire netting with a 150mm side lap. Fix securely to purlins with galvanized fixing clips. Lay underlay to avoid excessive dishing between purlins. When used vertically limit individual runs to 10 metres for bituminous underlays. Do not lay vertically on roof pitches under 10° without support.

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

3.13 GUTTER AND UNDER FLASHINGS

Lay Thermakraft 215™ bituminous breather type underlay cut to width by manufacturer for use as an underlay to valley, apron flashings, and internal gutters. Lap under flashings with adjoining underlays. Fix Thermakraft 215™ bituminous breather type underlay soffit liner from top plate down 150mm past ribbon plate.

Completion**3.14 CLEAN UP**

Clean up as the work proceeds.

3.15 LEAVE

Leave work to the standard required by following procedures.

3.16 REMOVE

Remove debris, unused materials and elements from the site.

4 SELECTIONS

For further details on selections go to www.thermakraft.co.nz. Substitutions are not permitted to the following, unless stated otherwise.

Damp Proof Course**4.1 THERMAKRAFT - SUPERCOURSE 500™ DPC**

Location:	Below bottom plate
Type:	Supercourse 500™ DPC
Jointing tape:	Thermakraft window sill tape 75mm Aluband™

Damp Proof Membrane**4.2 THERMATHENE BLACK™**

Location:	-
Type:	Thermathene Black™
Jointing tape:	Thermakraft "White General Purpose Underlay Tape"

Wall Underlays**4.3 THERMAKRAFT 220**

Location:	Walls
Type:	Thermakraft 220
Jointing tape:	75mm Aluband

Window / Door Sealing System**4.4 THERMAKRAFT - ALUBAND™**

Location: -
Type: Thermakraft window sill tape 75mm Aluband™

Stud Straps

4.5 THERMASTRAP

Location: Walls
Type: Thermastrap 201 , 19mm blue polypropylene tape

4221JV JSC TIMBER CEDAR VERTICAL WEATHERBOARD CLADDING

1 GENERAL

This section relates to the supply and fixing of **JSC Timber** Western Red Cedar vertical cladding solutions. It includes JSC Timber;

- | Vertical shiplap weatherboards
- | Board and Batten
- | Proprietary cavity batten systems
- | Fascias
- | Mouldings
- | Flashings

1.1 ABBREVIATIONS AND DEFINITIONS

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

The following abbreviations apply specifically to this section:

PEFC	Programme Endorsement of Forestry Certification
CSA	CSA International Forest Products Group standard
SFI	Sustainable Forest Initiative
FSC	Forest Stewardship Council
WRC	Western Red Cedar
COC	Chain Of Custody

Documents

1.2 DOCUMENTS REFERRED TO

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

NZBC B2/AS1	Durability
NZBC E2/AS1	External moisture
NZBC E2/VM1	External moisture
NZS 3602	Timber and wood-based products for use in building
NZS 3604	Timber-framed buildings
NZS 3617	Profiles of weatherboards, fascia boards and flooring
NZS 3631	New Zealand timber grading rules
NZS 4211	Specification for performance of windows
BRANZ BU 411	Recommended Timber Cladding Profiles

1.3 MANUFACTURER/SUPPLIER DOCUMENTS

Manufacturer's and supplier's documents relating to this part of the work available to download at www.jsctimber.co.nz:

- | Profiles selection
- | Corners, nails, batten profiles selections
- | JSC Timber Profile Booklet
- | Architectural Box
- | Western Red Cedar Technical & Physical Properties Data Sheet
- | CedarShield Factory Applied Coating System Data Sheet

Manufacturer's and supplier's documents relating to this part of the work available by contacting JSC Timber:

- | Producer Statement: On Design Vertical Shiplap (VertiClad) index JV-C and JV-RB
- | Report: Testing JSC Timber/VertiClad, JSC Timber Vertical Shiplap cavity system to [NZBC E2/AS1](#) and [NZBC E2/VM1](#)
- | JSC Timber Profile Drawings
- | JSC Timber Installation Instructions and Fixing Details
- | JSC Timber Quality Assurance Checklist
- | Third Party Certification documents
- | Maintenance Schedule Guidelines - issued at project completion by request

Manufacturer/supplier contact details

Company: JSC Timber
 Web: www.jsctimber.co.nz
 Email: specification@jsctimber.co.nz
 Telephone: 09 412 2800 / Richard Gibbs 021 977 876
 Facsimile: 09 412 2801

Performance

1.4 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](#). Refer to JSC Timber fixing details and technical specification.

1.5 PERFORMANCE

Accept responsibility for the weather-tight performance of the completed cladding system, including all penetrations. To [NZBC B2/AS1](#) Durability, [NZBC E2/AS1](#) External moisture and grading rules to [NZS 3631](#). Refer to JSC Timber for fixing details and technical specification.

Requirements

1.6 INFORMATION FOR OPERATION AND MAINTENANCE

Contractor to ensure owner has Maintenance Schedule Guidelines required by JSC Timber.

2 PRODUCTS

Materials

2.1 TIMBER SPECIES - WESTERN RED CEDAR

JSC Timber Western Red Cedar (*Thuja Plicata*) purchased under recognised environmental schemes, harvested from sustainably managed forests of British Columbia, Canada. Documentation is available on request.

2.2 VERTICAL WEATHERBOARDS

Western Red Cedar weatherboards machined to JSC Timber's profiles, lap and rebate details to BRANZ BU 411, and general design to [NZS 3617](#), grading to [NZS 3631](#), species and durability to [NZS 3602](#), table 2, reference 2A.1, Requirements for wood-based building components to achieve a 15-year durability performance. Weatherboards in lengths to suit specific weatherboard type and construction method with all loose knots and bark encased knots removed.

The Acceptable Solution is limited to the following types of weatherboards and their derivatives.

- ┆ Vertical shiplap standard and architectural profiles
- ┆ Vertical board and batten standard and architectural profiles

Note: A selection of the above weatherboards and fascia are also available in Western Red Cedar Engineered/Finger jointed (DuraTech) options: Paint finish only.

2.3 ASSOCIATED MOULDINGS

To JSC Timber profiles as detailed.

2.4 FASCIA BOARDS

To JSC Timber profiles as detailed.

2.5 WALL UNDERLAY

For flexible wall underlays, rigid wall underlays and rigid air barriers, refer to the appropriate separate section (s).

2.6 CAVITY BATTEN - NON STRUCTURALLY FIXED

Treatment to [NZBC B2/AS1](#) and [NZS 3602](#), table 1, reference 1D.10, **Requirements for wood-based building components to achieve a 50-year durability performance.**

2.7 HORIZONTAL CAVITY BATTENS

Refer index JSC-H; CCA 3.2 treated Radiata Pine timber battens are castellated on both faces to provide drainage and ventilation and can be used horizontally and vertically, width and height to match timber framing stud. Sizes 45x20mm, 45x45mm and 45x75mm with an 18 degree slope.

2.8 CAVITY CLOSER/VERMIN-PROOFING

Perforated uPVC, aluminium or stainless steel trays with upstands. Flashing to [NZBC B2/AS1](#) Durability table 1, [NZBC E2/AS1](#) section 4.0, **Flashings**, PBS vermin closure or as per E2/AS1 9.1.8.3, **Vermin-proofing**.

Components

2.9 NAILS, SILICONE BRONZE/STAINLESS STEEL - STAIN / OIL FINISH

JSC Timber rose head, flat head or pentagon head annular groove fixings, to [NZBC E2/AS1 Table 24](#). Refer to JSC Timber construction details for fixing details and to SELECTIONS for fixing sizes.

NOTE: Select appropriate nail size / length to achieve a minimum of 35mm embedment into the framing.

2.10 NAILS, STAINLESS STEEL - PAINT FINISH

JSC Timber jolt head or countersunk annular grooved 316 stainless steel fixings to [NZBC E2/AS1 Table 24](#).

Refer to JSC Timber construction details for fixing details and to SELECTIONS for fixing sizes.

NOTE: Select appropriate nail size / length to achieve a minimum of 35mm embedment into the framing.

2.11 CLINCH NAILS, STAINLESS STEEL

40 x 2.0mm Clinch Nail, annular grooved shank grade 316 stainless steel. Used to retain hidden lap tongues of rebated weatherboard profiles such as vertical shiplap.

2.12 FLASHINGS

To [NZBC E2 /AS1, 4.0 Flashings](#). Material, grade and colour as detailed and scheduled and to [NZBC E2 /AS1; Table 21, Compatibility of materials in contact](#) and Table 22, **Compatibility of materials subject to run-off**. Ensure that materials used for flashings are compatible with the window frame materials and fixings and cladding materials and fixings. Refer to JSC Timber Profile Booklet flashing detail selection page.

Finishes**2.13 FACTORY FINISH**

JSC CedarShield In-line factory applied weatherboard coating system. In-line factory coating options include oil or water based stain and paint coating systems. JSC CedarShield is an advanced spray application that has been specifically designed to maximise performance and drying time.

2.14 SITE FINISH

During installation all end grain and cut edges will require staining/painting. Additional coating/s to be applied on site to manufacturer's specifications. Refer to SELECTIONS. Once installed cladding must be cleaned and inspected for damage annually.

Maintenance Schedule available on request at project completion. Contact JSC Timber.

3 EXECUTION**Conditions****3.1 GENERALLY**

Execution to [NZBC E2/AS1: 3.0 Weathertightness risk factors](#), and 9.0 **Wall claddings**, 9.1.8 **Drained cavities** and 9.4 **Timber weatherboards**.

3.2 STORAGE

Take delivery of JSC Timber products, dry, unmarked and undamaged from freight and handling (Grade characteristics excluded). Store on site, off the ground, laid flat and true and under cover until installation process has commenced.

3.3 SUBSTRATE

Before starting fixing ensure that the substrate conforms to [NZS 3604](#), section 2, table 2.1, **Timber framing tolerances** and the requirements of [NZS 3604](#), section 6, **Foundation and subfloor framing** and [NZBC E2/AS1, 9.4 Timber weatherboards](#), governing support for timber board cladding.

3.4 MOISTURE CONTENT

Immediately before starting fixing, test the moisture content of the boards. Use an electrical moisture meter to test 5% of boards, but not less than 10 boards in the centre of the length. Do not start fixing until 90% of the values obtained are within the range in [NZS 3602](#) table 4, Allowable moisture content (%) at time of installation or in the case of framing timber at time of enclosure.

Application - preparation/general**3.5 FACTORY FINISH - STAIN / PAINT**

Spray applied to all faces of weatherboards. Ensure all end grain and cut edges are sealed using product specified and supplied by JSC Timber.

3.6 SITE STAINING OR PRIMING AND SEALING

If not factory coated before delivery, coat all faces and edges immediately the block stack is opened. Then fillet stack, laid flat and true, until fixed. Keep dry and undamaged. Stain or coat to suit the system to manufacturer's specification. JSC Timber strongly recommends that all end grain and cut edges are primed twice or stained prior to installation as per BRANZ BU 411.

3.7 SET-OUT

Using laser or mechanical devices set-out the overlap boards to ensure dimension to exposed face in line of weather is constant and that boards remain true. Use a string line to set out all nailing that will be visible in the finished work. Align all nailing accurately in straight lines.

3.8 CAVITY CLOSER/VERMIN-PROOFING

Use cavity closer/vermin proofing at the cavity base to JSC Timber fixing details. Cavity closer/vermin proofing shall be provided above window heads and at the base of drained cavity. Use PBS cavity closure as per JSC fixing details.

Upstand one side 10mm and the other 75mm. Length and width to suit cavity. Install cavity closer/vermin-proofing at base of walls, open horizontal (or raking) junctions, over openings (windows, meters etc).

It is important the openings in cavity closer/vermin-proofing are kept clear and unobstructed in order to maintain draining and venting of the cavity.

3.9 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 underlay 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)

Application - cavity battens

3.10 INSTALL HORIZONTAL DRAINED CAVITY

Fix JSC H castellated timber battens horizontally. Fix horizontal cavity battens to wall framing studs. The battens are fixed, by the cladding fixings, which will penetrate the wall framing studs over the building underlay, ref: [NZBC E2/AS1 9.1.8.5, Wall framing behind cavities](#). Seal the top of the cavity and install cavity closer/vermin-proofing at base of walls, open horizontal (or raking) junctions, over openings (windows, meters etc). Use cavity spacers where fixing is required between cavity battens. Refer to JSC Timber for fixing details and technical specification.

Nogs /dwangs at 480mm maximum centres forming a horizontal drained cavity. To be drained and open to the exterior at the base of cavity. Refer to JSC Timber VertiClad System for specific fixing details and technical specifications.

Cavity battens to be installed over wall underlay or Rigid Air Barrier and shall comply with table 23 and fixed to wall framing.

Ensure the openings in the cavity closer/vermin proofing are kept clean and unobstructed in order to maintain drainage and venting of the cavity.

Application - fixing nails

3.11 FIXING - OILED / STAINED TIMBER FINISH

Install level, true to line and face, to [NZBC E2/AS1: 9.4 Timber weatherboards](#). Coat all cut edges before fixing with JSC Timber specified oil/stain product. Pre-drill all fixings minimum 1mm smaller than nail gauge to ensure a snug fit and to minimise risk of moisture entry. Finish the nail heads flush onto and not into the board surface. Do not 'over drive' the nail head and crush the timber surface beneath and surrounding the nail.

Refer to E2/AS1, Table 24, **Fixing selection for wall claddings**, for dimensions and fixing details.

3.12 FIXING - PAINT FINISH

Install level, true to line and face, to [NZBC E2/AS1: 9.4 Timber weatherboards](#). Dressed faced profiles to have a radius to outer edges and be pre-sanded prior to undercoating and priming. Coat all cut edges before fixing with the correct undercoat and primer. Pre-drill all fixings minimum of 1mm smaller than nail gauge to ensure a snug fit and to minimise risk of moisture entry. Finish the jolt head nails 3mm below the surface and undercoat and prime prior to filling and sanding.

NOTE: All undercoat, primers, fillers and surface paints to be as specified. To ensure boards are well sealed make sure all exposed ends are top coated twice the same as face of boards.

Refer to E2/AS1, Table 24, **Fixing selection for wall claddings**, for dimensions and fixing details.

Application - weatherboards

3.13 FIXING JSC VERTICLAD WEATHERBOARDS

Adjust set-out to ensure there is a 2mm expansion gap between lapped boards. Use JSC spacer tool if required. Single face fix weatherboards to every fixing point, with nail driven in with a slight (2°+) upward slope, 35mm from overlapping edge of weatherboard. Nails to achieve a minimum 35mm embedment into the framing. Line nails horizontally across the boards. Do not pin laps of weatherboards.

External corners to be weatherproofed by the use of corrosion resistant back flashing and to be used behind the weatherboards at all external corners. Use external corner moulds, options include JSC Timber J40 (and scribe to suit profile) and/or J123 (65mmx19mm) and J124 (90mm x19mm) cover boards to form external box corners. Refer to JSC Timber fixing details.

Internal corners to be weatherproofed by the use of corrosion resistant back flashing and to be behind the weatherboards at all internal corners. The use of internal corner mould options includes JSC Timber J41 (19mmx19mm) or J44 (28mmx28mm). Refer to JSC Timber fixing details. In addition all cut edges are to be sealed prior to installation and manufacturers coating schedules adhered to.

Application - Ancillary

3.14 WINDOW FIXING

Fix to JSC Timber fixing details and technical specifications.

3.15 ALUMINIUM WINDOWS

To comply with NZBC 4211.

3.16 FLASHINGS

Fix to JSC Timber fixing details and technical specification. Material compatibility to [NZBC E2/AS1](#), table 21, **Compatibility of materials in contact** and table 22, **Compatibility of materials in run-off**.

3.17 SCRIBERS

Scribers are to be wet sealed in place and fixed in accordance with JSC fixing details and technical specification.

3.18 COMPLETE

Ensure the work is complete with all flashings, finishing and trim properly installed so the cladding system is completely weathertight. In addition ensure the JSC Timber Quality Assurance (QA) checklist has been signed off by the main contractor.

Completion

3.19 REPLACE

Replace all damaged or marked elements.

3.20 REMOVE

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

3.21 LEAVE

Leave work to the standard required for following procedures.

4 SELECTIONS

For further details on selections go to www.jsctimber.co.nz
Substitutions are not permitted to the following, unless stated otherwise.

4.1 JSC TIMBER - VERTICLAD VERTICAL SHIPLAP WEATHERBOARDS

Species:	JSC Western Red Cedar
Profile number:	J50
Grade:	PC1
Dimensions:	140mm x 18.5mm
Surface finish:	DSF
Moisture content:	14 - 18 % at fixing

4.2 JSC TIMBER - FASCIA

Species:	JSC Western Red Cedar
Grade:	PC1
Profile:	230 x 28
Surface finish:	BSF

4.3 NAILS

Type:	Stainless steel
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- 4.4 JSC TIMBER - CAVITY BATTENS - NON STRUCTURALLY FIXED
- Profiles: JSC-H
 Timber species: Pinus Radiata
 Timber grade: Merchant
 Treatment: H3.2
 Size: 45mm x 20mm
- 4.5 CAVITY CLOSER/VERMIN-PROOFING
- Brand/type: PBS Vermin closure to E2/AS1 9.1.8.3 Vermin -proofing
 Material: uPVC
- 4.6 INTERNAL AND EXTERNAL CORNER BACK FLASHINGS
- Material: Compatible to [NZBC E2/AS1](#) table 21
 Size: 75mm x 75mm x 90° angle or 50mm x 50mm x 90° angle
- 4.7 FACTORY FINISH
- Type: JSC Timber CedarShield in-line factory coating
 Coating type: Oil
 Coating process: JSC CedarShield application applied in JSC Timber Factory
 1st coat: Oil
 2nd coat: Oil
 Surface coating type: Resene- Woodsman Oil stain
 Product colour: Resene Heartwood Stain WW0809
- 4.8 SITE FINISH
- 1st coat: If factory finish not specified- Applied on site as per product manufacturer's guidelines
 2nd coat: Applied on-site as per product manufacturer's guidelines
 3rd coat: If required, applied on-site as per product manufacturer's guidelines
- 4.9 INFORMATION FOR OPERATION AND MAINTENANCE
- JSC Timber Maintenance Schedule Guidelines required: Refer to schedule

4241RF ROOFING INDUSTRIES EUROSTYLE SPANLOK™, EUROLOK™ CLADDING

1 GENERAL

This section deals with the supply and fixing of **Roofing Industries Ltd Eurostyle Spanlok™/ Eurolok™** cladding complete with accessories.

It includes:

- ┆ overlap rigid sheet metal profiled cladding **Eurostyle Spanlok™** (for North Island)
- ┆ overlap rigid sheet metal profiled cladding **Eurostyle Eurolok™** (for South Island)

1.1 RELATED WORK

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

1.2 ABBREVIATIONS AND DEFINITIONS

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

The following abbreviations apply specifically to this section:

BMT	Base metal thickness
MS	Modified silicone
NZMRM	New Zealand Metal Roofing Manufacturers Inc
LPB	Licensed Building Practitioner

Documents

1.3 DOCUMENTS

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

NZBC C/AS1-AS7	Protection from fire
NZBC E2/AS1	External moisture
AS/NZS 1170.2	Structural design actions - Wind actions
AS 1397	Continuous hot-dip metallic coated steel sheet and strip - Coatings of zinc and zinc alloyed with aluminium and magnesium
AS 3566	Self-drilling screws for the building and construction industries
NZS 3604	Timber-framed buildings
ISO 9223	Corrosion of metals and alloys - Corrosivity of atmosphere - Classification determination and estimation
NZMRM	NZ Metal roof and wall cladding - Code of practice

1.4 MANUFACTURER/SUPPLIER DOCUMENTS

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

Roofing Industries product literature including:

- ┆ **Eurostyle Spanlok™** Profile Technical Summary (North Island)
- ┆ **Eurostyle Eurolok™** Profile Technical Summary (South Island)

Manufacturer/supplier contact details

Company:	Roofing Industries Ltd
Web:	www.roof.co.nz
Email:	techinfo@roof.co.nz
Telephone:	0800 844 822

Warranties

1.5 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

15 years	for failure of coating adhesion
15 years	for weatherproofing by material penetration

- ┆ Provide this warranty on the metal coil suppliers standard warranty form.
- ┆ Commence the warranty from the date of practical completion of the contract works.

1.6 WARRANTY - INSTALLER/APPLICATOR

Provide an installer/applicator warranty:

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

Include a copy of the **Roofing Industries** maintenance requirements with the warranty.
Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.7 QUALIFICATIONS

Cladding Installers shall be experienced, competent installers familiar with Eurostyle Spanlok™ / Eurolok™ products. And for Restricted Building Work shall also be, an LBP or supervised by an LBP.

1.8 NO SUBSTITUTIONS

Substitutions are not permitted to any of the specified system, or associated components and products listed.

Compliance information

1.9 STATEMENTS

On completion of work Roofing Industries Ltd will, on request, arrange inspection and issue a Site Specific Statement to confirm that the system has been installed in accordance with Roofing Industries recommendations and good trade practice.

Performance - Wind

1.10 DESIGN PARAMETERS - NON SPECIFIC DESIGN

Building wind zone: 50m/s / 1.5 kPa ULS(refer to [NZS 3604](#), table 5.4)
Refer to **Roofing Industries** for "Wind Load Span Design Graphs" for load parameters.

1.11 FIXINGS, WIND

Design and use the clips and fixings appropriate for the wind design parameters and to NZMRM and Roofing Industries requirements. Refer to SELECTIONS for the selected profile. Allow for specific loadings at corners and the periphery of the wall, where localised pressure factors apply.
NOTE: Consult with Roofing Industries Ltd for requirements.

Performance - general

1.12 PERFORMANCE

Install cladding materials in accordance with the [NZMRM CoP](#) and Roofing Industries Profile Technical Summary for the selected profile, to form a weather-tight performance for the completed cladding system, including all penetrations through the walls.

1.13 SPREAD OF FIRE

To [NZBC C/AS1-AS7](#), 5.8.2 a) **Exterior Surface Finishes**.

1.14 CO-ORDINATE

Co-ordinate to ensure substrate and preparatory work is complete and other work programmed in the order required for access and completion of the walls. Ensure that all necessary members are positioned so that flashings can be fastened at both edges through the cladding to the primary structure.

2 PRODUCTS

Materials

2.1 PRE-FINISHED HOT-DIPPED ALUMINIUM/ZINC COATED STEEL

Formability steel sheet, G300 for roll forming and for flashings, coated to AS 1397.

Fixings

2.2 FASTENERS GENERALLY

Fixings and fasteners are to be compatible with all materials, the environment and meeting the requirements of the NZ Building Code.
Refer to Roofing Industries Eurostyle Spanlok™ / Eurolok™ Profile Technical Summary.

2.3 FIXING CLIPS

Clips to Roofing Industries recommendations or to Roofing Industries Profile Technical Summary. Clips to suit the material and profile of the Eurostyle Spanlok™ / Eurolok™ sheet to be installed with the installation of the trays.
Fix clips depending on the wind loadings and refer to Roofing Industries Profile Technical Summary for Eurostyle Spanlok™ / Eurolok™.

2.4 FIXING SCREWS

Each clip will be fixed to Roofing Industries Eurostyle™ Profile Technical Summary. Screws to be manufactured from material appropriate to the cladding material and the supporting structure, as required by Roofing Industries and with durability no less than the material fixed. Screws into timber to penetrate by minimum 35mm into purlins or full plywood thickness. When fixing to steel framing refer to Roofing Industries for sizes. Refer to SELECTIONS.

2.5 RIVETS

Minimum diameter 4.0mm sealed rivets. For Stainless, use stainless steel rivets. Copper cladding material, use copper rivets. Aluminium/Zinc coated steel and aluminium cladding materials, use aluminium rivets.

Components

2.6 EXTERIOR CAVITY WALL BATTENS - TIMBER

Refer to timber framing sections.

2.7 FLASHINGS GENERALLY

To [NZBC E2/AS1](#), 4.0 **Flashings**, NZMRM recommendations and to Roofing Industries details. Formable grade flashings, material to match selected or cladding, to the same standards as the profiled sheets, notched where across profile. Refer to SELECTIONS for details.

2.8 WALL AND PARAPET FLASHINGS

To [NZBC E2/AS1](#), 4.0 **Flashings**.

Supplied by the cladding manufacturer to match or to suit the cladding.

2.9 EXTERIOR CAVITY CLOSER/VERMIN-PROOFING

Refer to timber framing sections.

Vermin-proofing/cavity closer to [NZBC E2/AS1](#): clause 9.1.8.3 and figure 66.

2.10 CLOSURE STRIPS

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

Accessories

2.11 WALL UNDERLAY

Refer to 4161 UNDERLAYS, FOIL AND DPC.

2.12 SEALANT

Neutral curing MS sealant or polymer sealant as required by **Roofing Industries** and used as directed.

2.13 LAP SEALING TAPE

Closed cell 3mm x 16mm self adhesive tape.

2.14 SEPARATION STRIP TIMBER CAVITY BATTENS

PVC tape or similar as a separator between the timber battens and metal cladding. Ensure separator is slightly wider than the batten.

3 EXECUTION

Conditions

3.1 DELIVERY AND STORAGE

Take delivery of and accept packs of cladding dry and undamaged on delivery. Reject and replace goods that are damaged. Store on a level firm base with packs well ventilated and completely protected from weather and damage. Do not allow moisture to build up between sheets.

3.2 HANDLING

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

3.3 INSPECTION

Inspect the wall framing and supporting structure to ensure that it is complete and fully braced ready for cladding.

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 lead sheet in contact with or allow water run-off onto galvanized or aluminium/zinc coated steel.

3.5 VENTILATION

Ensure Eurostyle Spanlok™/ Eurolok™ cladding has passive ventilation for the removal of condensation or moisture to NZRM CoP, 4.3.7, **passive ventilation**.

Application

3.6 VERTICAL 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.

3.7 HORIZONTAL SET-OUT

Set cladding out to a horizontal level line checking the set out point lines up with any door or window openings. Lay sheets from the bottom towards the top. Check laying to avoid creep or spread off the horizontal.

3.8 FORMING

Form stop-ends and downturns to Roofing Industries details and techniques using the required tools.

3.9 SEAL CUT EDGES

In very severe marine environments, where deemed necessary by the substrate manufacturer, seal cut edges of pre-coated steel sheet with edge protection lacquer before fixing to the Roofing Industries requirements.

3.10 END LAPS

End laps are not permitted, except where specifically detailed and prior agreement given by Roofing Industries.

3.11 THERMAL MOVEMENT

Fix for Thermal Movement to **Roofing Industries** Profile Technical Summary for Selected Profile. Sliding clips to be used where nominated.

3.12 FIXING GENERALLY

Install and fix in accordance with NZMRM - Code of Practice and to Roofing Industries required fixing patterns and details for each area of the cladding. Use only screws as required by the Roofing Industries. Paint colour matched fixings and accessories before installation. Fixings to be increased in length to suit cavity batten thickness and any rigid sub-cladding.

3.13 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 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 where appropriate.
- ┆ installation of flashings (those required to be installed prior to installation of penetrating elements).

3.14 WALL UNDERLAY

Ensure that the appropriate wall underlays have been installed and fixed correctly, before proceeding with installation of the cladding.

3.15 MARKING AND CUTTING

Cut only by shearing tools. Do not use black lead pencils for marking aluminium/zinc coated products. Remove all cutting and drilling debris.

3.16 FIX SHEETS

Fix sheets in place using the clips as previously set out using the fastening system required by Roofing Industries.

3.17 INSTALL FLASHINGS

Flash to parapets, walls and penetrations to detail, to the NZMRM - Code of practice recommendations and to Roofing Industries requirements. Cut accurately and fix using sealant and fixings to detail and to the Roofing Industries requirements to form a weatherproof cover. For visible flashings, plan joints/junction to take account of the aesthetic requirements.

3.18 FLASHING PENETRATIONS

Flash all penetrations through the cladding. Fit pipe flashings with a proprietary collar flashing, with other penetrations flashed as detailed and to provide a weathertight installation. Ensure that flashings are set to avoid any ponding of water.

3.19 USE OF SEALANTS

Select and use sealants only as recommended by Roofing Industries. Apply sealant in two narrow beads transversely across flashing intersections, close to the two edges. Avoid exposing sealant on outside surfaces.

Completion

- 3.20 REPLACE
Replace damaged or marked elements. Do not attempt to repair coatings by applying colour match paint to pre-finished surfaces.
- 3.21 COMPLETE
Ensure the work is complete with all flashings, finishing and trim properly installed so the cladding system is completely weathertight.
- 3.22 REMOVE
Remove trade rubbish and unused materials from the surrounds daily during the work. Remove debris, unused materials and elements from the site.

4 SELECTIONS

For further details on selections go to www.roof.co.nz.
Substitutions are not permitted to the following, unless stated otherwise.

Materials

Coating system

- 4.1 COATING SYSTEM - EXPOSURE ZONE D (CAT 4)
Project Exposure Zone D to [NZS 3604](#), C 4 to ISO 9223.
Profile/location: Spanlok
Base material: Zinalume on steel
Coating system: Colorsteel Maxx
Coating colour: Black

Cladding

- 4.2 ROOFING INDUSTRIES - EUROSTYLE SPANLOK CLADDING
BMT/material: 0.55mm steel
Profile: **Spanlok™**
Framing: Timber
Tray width: 450
Clips: Concealed metal clip fixing
Clip Fixing: Refer to Roofing Industries Profile Technical Summary

Accessories

- 4.3 FLASHINGS - GENERALLY
BMT/material: 0.55mm Steel
Coating system: To match cladding
Paint colour: To match cladding

4311RF ROOFING INDUSTRIES EUROSTYLE SPANLOK™, EUROLOK™ ROOFING

1 GENERAL

This section deals with the supply and fixing of **Roofing Industries Ltd Eurostyle Spanlok™ / Eurolok™** roofing complete with accessories.

It includes:

- ┆ overlapped rigid sheet metal profiled roofing **Eurostyle Spanlok™** (for the North Island)
- ┆ overlapped rigid sheet metal profiled roofing **Eurostyle Eurolok™** (for the South Island)

1.1 RELATED WORK

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

1.2 ABBREVIATIONS AND DEFINITIONS

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

The following abbreviations apply specifically to this section:

BMT	Base metal thickness
NZMRM	New Zealand Metal Roofing Manufacturers Inc.
LPB	Licensed Building Practitioner

Documents

1.3 DOCUMENTS

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

NZBC E2/AS1	External moisture
NZBC G12/AS1	Water Supplies
AS/NZS 1170.2	Structural design actions - Wind actions
AS 1397	Continuous hot-dip metallic coated steel sheet and strip - Coatings of zinc and zinc alloyed with aluminium and magnesium
AS 3566	Self-drilling screws for the building and construction industries
NZS 3604	Timber-framed buildings
ISO 9223	Corrosion of metals and alloys - Corrosivity of atmosphere - Classification determination and estimation
NZMRM CoP	NZ metal roof and wall cladding Code of Practice

1.4 MANUFACTURER/SUPPLIER DOCUMENTS

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

Roofing Industries product literature including:

- ┆ **Eurostyle Spanlok™** Profile Technical Summary (North Island)
- ┆ **Eurostyle Eurolok™** Profile Technical Summary (South Island)

Manufacturer/supplier contact details

Company:	Roofing Industries Ltd
Web:	www.roof.co.nz
Email:	techinfo@roof.co.nz
Telephone:	0800 844 822

Warranties

1.5 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

15 years	for failure of coating adhesion
15 years	for weatherproofing by material penetration

- ┆ Provide this warranty on the metal coil supplier standard warranty form.
- ┆ Commence the warranty from the date of practical completion of the contract works.

1.6 WARRANTY - INSTALLER/APPLICATOR

Provide an installer/applicator warranty:

5 years	For workmanship
---------	-----------------

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

Include a copy of the **Roofing Industries** maintenance requirements with the warranty.
Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.7 QUALIFICATIONS

Cladding Installers shall be experienced, competent installers familiar with Eurostyle Spanlok™ / Eurolok™ products. And for Restricted Building Work shall also be, an LBP or supervised by an LBP.

1.8 NO SUBSTITUTIONS

Substitutions are not permitted to any of the specified system, or associated components and products listed.

Performance - Wind

1.9 DESIGN PARAMETERS - NON SPECIFIC DESIGN

Building wind zone 50m/s / 1.5 kPa ULS(refer to [NZS 3604](#), table 5.4)
Refer to **Roofing Industries** for "Wind Load Span Design Graphs" for load parameters.

1.10 FIXINGS, WIND

Design and use the clips and fixings appropriate for the wind design parameters and to [NZMRM CoP](#) and Roofing Industries (Profile Technical Summary) requirements. Refer to SELECTIONS for the selected profile.
Allow for specific loadings at corners and the periphery of the roof, where localised pressure factors apply.
NOTE: Consult with Roofing Industries for requirements.

Performance - general

1.11 PERFORMANCE

Install roofing materials in accordance with the [NZMRM CoP](#) and Roofing Industries Profile Technical Summary for the selected profile, to form a weather-tight performance for the completed roofing system, including all penetrations through the roof and junctions with walls and parapets.

1.12 DRINKING WATER

Roofing for collecting potable water to [NZBC G12/AS1](#).

1.13 CO-ORDINATE

Co-ordinate to ensure substrate and preparatory work is complete and other work programmed in the order required for access and completion of the roof. Ensure that all necessary members are positioned so that flashings can be fastened at both edges through the roof profile or cladding to the primary structure.

2 PRODUCTS

Materials

2.1 PRE-FINISHED HOT-DIPPED ALUMINIUM/ZINC COATED STEEL

Formability steel sheet, G300 for roll forming and for flashings, coated to AS 1397.

Fixings

2.2 FASTENERS GENERALLY

Fixings and fasteners are to be compatible with all materials, the environment and meeting the requirements of the NZ Building Code.
Refer to Roofing Industries Eurostyle Spanlo™k / Eurolok™ Profile Technical Summary.

2.3 FIXING CLIPS

Clips to Roofing Industries recommendations or to Roofing Industries Profile Technical Summary. Clips to suit the material and profile of the Eurostyle Spanlok™ / Eurolok™ sheet to be installed with the installation of the trays.
Fix clips depending on the wind loadings and refer to Roofing Industries Profile Technical Summary for Eurostyle Spanlok™ / Eurolok™.

2.4 FIXING SCREWS

Each clip will be fixed to Roofing Industries Profile Technical Summary. Screws to be manufactured from material appropriate to the cladding material and the supporting structure, as required by Roofing Industries and with durability no less than the material fixed. Screws into timber to penetrate by minimum 35mm into purlins or full plywood thickness. Refer to SELECTIONS.

2.5 RIVETS

Minimum diameter 4.0mm sealed rivets. For Stainless, use stainless steel rivets. Copper roofing material, use copper rivets. Aluminium/Zinc coated steel and aluminium roofing materials, use aluminium rivets.

Components

2.6 UNSUPPORTED SUBSTRATE - TIMBER PURLINS

Refer to 3821 TIMBER FRAMING.

2.7 UNSUPPORTED SUBSTRATE - STEEL PURLINS

Refer to steel framing section.

2.8 FLASHINGS GENERALLY

To [NZBC E2/AS1](#), 4.0 **Flashings**, [NZMRM CoP](#) recommendations and to Roofing Industries details. Formable grade flashings, material to match selected roofing, to the same standards as the profiled sheets, notched where across profile. Refer to SELECTIONS for details.

2.9 FLASHINGS TO VERGE, RIDGE AND HIP

To E2/AS1, 4.0, **Flashings**.

Supplied by Roofing Industries to match or to suit the roofing.

2.10 BOOT FLASHINGS

Generally to E2/AS1, 8.4.17 **Roof penetrations**

EPDM proprietary pipe flashing laid on 45° bias to roofing. A boot flashing should be positioned so that it dams a roofing pan no more than 50%, if this cannot be avoided use a diverter flashing to [NZMRM CoP](#).

Accessories

2.11 WIRE NETTING AND SAFETY MESH

Refer to 4161 UNDERLAYS, FOIL AND DPC.

2.12 UNDERLAY AND REFLECTIVE FOIL

Refer to 4161 UNDERLAYS, FOIL AND DPC.

2.13 UNDERLAYMENT

Thermakraft Drainage Matt Mk1, is a 7mm thick extruded three dimensional synthetic black mesh.

2.14 SEALANT

Neutral curing silicone or polymer sealant as required by Roofing Industries and used as directed.

3 EXECUTION

Conditions

3.1 DELIVERY AND STORAGE

Take delivery of and accept packs of roofing dry and undamaged on delivery. Reject and replace goods that are damaged. Store on a level firm base with packs well ventilated and completely protected from weather and damage. Do not allow moisture to build up between sheets.

3.2 HANDLING

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

3.3 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.

3.4 SEPARATION

Isolate dissimilar materials (metals and non-metals) 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 lead sheet or copper in contact with or allow water run-off onto galvanized or aluminium/zinc coated steel.

3.5 FRAMING TIMBER MOISTURE (PURLINS)

When continuous metal cladding etc. runs along a long continuous timber member and is directly fixed to it, the timbers equilibrium moisture content (EMC) to be 18% or less. For flashings in this situation (sometimes called transverse flashings) the framing EMC to be maximum 16%, and preferably as low as 12%. Transverse flashings can be temporarily tacked in place and final fixing done when moisture content is acceptable.

3.6 PURLIN SUBSTRATE

Where the Eurostyle Spanlok™ / Eurolok™ is installed over an unsupported substrate purlin centres to be set out maximum 600mm intermediate centres with sub-framing support to match. End spans and the peripheral battens to be 2/3rd of intermediate battens.

Refer to Roofing Industries Eurostyle™ Profile Technical Summary and/or [NZS 3604](#), Section 10, Roof framing.

3.7 VENTILATION

Ensure Eurostyle Spanlok™ / Eurolok™ roofing has passive ventilation at the eaves and ridge for the removal of condensation or moisture to NZRM CoP , 4.3.7, **passive ventilation**.

Application

3.8 FIX INSULATION

Refer to Thermal Insulation sections.

3.9 SET-OUT

Carefully set out with side laps away from the prevailing wind where possible, with the widths of end sheets the same where practicable, all sheets square and over sailing the gutter true to line. Check during fixing to eliminate creep or spread and string lines along purlin centres to keep fastenings in line.

3.10 FORMING

Form stop-ends and downturns to Roofing Industries details and techniques using the required tools.

3.11 SEAL CUT EDGES

In very severe marine environments, where deemed necessary by the substrate manufacturer, seal cut edges of pre-coated steel sheet with edge protection lacquer before fixing to the Roofing Industries requirements.

3.12 END LAPS

End laps are not permitted, except where specifically detailed and prior agreement given by Roofing Industries.

3.13 THERMAL MOVEMENT

Roof fixing and jointing to conform to Roofing Industries Profile Technical Summary requirements for thermal movement. Sliding clips to be used where nominated .

3.14 FIXING GENERALLY

Install and fix in accordance with [NZMRM CoP](#) and to Roofing Industries Profile Technical Summary required fixing patterns and details for each area of the roof. Use only screws as required by the Roofing Industries. Paint colour matched fixings and accessories before installation.

3.15 FIX UNDERLAY

Fit a 200mm wide strip of underlay between the plywood substrate and any drip edge flashing with a 15mm over-sail into gutter. Once drip edge flashings are installed fit and lap roofing underlay over the plywood substrate and the drip edge flashing to the underlay manufacturer's requirements.

3.16 MARKING AND CUTTING

Cut only by shearing tools. Use ink pen, chalk line or coloured pencil for marking roof sheets prior to cutting. Do not use black lead pencils for marking aluminium/zinc coated products. Remove all cutting and drilling debris from the roof.

3.17 FIX SHEETS

Fix sheets in place using the clips as previously set out.

3.18 INSTALL FLASHINGS

Flash roof to parapets, walls and penetrations to detail, to the [NZMRM CoP](#) recommendations and to Roofing Industries requirements. Flashings to be installed on timber framing with a moisture content of less than 20%. Cut accurately and fix using sealant and fixings to details and to the Roofing Industries requirements to form a weatherproof cover. Ensure flashings are designed and installed to avoid water ponding.

3.19 FIX RIDGES AND HIPS

Cut accurately and fix using primary fasteners to the purlins. Join using sealant and to [NZMRM CoP](#). All laps 150mm minimum.

3.20 FIX VERGE AND CAP FLASHINGS

Cut accurately and fix using primary fasteners to the purlins. Join using sealant and to [NZMRM CoP](#). All laps 150mm minimum. Ensure flashings are designed and installed to avoid water ponding.

3.21 FLASHING PENETRATIONS

Flash all penetrations through the roof. Fit pipe flashings with a proprietary collar flashing, with other penetrations flashed as detailed and to provide a weathertight installation. Ensure that flashings are set to avoid any ponding of water.

3.22 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

3.23 REPLACE

Replace damaged or marked elements. Do not attempt to repair coatings by applying colour match paint to pre-finished surfaces.

3.24 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.

3.25 REMOVE

Remove trade rubbish 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.

4 SELECTIONS

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

Substitutions are not permitted to the following, unless stated otherwise.

Materials

Coating system

4.1 COATING SYSTEM - EXPOSURE ZONE D (CAT 4)

Project Exposure Zone D to [NZS 3604](#), C 4 to ISO 9223.

Profile/location:	Spanlok Roof
Base material:	Zincalume on steel
Coating system:	Colorsteel Maxx
Coating colour:	Black

Roofing

4.2 ROOFING INDUSTRIES - EUROSTYLE SPANLOK™ ROOFING

BMT/material:	0.55mm Steel
Profile:	Spanlok™
Substrate:	Purlins
Tray width:	450mm
Clips:	Concealed metal clip fixing
Clip Fixing:	Refer to Roofing Industries Profile Technical Summary

Accessories

4.3 FLASHINGS - GENERALLY

BMT/material:	0.55mm Steel
Coating system:	To match roofing
Paint colour:	To match roofing

4422VE VIKING ENVIROCLAD & ENVIROCLAD FBS MEMBRANE

1 GENERAL

This section relates to **Viking Enviroclad** membrane and **Viking Enviroclad FBS** (fleece backed) membrane system:

It includes **Enviroclad** applied as a single layer membrane and **Enviroclad FBS** incorporating a polyester fibre fleece-backing;

- ┆ suitable for industrial, commercial and residential roofing and decking applications

1.1 ABBREVIATIONS AND DEFINITIONS

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

The following abbreviations apply specifically to this section

TPO	Thermoplastic polyolefin
FBS	Fleece-back system

Documents

1.2 DOCUMENTS

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

NZBC E2/AS1	External moisture
AS/NZS 2269.0	Plywood - Structural - Specifications

1.3 MANUFACTURER/SUPPLIER DOCUMENTS

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

Viking Waterproofing Membrane Systems manual

Viking Enviroclad Plywood Substrate Checklist

Viking Concrete Substrate Checklist

Viking Enviroclad Standard Details

Viking Enviroclad Applicator Manual

[BRANZ Appraisal 656](#) - Enviroclad Roofing Membrane

[CodeMark Certificate Number 30058](#) Rev B - Viking Enviroclad Roofing and Deck Membrane System

Copies of the above literature are available from Viking Roofspec

Web: www.vikingroofspec.co.nz

Email: info@vikingroofspec.co.nz

Telephone: 0800 729 799

Facsimile: 0800 729 788

Warranties

1.4 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

20 years: For Viking **Enviroclad** Membrane

20 years: For Viking **Enviroclad FBS** Membrane

- ┆ Provide this warranty on the Viking Roofing standard form.
- ┆ Commence the warranty from the date of completion of fixing.

Refer to the section 1237 WARRANTIES for additional requirements.

1.5 WARRANTY - INSTALLER/APPLICATOR

Provide an installer/applicator warranty:

5 years: For **Enviroclad** membrane when installed by Viking approved applicator

5 years: For **Enviroclad FBS** membrane when installed by Viking approved applicator

- ┆ Provide this warranty in the Viking Enviroclad Membrane Product Warranty on standard form.
- ┆ Commence the warranty from the date of completion of fixing.

Refer to the section 1237 WARRANTIES for additional requirements.

1.6 WARRANTY - VIKING FULL SYSTEM WARRANTY ON APPLICATION

Provide a Viking Full System Warranty for materials and installation:

20 years: For Viking **Enviroclad** Membrane
 20 years: For Viking **Enviroclad FBS** Membrane

- ┆ Register with Viking Roofspec prior to installation.
- ┆ Approved Applicator must hold d current Stage 3 Viking Roofspec Licence.
- ┆ Provide this warranty on the Viking Full System Warranty job completion form.
- ┆ Commence the warranty from the date of completion of fixing.

Refer to the section 1237 WARRANTIES for additional requirements.

Requirements**1.7 QUALIFICATIONS**

Installation of the membrane to be carried out by Viking Approved Applicators. Installation of substrates must be completed by suitably qualified persons in accordance with instructions given in Manufacturers Technical Literature and [BRANZ Appraisal 656](#) - **Enviroclad** Roofing Membrane.

1.8 NO SUBSTITUTIONS

Substitutions are not permitted to any specified Viking membrane waterproofing materials, or associated products, components or accessories.

Performance**1.9 TEST**

Flood test horizontal applications with a minimum 50mm depth of water for 24 hours. Make good any lack of watertightness when the surface is completely dry.

1.10 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. All penetrations to comply with Viking Roofspec recommendations and standard details.

2 PRODUCTS**Materials****2.1 ENVIROCLAD WATERPROOFING MEMBRANE**

Polyester reinforced thermoplastic polyolefin (TPO) membrane. Refer to SELECTIONS for size and colour options.

Components**2.2 ADHESIVE - ENVIROCLAD ONLY**

Enviroclad Bonding Adhesive - proprietary solvent based contact adhesive.

2.3 ENVIROCLAD CUT EDGE SEALANT (CLEAR)

Proprietary sealant for sealing cut edges.

2.4 WATER CUT-OFF MASTIC

Mastic Sealant for use at compression terminations, drains and beneath metal edging.

2.5 ENVIROCLAD UNIVERSAL SEALANT

UV stable sealant for use in exposed terminations (e.g. chase sealing).

2.6 ENVIROCLAD WEATHERED MEMBRANE CLEANER

Proprietary membrane cleaner.

2.7 ENVIROCLAD OUTSIDE AND INSIDE CORNERS

Proprietary unreinforced moulded TPO flashings to be welded as internal and external corners.

2.8 ENVIROCLAD UNREINFORCED MEMBRANE

Proprietary unreinforced TPO membrane. 300mm x 15.2m.

2.9 ENVIROCLAD T-JOINT COVERS

Proprietary unreinforced TPO disks.

2.10 ENVIROCLAD PIPE FLASHINGS

Proprietary unreinforced moulded TPO flashings for sealing pipe penetrations.

2.11 ENVIROCLAD POURABLE POCKETS

Proprietary unreinforced moulded TPO surrounds for encasing pipe penetrations.

2.12 ENVIROCLAD THERMOPLASTIC POURABLE SEALER

Proprietary thermoplastic pourable sealer for filling of pourable pocket.

2.13 SPLICE WIPES

Proprietary wipes for cleaning and drying membrane prior to welding.

Accessories

2.14 VENTS

Aluminium vent or TPO vent.

2.15 ENVIROCLAD WALKWAY ROLLS

Proprietary non-slip TPO walkway mat. 792mm x15m. (Apply and weld in 3m sections)

2.16 ENVIROCLAD SCUPPER OUTLETS

TPO scuppers. 100mm x 100mm or 100mm x 65mm outlets.

2.17 LEAF AND GRAVEL GRATES

Viking Gravel/Leaf Grates.

2.18 CLAMP RING ROOF DRAINS OR OVERFLOWS

80mm, 100mm or 150mm clamp sealed drains and overflows.

2.19 DRYLIGHT SKYLIGHT

1220mm x 1220mm single piece reaction injection moulded skylight.

2.20 DRYLIGHT FLASHING SLEEVE

Single piece TPO proprietary flashing.

2.21 ENVIROCLAD DROPPER OUTLETS

Proprietary 80mm or 100mm TPO droppers.

3 EXECUTION

Conditions

3.1 GENERALLY

All work and materials to comply with current Viking Enviroclad technical literature and standard details.

3.2 STORAGE

Take delivery of **Enviroclad** membrane in rolls undamaged and include for site handling facilities where required. Store rolls horizontally only. Provide dry storage for all products. Stack off the ground on a level surface and with accessories.

3.3 WEATHER

Lay **Enviroclad** membrane in fair weather, with ambient air temperature no less than 7°C.

3.4 EQUIPMENT

Viking Roofspec Approved Applicators to use the following equipment:

- ┆ Hand welding machine
- ┆ Robotic welding machine
- ┆ Hand rollers
- ┆ Fast adhesive Caulking Gun (FBS only) battery powered or pneumatic
- ┆ Roller (up to 75kg)

Application - preparation

3.5 PRELIMINARY WORK

Ensure that preliminary work, including formation of falls, flashing rebates, grooves, ducts, provision of battens and fixing of vents and outlets to levels, is complete and properly constructed to enable the system to work as intended. The substrate to be smooth, clean, dry and stable.

3.6 ACCEPTANCE OF SUBSTRATE

Confirm that the substrate, including sumps, outlets and projections, will ensure work of the required standard.
 . Ensure the fall complies with [NZBC E2/AS1 8.5.6](#), **Roof and deck drainage**, including correct fall to rainwater outlets to avoid ponding.

3.7 PLYWOOD SUBSTRATE

Install to requirements of current Viking Roofspec Enviroclad Plywood Substrate Checklist. Plywood to be;

- a minimum of 17mm thick and complying with [AS/NZS 2269.0](#)
- minimum CD structural grade with the sanded C side upwards
- H3.2 treated (CCA) and kiln dried.

Lay plywood with staggered joints (brick bond) with all edges of the sheets fully supported. Do not use tongue and groove plywood.

Leave a 3mm gap between all sheets. Fix with 10 gauge x 50mm stainless steel countersunk screws. Fix at 50mm from the corners, 150mm centres on edges and 200mm centres on intermediate supports. No timber corner fillets are to be used. Chamfer all external edges with a minimum radius of 5mm where the membrane is to be wrapped over.

Provide falls to a minimum of those stated in [NZBC E2/AS1, 8.5.1](#), - 1:30 for roofs, 1:40 for decks and 1:100 for gutters.

Plywood and the timber substructure to have a maximum moisture content of 18% when the membrane is adhered.

Application - laying

3.8 GENERAL

Install to current application standards as detailed in Viking Roofspec Technical literature and Viking **Enviroclad** Applicators Manual.

3.9 PLYWOOD SUBSTRATE PREPARATION

Plywood to be clean and dry before application of the waterproofing membrane.

3.10 POSITION AND RELAX

Membrane to be unrolled onto the prepared substrate and allowed to relax for at least 20 minutes prior to installation. Position membrane over acceptable substrate and fold membrane back to expose half of the underside.

3.11 APPLY ADHESIVE - ENVIROCLAD

Apply **Enviroclad** Bonding Adhesive, to the exposed underside of the membrane and to the corresponding substrate, using a plastic core medium nap paint roller at a coverage rate of 2m² per litre (includes coverage on both membrane and substrate).

3.12 INSTALL MEMBRANE SHEETS - ENVIROCLAD

Allow adhesive to flash off until tacky. Lay the glued Enviroclad membrane onto the glued substrate. Brush down the bonded section of Enviroclad membrane immediately with a soft bristle broom. Fold back the unglued half of the sheet and repeat procedure.

3.13 LAP JOINTS

Install adjoining **Enviroclad** membrane sheets in the same manner, overlapping edges to provide a minimum 40mm hot air weld.

3.14 HOT AIR WELD

Clean all weld areas with Weathered Membrane Cleaner. Then weld the adjoining **Enviroclad** membrane sheets (minimum width of weld is 40mm).

3.15 MEMBRANE CLEANER

Ensure that all membrane, including accessories, to be welded is cleaned using Weathered Membrane Cleaner. Wipe the surface where the **Enviroclad** membrane cleaner has been applied with a clean, dry HP Splice Wipe to remove residue prior to welding.

3.16 INSPECT

Inspect and test joints all welds using a seam probe. Seal all cut reinforced membrane edges using Cut Edge Sealer, or roll the membrane edge using the correct welding technique. Flood test with a minimum 50mm depth of water for 24 hours.

3.17 PENETRATIONS AND JUNCTIONS

Form and finish upstands, downturns, penetrations, outlets and vents to conform to current Viking Roofspec Standard Details. Confirm installation of all required flashings and terminations, to leave membrane watertight upon project completion.

3.18 VENTING – ROOF/DECK CAVITIES

Provide adequate ventilation to [NZBC E2/AS1, 8.5.2, General](#). If applying roof mounted proprietary vents, install a minimum one Viking roof vent for the first 40m² of flat roof area and one vent per 90m² thereafter. Check that the cavity is cross ventilated to allow air movement across the entire cavity.

Finishing

3.19 FOOT TRAFFIC

Keep foot traffic to a minimum after laying the membrane. Lay protection as required for foot traffic or later works.

3.20 ACCESS BOARDS

Provide access boards for later operations and remove when no longer needed.

3.21 ACCEPTANCE

Inspect the completed work. Protect and maintain roofing until completion of the contract works.

3.22 SUBSEQUENT WORK

Make good any damage and repair to Viking Roofspec specifications.

Completion

3.23 CLEAN UP

Clean up as the work proceeds.

3.24 LEAVE

Leave work to the standard required by following procedures.

3.25 REMOVE

Remove debris, unused materials and elements from the site.

4 SELECTIONS

Substitutions are not permitted to the following, unless stated otherwise.

4.1 VIKING ENVIROCLAD MEMBRANE

Location: Garage Roof

Substrate: Ply

Brand/type: **Viking Enviroclad**

Thickness: 1.5mm

Size: 3.0 or 3.6 metres wide x 30.4 metres long

Colour: Grey

Finish: smooth

4521 ALUMINIUM WINDOWS AND DOORS

1 GENERAL

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

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

1.1 RELATED WORK

Refer to glazing sections for glass types

1.2 ABBREVIATIONS AND TERMS

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

Documents

1.3 DOCUMENTS

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

NZBC E2/AS1	External moisture
NZBC F4/AS1	Safety from falling
NZBC H1/VM1	Energy efficiency
NZBC H1/AS1	Energy efficiency
AS/NZS 1580.108.1	Methods of test for paints and related materials - Determination of dry film thickness on metallic substrates - Non destructive methods
AS/NZS 1170.2	Structural design actions - Wind loads
NZS 1170.5	Structural design actions - Earthquake actions - New Zealand
AS/NZS 1734	Aluminium and aluminium alloys - flat sheets, coiled sheet and plate
AS/NZS 1866	Aluminium and aluminium alloys - Extruded rod, bar, solid and hollow shapes
NZS 3604	Timber-framed buildings
AS 3715	Metal finishing - Thermoset powder coatings for architectural applications
BS 3900	Methods of tests for paints, Part C5: Determination of film thickness
NZS 4211	Specification for performance of windows
NZS 4223.3	Glazing in buildings - Human impact safety requirements
AS/NZS 4680	Hot-dip galvanized (zinc) coatings on fabricated ferrous articles
WANZ Installation Guide:	The WANZ Guide to Window Installation as described in E2/AS1 Amendment 5.
WANZ PQAS	Powder Coating Quality Assurance System
WANZ SFA 3503-03	Anodic Oxide coatings on wrought aluminium for external architectural application (2005).
BRANZ BU 337	Protecting Window Glass from Surface Damage
AAMA 2604	Voluntary specification, performance requirements and test procedures for high performance organic coatings on aluminium extrusions and panels.
AAMA 2605	Voluntary specification, performance requirements and test procedures for superior performing organic coatings on aluminium extrusions and panels.
US Federal Specification	
TT-S-001543A	Sealing compound, silicone rubber base (for caulking, sealing and glazing in buildings and other structures)
TT-S-00230C	Sealing compound, elastomeric type, single component (for caulking, sealing and glazing in buildings and other structures)

Warranties

1.4 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

5 years: For fabrication

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

1.5 WARRANTY - INSTALLER/APPLICATOR

Provide an installer/applicator warranty:

2 years: For installation

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

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.6 QUALIFICATIONS

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

1.7 COMPLIANCE

Windows and doors to be manufactured and installed to [NZBC E2/AS1](#).

1.8 CERTIFICATION

Provide evidence of a certificate by a laboratory accredited by International Accreditation of New Zealand that the windows and doors offered comply with the requirements of [NZS 4211](#).

Performance

1.9 PERFORMANCE - WINDOWS AND DOORS

To [NZS 4211](#), including:

- ┆ deflection, opening sashes, air infiltration, water penetration, ultimate strength, torsional strength of sashes, marking.

Refer to SELECTIONS.

1.10 PERFORMANCE - STRUCTURAL/WEATHER-TIGHTNESS

The structural and weather-tight performance of the completed joinery, the glazing and infill panels is the responsibility of the window manufacturer.

Performance - Wind (design by contractor)

1.11 WIND - NON SPECIFIC DESIGN

Design the installation to the wind zone parameters of [NZS 3604](#), table 5.4.

Refer to SELECTIONS for wind zone.

Finishes

1.12 CERTIFY COATINGS - POWDER COATING

Certify on request, compliance with this specification and support with control and sampling records. Test for film thickness to BS 3900, part C5, method No. 4, using method (b) or to AS/NZ 1580.108.1 for certifying thickness and method (a) where any dispute arises as to the thickness provided.

The coating should be applied by an applicator who can certify that the coating has been applied in accordance with the specification.

2 PRODUCTS

Materials

2.1 WINDOWS

Refer to SELECTIONS for type and finish.

2.2 DOORS

Refer to SELECTIONS for type and finish.

2.3 ALUMINIUM EXTRUSIONS

Alloy designation to comply with [AS/NZS 1866](#). Branded and extruded for anodising or powder coating.

2.4 ALUMINIUM SHEET AND STRIP

Complying with [AS/NZS 1734](#) of suitable thickness. Rolled for anodising or powder coating.

Alloy designation: 5251 - H16 or 5005 - H16

2.5 STAINLESS STEEL SHEET AND STRIP

Type: 316 austenitic steel
 Finish grade: 2B (satin lustre)

2.6 GLASS

Refer to the glazing section for glass types and installation.

2.7 REVEALS - ALUMINIUM

Aluminium reveals fitted to frame via thermal break.

2.8 FLASHINGS GENERALLY

To [NZBC E2/AS1](#), 9.1.10 **Windows and Doors**. Material, grade and colour of head flashings to match the window frames. Ensure that materials used for head, jamb and sill flashings are compatible with the window frame materials and fixings and cladding materials.

Components - for cavity systems

2.9 STANDARD CAVITY CLOSER

A perforated device constructed from either aluminium or PVC to close the cavity above the window or door unit, between the cladding and head flashing, to provide ventilation in accordance with [NZBC E2/AS1](#) to the spaces above the window or door.

2.10 WANZ SUPPORT BAR

Extruded aluminium support bar with built in drainage and ventilation to [NZBC E2/AS1](#), to provide continuous support to the window unit. Size to suit cladding type.

Components

2.11 GLAZING GASKETS

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

2.12 HARDWARE AND FURNITURE

Hinges, stays, catches, fasteners, latches, locks and furniture as offered by the window and door manufacturer. Refer to SELECTIONS for type and finish. Key alike all lockable window hardware able to be keyed alike.

2.13 SAFETY STAYS

Stainless steel non releasable restrictors to limit window opening to [NZBC F4/AS1](#), Table 2, Acceptable opening sizes for barriers.

Sealants

2.14 STRUCTURAL SEALANT

Silicone chemically curing sealant specifically formulated and tested or approved equivalent with not less than a $\pm 40\%$ movement factor complying with US Federal Specification TT S 001543A.

2.15 WEATHERING/INSTALLATION SEALANT

Building sealant used in accordance with manufacturer's instructions for weather sealing aluminium frames to the cladding, complying with US Federal Specification TT S 0011534A, or a one-part polyurethane moisture curing, elastic joint sealant of medium modulus ($\pm 25\%$ movement) to US Federal Specification TT S 00230C.

2.16 FOAM TAPE

Foam tape to [NZBC E2/AS1](#), 9.1.10.7 **Closed cell foam tape**.

Finishes

2.17 POWDER COATED ALUMINIUM - EXTRA DURABLE

Polyester powder organic coating in accordance with [WANZ PQAS](#) and AS 3715.

2.18 POWDER COATED ALUMINIUM - HIGH DUTY

Polyester powder coating in accordance with [WANZ PQAS](#) and AAMA 2604.

2.19 POWDER COATED ALUMINIUM - SUPER DUTY

PVF² fluoropolymer powder coating in accordance with AAMA 2605 and [WANZ PQAS](#).

3 EXECUTION

Conditions - generally

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

Conditions - fixings and fastenings

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

Assembly

- 3.10 FABRICATION
Fabricate frames as detailed on shop drawings. Install glazing, hinges, stays and running gear as scheduled. Provide temporary bracing and protection. Temporarily secure all opening elements for transportation.
- 3.11 TIMBER / PVC REVEALS
Before fixing to aluminium frames, ensure that timber reveals which are being painted have been primed on all surfaces.
- 3.12 HARDWARE GENERALLY
Factory fit all required and scheduled hardware. Account for all keys and deliver separately to the site manager.
- 3.13 SAFETY STAYS
Factory fit safety stays to all windows scheduled for safety stays and to all windows where safety stays are required to comply with [NZBC F4/AS1 4.0](#), Opening windows.

Installation - windows and doors

- 3.14 CORROSION PROTECTION
Before fixing, apply suitable barriers of bituminous coatings, stops or underlays between dissimilar metals in contact, or between aluminium in contact with concrete.
- 3.15 CONFIRM PREPARATION OF EXTERIOR WALL OPENINGS
Confirm that exterior wall openings have been prepared ready for the installation of all window and door frames. Do not proceed with the window and door installation until required preparatory work has been completed.

Required preparatory work includes the following:

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

3.16 INSTALLATION

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

3.17 INSTALLATION CAVITY CONSTRUCTION

Install to [WANZ Installation Guide](#) details and drawings including WANZ sill support bars.
For thresholds with support bars fixed through membranes, pre-fill support bar screw holes with silicone sealant to [NZBC E2/AS1, figure 62\(d\)](#).

3.18 INSTALL FLASHINGS

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

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

Except where window/door frames are recessed, ensure that head flashings over-sail unit by 20mm minimum plus any jamb scribe width at each end.

3.19 COMPLETE AIR SEAL

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

3.20 FIX HARDWARE

Fix all sash and door hardware and furniture as scheduled.

Application - jointing and sealing

3.21 SEAL FRAMES ON SITE

Seal frames to each other and to adjoining structure and finishes, all as required by the window manufacturer and to make the installation weathertight. In very high and extra high or greater wind zones, seal between the window head and the head flashing. Do not seal the junction between the sill member and the cladding or sill flashing which must remain open.

3.22 PREPARE JOINTS

Ensure joints are dry. Remove loose material, dust and grease. Prepare joints in accordance with the sealant manufacturer's requirements, using required solvents and primers where necessary. Mask adjoining surfaces which would be difficult to clean if smeared with sealant.

3.23 BACK UP

When using back-up materials do not reduce depth of joint for sealant to less than the minimum required by the manufacturer of the sealant. Insert polyethylene rod or tape back-up behind joints being pointed with sealant.

3.24 SEALANT FINISH

Tool sealant to form a smooth fillet with a profile and dimensions required by the sealant manufacturer. Remove excess sealant from adjoining surfaces, using the cleaning materials nominated by the sealant manufacturer and leave clean.

Completion - cleaning

3.25 REMOVE TRADE DEBRIS

Remove trade debris by appropriate means on a floor by floor basis as each floor is completed and again before any work is covered up by others. Arrange for general removal.

3.26 TRADE CLEAN

Trade clean window frames, operable windows and doors, glass and other related surfaces inside and out at the time of installation to remove marks, dust and dirt, to enable a visual inspection of all surfaces.

Completion

3.27 PROTECTIVE COVERINGS

Retain protective coverings and coatings and keep in place during the fixing process. Provide protective coverings and coatings where required to prevent marking of surfaces visible in the completed work and to protect aluminium joinery from following trades.

3.28 SAFETY

Indicate the presence of transparent glasses for the remainder of the contract period, with whiting, tape or signs compatible with the glass type. Indicators other than whiting must not be applied to the glass surface. Masking tape must not be used for this purpose.

3.29 IN SITU TOUCH-UP TO POWDER COATED ALUMINIUM

In situ touch-up of polyester or fluoropolymer coated aluminium is only permitted only to minor surface scratching. Otherwise replace all damaged material.

3.30 REMOVE

At the appropriate stage of the project, remove safety indicators and protective coverings and wipe down all joinery thoroughly.

3.31 REPLACE

Replace damaged, cracked or marked elements.

4 SELECTIONS

Performance

4.1 THERMAL PERFORMANCE

R-value: R0.26 (as determined from [NZBC H1/VM1](#) or H1/AS1)

Performance - Wind (design by contractor)

4.2 WIND - NON SPECIFIC DESIGN

Building wind zone Very High (refer to [NZS 3604](#), table 5.4)

Window and door system

4.3 ALUMINIUM WINDOWS

Manufacturer:

Type/location:

4.4 ALUMINIUM DOORS

Manufacturer:

Type/location:

Finishes

4.5 ORGANIC POWDER COATING FINISH

Type: Polyester organic powder coating ~

System integrity: Minimum 10 years

Thickness: Average of 80 microns with a minimum of 50 microns

Colour: Silver Pearl

4.6 FLUOROPOLYMER POWDER COATING FINISH

Type: PVF2 fluoropolymer powder coating

System integrity: Minimum 20 years

Thickness: Average of 80 microns with a minimum of 50 microns

Colour: Silver Pearl

4.7 HARDWARE

	Brand/style	Material/finish
Sash fasteners:		
Door furniture:		

4610 GLAZING RESIDENTIAL

1 GENERAL

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

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

1.1 ABBREVIATIONS AND DEFINITIONS

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

The following abbreviations apply specifically to this section:

PVB	Polyvinyl Butyral
CIP	Cast in place

Documents

1.2 DOCUMENTS

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

NZBC F4/AS1	Safety from falling
NZBC H1/AS1	Energy Efficiency
AS/NZS 1170.2	Structural design actions - Wind loads
NZS 3604	Timber-framed buildings
NZS 4211	Specification for performance of windows
NZS 4218	Thermal insulation - Housing and Small Buildings
NZS 4223.1	Glazing in buildings - Glass selection and glazing
NZS 4223.Supp1	Glazing in buildings - Supplement 1 to NZS 4223.1:2008 and NZS 4223.4:2008
NZS 4223.2	Glazing in buildings - Insulating glass units
NZS 4223.3	Glazing in buildings - Human impact safety requirements
NZS 4223.4	Glazing in buildings - Wind, dead, snow and live action
AS/NZS 2208	Safety glazing materials in buildings
AS/NZS 4666	Insulating glass units
BRANZ BU 337	Protecting window glass from damage

Warranties

1.3 WARRANTY - MANUFACTURER/SUPPLIER

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

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

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

Performance

1.4 ENERGY EFFICIENCY

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

2 PRODUCTS

Materials

2.1 CLEAR FLOAT GLASS

Clear ordinary annealed transparent float glass for general window glazing. Thickness to [NZS 4223.1](#) and [NZS 4223](#). Supp 1.

2.2 LAMINATED GLASS

Grade A Safety Glass to [AS/NZS 2208](#) with PVB or CIP resin interlayer.

2.3 TOUGHENED GLASS

Grade A Safety Glass to [AS/NZS 2208](#).

Materials, screens

2.4 GLASS SCREENS SHOWER & BATH

Proprietary shower / bath screens, formed to shape before toughening, complete with matching hardware.

Components, aluminium and uPVC glazing

2.5 GLAZING TAPE AND GASKETS

Single/double sided pressure sensitive self-adhesive low/medium/high density foam tapes/butyl tapes selected to suit the glazing detail to window manufacturers' requirements.

2.6 SETTING BLOCKS

Santoprene/Neoprene, 80-90 Shore A hardness, set at quarter points or to detail, to support the weight of glass panes.

3 EXECUTION

Conditions

3.1 GENERAL REQUIREMENTS

To [NZS 4223.1](#), [NZS 4223.3](#), [NZS 4223.4](#). All external glazing to be wind and watertight on completion.

3.2 DELIVERY

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

3.3 GLASS CONDITION

All glass to have undamaged edges and surfaces.

3.4 GLASS THICKNESS

If not specifically stated in the glazing schedule determine the minimum thickness of glass for each sheet as required by [NZS 4223.1](#), [NZS 4223.3](#), [NZS 4223.4](#) and [NZS 4223](#). Supp 1. For windows tested to [NZS 4211](#), ensure glass meets the requirements of the window testing.

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

3.5 REBATE DIMENSIONS

Provide rebates for glazing to the widths and depths necessary for each situation including minimum glass edge cover to [NZS 4223.1](#), Section 4 Glazing.

3.6 JOINTING, PUTTY AND SEALING MATERIAL COMPATIBILITY

Ensure jointing, putty and sealing materials are compatible with glass substrates. Confirm compatibility with laminated glass, IGUs and coatings.

Conditions - human impact safety requirements

3.7 SAFETY GLAZING, GENERAL REQUIREMENTS

Glazing of doors, side panels, low level and window seat glazing, bathrooms, stairwell landings and similar locations, to [NZS 4223.3](#) for thickness and maximum areas of safety glass.

3.8 SAFETY GLAZING MATERIAL

Use only safety glazing materials defined in [NZS 4223.3](#), that also comply with the relevant requirements of [AS/NZS 2208](#). Ensure material is permanently marked and if cut by the distributor or installer mark each piece to [NZS 4223.3](#), 2.8 Identification.

3.9 CONTAINMENT

Edge cover to comply with [NZS 4223.1](#), Section 4 Glazing, table 5. Otherwise to [NZS 4223.3](#), 2.3 Edge cover.

Assembly

3.10 WORKING OF GLASS

All working of glass as required in [NZS 4223.1](#).

3.11 EDGE WORK AND BEVELLING

Edgework other than a clean cut. Refer to SELECTIONS/drawings for type.

3.12 SURFACE TREATMENT

Refer to SELECTIONS/drawings for finish.

3.13 SURFACE CUTTING

Refer to SELECTIONS/drawings for finish.

3.14 INSTALL SAFETY GLASS

To [NZS 4223.3](#).

Application aluminium**3.15 INSTALL GLASS TO ALUMINIUM FRAMES**

Install glass to NZS4223.1.

- ┆ Bead glaze to Section 4 Glazing.
- ┆ Channel glaze to Section 4 Glazing, and Section 5 for Framed, Unframed, Partly Framed Glass Assemblies.

Application miscellaneous**3.16 INSTALL GLASS SHOWER & BATH SCREENS**

Install shower and bath screens and doors to manufacturer's requirements.

Finishing**3.17 SAFETY**

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

Completion**3.18 TRADE CLEAN**

Clean off or remove safety indicators at completion of the building.

3.19 REPLACE

Replace damaged, cracked or marked glass.

3.20 LEAVE

Leave work to the standard required by following procedures.

3.21 REMOVE

Remove debris, unused materials and elements from the site.

4 SELECTIONS**Performance - wind****4.1 WIND ZONE - NON-SPECIFIC DESIGN**

Building wind zone: Very High (as determined from [NZS 3604](#), [NZS 4223.4](#))

4710K EARTHWOOL® GLASSWOOL INSULATION

1 GENERAL

This section relates to **Earthwool® glasswool by Knauf Installation** installed, fixed or fitted as thermal and acoustic insulation:

It includes:

- | Earthwool® glasswool insulation: Wall segments
- | Earthwool® glasswool insulation: Ceiling segments
- | Earthwool® glasswool insulation: Underfloor segments
- | Earthwool® glasswool insulation: Acoustic segments
- | Earthwool® glasswool insulation: Ceiling rolls
- | Earthwool® glasswool insulation: DriTherm® masonry slab

1.1 RELATED WORK

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

Documents

1.2 DOCUMENTS

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

NZBC H1/AS1	Energy efficiency
AS/NZS 3000	Electrical installations
NZS 4218	Energy efficiency - Small building envelope
NZS 4220	Code of practice for energy conservation in non-residential buildings
NZS 4243.1	Energy efficiency - Large buildings - Building thermal envelope
NZS 4246	Energy efficiency - Installing bulk thermal insulation in residential buildings
AS/NZS 4859.1	Materials for the thermal insulation of buildings - General criteria and technical provisions
AS/NZS 60598.2.2:2001	Luminaires- Particular Requirements - Recessed luminaires
AS/NZS 60695.11.5	Fire hazard testing - Test flames - Needle-flame test method - Apparatus, conformity test arrangement and guidance

1.3 MANUFACTURER/SUPPLIER DOCUMENTS

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

Knauf Insulation Product Guide New Zealand

Earthwool® glasswool insulation: Wall and Ceiling Datasheets (roll and segments)

Earthwool® glasswool insulation: Wall and Ceiling Datasheets (roll and segments)

Earthwool® glasswool insulation: Acoustic segments Datasheet

Earthwool® glasswool insulation: Ceiling roll Datasheet

Earthwool® glasswool insulation: Underfloor segments Datasheet

Earthwool® glasswool insulation: Underfloor roll with wind wash barrier Datasheet

Earthwool® glasswool insulation: DriTherm® masonry slab

Earthwool® glasswool insulation: Installation Instructions

[BRANZ Appraisal 648](#) - Earthwool glasswool Insulation

Manufacturer/supplier contact details

Company: **Knauf Insulation New Zealand**

Web: www.knaufinsulation.co.nz

Email: info.nz@knaufinsulation.com

Telephone: 0800 KNAUFI (562 834)

Technical Support: tech.nz@knaufinsulation.com

Customer Service: sales.nz@knaufinsulation.com

Warranties

1.4 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

50 years: For unfaced glasswool materials

- | 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 1237 WARRANTIES for additional requirements.

Requirements

1.5 QUALIFICATIONS

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

1.6 NO SUBSTITUTIONS

Substitutions are not permitted to any specified Knauf Insulation, associated products, components or accessories.

2 PRODUCTS

Materials - thermal insulation

2.1 EARTHWOOL® GLASSWOOL: INSULATION CEILING SEGMENTS / ROLLS

Earthwool® glasswool: Ceiling segments and rolls to [AS/NZS 4859.1](#), [NZS 4218](#), [NZS 4243.1](#) and [NZS 4220](#). Rectangular insulation segments and rolls made using recycled glass and with ECOSE® Technology. Refer to SELECTIONS for location, type, R-value and thickness.

2.2 EARTHWOOL® GLASSWOOL INSULATION: WALL SEGMENTS

Earthwool® glasswool: Wall segments to [AS/NZS 4859.1](#), [NZS 4218](#), [NZS 4243.1](#) and [NZS 4220](#). Rectangular insulation segments and rolls made using recycled glass and with ECOSE® Technology. Refer to SELECTIONS for location, type, R-value and thickness.

Components

2.3 FASTENERS

Staple gun/tacker to fix underfloor strapping - segments only. Underfloor roll with a wind wash barrier can be directly fixed in place.

2.4 TAPES

Polypropylene or similar strapping stapled across framing to retain insulation in wall and ceiling applications. Underfloor segments require polythene banding, 12mm wide with a 50kg breaking strain.

3 EXECUTION

Conditions

3.1 STORAGE

Accept materials undamaged and dry and store in a location that protects them from the weather and damage. Avoid distortion, stretching, puncturing and compression. Do not use damaged or wet insulation material.

3.2 HANDLING

Wear protective clothing as necessary and when handling, avoid delamination or distortion of the rectangular form. Maintain full thickness unless compression is an installation system requirement.

3.3 INSPECTION

Before starting installation of Earthwool® glasswool check that the location and framing are dry, that the cavities are not interconnected and that mesh, wall and roof underlays and vapour barriers are in place. Install when the building is enclosed and when the construction materials have achieved the maximum permitted moisture content or less.

Application - general

3.4 INSTALL INSULATION - GENERAL

Lay, install, fit and fix to [NZBC H1/AS1](#): Energy efficiency, 2.0 Building thermal envelope, and to manufacturer's requirements. Install in housing to [NZS 4218](#) and [NZS 4246](#). Install in large buildings to [NZS 4243.1](#) and [NZS 4220](#). Allow insulation to re-loft/relax prior to installation. Do not cover vents. Allow a clear gap around metal flues as recommended by the fireplace manufacturer. Where possible lift up electrical wires, lighting transformers/controllers and lay the insulation underneath. Refer to manufacturer's installation instructions and [NZS 4246](#) for further details.

3.5 RECESSED LIGHT FITTINGS - CLEARANCE

Non-residential applications;

The clearance between insulation and recessed downlights

- ┆ 100mm gap to [AS/NZS 3000](#), figure 4.9.
- ┆ Provide larger clearances where required by the light manufacturer.

Residential applications;

- | Ensure new recessed downlights are one of the new classes classified in [AS/NZS 60598.2.2](#); CA 80, CA 135, IC and IC - F
- | Classification type CA 80, CA 135, to [AS/NZS 60598.2.2](#); insulation can abut the sides
- | Classification type IC and IC - F, to [AS/NZS 60598.2.2](#); insulation can abut and cover over the top of the downlight
- | Classification type NON IC to [AS/NZS 60598.2.2](#); insulation cannot abut or cover the downlight. This class of downlights is banned from residential applications.
- | Provide larger clearances where required by the light manufacturer.
- | In a retrofit situation where recessed downlights are unclassified or unknown, ensure 100mm clearance between insulation and downlights to [AS/NZS 3000](#), figure 4.9.

3.6 INSULATION CLEARANCES GENERALLY

Insulation may need to have a gap to some mechanical and electrical services and equipment, including ducts and chimneys. The gaps should be to the [NZS 4246](#) based tables below or to the equipment manufacturers requirements if they require larger gaps. Smaller gaps to manufacturers requirements can be used for equipment specifically manufactured with heat shielding or similar (excludes light fittings). Installed gap not to be more than 50mm bigger than the required gap.

The following tables are subject to:

- | The requirements of [NZS 4246](#).
- | The insulation is exposed to the source of heat or equipment etc.
- | Insulation, has passed the needle flame test to [AS/NZS 6069.11.5](#) and/or is non-combustible.
- | Gaps to hot surfaces may have to be increased with non-compliant insulation and plastic/polymeric type insulation (EPS, XPS, PIR, etc), check with insulation manufacturer.
- | Gaps to hot surfaces may be able to be reduced with non-combustible insulation, check with equipment manufacturer.
- | "Secure insulation" if required means, glue, mechanical fix, or provide fixed barriers at gap edge of insulation to hold in place. Rigid or semi rigid insulation may only need a firm friction fit (secure loose pieces).
- | Loose fill insulation will require fixed barriers to [NZS 4246](#) to maintain gaps.

LIGHT FITTINGS

Type of fitting	Minimum insulation clearance	Comments
Unmarked recessed	100mm	New or old unmarked & unknown fittings and/or insulation. Secure insulation.
CA 80, CA 90 or CA 135 recessed	Abut in residential. 100mm in others	Do NOT cover the fittings
IC, IC-F or IC-4 recessed	Abut in residential. 100mm in others	Cover in residential only. Do NOT cover in others
Independent control gear	Place on top of insulation & 50mm from fitting	If not on top allow 50mm clearance to insulation, do not cover. Includes, transformers, ballasts & drivers etc.
Surface fittings not exposed to insulation	Nil	Where surface fittings are isolated from insulation by appropriate linings. Excludes high heat fittings.
Surface fittings & exposed insulation	200mm	This is exposed insulation to any part of the exposed fitting & bulb/tube (e.g. exposed light in an unlined basement). Secure insulation.

INBUILT RECESSED HOT APPLIANCES

Appliance	Minimum insulation clearance	Comments
Electrical heaters	100mm	Clearance may be able to be reduced with non-combustible insulation. Secure insulation.
Gas appliance exposed flame	200mm	Clearance may be able to be reduced with non-combustible insulation or with specific details from the appliance manufacturer. Excludes uncommon appliances, refer NZS 4246 .
Gas appliance flues	75mm	Clearance may be able to be reduced with non-combustible insulation. Secure insulation. Excludes uncommon appliances refer NZS 4246 .
Oil-fired appliances and flues	230mm	Clearance may be able to be reduced with non-combustible insulation or with specific details from the appliance manufacturer. Secure insulation.
Open fireplace opening	200mm	Clearance may be able to be reduced with non-combustible insulation. Secure insulation.
Brick masonry chimneys	50mm	Clearance may be able to be reduced with non-combustible insulation. Secure insulation.
Metal chimneys & flues	75mm	Clearance may be able to be reduced with non-combustible insulation or with specific details from the appliance manufacturer. Secure insulation.
Solid fuel appliance	600mm	Clearance may be able to be reduced with non-combustible insulation or with specific details from the appliance manufacturer. Secure insulation.
Solid fuel appliance flue	600mm	Clearance may be able to be reduced with non-combustible insulation or with specific details from the appliance manufacturer. Secure insulation.

EXTRACTS, VENTS, PIPES & ROOF UNDERLAY

Application	Minimum insulation clearance	Comments
Ducted fan motors	50mm	Includes ducted rangehoods, extractors etc. Applies to the motor unit and electrical enclosures (not the ducts)
Ducted fan ducts	Abut	Excludes motor unit and electrical enclosures.
Unducted fan motors usually discharging to ceiling space	200mm	Includes unducted, rangehoods, extractors etc, discharging into roof space. To prevent debris falling into motor. Clearance may be able to be reduced, by providing a fixed barrier around the vent.
Passive vents (still in use)	200mm	To prevent debris falling through. Clearance may be able to be reduced, with more cohesive insulation, like some of the rigid plastic types or providing a fixed barrier around the vent.
Plumbing penetrations through floors	100mm	Keep gap between pipe penetration and floor insulation in case of leaks.
Roofing material/underlay	25mm	From underside of roofing or flexible roofing underlay, to prevent wicking

3.7 CHECK WALL AND ROOF UNDERLAYS

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

Application - walls

3.8 FIT EARTHWOOL® GLASSWOOL INSULATION - TIMBER FRAMING

Friction fit Earthwool® glasswool: Wall segments between framing members and linings. Cut on site to fill cavity and provide a close even fit. When cutting to fill a void, oversize by up to 10mm to ensure a tight fit. Ensure there is a friction fit on all faces of the insulation. If cavity depth is greater than the insulation nominal thickness, fix or strap the product to secure in accordance with installation instructions. Cut into smaller pieces for smaller spaces and around penetrations to achieve efficient thermal performance. Do not fold, tuck or compress the insulation. Refer to [NZS 4246](#) for installation guidelines and Earthwool® glasswool Product Data Sheets, for detailed installation instructions.

Application - ceiling

3.9 FIT EARTHWOOL® GLASSWOOL INSULATION SEGMENT - BETWEEN RAFTERS (SKILLION ROOF)

Friction fit Earthwool® glasswool: Ceiling segments between ceiling rafters. Use a sharp craft knife to cut to required size or around penetrations if required. Maintain a minimum clearance of 25mm between the insulation and the roofing membrane (underlay) except where a solid timber (or plywood) substrate is used under the roof cladding.

3.10 CEILING INSULATION EDGE DETAIL

Where perimeter of ceiling space is too low to allow full depth of insulation plus the 25mm air gap to the underlay, provide reduced perimeter insulation to [NZS 4246.6.2](#) and maintain the 25mm gap.

Completion**3.11 CLEAN UP**

Clean up as the work proceeds. Ensure no spare off cuts or any other materials remain behind claddings or linings.

3.12 LEAVE

Leave work to the standard required by following procedures.

3.13 REMOVE

Remove debris, unused materials and elements from the site. Earthwool® glasswool packaging is recyclable.

4 SELECTIONS

For further details on selections go to www.knaufinsulation.co.nz
Substitutions are not permitted to the following, unless stated otherwise.

Wall insulation**4.1 EARTHWOOL® GLASSWOOL INSULATION: WALL SEGMENTS**

Location:	Walls
Brand:	Earthwool® glasswool
R-value:	R2.6
Thickness:	90mm

Ceiling insulation**4.2 EARTHWOOL® GLASSWOOL INSULATION: CEILING SEGMENT - SKILLION ROOF**

Location:	Ceiling
Brand:	Earthwool® Ceiling Segment
R-value:	R3.6
Thickness:	150mm
Dimensions:	1200mm x 7m

5113G GIB® PLASTERBOARD LININGS

1 GENERAL

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

- | standard systems
- | superior finish quality systems
- | bracing systems
- | fire rated garage boundary wall systems
- | wet area systems
- | GIBFix® Framing systems

1.1 ABBREVIATIONS AND DEFINITIONS

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

The following abbreviations apply specifically to this section:

AWCINZ Association of Wall and Ceiling Industries New Zealand

Documents

1.2 DOCUMENTS

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

NZBC C/AS2-AS6	Protection from fire
NZBC E2/AS1	External moisture
AS 1397	Continuous hot-dip metallic coated steel sheet and strip - Coatings of zinc and zinc alloyed with aluminium and magnesium
AS/NZS 2588	Gypsum plasterboard
AS/NZS 2589	Gypsum linings - Application and finishing
NZS 3604	Timber-framed buildings
AS/NZS 4600	Cold-formed steel structures
ISO 5660.1	Reaction-to-fire tests - Heat release, smoke production and mass loss rate - Part 1: Heat release rate (cone calorimeter method)
ISO 5660.2	Reaction-to-fire tests - Heat release, smoke production and mass loss rate - Part 2: Smoke production rate (dynamic measurement)

BRANZ Technical Paper P21 BRANZ Technical Paper P21: A wall bracing test and evaluation procedure (2010)

NASH Residential and Low-Rise Steel Framing Part 1 2010 Design Criteria

1.3 MANUFACTURER/SUPPLIER DOCUMENTS

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

- | GIB® Site Guide (Dec 2014)
- | GIB® Noise Control Systems (March 2006)
- | GIB® Fire Rated Systems (Oct 2012)
- | GIB Aqualine® Wet Area Systems (March 2007)
- | GIB Superline® (June 2013)
- | GIB® Ezybrace® Systems (2016)
- | GIB Ezybrace® Bracing Software (2016)
- | GIB Ezybrace® Systems (June 2011), with amendments (Dec 2014)
- | GIB Ezybrace® for Steel Frame Housing (NASH) Software (2011)
- | GIBFix® Framing System (2016)
- | GIB® Rondo® Metal Ceiling Batten Systems
- | GIB-Cove®
- | GIB® Goldline™ Platinum Tape-on Trims (Jan 2006)
- | GIB® UltraFlex® high impact corner mould (Sept 2004)
- | GIB® Tough Systems (Nov 2014)

BRANZ Appraisal 294 (2011) - GIB Ezybrace® Systems

BRANZ Appraisal 427 (2007) - GIB Aqualine® Wet Area Systems

BRANZ Appraisal 928 (2016) - GIB Ezybrace® Systems 2016

GreenTag Certification [WWLCG001-001-A-2015](#) - GreenTag™ GreenRate/Level C for:

- | GIB® Standard (10mm & 13mm)
- | GIB Fyrelite® (10mm, 13mm, 16mm & 19mm)
- | GIB Braceline® (10mm & 13mm)

- ┆ GIB® Noiseline® (10mm & 13mm)
- ┆ GIB Toughline® (13mm)

Copies of the above literature are available at
 Company: Winstone Wallboards
 Web: www.gib.co.nz
 Telephone: 0800 100 442

Requirements

1.4 NO SUBSTITUTIONS

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

1.5 INSTALLER WORK SKILLS AND QUALIFICATIONS

GIB® plasterboard fixers and plasterers to be experienced competent workers, familiar with GIB® plasterboard lining systems installation and finishing techniques. Submit evidence of experience on request. For example:

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

Performance

1.6 INSPECTIONS AND ACCEPTANCE

Allow for inspection of the finished plasterboard surface:

- ┆ before applying sealer and
- ┆ before applying finish coatings or decorative papers,

so that after assessment of the type and/or angle of illumination and its effect on the completed decorative treatment, group approval and acceptance of the surface can be given.

1.7 BRACING REQUIREMENTS

Braced wall systems to [NZS 3604](#) when tested to BRANZ Technical Paper P21, using:

- ┆ GIB Ezybrace® Systems (2016) and/or GIB Ezybrace® Bracing Software (2016)
- ┆ GIB Ezybrace® Systems (2011)
- ┆ GIB Ezybrace® for Steel Frame Housing (NASH) Software 2011 (to NASH Residential and Low-Rise Steel Framing Part 1 2010 Design Criteria)

Refer to drawings for location and type.

2 PRODUCTS

Materials

2.1 GIB® PLASTERBOARD

Gypsum plaster core encased in a face and backing paper formed for standard and water resistance use to [AS/NZS 2588](#). Refer to SELECTIONS for location, type, thickness and finish.

GIB® Standard plasterboard

GIB Wideline® plasterboard

GIB Ultraline® high quality surface plasterboard

GIB Fyrelime® fire resistant plasterboard

GIB Braceline® & GIB® Noiseline® dual purpose wall bracing & noise control plasterboard

GIB Aqualine® wet area plasterboard

GIB Toughline®

GIB Superline®

Components

2.2 SCREWS

GIB® Grabber® drywall type screws as follows:

Grabber® type	Used for fixing:
High Thread	GIB Ezybrace® or Standard systems to timber
Self Tapping	Standard systems to light gauge steel or timber
Dual Thread Screws	GIBFix®, GIB Ezybrace®, or Standard systems, to light gauge steel or timber
Wafer Head Needle Tip	Light gauge metal to timber not directly under plasterboard
Pancake Head Drill Tip	Light gauge metal to light gauge metal directly under plasterboard

Refer to GIB® requirements for appropriate details.

2.3 NAILS

GIB® Nails (gold passivated).

Size: 30mm, 40mm

2.4 TAPE ON TRIMS AND EDGES

GIB® Goldline™ tape-on trims
GIB® UltraFlex® high impact corner mould
GIB® Levelline® Tape on Trim

2.5 METAL ANGLE TRIMS

GIB® galvanized steel slim angle trims.

2.6 CONTROL JOINTS

GIB® Rondo® P35 control joints.
GIB® Goldline™ tape-on trims
GIB® plastic smooth control joints.
GIB® plastic W-profile control joints.

Accessories

2.7 ADHESIVE

Timber frame and/or steel frame:
GIBFix® One ultra low VOC water based wallboard adhesive
GIBFix® All-Bond solvent based wallboard adhesive

2.8 JOINTING COMPOUND

Bedding compound:	GIB Tradeset®, GIB Lite Blue®, GIB MaxSet®, GIB ProMix® All Purpose, GIB Plus 4®
Finishing compound:	GIB ProMix® All Purpose, GIB® Trade Finish®, GIB® Trade Finish® Lite, GIB ProMix® Lite, GIB® U-Mix, GIB Plus 4®, GIB Trade Finish® Multi
Cove:	GIB-Cove® Bond

2.9 JOINTING TAPE

GIB® paper jointing tape.

2.10 GAP FILLER

GIB® Gap Filler ultra low VOC multi-purpose acrylic flexible filler

3 EXECUTION

Conditions

3.1 STORAGE

Store GIB® plasterboard sheets and accessories in dry conditions stored indoors out of direct sunlight in neat flat stacks on either an impervious plastic sheet or clear of the floor with no sagging and avoiding damage to ends, edges and surfaces. Reject damaged material. Refer to GIB® Site Guide (Dec 2014).

3.2 LEVELS OF PLASTERBOARD FINISH

Provide the selected plasterboard surfaces to the pre decorative levels of finish specified in [AS/NZS 2589](#).

3.3 CONFIRM LEVELS OF PLASTERBOARD FINISH ACCEPTANCE

Before commencing work, agree in writing upon the surface finish assessment procedure towards ensuring that the quality of finish expectations are reasonable and are subsequently obtained and acceptable.

Do not apply decorative treatment until it is agreed in writing by the contractor, subcontractors and decorator that the specified plasterboard Level of Finish has been achieved.

"Levels of plasterboard finish" is a tool for specifying the required quality of finish when installing and flush stopping GIB® plasterboard **prior** to the application of a range of decorative finishes under various lighting conditions. Refer to **AS/NZS 2589**.

3.4 SUBSTRATE

Do not commence work until the substrate is plumb, level and to the standard required by the sheet manufacturer's requirements. Refer to GIB® Site Guide (Dec 2014).

3.5 TIMBER FRAME MOISTURE CONTENT

Maximum allowable moisture content to [AS/NZS 2589](#) for timber framing at lining: 18% or less for plasterboard linings. Refer to [NZBC E2/AS1](#) and GIB® Site Guide (Dec 2014).

3.6 PROTECTION

Protect surfaces; cabinetwork, fittings, equipment and finishes already in place from the possibility of water staining and stopping damage. Refer to GIB® Site Guide (Dec 2014).

Application

3.7 LINING WALLS AND CEILINGS GENERALLY

Form to GIB® Site Guide (Dec 2014). Ensure bulk insulation thickness shall not exceed that of the wall framing.

3.8 BOARD ORIENTATION

Minimise joints by careful sheet layout using the largest sheet sizes possible, and generally fixing horizontally. Where part sheets are required for various stud heights they should be positioned so the cut sheet is as low as possible to keep joints below eye level.

3.9 FORM WET AREA SYSTEMS

Form to GIB Aqualine® Wet Area Systems requirements.

3.10 FORM BRACING SYSTEMS

Form bracing systems to:

- ▮ GIB Ezybrace® Systems (2016)
- ▮ GIB Ezybrace® Systems (2011)

3.11 FORM CONTROL JOINTS

Form control joints to GIB® Site Guide (Dec 2014) requirements.

3.12 INSTALL TAPE-ON TRIMS

Install to GIB® Goldline™ Tape-on trims literature and/or GIB® Ultraflex high impact corner mould literature.

Finishing

3.13 FINISHING GENERALLY

To GIB® Site Guide (Dec 2014) and [AS/NZS 2589](#).

Completion

3.14 REPLACE

Replace damaged sheets or elements.

3.15 CLEAN DOWN

Clean down completed surfaces to remove irregularities and finally sand down with fine paper to the sheet manufacturer's requirements, to leave completely smooth and clean.

3.16 REMOVE

Remove debris, unused materials and elements from the site.

3.17 LEAVE

Leave work to the standard required by following procedures.

4 SELECTIONS

Plasterboard

4.1 GIB® STANDARD SYSTEMS WALLS

Location	Plasterboard type / Lining requirements	Thickness	Finish Level
Walls	GIB® Standard plasterboard	10mm	Level 5
Ceilings	GIB® Standard plasterboard	13mm	Level 5

4.2 GIB® WATER RESISTANT SYSTEMS WALLS

Location	Plasterboard type / Lining requirements	Thickness	Finish Level
Bathroom & Kitchen	GIB Aqualine® plasterboard	10mm	F5

4.3 GIB® STANDARD SYSTEMS CEILINGS

Location	Plasterboard type / Lining requirements	Thickness	Finish Level
Ceiling	GIB® Standard plasterboard	13mm	

4.4 GIB® BRACING SYSTEMS

Refer to:

- ┆ GIB Ezybrace® Systems (2016)
- ┆ GIB Ezybrace® Systems (2011)

For bracing element location refer to drawn documentation.

Accessories

4.5 GIB® TAPE ON EDGE OR CORNER TRIMS

Brand/type:

5230 INTERIOR DOORS

1 GENERAL

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

1.1 RELATED SECTIONS

Refer to glazing section/s for glass type and thickness.

1.2 DOCUMENTS

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

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

2 PRODUCTS

2.1 TIMBER

To [NZS 3602](#).

2.2 PROFILES, FACINGS, SCRIBERS AND ARCHITRAVES

Traditional profiles to [NZS 3610](#). Proprietary profiles and special profiles as detailed. Pencil radius corners of profiled schedules for paint finish.

2.3 DOORS, PAINTED

Doors as scheduled (without clashing strips).

2.4 CAVITY SLIDERS

Doors hung within a proprietary cavity slider frame and complete with brand-matched sliding door gear.

2.5 DOOR HINGES

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

2.6 SLIDING DOOR GEAR

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

3 EXECUTION

3.1 SITE MEASURE

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

3.2 EXECUTION GENERALLY

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

3.3 FACTORY FIT HARDWARE

Factory fit the following where specified: -

- ┆ Hinges

3.4 FACTORY FINISHING

Before delivery to site: -

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

Internal doors

3.5 INTERNAL JOINERY FRAMES

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

3.6 DOOR FRAMES, SOLID REBATED

Fabricate as detailed. Hang doors to operate freely on hinges, sliding, or bi-fold gear and to the door manufacturer's requirements. Pre drill for fixings through frame. Countersink and plug frames scheduled for clear finish. Fit hardware.

3.7 DOOR LINERS

Heads and jambs finished minimum 18mm, with 10mm planted door stops. Width to match width of lined walls. Hang doors on hinges, sliding, or sliding-folding gear to the door manufacturer's requirements and to operate freely. Countersink and plug frames scheduled for clear finish. Fit hardware.

3.8 DOOR LINERS, EXTENDED

Heads and jambs finished 30mm, rebated for wall linings and extended a minimum of 10mm. 10mm planted door stops. Hang doors on hinges, sliding and bi-fold gear to the door manufacturer's requirements and to operate freely. Countersink and plug frames scheduled for clear finish. Fit hardware.

3.9 CAVITY SLIDERS

Install in accordance with the door manufacturer's requirements, allowing for removal of top trim for maintenance.

Completion**3.10 CHECK**

Check and adjust operation of all sashes, doors, hardware and furniture.

3.11 TEMPORARY PROTECTION

On completion remove any temporary protection and leave ready for following work.

4 SELECTIONS

6141 GROUND, SEALED OR POLISHED CONCRETE

1 GENERAL

This section relates to the provision of a high quality concrete finish to new or existing concrete surfaces incorporating mixed design aggregates and plain concrete.

It includes:

- ┆ plain polish
- ┆ grind and seal
- ┆ grind and polish

1.1 RELATED WORK

Refer to appropriate concrete section(s) for mix design and placement.

1.2 ABBREVIATIONS AND DEFINITIONS

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

The following definitions apply specifically to this section:

Plain polish:	The concrete is mechanically ground just enough to clean it (virtually no aggregate exposed) and clear sealed.
Grind:	The concrete is mechanically ground to expose aggregate
Grind and seal:	The concrete is mechanically ground and clear sealed.
Grind and polish:	The concrete is mechanically ground, then hardened, then polished, then sealed and finally burnished.

Documents

1.3 DOCUMENTS

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

NZS 3114	Specification for concrete surface finishes
AS/NZS 3661.1	Slip resistance of pedestrian surfaces - Requirements

Requirements

1.4 QUALIFICATIONS

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

1.5 PROVIDE SAMPLE

Provide a sample of specified finishes before commencing work. Sample to be of similar mix to the proposed construction. Refer to SELECTIONS. Keep sample on site until concrete polishing is completed.

1.6 TECHNIQUE DISCUSSION - CONCRETE PLACEMENT

Advise the concrete placer of the areas scheduled for ground/polished finishes. Ensure the placed concrete to be ground is not overworked resulting excess sand /cement paste at the concrete surface

1.7 TECHNIQUE DISCUSSION AND FINISH STANDARD

Before commencing work, arrange a meeting to confirm the method of carrying out the work. Select an area on site, grind and finish the selected area to achieve the agreed finish. When agreement is reached, this then becomes the finish standard for the balance of the work.

2 PRODUCTS

2.1 PENETRATING SEALER

Refer to SELECTIONS.

2.2 SURFACE SEALER

Refer to SELECTIONS.

2.3 GROUT

Cement base slurry grout.

3 EXECUTION

Conditions

3.1 CONFIRM CONCRETE SURFACE

Confirm concrete surface is of the required standard for the concrete polishing and finishing processes. Do not proceed if placed concrete is not capable of delivering the specified finish. Seek written direction as to what action is required.

3.2 PLACING THE CONCRETE

Place concrete with light vibrate only, do not over vibrate. The concrete pavement or floor must be to [NZS 3114:1987](#), a Class U3 finish. Very light power float (1 or 2 light passes).

3.3 PROTECTION

Cover glass, anodised aluminium and other surfaces to protect from damage that is caused from cementitious dust.

Application - grind and polish**3.4 GRIND TYPE - GRIND AND POLISH**

For type and depth of grind refer to SELECTIONS.

3.5 FIRST GRIND - GRIND AND POLISH

For new slabs grind 7 -10 days minimum after placing the concrete. Grind the floor to expose the aggregate using a 20/40 grit steel bonded diamond. Aggregate should be consistent over the surface.

3.6 APPLY DENSIFIER - GRIND AND POLISH

Apply selected densifier to manufacturer's requirements.

3.7 SECOND GRIND - GRIND AND POLISH

When the building is appropriately enclosed, linings completed before fittings, fixtures and skirtings are installed, grind the residue off the floor and start polishing the surface using a 50 grit resin bonded diamond, progressing by approximately doubling the grit each pass up to 800 to 3000 grit resin bonded diamond, depending on gloss level required. Refer to SELECTIONS for gloss levels.

3.8 APPLY CONCRETE SEALER - GRIND AND POLISH

Apply selected concrete penetrating sealer to manufacturer's requirements.

3.9 BURNISH

Burnish to remove final residue and polish with purpose made pad.

Application - holes and cuts**3.10 GROUT HOLES**

Grout slurry the air holes left in the concrete surface. Polish to remove grout within 24 hours of application using a 120 grit diamond.

3.11 GROUTING CONCRETE CUTS

Grout construction cuts and decorative cuts. Polish to remove excess grout within 24 hours of application using a 120 grit diamond.

Protect slab**3.12 PROTECT SURFACE AFTER FIRST GRIND**

Fully cover and protect from damage after the first grind and once the building is enclosed. Ensure material allows the floor to breath and is non-staining.

3.13 PROTECT FINISHED POLISHED CONCRETE

Protect floor from damage. Provide protection by laying breathable, non staining sheet material for the period between completion of polishing and completion of the contract works.

Completion**3.14 LEAVE**

Leave work to the standard required by following procedures.

3.15 REMOVE

Remove debris, unused materials and elements from the site.

4 SELECTIONS**Grind and polish**

4.1 GRIND AND POLISH CONCRETE

Location:	Lounge Wing and Ground floor
Time first grind:	7-10 days
Sample type:	Both
Depth of grind:	Heavy grind 3mm to 5mm
Finish level:	1500 grit Semi-gloss finish
Sealer:	Penetrating sealer

6211 WALL TILING

1 GENERAL

This section relates to the supply and installation of ceramic wall tiles.
It includes:

- ┆ cement render walls
- ┆ concrete masonry walls
- ┆ timber substrate walls

1.1 RELATED WORK

Refer to 6221 FLOOR TILING for floor tiling.

Documents

1.2 DOCUMENTS

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

AS 3740	Waterproofing of wet areas within residential buildings
AS 3958.1	Ceramic tiles - Guide to the installation of ceramic tiles
AS ISO 13007.1	Ceramic tiles - Grouts and adhesives: Terms, definitions and specifications for adhesives
AS ISO 13007.3	Ceramic tiles - Grouts and adhesives: Terms, definitions and specifications for grouts
BRANZ	Good practice guide - Tiling

Requirements

1.3 QUALIFICATIONS

Tilers to be experienced, competent trades people familiar with the materials and techniques specified.

1.4 NO SUBSTITUTIONS

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

1.5 ADHESIVES COMPATIBILITY

Adhesives selected for use on proprietary substrates or waterproof membranes to have documented compatibility approval from the respective manufacturers.

2 PRODUCTS

Materials

2.1 WALL TILES

Refer to SELECTIONS for product selection.

Accessories

2.2 LIQUID WATERPROOFING MEMBRANE

To AS 3740.

2.3 SAND AND CEMENT GROUT

1 part Portland cement to 2-3 parts fine sand mixed to a paste consistency with a minimum of clean water.

2.4 GROUT

Cement based, compressible and to suit particular location/use. To AS ISO 13007.3.

2.5 TILE ADHESIVE

To AS ISO 13007.1.

2.6 MOVEMENT JOINT SEALANT

To BRANZ Good practice guide: Tiling, section 5.0.

- ┆ Neutral cured sealant for areas where waterproof membranes are used or where used against aluminium.
- ┆ Acid cured sealant except for areas where waterproof membranes are used or where used against aluminium.

Note: Check compatibility of membrane and sealant, use bond breaking tape to separate them if required.

3 EXECUTION

3.1 DELIVERY, STORAGE AND HANDLING

Take delivery of materials and goods and store on site and protect from damage.
Protect finished surfaces, edges and corners from damage.
Move/handle goods in accordance with manufacturer's requirements.
Reject and replace goods that are damaged or will not provide the required finish.

3.2 CHECK TILES

Check tiles to ensure that they are as specified, from the same batch, of a consistent colour and pattern and sufficient to complete the work. Reject tiles that vary widely in colour or pattern. Reject tiles that are damaged.

3.3 CONFIRM LAYOUT

Before commencing work confirm the proposed layout of tiles and expansion joints and other visual considerations of the finished work.

3.4 SETTING OUT

Before commencing the setting out confirm the number and location of cut tiles. Minimise in number with no cut tiles less than half size and only at the perimeter of the work.

Conditions

3.5 SERVICES AND ACCESSORIES

Ensure that all services and accessories are in place and located to suit the tile layout, and that the substrate, background and adjoining surfaces (with the preparation called for in this section) are of the quality necessary to allow tiling of the required standard.

3.6 SUBSTRATE TEMPERATURE

Do not carry out tiling where the substrate temperature is below 5°C or above 40°C.

3.7 LIGHTING

Light the tile work as closely and clearly as possible to that of the finished lighting, to ensure that differences in plane surface are highlighted during installation.

Application - preparing new surfaces

3.8 NEW SHEET LININGS

Remove contaminants that may affect bonding or adhesion. Surface to finish clean and dry with a texture to give a complete key to the tile manufacturer's requirements and with a maximum variation in the background plane of 4mm in 2 metres.

Application - waterproof membranes

3.9 INSTALL WATERPROOFING MEMBRANE

Install waterproofing membrane between the tile adhesive and the substrate. Reinforce all junctions of the waterproofing membrane to BRANZ Good practice guide - Tiling; 7.0 Waterproofing interior wet areas. Unless otherwise specified or shown on the drawings, install waterproof membranes as follows: -

Unenclosed shower cubicle

- ┆ To 1800mm above floor and 300mm above shower rose.
- ┆ To at least 1500mm from shower rose.
- ┆ To the floor within 1500mm of the shower rose.

Bath with a shower over and no shower screen

- ┆ To 1500mm from the shower rose and top edge.
- ┆ To 1800mm above base of bath.
- ┆ To the floor within 1500mm of the shower rose.

Bath with shower over and a screen for the shower

- ┆ To 1800mm height around sides of bath.

Bath

- ┆ To 150mm minimum around the sides and along walls horizontally 150mm minimum.

Splashback to a vanity

- ┆ To 300mm minimum up wall behind the vanity.
- ┆ To the floor level at least twice the width of the vanity and 500mm min beyond it at each end.

3.10 LIQUID WATERPROOFING MEMBRANE

Apply the selected liquid waterproof membrane system to the membrane manufacturer's requirements and in accordance with AS 3740 and to BRANZ Good practice guide - Tiling, 7.0 Waterproofing interior wet areas.

Application - tile installation**3.11 TILE FIXING GENERALLY**

To AS 3958.1. Apply adhesive, prepare and fix tiles by the method required by the adhesive manufacturer and tap them firmly into place.

3.12 FITTING TILES

Ensure cut edges are smooth and installed without jagged or flaked edges. Do not install single tiles in more than one piece. Maintain the heights of wall tile work in full courses to the nearest dimension. Within allowed tolerances, ensure corners of tiles are flush and level with corners of adjacent tiles. Keep joint lines, including mitres, straight and of an even width. Fully bed trim units, moulded or shaped pieces and other accessories with an appropriate bedding material. Fix accessories level, plumb and true to the designated projection at detailed locations and heights.

3.13 MOVEMENT JOINTS

Provide movement joints with a minimum width of 4mm, carried through tile and bedding and where substantial movement is anticipated, through the rigid sheet to the structure. Install joints over expansion joints, at junctions between different backgrounds, abutting other materials, at storey heights horizontally and 3 to 4 metres vertically, at internal corners and at junctions with floors and columns. Ensure joints are clean, formed, filled and with sealant inserted to the sealant manufacturer's requirements.

3.14 TILE FINISH AND JOINTS

Ensure finished surfaces are flat and true to a tolerance of ± 4 mm in 2 metres from the required plane. Clean surplus bedding material from joint spaces and tile surface. Ensure joint widths are consistent throughout the installation with 1.5mm width for dust-pressed tiles and 6mm for extruded tiles, measured at the tile face.

Ensure joint alignment is consistent throughout the installation and to a tolerance of ± 4 mm in 2 metres from the detailed joint alignment.

3.15 THIN BED FIXING

Apply adhesive to a maximum 3mm bed thickness with a minimum of voids.

Notched trowel method

- ▮ For internal dry applications, spread adhesive to a uniform thickness and "rib" it with a notched trowel to the adhesive manufacturer's requirements. Press tiles and beat into place to obtain adequate coverage by adhesive on the back of each tile.

Floating method

- ▮ Apply adhesive to a uniform thickness. Apply tiles with a twisting or sliding action and tap back firmly into the floated bedding.

Buttering

- ▮ With a trowel butter adhesive evenly over the whole of the back of the tile, slightly thicker than the final required adhesive thickness. Press and tap firmly into position leaving no voids. Do not use "spot-fixing".

Occasionally remove a tile as fixing proceeds to check the maintenance of adequate contact with the adhesive.

3.16 THICK BED FIXING

Apply thick-bed cement based adhesive to an average 6mm bed thickness as a floated bed and to the tile manufacturer's requirements. Prepare and fix tiles by the method required by the tile manufacturer and beat and tap them firmly into place.

Grouting**3.17 APPLY GROUTING**

Remove spacers. Apply grouting mix to as large an area as can be worked before setting commences. Work with a grouting tool back and forth until joints are completely filled with no adhesive showing. Avoid damage to the surface of tiles, using masking tape where necessary. Finish to the depth of the cushion and flush with surface to cushion edge and square edge tiles. Remove surplus grout with a damp cloth and tool the joints to finish the grout uniform in colour, smooth and without voids, pinholes or low spots.

3.18 APPLY PROPRIETARY GROUTING

Remove spacers. Prepare joints, mix and apply grout and finish off to the tile manufacturer's requirements, uniform in colour, smooth and without voids, pinholes or low spots.

Cleaning**3.19 CLEAN TILES**

Upon completion of setting and grouting, thoroughly sponge and wash the tiles to leave them completely clean and without blemish. Finally polish glazed tiles with a clean dry cloth.

Completion**3.20 ROUTINE CLEANING**

Carry out routine trade cleaning of this part of the work including periodic removal all debris, unused and temporary materials and elements from the site.

3.21 DEFECTIVE OR DAMAGED WORK

Repair damaged or marked elements. Replace damaged or marked elements where repair is not possible or will not be acceptable. Adjust operation of equipment and moving parts not working correctly. Leave work to the standard required for following procedures.

4 SELECTIONS

Substitutions are not permitted to the following, unless stated otherwise.

6221 FLOOR TILING

1 GENERAL

This section relates to the supply and installation of ceramic floor tiles.
It includes:

- ┆ concrete substrates
- ┆ timber substrate floors
- ┆ timber floor overlays

1.1 RELATED WORK

Refer to 6211 WALL TILING for wall tiling.

Documents

1.2 DOCUMENTS

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

NZBC D1/VM1	Access routes
NZBC D1/AS1	Access routes
NZBC E3/AS1	Internal moisture
AS/NZS 3661.1	Slip resistance of pedestrian surfaces - Requirements
AS 3740	Waterproofing of wet areas within residential buildings
AS 3958.1	Ceramic tiles - Guide to the installation of ceramic tiles
NZS 4121	Design for access and mobility - Buildings and associated facilities
AS/NZS 4671	Steel reinforcing materials
AS ISO 13007.1	Ceramic tiles - Grouts and adhesives: Terms, definitions and specifications for adhesives
AS ISO 13007.3	Ceramic tiles - Grouts and adhesives: Terms, definitions and specifications for grouts
BRANZ	Good practice guide: Tiling

Requirements

1.3 QUALIFICATIONS

Tilers to be experienced, competent trades people familiar with the materials and techniques specified.

1.4 NO SUBSTITUTIONS

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

1.5 DEFLECTION CRITERIA FOR SUSPENDED FLOORS

Check that the floor is rigid enough for the tiling. Deflection of suspended floors should not exceed 1/360th of the span under dead load and live load.

1.6 ADHESIVES COMPATIBILITY

Adhesives selected for use on proprietary substrates or waterproof membranes to have documented compatibility approval from the respective manufacturers.

1.7 PROVIDE SPARE TILES

Provide spare tiles. Refer to SELECTIONS for type and quantity.

Performance

1.8 SLIP RESISTANCE FOR ACCESS ROUTES

Slip resistance for tiles to comply with NZBC D1/AS1: 2.0 Level access routes and 3.0 Ramps.

- ┆ when in place on a level access route, to have a mean coefficient of friction (μ) not less than 0.4 when tested in accordance with AS/NZS 3661.1.
- ┆ when in place on a sloping access route, to have a coefficient of friction (μ) not less than $0.4 + 0.0125S$ (S = slope of surface expressed as a percentage).

1.9 PROVIDE EVIDENCE OF SLIP RESISTANCE

Provide evidence that the tiles comply with the standard of performance specified.

1.10 CERTIFY SLIP RESISTANCE

Provide certificates and any other evidence at the time of selection/supply that the tiles comply with [NZBC D1/VM1](#) and [NZBC D1/AS1](#): Access routes.

2 PRODUCTS

Materials

2.1 FLOOR TILES

Refer to SELECTIONS for product selection.

2.2 REINFORCING MESH

To [AS/NZS 4671](#), galvanized 500mm x 500mm x 2.5mm.

2.3 SEPARATING LAYER

Single layer heavy gauge polyethylene film.

2.4 BUILDING UNDERLAY

Breather type bitumen saturated kraft paper.

Components

2.5 EXPANSION JOINT, METAL AND RUBBER

Clear anodised aluminium/brass with metal anchor to set into in-situ concrete, cement screed/bed and complete with rubber infill.

2.6 EXPANSION JOINT, METAL AND COMPOUND

Aluminium/brass angles with high density foam rubber insert and jointing compound.

2.7 EXPANSION JOINT, PLASTIC

Rigid stabilised PVC sides with flexible central section.

Accessories

2.8 SCREED

Mix of 3:1 Portland cement, coarse washed sand gauged with liquid polymer additive to the tile manufacturer's stated requirements.

2.9 CEMENT MORTAR

Sand and cement bedding coat with liquid polymer additive, to the tile manufacturer's stated requirements.

2.10 LIQUID WATERPROOFING MEMBRANE

To AS 3740.

2.11 TILE ADHESIVE

To AS ISO 13007.1.

2.12 SAND AND CEMENT GROUT

1 part Portland cement to 2-3 parts fine, washed sand, mixed to a paste consistency with a minimum of clean, potable water.

2.13 PROPRIETARY GROUT

Cement based, compressible and to suit particular location/use. To AS ISO 13007.3.

2.14 MOVEMENT JOINT SEALANT

To BRANZ Good practice guide: Tiling, section 5.0.

- ┆ Neutral cured sealant for areas where waterproof membranes are used or where used against aluminium.
- ┆ Acid cured sealant except for areas where waterproof membranes are used or where used against aluminium.

Note: Check compatibility of membrane and sealant, use bond breaking tape to separate them if required.

3 EXECUTION

3.1 DELIVERY, STORAGE AND HANDLING

Take delivery of materials and goods and store on site and protect from damage.
Protect finished surfaces, edges and corners from damage.
Move/handle goods in accordance with manufacturer's requirements.
Reject and replace goods that are damaged or will not provide the required finish

3.2 CHECK TILES

Check tiles to ensure that they are as specified, from the same batch, of a consistent colour and pattern and sufficient to complete the work. Reject tiles that vary widely in colour or pattern. Reject tiles that are damaged.

3.3 CONFIRM LAYOUT

Before commencing work confirm the proposed layout of tiles and expansion joints and other visual considerations of the finished work.

3.4 SETTING OUT

Before commencing the setting out confirm the number and location of cut tiles. Minimise in number with no cut tiles less than half size and only at the perimeter of the work.

3.5 GENERALLY

Prepare surface and complete tiling work in accordance with AS 3958.1, as modified by BRANZ Good practice guide: Tiling.

Conditions**3.6 SERVICES AND ACCESSORIES**

Ensure that all services and accessories are in place and located to suit the tile layout, and that the substrate, background and adjoining surfaces (with the preparation called for in this section) are of the quality necessary to allow tiling of the required standard.

3.7 DO NOT START

Do not start laying tiles until concrete floors are cured, moisture content of floors is such that shrinkage is complete, thermal movement has been accommodated and the levels and surface finish will achieve tile laying of the required standard.

3.8 SUBSTRATE TEMPERATURE

Do not carry out tiling where the substrate temperature is below 5°C or above 40°C.

3.9 MOISTURE CONTENT

Ensure the floor is dry and if in doubt check for moisture content by hygrometer. Do not proceed with tiling work until readings for the whole area show 75% relative humidity or less.

3.10 SCREEDS

Form screeds with a deviation from plane of not more than 5mm over 3 metres.

3.11 FALLS

Form screeds in areas where water is used in significant amounts with a deviation from plane of not more than 5mm over 3 metres. Unless otherwise specified form screeds with the following falls:
Unless stated otherwise provide minimum fall gradients to BRANZ Good Practice Guide - Tiling, clause 6.5 Falls in floors.

1 : 40 minimum	For tiled decks which also acts as a roof
1 : 60 minimum	For paving over ground
1 : 50 minimum	For unenclosed shower bases (to NZBC E3/AS1 , 3.3.5)
1 : 60 minimum	For enclosed shower bases
1 : 50 minimum	For shower bases for people with disabilities (to NZS 4121 , 10.5.11.3 (b).)
1 : 60 minimum	For commercial kitchens or similar

Application - preparing new surfaces**3.12 CONCRETE FLOORS**

Completely remove surface contaminants such as paints, oils, release and curing compounds. Remove projections, unevenness and loose material to leave a clean dust and dirt free surface.

Movement joints**3.13 MOVEMENT JOINTS**

Provide movement joints with a minimum width of 4mm, carried through tile and bedding and where substantial movement is anticipated, through the rigid sheet to the structure. Install joints over expansion joints, at junctions between different backgrounds, abutting other materials, at internal corners and at junctions with floors and columns. Ensure joints are clean, formed, filled and with sealant inserted to the sealant manufacturer's requirements.

3.14 METAL EXPANSION JOINT

Accurately locate and fix joints in situ, with the bedding, or on top of the bedding, to finish flush with the installed tile and to the tile manufacturer's requirements. Fit and fix rubber/rubber compound inserts to finish flush. Fit expansion joints at regular intervals over the floor area at intervals not exceeding 4 metres, at changes in floor plane and where the floor plane is interrupted.

Waterproofing

3.15 INSTALL WATERPROOFING MEMBRANE - INTERIOR WET AREAS

Install waterproofing membrane to manufacturers requirements and to BRANZ Good tiling practice, 7.0 Waterproofing interior wet areas. Reinforce all junctions of the waterproofing membrane to BRANZ Good practice guide: Tiling; 7.0 Waterproofing interior wet areas. Unless otherwise specified or shown on the drawings, install waterproof membranes as follows:

Unenclosed shower cubicle

- | To 1800mm above floor and 300mm above shower rose.
- | To at least 1500mm from shower rose.
- | To the floor within 1500mm of the shower rose.

Bath with a shower over and no shower screen

- | To 1500mm from the shower rose and top edge.
- | To 1800mm above base of bath.
- | To the floor within 1500mm of the shower rose.

Bath with shower over and a screen for the shower

- | To 1800mm height around sides of bath.

Bath

- | To 150mm minimum around the sides and along walls horizontally 150mm minimum.

Splashback to a vanity

- | To 300mm minimum up wall behind the vanity.
- | To the floor level at least twice the width of the vanity and 500mm min beyond it at each end.

Application - tile installation

3.16 BONDED CEMENT MORTAR

Apply proprietary cement slurry bond coat over the whole of the floor to the tile manufacturer's requirements. Thoroughly mix and place the 40mm thick mortar bed over the bond coat and firmly tamp, screed and compact to the required level. Apply proprietary cement slurry bond coat to the wet mortar bed and set tiles while still tacky, firmly beating into the bedding and aligning the 3mm tile joints at the same time.

3.17 MODIFIED CEMENT BASED ADHESIVE

Apply and float thick or thin bed of modified cement based adhesive to bed thickness to the adhesive manufacturer's requirements. Rib surface with a notched trowel, press tiles and place with required grout joints and to obtain adequate coverage by adhesive on the back of each tile to AS 3958.1.

3.18 MODIFIED CEMENT BASED ADHESIVE AND WATERPROOF MEMBRANE

Apply appropriate waterproof membrane to manufacturer's requirements. Apply and float thick or thin bed of modified cement based adhesive to bed thickness to the adhesive manufacturer's requirements. Rib surface with a notched trowel, press tiles and place with required grout joints and to obtain adequate coverage by adhesive on the back of each tile to AS 3958.1.

3.19 PLASTER SCREED AND SEPARATING LAYER

Lay polyethylene sheet/building underlay to a smooth surface, joints lapped 100mm minimum. Place galvanized steel mesh over with spacers to centralise it in the mortar bed. Thoroughly mix and place the proprietary screed mix to the manufacturer's requirements and compact to the required level. Ensure drying times are observed before installation of tiles by thin/thick set method.

3.20 EXPANSION JOINT, COMPOUND

Provide expansion joints; at 4 metre intervals, at the perimeter of floors, at changes of level and around structural features. Carefully clean out the joint, insert the backing rod and fill with compound placed by gun. After the correct interval, finish the surface off flush to the compound manufacturer's requirements.

Grouting

3.21 APPLY GROUTING

Remove spacers. Apply grouting mix to as large an area as can be worked before setting commences. Work with a grouting tool back and forth until joints are completely filled with no adhesive showing. Avoid damage to the surface of tiles, using masking tape where necessary. Finish to depth of cushion and flush with surface to cushion edge and square-edge tiles. Remove surplus grout with a damp sponge and tool the joints to finish the grout uniform in colour, smooth and without voids, pinholes or low spots.

3.22 APPLY PROPRIETARY GROUTING

Remove spacers. Prepare joints, mix and apply grout and finish off to the grout manufacturer's requirements, to finish the grout uniform in colour, smooth and without voids, pinholes or low spots.

Cleaning

3.23 CLEAN TILES

Upon completion of setting and grouting, thoroughly sponge and wash the tiles to leave them completely clean and without blemish. Finally polish glazed tiles with a clean dry cloth.

Completion

3.24 ROUTINE CLEANING

Carry out routine trade cleaning of this part of the work including periodic removal all debris, unused and temporary materials and elements from the site.

3.25 DEFECTIVE OR DAMAGED WORK

Repair damaged or marked tiles. Replace damaged or marked tiles where repair is not possible or will not be acceptable. Leave work to the standard required for following procedures. Ensure tiles are not disturbed by foot traffic for at least 24 hours after laying and after grouting.

3.26 PROTECTION

Provide the following temporary protection of the finished work:
Provide protection to tiles by laying sheet material such as insulating board for the period between completion of laying and completion of the contract works.

4 SELECTIONS

Substitutions are not permitted to the following, unless stated otherwise.

6511 CARPETING

1 GENERAL

This section relates to the supply and installation of carpet laid conventionally (stretched), direct stuck or double stuck down.

It includes:

- ┆ carpet underlay
- ┆ woven sheet carpet

Documents

1.1 DOCUMENTS

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

- | | |
|--------------------------------|---|
| NZBC C/AS2-AS7 | Protection from fire |
| AS/NZS 2455.1 | Textile floor coverings - Installation practice - General |

Warranties

1.2 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

1 year: For materials

- ┆ 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 1237 WARRANTIES for additional requirements.

1.3 WARRANTY - INSTALLER/APPLICATOR

Provide an installer/applicator warranty:

1 year: For execution

- ┆ 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 1237 WARRANTIES for additional requirements.

Requirements

1.4 QUALIFICATIONS

Carpet layers to be experienced, competent trades people familiar with the materials and the techniques specified, and with [AS/NZS 2455.1](#).

1.5 MOISTURE CONTENT OF CONCRETE SLAB

Concrete slab is to be cured and dried to a relative humidity of not exceeding 75% or until the moisture content does not exceed 5.5%, in accordance with [AS/NZS 2455.1](#), refer to section 6192 FLOORING SUBSTRATE PREPARATION.

1.6 ACCEPTABLE PRODUCT/MATERIAL SUPPLIERS

Where a product or material supplier is named in SELECTIONS, the product/material must be provided by the named supplier. Where more than one named supplier, any one of the named suppliers will be acceptable.

1.7 NO SUBSTITUTIONS

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

1.8 SAMPLES

Provide samples of each carpet for review of colour, design and quality. Submit on request samples of underlay and accessories offered.

1.9 RESERVE MATERIAL

Supply reserve carpet, all suitably packaged for delivery and storage. Refer to SELECTIONS.

2 PRODUCTS

Materials

2.1 UNDERLAY

To [AS/NZS 2455.1](#) Soft underlay and underlays manufacturer's requirements.
Refer to SELECTIONS for product selection.

2.2 CARPET

To [AS/NZS 2455.1](#) Textile floor coverings.
Refer to SELECTIONS for product selection.

Components**2.3 BINDER BARS**

Anodised aluminium section with fluted face.

2.4 DIVIDER STRIPS

Hardwood strips 20mm x 15mm or as specified. Refer to SELECTIONS for type and size.

2.5 EDGE GRIPPER

To [AS/NZS 2270](#).

Timber/plywood with steel grippers to carpet manufacturer's requirements, constructed of sufficient pins and nails so as to withstand a minimum stretching force of 6580N over a 1220 mm length.

Accessories**2.6 TAPE**

To carpet manufacturer's requirements.

3 EXECUTION**Conditions****3.1 DELIVERY**

Take delivery of materials and goods and store on site and protect from damage.
Accept rolls of carpet and accessories undamaged and dry.

3.2 HANDLE AND STORE

Handle carpet on flat dollies using carpet cradles, with probes on fork- lifts and without sharp bending or folding. Store carpet in flat bins with a maximum height of three rows. Keep dry. Protect from damage.

3.3 INSPECTION

Before starting work inspect the substrate to ensure that it will allow work of the required standard, and that all fittings and fixtures around which the carpet is to be scribed are in place.

3.4 PROTECTION

Protect adjoining work surfaces and finishes during the carpet installation.

3.5 TAPE

Tape for binding and seaming using type and width required by the carpet manufacturer to suit the specified carpet and the standard of performance required.

3.6 LAYOUT

Plan the general layout so that:

- ┆ seams run lengthways
- ┆ traffic runs along the seam
- ┆ light from windows is not across the seam
- ┆ pile faces away from the light source.

3.7 TEMPERATURE

Acclimatise carpet to a room temperature above 15°C through the whole of the installation.

3.8 FLOOR PREPARATION

Refer to 6192 FLOORING SUBSTRATE PREPARATION. Prepare floor and check conditions required for laying to [AS/NZS 2455.1](#), section 2.

Application - substrate preparation**3.9 PREPARING NEW CONCRETE FLOOR**

To be level, smooth, clean, cured and dry. Remove loose material and dust. Refer to 6192 FLOORING SUBSTRATE PREPARATION.

Application - carpet laying**3.10 INSTALLATION, UNDERLAY**

Installation to underlay manufacturer's requirements. Lay at right angles to the carpet direction.

3.11 INSTALLATION, CONVENTIONAL SYSTEM

Tape carpet joints, fix grippers to floor and install underlay and carpet to [AS/NZS 2455.1](#), section 3. Stretch carpet tight in both width and length evenly without bowing, square with walls.

3.12 FIXING TRIMS

Fix binder bars, carpet to carpet bars, and trims to all junctions with other materials and to carpet edges, to the carpet manufacturer's requirements. Ensure that junctions with other materials are neatly formed, with bars and trim securely fastened to the substrate, 20mm from each end and at a maximum of 100mm centres.

Completion**3.13 ROUTINE CLEANING**

Carry out routine trade cleaning of this part of the work including periodic removal all debris, unused and temporary materials and elements from the site.

3.14 DEFECTIVE OR DAMAGED WORK

Repair damaged or marked elements. Replace damaged or marked elements where repair is not possible or will not be acceptable. Leave work to the standard required for following procedures.

4 SELECTIONS

Substitutions are not permitted to the following, unless stated otherwise.

7112 RAINWATER STORAGE TANKS

1 GENERAL

This section relates to the installation of domestic rainwater storage tanks.

Related work

1.1 RELATED SECTIONS

Refer to 7431 DRAINAGE COMMON REQUIREMENTS for general requirements

Refer to 7411 RAINWATER SPOUTING SYSTEMS for downpipe installation

Refer to electrical section/s for electrical connections

Documents

1.2 DOCUMENTS

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

NZBC G1/AS1	Personal Hygiene
NZBC G12/AS1	Water Supplies
AS/NZS 1260	PVC-U pipes and fittings for drain, waste and vent application
AS/NZS 1546.1	On-site domestic wastewater treatment units - septic tanks
AS 2070	Plastic materials for food contact use
AS/NZS 2845.1	Water supply - Mechanical backflow prevention devices - materials, design and performance requirements
AS/NZS 3000	Electrical installations
AS/NZS 3500.1:2003	Plumbing and drainage - water services
AS/NZS 3500.3	Plumbing and drainage - stormwater drainage
AS/NZS 4020	Testing of products for use in contact with drinking water
AS/NZS 4130	Polyethylene (PE) pipes for pressure applications
AS/NZS 4766	Polyethylene storage tanks for water and chemicals
ATS 5200.026	Technical Specification for plumbing and drainage products - Cold water storage
HB 230	Rainwater Tank Design and Installation Handbook
Ministry of Health	Household water supplies: The selection, operation, and maintenance of individual household water supplies

Requirements

1.3 HEALTH REQUIREMENTS

Refer to The Ministry of Health publication "Household water supplies: The selection, operation, and maintenance of individual household water supplies" for guidance.

1.4 QUALIFICATIONS

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

Performance

1.5 DESIGN AND INSTALLATION

To HB 230 Rainwater Tank Design and Installation Handbook, to [AS/NZS 3500.3](#) and to [NZBC G1/AS1](#) and [NZBC G12/AS1](#).

1.6 TESTING OF PRODUCTS

Materials used in the manufacture of rainwater tanks to be tested to [AS/NZS 4020](#).

2 PRODUCTS

Components

2.1 RAINWATER STORAGE TANK

- ┆ Above ground tank manufactured from polyethylene to [AS/NZS 4766](#) and to AS 2070.
- ┆ Above ground tank manufactured from precast concrete to ATS 5200.026 Technical Specification for plumbing and drainage products - Cold water storage tanks.
- ┆ Above ground tank manufactured from precast reinforced plaster to ATS 5200.026 Technical Specification for plumbing and drainage products - Cold water storage tanks.

- i Underground tank manufactured from reinforced concrete. To be designed, inspected and certified by a professional consulting engineer in accordance with the specified test method, performance requirements, pressure testing and objectives of [AS/NZS 1546.1](#) and [AS/NZS 4766](#). Tanks to be fitted with a secure fitting lid to provide internal access for cleaning or inspection.

Accessories

2.2 TANK FITTINGS

Fittings kit supplied with the tank for complete installation.

2.3 UPVC PIPES AND FITTINGS

Unplasticised PVC pipe and fittings to [AS/NZS 1260](#).

2.4 POLYETHYLENE PIPES AND FITTINGS

High density polyethylene pipe and fittings to [AS/NZS 4130](#).

2.5 WATER PUMP

Pump designed to pressurised water supply from tank into the building.

2.6 TANK VENT

Vent with insect proof stainless steel mesh fitted on top of the tank.

2.7 FIRST FLUSH WATER DIVERTER

Wall mounted or underground system specific to installation. To prevent the first flow of water from the roof entering the water storage tank.

2.8 FILTER SYSTEM

Inline cartridge filter housing fitted between the first flush diverter and the inlet, or a 955 micron filter tank screen system fitted within the tank.

2.9 TANK VACUUM SYSTEM

Designed to suck from the bottom of the tank when the tank is full to overflowing. System to include anti siphon device.

2.10 WATER TREATMENT (UV)

Combination filtration and UV disinfection system.

2.11 SEALS

Uniseals for pipe connections to the top of the tank.

2.12 TANK BASE BEDDING

Clean sand or concrete 100 to 150mm thick.

2.13 CONCRETE

To **NZS 3104**: Prescribed mix 17.5 MPa: For in situ tank base and water pump pad.

3 EXECUTION

Conditions

3.1 SITE ACCESS

Transportation on site to the position of the tank is at the risk and responsibility of the contractor. Make provision for manoeuvring and unloading of tank

Application - site

3.2 SITE EXCAVATION FOR UNDERGROUND GROUND TANK

Excavate to required size. Place tank into excavation and connect up to the plumbing system with backflow prevention fitted to [AS/NZS 3500.1:2003](#). Drainage system to [AS/NZS 3500.3](#). Backfill with free draining material to manufacturer's requirements. Ensure tank access lids are designed and installed to prevent child and stormwater ingress.

3.3 LAYING AND JOINTING

Lay in straight lines between changes of line or grade from the lower end of the drain with sockets pointing uphill. Set each pipe true to line and grade and each joint completed before the next pipe is laid.

Application - fittings

3.4 WATER PUMP INSTALLATION

Install pump on a solid base bolted down through base plate. Place weather tight housing over the pump and secure to base. Connect to water supply and power supply

3.5 WATER TREATMENT SYSTEM INSTALLATION

Install ultraviolet light radiation treatment unit between pump and house to manufacturer's specifications. Connect to power supply provided.

3.6 BACK FLOW PREVENTION DEVICES

Install to [AS/NZS 2845.1](#), to [AS/NZS 3500.1:2003](#) and to [NZBC G12/AS1](#).

Application - connections

3.7 FIRST FLUSH WATER DIVERTER

Install either adjacent to the tank or underground, first flush water diverter. Connect downpipes from the roof gutter to the first flush water diverter. Connect the first flush diverter to the top of the tank. Refer to manufacturer's installation details.

3.8 FILTER INSTALLATION

Install proprietary in-line filter before the inlet connection.

3.9 INLET CONNECTION

Install inlet pipe into top of tank at manufacturer's designated mounting area using a Uniseal type connection.

3.10 OUTLET CONNECTION

Install pipe to manufacturer's installation details. To the outlet connect a floating arm draw-off to deliver water from 100mm below the surface. From the base connection run a flexible hose to the pump. Install ball valve in line between base connection and water pump. Support all pipework at outlet.

3.11 OVERFLOW PIPE

Install pipe to manufacturer's installation details and connect to approved discharge point or as detailed.

3.12 PIPE SEALS

Insert Uniseals in clean cut holes of the correct size. Insert Uniseal into hole with widespread facing the pipe to be inserted. Lubricate the pipe with detergent and push through the Uniseal. Use only on top of tank connections.

3.13 ELECTRICAL CONNECTION

Installation to [AS/NZS 3000](#). Allow to connect up water pump and water treatment unit to the power supply as provided.

Commissioning

3.14 POST INSTALLATION TESTING

Test and commission the completed system to manufacturer's requirements and [AS/NZS 3500.1:2003.16](#) Testing and Commissioning. At the completion and testing of the water service, check all valves and other components to confirm their correct performance.

Completion

3.15 REPLACE

Replace damaged or marked elements.

3.16 LEAVE

Leave work to the standard required by following procedures.

3.17 CLEAN

Clean and flush out the whole installation. Remove silt and debris.

3.18 REMOVE

Remove debris, unused materials and elements from the site.

4 SELECTIONS

4.1 RAINWATER STORAGE TANK

Manufacturer:	
Tank material:	Concrete
Capacity:	25,000 litres
First flush water diverter:	Yes
Filter:	In-line cartridge filter housing
Water Pump:	Yes

7123AF AQUATHERM GREEN PIPE® HOT & COLD WATER SYSTEM

1 GENERAL

This section relates to **aquatherm green pipe®** and piped water supply systems from the network utility supply authority water main to designated points and appliances, distributing piped hot water to appliances, and the installation of tapware.

1.1 RELATED WORK

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

Documents

1.2 DOCUMENTS

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

NZBC C/AS1-AS7	Protection from fire
NZBC G4/AS1	Ventilation
NZBC G12/AS1	Water supplies
AS/NZS 2845.1	Water supply - Backflow prevention devices - Materials, design, and performance requirements
AS 2845.3	Water supply - Backflow prevention devices - Field testing and maintenance
AS/NZS 3500.1:2003	Plumbing and drainage - Water services
AS/NZS 3500.5	Plumbing and drainage - Housing installations
NZS 4305	Energy efficiency domestic type hot water systems
NZS 4602	Low pressure copper thermal storage electric water heaters
NZS 4607	Installation of thermal storage electric water heaters: valve vented Systems
NZS 4617	Tempering (3-port mixing) valves
AS/NZS 5601.1: 2010	Gas installations - general installations
NZS 7702	Specification for colours for identification, coding and special purposes
DIN 8077	Polypropylene (PP) Pipes - PP-R - Dimensions
DIN 8078	Polypropylene (PP) Pipes - PP-R - General quality requirements and testing
Gas (Safety and Measurement) Regulations 2010	
Plumbers, Gasfitters and Drainlayers Act 2006	
NZ Backflow Testing Standard:	NZ Backflow Testing Standard 2011, Field testing of backflow prevention devices and verification of air gaps

1.3 MANUFACTURER/SUPPLIER DOCUMENTS

Manufacturer's and supplier's documents relating to this part of the work:
 Aquatherm green pipe® technical manual - For the application in sanitary and heating
[BRANZ Appraisal 539](#) - aquatherm® - green pipe Piping System
[BRANZ Appraisal 629](#) - aquatherm® - lilac Piping System
 SAI Global WMKA AQ 2437 - aquatherm® - green pipe Piping System

Manufacturer/supplier contact details:

Company: **aquatherm NZ Ltd**
 Web: www.aquatherm.co.nz
 Email: sales@aquatherm.co.nz
 Telephone: 0-9-570 7204

Warranties

1.4 WARRANTY - MANUFACTURER/SUPPLIER

Provide an aquatherm 50 year warranty of service life
 10 years: For third party warranty for property and bodily damage (refer to Aquatherm NZ Ltd for details)

- ┆ Provide this warranty on the manufacturer/supplier standard form.
- ┆ Commence the warranty from the date of completion of system testing.

Refer to the general section 1237 WARRANTIES for additional requirements.

1.5 WARRANTY - INSTALLER/APPLICATOR

Provide an installer warranty:

2 years: For work under normal environment and use conditions and failure of execution.

- ┆ Provide this warranty on the installer's standard form.
- ┆ Commence the warranty from the date of practical completion of the contract works.

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.6 NO SUBSTITUTIONS

Substitutions are not permitted to any specified aquatherm green pipe® or associated products, components or accessories.

1.7 QUALIFICATIONS

Plumbers to be certified aquatherm® installers, familiar with the materials and the techniques specified. Carry out all work under the direct supervision of a certifying plumber under the [Plumbers, Gasfitters and Drainlayers Act 2006](#).

1.8 INFORMATION FOR OPERATION AND MAINTENANCE

Supply maintenance manual information to requirements set out in the 1239 OPERATION & MAINTENANCE section.

Performance

1.9 DURABILITY

aquatherm green pipe® meets the 50 year durability requirements of [NZBC B2/AS1](#) for pipes cast into concrete to Aquatherm requirements.

1.10 TESTING

Confirm the timing before carrying out any tests. Supply potable water and the apparatus needed. Ensure that any connected tapware is isolated before commencing testing. Test to **aquatherm®** testing procedures as applicable. Provide completed test records in the **aquatherm®** New Zealand Products Catalogue standard form.

2 PRODUCTS

Materials

2.1 AQUATHERM GREEN PIPE POLYPROPYLENE PP-R 80 WATER PIPE

aquatherm green pipe® to DIN 8077 and DIN 8078 complete with fusion welded fittings and accessories brand-matched.

2.2 VALVES

Pressure reducing or limiting valve, filter, non-return valve, cold water expansion valve, pressure relief valve, pressure relief valve and isolating valves to [NZBC G12/AS1](#).

2.3 INSULATION

Pre-formed pipe sections complete with bends and fittings, with fixing tape to the manufacturer's requirements.

Materials - Hot water heating appliances

2.4 HEAT PUMP WATER HEATER - INTEGRAL SYSTEM

Heat pump water heating system, with insulated storage cylinder and compressor/condenser/evaporator, complete with required fittings.

Components

2.5 PIPE CLAMPS

aquatherm® proprietary pipe clamps and clips.

2.6 VALVES

aquatherm® proprietary valves and ball cocks as selected and required.

3 EXECUTION

Conditions**3.1 HANDLE AND STORE**

Handle and store pipes, fittings and accessories to avoid damage. Store on site, under cover, out of direct sunlight, on a clean level area, stacked to eliminate movement and away from work in progress to aquatherm green pipe® technical manual, section 4 Installation principles.

3.2 CORE HOLES AND SLEEVES

Review location and fit core holes and sleeves as needed throughout the structure in conjunction with the boxing, reinforcing and placing of concrete. Strip core holes and make good after installation of pipework.

3.3 FASTENING TECHNIQUE

Fix pipework using aquatherm® proprietary pipe brackets, spacing to aquatherm green pipe® Pipe Systems technical manual, section 4 Installation principles. Ensure brackets are set out as fixed or sliding points aquatherm green pipe® Pipe Systems technical manual, section 4 Installation principles.

3.4 CONCEAL

Conceal pipework within the fabric of the building unless detailed otherwise. Satin finish chrome plate exposed work, complete with matching ferrule at the surface penetration.

3.5 IN CONCRETE INSTALLATION

Install directly in concrete to aquatherm green pipe® pipe installation procedures.

3.6 IN GROUND INSTALLATION

Install to [AS/NZS 3500.5](#). 2.13.4 **Under concrete slabs**.

3.7 THERMAL MOVEMENT

Accommodate movement in pipes resulting from temperature change by the layout of the pipe runs, by expansion joints and by sleeving through penetrations. Install pipework to aquatherm green pipe® Pipe systems technical manual, section 4 Installation principles.

3.8 PIPE SIZE

Flow rates to each outlet to be no less than those given in [NZBC G12/AS1](#), table 3, Acceptable flow rates to sanitary fixtures, with pipe size as determined in [NZBC G12/AS1](#), table 4, Tempering valve and nominal pipe diameters and the aquatherm green pipe® Pipe Systems technical manual.

Application - jointing**3.9 AQUATHERM GREEN PIPE POLYPROPYLENE PP-R 80 WATER SUPPLY**

Size the piping layout to eliminate loss of pressure at any point by simultaneous draw-off. Run pipes complete with all fittings, support and fixing, fusion weld joints and install to manufacturers specifications, all to [NZBC G12/AS1](#). Conceal pipework and pressure test before the wall linings are fixed.

Application - distribution systems**3.10 COLD WATER INSTALLATION**

From connection point, size the runs and branches to deliver the acceptable flow rate to [NZBC G12/AS1](#), table 3, Acceptable flow rates to sanitary fixtures at each outlet. Allow for the expected concurrent use of adjoining fixtures. Lay out pipes in straight runs with support spacing to [NZBC G12/AS1](#), table 7, Water supply pipework support spacing firmly fixed and buffered to eliminate noise and hammer, with preformed tee-connection take-offs and branches, with bends to aquatherm® requirements, complete with necessary valves and fittings.

3.11 MAIN ISOLATING VALVE

Install an aquatherm green pipe® isolating ball valve in an accessible position at the point of entry to the building.

3.12 IN LINE FILTER

Install an in line filter immediately adjacent to the isolating valve in an accessible position to allow for easy cleaning.

3.13 INSULATION

Lag all pipes with insulation to the manufacturer's requirements. Refer to SELECTIONS for type.

Installation - hot water systems**3.14 INSTALL HEAT PUMP WATER HEATER - INTEGRAL SYSTEM**

Install complete with the necessary fittings to the manufacturer's installation instructions.

Installation - tapware

3.15 INSTALLING APPLIANCE ISOLATING VALVES - CONCEALED

Install isolating valves for appliances in accessible positions. Locate in adjacent cupboards and position to allow for easy connection and operation.

3.16 INSTALL TAPWARE

Install to manufacturer's requirements.

3.17 INSTALLING BACKFLOW PREVENTION DEVICE

Provide and install backflow prevention device as near as practicable to the potential source of contamination, and in an accessible position for maintenance and testing to AS 2845.3 or [NZ Backflow Testing Standard](#).

Completion**3.18 FLUSH OUT PIPEWORK**

Flush out pipework. Remove all filters, clean and reassemble.

3.19 REPLACE

Replace damaged or marked elements.

3.20 LEAVE

Leave work to the standard required by following procedures.

3.21 REMOVE

Remove debris, unused materials and elements from the site.

4 SELECTIONS

For further details on selections go to www.aquatherm.co.nz.
Substitutions are not permitted to the following, unless stated otherwise.

Water main**4.1 AQUATHERM GREEN PIPE POLYPROPYLENE PP-R 80 SDR 11**

Size: 25mm outside diameter

4.2 AQUATHERM GREEN PIPE POLYPROPYLENE PP-R 80 SDR 7.4 FOR HOUSING

Size: 25mm outside diameter

Pipework**4.3 AQUATHERM GREEN PIPE POLYPROPYLENE PP-R 80 PIPE WORK**

Branch off take: aquatherm green pipe® SDR 7.4

Branch main: aquatherm green pipe® SDR 11

Main: aquatherm green pipe® SDR 11

4.4 HOT WATER RING MAIN AQUATHERM GREEN PIPE FASER POLYPROPYLENE PP-R 80

Pipework: aquatherm green pipe® FASER composite pipe SDR 7.4

Pipe size: 20mm

Insulation: Yes

Pump:

7411RI ROOFING INDUSTRIES METAL RAINWATER SYSTEMS

1 GENERAL

This section relates to **Roofing Industries** metal rainwater disposal systems including spouting and downpipes, in various metal substrates.

1.1 RELATED WORK

Refer to 4311RI ROOFING INDUSTRIES PROFILED METAL ROOFING for profiled metal roofing.

1.2 ABBREVIATIONS AND DEFINITIONS

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

The following abbreviations apply specifically to this section:

BMT	Base metal thickness
NZMRM	New Zealand Metal Roofing Manufacturers Inc

Documents

1.3 DOCUMENTS

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

NZBC E1/AS1	Surface Water: 4.0 Downpipes, 5.0 Roof gutters
NZBC E2/AS1	External moisture: 8.1.6 Gutters
BS EN 988	Zinc and zinc alloys. Specification for rolled flat products for building
AS 1566	Copper and copper alloys - Rolled flat products
AS/NZS 2728	Prefinished/pre-painted sheet metal products for interior/exterior building applications - Performance requirements
NZMRM CoP	NZ metal roof and wall cladding Code of Practice

1.4 MANUFACTURER/SUPPLIER DOCUMENTS

Manufacturer's and supplier's documents relating to this part of the work: Roofing Industries, Fascia, Spouting, Downpipes.

Manufacturer/supplier contact details

Company:	Roofing Industries
Web:	www.roof.co.nz
Email:	sales@roof.co.nz
Telephone:	0800 844 822

Area email contacts:

Area contact	E-mail
Auckland:	office@roof.co.nz
Whangarei:	northland@roof.co.nz
Hamilton:	waikato@roof.co.nz
Taupo:	taupo@roof.co.nz
Palmerston North:	central@roof.co.nz
Christchurch:	south@roof.co.nz

Requirements

1.5 QUALIFICATIONS

Roofing Industries installers to be experienced, competent trades people familiar with the materials and techniques specified.

1.6 NO SUBSTITUTIONS

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

Performance

1.7 TEST

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

1.8 DESIGN

Layout, falls and capacity of spouting to falls and the size and position of downpipes to comply with [NZBC E1/AS1](#). Refer to [NZMRM CoP](#) recommendations, sections 8.4, Gutters and 8.5, Downpipes.

2 PRODUCTS

Materials

2.1 COLOURSTEEL® ZINCALUME

COLORSTEEL® Endura® and COLORSTEEL® Maxx® coated steel, to [AS/NZS 2728](#).

Products

2.2 SPOUTING

Complete with matching brackets and screws. Spouting to be sized to comply with [NZBC E1/AS1](#) and installed to [NZBC E2/AS1](#) 8.1.6, **Gutters**. Refer to SELECTIONS for type. Refer to [NZMRM CoP](#) recommendations.

2.3 DOWNPIPES

Complete with stand-off brackets, galvanised or aluminium screw fixed or brass screw fixed for copper. Refer to SELECTIONS for type.

Components

2.4 DROPPERS

Material to match spouting, sized to fit inside the downpipe.

2.5 BRACKETS

Material to match the spouting. Refer to SELECTIONS for type.

2.6 SEALANT

Neutral cure silicone or MS Polymer sealant.

3 EXECUTION

Conditions

3.1 DELIVERY, STORAGE AND HANDLING

Take delivery and handle and store downpipes, spouting and accessories to avoid damage. Store on site under cover, on a clean level area, stacked to eliminate movement and away from work in progress. Avoid exposure to sunlight if strippable film is still on the product.

3.2 SUBSTRATE

Check that fascias, barge or cladding are level and true to line and face and will allow work of the required standard without distortion to the product alignment. Do not proceed until they are up to standard.

3.3 THERMAL MOVEMENT

Make adequate provision in the fixing and jointing of the spouting for thermal movement in the length of the spouting. As Zinalume and ZAM are steel based and have different expansion to Aluminium and Copper, refer to [NZMRM CoP](#) recommendations.

3.4 CORROSION

Separate metals subject to electrolytic action from each other and from treated timber, concrete and other lime substances by space, painting of surfaces, taping, or separator strips.

Check compatibility of metals used for rainwater goods, against the materials being used for roofing and flashings.

Application - metal

3.5 INSTALL METAL SPOUTING

Establish minimum falls necessary (minimum 1:500, 2mm in 1 metre) to outlets to prevent ponding and screw fix brackets true-to-line between 600mm to 750mm centres maximum, depending on profile requirements. In areas where snow fall is possible the centres should be 600mm maximum and snow straps fitted and this also applies for High and Extra High wind loads. Cut out neatly for and fit the pre-formed downpipe dropper and seal/solder and rivet around the joint. All installation to [NZMRM CoP](#) recommendations section 8.4, **Gutters**.

3.6 INSTALL METAL DOWNPIPES

Form downpipes complete with offsets and shoes as needed with all joints lapped and sealed as required. Screw fix with matching pipe clips to rigidly stand plumb to the wall, and discharging into the stormwater gully or pipe inlet. All installation to [NZMRM CoP](#) recommendations section 8.5, **Downpipes**.

Downpipes

Application - general

3.7 INSTALLATION GENERALLY

Install to [NZMRM CoP](#) recommendations where not otherwise specified. Ensure a 10mm gap is left between spouting ends and wall cladding and that any overflow from spouting and or overflows direct water to the outside of the building.

3.8 INSTALL VALLEY GUTTERS

Attach valley gutters to valley boards by clips allowing for thermal movement to [NZMRM CoP](#), clause 8.4.5, **Valley gutters**. Separate valley gutter from valley boards with a layer of roofing underlay. Refer to [NZBC E2/AS1 8.1.6.1](#), **Internal, valley and hidden gutters** and to 8.1.6.3, **Internal gutters**.

3.9 INSTALL SECRET GUTTERS

Install secret gutters to fall allowing for thermal movement [NZMRM CoP](#), clause 8.4.8, Secret gutter. Rivet and seal joints with MS Polymer sealant.

3.10 INSTALL OUTLETS AND OVERFLOWS

Install outlets and overflows where required to [NZMRM CoP](#), clause 8.6.2, **Outlets and overflows**.

3.11 INSTALL SUMP PROTECTION

Install leaf guards of the same area as the sump. Set the leaf guard above the calculated level of flow; not directly in the outlet.

Completion

3.12 REPLACE

Replace damaged or marked elements.

3.13 LEAVE

Leave the whole of this work discharging completely and freely into the stormwater system and free of all debris. Leave work to the standard required by following procedures.

3.14 REMOVE

Remove debris, unused materials and elements from the site.

4 SELECTIONS

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

Substitutions are not permitted to the following, unless stated otherwise.

Prepainted zincalume system

4.1 ROOFING INDUSTRIES - PREPAINTED ZINCALUME SPOUTING

Manufacturer:	Roofing Industries
Profile/size:	125mm Box gutter
Base material:	Steel with Zincalume® coating
BMT:	0.55mm
Finish:	Prepainted Steel
Colour:	Black
Brackets:	External

4.2 ROOFING INDUSTRIES - PREPAINTED ZINCALUME DOWNPIPES

Manufacturer:	Roofing Industries
Profile/size:	75 x 50
Base material:	Steel with Zinalume® coating
BMT:	0.50mm
Finish:	Prepainted Steel
Colour:	Black
Clips:	Clip to match downpipe material
Profile/size:	65mm, 80mm, 100mm.
Finish:	Colorcote® MagnaFlow™ or Coloursteel® Endura® / Maxx®
Colour:	Standard colours, Designer colours. Refer to Colorcote®/ Colorsteel® colour chart.
Clips:	Clip 40mm offset or Munzing ring. Munzing rings allow the downpipe to be fixed at any distance from the wall.

7421MO MARLEY OPTIM DWV SANITARY SYSTEM

1 GENERAL

This section relates to the supply and laying of **Marley New Zealand Limited** above ground gravity flow PVC-U sanitary systems for residential and commercial applications.
It includes:

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

1.1 RELATED WORK

Refer to 7151 SANITARY FIXTURES, TAPWARE & ACCESSORIES for sanitary fixtures.
Refer to 7123 HOT AND COLD WATER SYSTEM for potable water systems.
Refer to 7420MD MARLEY DBLUE® ACOUSTIC SANITARY SYSTEM for acoustic sanitary system
Refer to 7431M MARLEY DRAINAGE SYSTEMS for underground drains.
Refer to 7142 GREYWATER SYSTEMS for greywater systems.

Documents

1.2 DOCUMENTS

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

NZBC G1/AS1	Personal hygiene
NZBC G13/AS1	Foul water - Sanitary plumbing
AS 2887	Plastic waste fittings
AS/NZS 1260	PVC-U pipes and fittings for drain, waste and vent applications
AS/NZS 1462.22	Methods for test for plastic pipes and fittings - Method 22: Method for determination of pipe stiffness
AS/NZS 1462.3	Methods for test for plastic pipes and fittings - Method for determining the impact characteristics of pipes
AS/NZS 2032	Installation of PVC pipe systems
AS/NZS 3500.2	Plumbing and drainage - Sanitary plumbing and drainage
Plumbers, Gasfitters and Drainlayers Act 2006	

1.3 MANUFACTURER/SUPPLIER DOCUMENTS

Manufacturer's and supplier's documents relating to this part of the work:
Marley OPTIM DWV Technical Design Manual
Marley Material Safety Data Sheets

Manufacturer/supplier contact details

Company:	Marley New Zealand Limited
Web:	www.marley.co.nz
Email:	guyy@marley.co.nz
Telephone:	09 279 2799

1.4 WARRANTY - INSTALLER

Provide an installer warranty:
2 years: For installation

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

Refer to the general section 1237 WARRANTIES for additional requirements.

Requirements

1.5 QUALIFICATIONS

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

1.6 NO SUBSTITUTIONS

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

1.7 AS BUILT DOCUMENTS

Refer to the general section 1238 AS BUILT DOCUMENTATION for the requirements for submission and review of as built documents and records.

Provide the following as built documents and records:

Waste pipe locations

- ┆ Provide draft as built information prior to practical completion.
- ┆ Provide final as built information prior to the end of the defects liability period.

Compliance information**1.8 INFORMATION REQUIRED FOR CODE COMPLIANCE**

Provide the following compliance documentation: -

- ┆ Installer's approval certificate from the manufacturer / importer / distributor
- ┆ Manufacturer's, importer's or distributor's Certificate of Conformance
- ┆ Installer's warranty
- ┆ Producer Statement - Construction from the installer
- ┆ Producer Statement - Construction Review from an acceptable suitably qualified person
- ┆ Other information required by the BCA in the Building Consent Approval documents.

Performance**1.9 TESTING**

Confirm timing before carrying out any tests. Supply potable water and apparatus needed. Seal openings below the section being tested and slowly raise the water level to a minimum of 3 metres above the highest point of the section. Do not exceed 6 metres of head above the lowest point. Carry out and record a visual inspection that each joint showed no evidence of leaks.

2 PRODUCTS**Materials****2.1 PVC-U DWV PIPEWORK - RESIDENTIAL**

Marley PVC-U DWV pipework comprised of unplasticised PVC waste pipes, traps and fittings manufactured to [AS/NZS 1260](#), tested to AS/NZS 1462.22 and AS/NZS 1462.3, and compliant with [AS/NZS 3500.2](#). Available in a range of pipe types with nominal size DN20 to DN150 and stiffness class SN4 and SN6. Refer to SELECTIONS for options.

2.2 PVC-U VENT PIPES

Marley PVC-U vent pipes comprised of unplasticised PVC including fittings and accessories manufactured to [AS/NZS 1260](#), tested to AS/NZS 1462.22 and AS/NZS 1462.3, and compliant with [AS/NZS 3500.2](#). Available in a range of pipe types with nominal size DN 40 to DN 100 and stiffness class SN4 to SN10. Refer to SELECTIONS for options.

2.3 FLOOR WASTE

Vinyl Rite Floor Waste System, with solvent joint and standard white PVC grate. Available in a range sizes and grate types, refer to SELECTIONS for options.

2.4 GULLY TRAP

Refer to 7431M MARLEY DRAINAGE SYSTEMS for gully traps.

Components**2.5 PROTECTIVE TAPE**

Plasticised PVC tape system with primer, mastic fixing and outer coating.

3 EXECUTION**Conditions****3.1 EXECUTION GENERALLY - AS/NZS 3500.2**

Carry out this work and complete all tests to [NZBC G1/AS1: 2.0, 3.0](#) and [AS/NZS 3500.2:2003](#), as modified by [NZBC G13/AS3](#).

3.2 ELECTROLYTIC ACTION

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

3.3 HANDLE AND STORE

Handle and store pipes, fittings and accessories to avoid damage. Store on site under cover on a clean level area, stacked to eliminate movement and away from work in progress.

3.4 SETTING OUT

Set out location of all stacks, discharge pipes, fittings and vent pipes and the completeness of their discharge into the drainage system.

3.5 CORE HOLES AND SLEEVES

Fit core holes and sleeves as needed throughout the structure in conjunction with the boxing, reinforcing and placing of concrete. Sleeve diameter to be 25mm larger than outside diameter of pipe accommodated. Strip core holes and make good after installation of pipework.

3.6 PIPE ACCESS

Fit and fix stacks, wastes and pipes in ducts independent of all other services so they are easily replaceable for their full length. Wrap or tape pipes buried in concrete.

3.7 FITTINGS ACCESS

Fit and fix traps and wastes to enable access for cleaning and for maintaining the total system.

3.8 CONFIRM LOCATION

Unless the location and height are clearly delineated on the drawings, confirm installation height and plan locations of sanitary fittings before commencing the piping installation.

3.9 CORROSION

Separate metals subject to electrolytic action from each other and from treated timber, concrete and other lime substances by space, painting of surfaces, taping, or separator strips.

Installation - traps and wastes

3.10 INSTALL GULLY TRAPS

Refer to 7431M MARLEY DRAINAGE SYSTEMS for installation of gully traps.

Installation - jointing

3.11 JOINTING PVC-U PIPE - SOLVENT WELDED JOINTS

Prime and solvent weld joints using spigots and sockets to Marley requirements.

Jointing to be in accordance with Marley OPTIM DWV jointing procedures as shown in the Marley OPTIM technical manual.

Installation - fixing

3.12 THERMAL MOVEMENT

Accommodate longitudinal movement in pipes resulting from temperature changes. Incorporate expansion joints in PVC-U pipes. Install PVC pipes to [AS/NZS 2032](#). Take particular care to allow for movement at horizontal take-off locations from stacks.

3.13 TRAPS AND FIXTURE DISCHARGE PIPES

Size traps and pipes as required for each fixture or appliance. Establish the developed length of waste pipes. Vent and allow access for cleaning as required. Follow the most direct line with the least number of bends to [NZBC G13/AS1](#): Foul water sanitary plumbing, table 4, Discharge unit loading for stacks and graded discharge pipes and table 7, Distance between supports.

3.14 DISCHARGE STACKS AND VENTS

Size stacks and vents to [NZBC G13/AS1](#): Foul water sanitary plumbing, table 2, Fixture discharge pipe sizes and discharge units and table 6, Vent pipe sizes. Extend up past the highest branch to form a discharge stack vent terminating to [NZBC G13/AS1](#): Foul water sanitary plumbing, figure 12 and finishing at the base with a 45 degree bend. Support system to [NZBC G13/AS1](#): Foul water sanitary plumbing, table 7, Distances between supports.

Completion

3.15 ROUTINE CLEANING

Carry out routine trade cleaning of this part of the work including periodic removal of all debris, unused materials and elements from the site.

3.16 DEFECTIVE OR DAMAGED WORK

Repair damaged or marked elements. Replace damaged or marked elements where repair is not possible or will not be acceptable.

Commissioning

3.17 TESTING

Pre-test all pipework during construction. On completion of the work and before approval for acceptance of the pipework, carry out a final test to the approval of the engineer and if required witnessed by the representative of the territorial authority.

4 SELECTIONS

For further details on selections go to www.marley.co.nz
Substitutions are not permitted to the following, unless stated otherwise.

Materials - sanitary systems

4.1 MARLEY PVC-U VENT PIPE

Location:	External
Manufacturer:	Marley New Zealand Limited
Pipe brand/type:	MarleyOptim
Pipe diameter:	50mm
Jointing:	Solvent

4.2 MARLEY FLOOR WASTE SYSTEM

Location:	Bathroom
Manufacturer:	Marley New Zealand Limited
Brand:	Vinyl Rite Floor Waste System
Joint:	Solvent joint
Grate:	

7462 WASTEWATER TREATMENT SYSTEM

1 GENERAL

This section relates to the installation and management of on-site domestic wastewater treatment systems including;

- ▮ septic tank
- ▮ aerated wastewater treatment system

Use this section in conjunction with the appropriate foul water drainage section(s).

1.1 RELATED WORK

Refer to Sanitary Systems section for above ground pipework
Refer to electrical section/s for electrical connections

1.2 ABBREVIATIONS AND DEFINITIONS

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

The following abbreviations apply specifically to this section:

AWTS	Aerated wastewater treatment system
O & M	Operation and maintenance
ETS	Evapo-transpiration-seepage

The following definitions apply specifically to this section:

Land application:	Means the application of effluent to areas of land for further treatment.
Wastewater:	Wastewater is defined as FOUL WATER in the New Zealand Building Code .

Documents

1.3 DOCUMENTS REFERRED TO

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

NZBC G13/AS2	Foul Water
NZBC G13/VM4	Foul Water
AS/NZS 1260	PVC-U pipes and fittings for drain, waste and vent application
AS/NZS 1546.1	On-site domestic wastewater treatment units - Septic tanks
AS/NZS 1546.3	On-site domestic wastewater treatment units - Aerated wastewater treatment system
AS/NZS 1547	On-site domestic wastewater management
AS 2439.2	Perforated plastics drainage and effluent pipe and fittings - Perforated effluent pipe and associated fittings for sewage applications
AS/NZS 3000	Electrical installations
NZS 3104	Specification for concrete production
AS/NZS 3500.2:2003	Plumbing and drainage - Sanitary plumbing and drainage
NZS 3604	Timber-framed buildings
AS/NZS 4130	Polyethylene (PE) pipes for pressure applications
NZS 4229	Concrete masonry buildings not requiring specific engineering design

Warranties

Requirements

1.4 DESIGN

Specific design of wastewater treatment system by the manufacturer or consulting engineer experienced in wastewater disposal.

1.5 STRUCTURE

Construct from durable materials, to be watertight, impervious to contamination from waste contained within and from groundwater, be capable of withstanding vertical, lateral and uplift loads, prevent direct flow of wastewater between inlet and outlet, avoid foul air and gases and provide access for the removal of waste contents.

1.6 OPERATION AND MAINTENANCE MANUALS

Provide to the owner and regulatory authority, specific O & M guidelines for the on-site system as designed and installed. Refer to [AS/NZS 1547](#) for basic technical information covering operation, maintenance and monitoring of on-site domestic wastewater systems.

1.7 QUALIFICATIONS

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

Performance

1.8 INSTALLATION CERTIFICATION

Certify the installation to [AS/NZS 1547](#) and [NZBC G13/VM4](#). The certificate to be issued to and held by the regulatory authority.

2 PRODUCTS

Components

2.1 SEPTIC TANK

- ┆ Tank construction to [AS/NZS 1546.1](#) manufactured from 30 MPa reinforced concrete, or
- ┆ Tank construction to [AS/NZS 1546.1](#) manufactured from 35 MPa steel fibre reinforced concrete, or
- ┆ Tank construction to [AS/NZS 1546.1](#) manufactured from ribbed polyethylene.

Tank to have manufacturers name and other required information as per [AS/NZS 1546.1](#), 4. Marking. Capacity of system for the intended installation to [AS/NZS 1547](#) Appendix J.

2.2 PUMP

Submersible high-head pump designed to carry screened effluent from septic tanks to dispersal field.

2.3 FILTER FOR TANK VENT

Activated carbon filter fitted to the tanks vent to absorb odours.

2.4 EFFLUENT FILTER

Proprietary septic tank effluent filter installed either in the tank or outlet pipe.

Accessories

2.5 UPVC PIPES AND FITTINGS

Unplasticised PVC pipe and fittings to [AS/NZS 1260](#).

2.6 POLYETHYLENE PIPES AND FITTINGS

High density polyethylene pipe and fittings to [AS/NZS 4130](#). Perforated pipe for dispersal in land application areas to AS 2439 part 2.

2.7 BEDDING, SURROUND AND FILLING MATERIALS

- | | |
|-----------|--|
| Granular: | Clean gravel or crushed stone or a blend of these. Particle size from minimum 7mm to maximum 20mm. |
| Selected: | Fine grain soil or granular material suitable for bedding and excluding topsoil, organic matter and rubbish. |
| Ordinary: | Top soil or other excavated materials excluding organic matter and rubbish. |

2.8 CONCRETE

To [NZS 3104](#):

- ┆ Prescribed mix 17.5 MPa: For in situ bases, anchors and pipe surrounds.
- ┆ Prescribed mix 14 MPa: For bedding only.

3 EXECUTION

Conditions

3.1 EXCAVATION

Open not more than 120 metres of trench at any one time. Excavated trench to a minimum width of pipe diameter plus 300mm. Do not batter or cut the trench wider above the top of the pipe.

For deep excavation, trench width to be sufficient to provide safe access and to accommodate shoring to WorkSafe NZ requirements. Width of bottom of trench up to 300mm above top of pipe to be pipe diameter plus 300mm.

Maintain free of water and free of all falling material.

3.2 TRENCHING - PARALLEL TO FOUNDATIONS TO NZS 3604 OR NZS 4229

Trenches running parallel, below and close to foundations of buildings to [NZS 3604](#) or [NZS 4229](#) to be separated to [NZBC G13/AS2](#), 5.6, Proximity of Trench to Building, for foul water drains.

3.3 BEDDING - AS/NZS 3500.2

Place to [AS/NZS 3500.2:2003](#), 5.4, Bedding of drains, using compacted granular material to avoid differential settlement and to obtain longitudinal support of the pipe.

3.4 SURROUND AND BACKFILL - AS/NZS 3500.2

Place to [AS/NZS 3500.2:2003](#), 5.4, Bedding of drains, and 5.5, Installation of backfill material, using compacted granular material and compacted fill. Compact in layers not exceeding 100mm.

3.5 SETTING OUT

Position on site wastewater treatment system to comply with territorial authority approval. Use string line, boning rod or laser equipment methods. Use surveying and levelling equipment to accurately set out design invert levels.

3.6 LAYING AND JOINTING

Lay in straight lines between changes of line or grade from the lower end of the drain with sockets pointing uphill. Set each pipe true to line and grade and each joint completed before the next pipe is laid. Cap ends of uncompleted runs each day to prevent entry of foreign matter. Test drains and backfill progressively to minimise site disruption. Concrete cap trenches to drains with less than 375mm cover.

3.7 LAYING FOUL WATER DRAINS

Lay the drainage system from soil stacks and gully traps, including access chambers, inspection chambers, bends, junction inspections, buchan traps and vents (fresh air inlets). Discharge into the network utility operator foul water system to their requirements.

3.8 DIFFERENTIAL SETTLEMENT

Provide flexible jointing, bedding and surrounding of pipes at junctions with manholes, foundation walls and other points where differential settlement may occur.

Application - fittings

3.9 INSTALL SEPTIC TANK

Install to manufacturer's requirements. In situations when flotation due to hydrostatic uplift from a high water table is possible, anchor the septic tank to manufacturer's instructions. Connect to pipe systems.

Application - connections

3.10 SEPTIC TANK DISPERSAL METHOD FOR LAND APPLICATION SYSTEM

The following systems to be verified by specific design:

- ┆ absorption trenches and beds
- ┆ ETS
- ┆ mound
- ┆ irrigation by subsurface drip, surface drip, or spray system

Carry out installation of system to comply with the design and to [AS/NZS 1547](#). Place filter cloth above the distribution aggregate to prevent soil incursion.

3.11 PUMP

Install submersible high- head pump designed to carry screened effluent from septic tanks to dispersal field.

3.12 ELECTRICAL CONNECTION

Installation to [AS/NZS 3000](#). Allow to connect up to the power socket as provided.

3.13 TEMPORARY BRIDGES

Provide temporary bridges over trenches to prevent heavy construction traffic damaging pipes after backfilling.

Completion

3.14 REPLACE

Replace damaged or marked elements.

3.15 LEAVE

Leave work to the standard required by following procedures.

3.16 CLEAN

Clean and flush out the whole installation. Remove silt and debris.

3.17 REMOVE

Remove debris, unused materials and elements from the site.

4 SELECTIONS

7673M MITSUBISHI ELECTRIC HEAT PUMPS

1 GENERAL

This section relates to the supply and installation of Mitsubishi Electric Heat Pumps including;

- | Wall mounted
- | Floor mounted
- | Ceiling mounted
- | Ducted systems
- | Controllers

1.1 ABBREVIATIONS AND DEFINITIONS

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

The following abbreviations apply specifically to this section:

L10	Centile Level, sound level that is equalled or exceeded for 10% of the time
HFC	Hydro fluorocarbon
mm Hg	mm mercury - unit of pressure
NIWA	National Institute of Water and Atmospheric Research
ASHRAE	American Society of Heating and Air-Conditioning Engineers
IRHACE	Institute of Refrigeration, Heating and Air Conditioning Engineers
MEPS	Minimum Energy Performance Standards
AIRAH	Australian Institute of Refrigeration, Airconditioning and Heating

Documents

1.2 DOCUMENTS

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

NZBC E2/AS1	External Moisture
NZBC G4/AS1	Ventilation
AS 1324.2	Air filters for use in general ventilation and air conditioning - methods of test
AS 1397	Continuous hot-dip metallic coated steel sheet and strip - Coatings of zinc and zinc alloyed with aluminium and magnesium
AS/NZS 1571	Copper - seamless tubes for air conditioning and refrigeration
AS/NZS 2107	Acoustics - Recommended design sound levels and reverberation times for building interiors
AS/NZS 3666.1	Air handling and water systems of buildings - Microbial control - Design, installation and commissioning
AS/NZS 3823.1.1	Performance of electrical appliances - Airconditioners and heat pumps - Part 1.1: Non-ducted airconditioners and heat pumps - Testing and rating for performance
AS/NZS 3823.1.2	Performance of electrical appliances - Airconditioners and heat pumps - Part 1.2: Ducted airconditioners and air-to-air heat pumps - Testing and rating for performance
AS/NZS 3823.2	Performance of electrical appliances - Air conditioners and heat pumps - Energy labelling and minimum energy performance standard (MEPS) requirements
AS 4254.1	Ductwork for air handling systems in buildings - Flexible duct
NZS 4303	Ventilation for acceptable indoor air quality

1.3 MANUFACTURER/SUPPLIER DOCUMENTS

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

Web based Manuals and Brochures: www.mitsubishi-electric.co.nz

Manufacturer/supplier contact details

Company: Black Diamond Technologies Ltd
 Web: www.mitsubishi-electric.co.nz
 Email: techinfo@bdt.co.nz
 Telephone: 0800 784 382

Warranties

1.4 WARRANTY - MANUFACTURER/SUPPLIER

Provide a material manufacturer/supplier warranty:

5 years	For parts and labour Air Conditioning Split System (M & S Series)
3 years	For parts and labour Air Conditioning (P Series)
1 year	Close Control (Computer Room) systems
1 year	Accessories and Peripherals

- ┆ 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 1237 WARRANTIES for additional requirements.

Requirements

1.5 CO-ORDINATE WORK

Co-ordinate all items with the main contractor, in particular cutting of penetrations and waterproofing. Exterior penetrations to [NZBC E2/AS1](#) as consistent with the project requirements.

1.6 SAMPLES, DRAWINGS AND BROCHURES

Submit, on request for review, samples, drawings and brochures of units, grilles and any other elements that affect the interior finishes.

1.7 QUALIFICATIONS

Installers to be experienced in the installation of Mitsubishi Electric Heat Pumps and authorised by Black Diamond Technologies Ltd. If requested provide evidence of qualification / authorisation prior to commencing work.

Handling or recovering refrigerant to be carried out by the appropriate Approved Filler and/or Handler, with a test certificate under the [HSNO](#) Act.

1.8 NO SUBSTITUTIONS

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

1.9 AIR CONDITIONING LOAD CALCULATIONS

General: Calculate the cooling and heating loads using one of the following:

- ┆ Manual methods: AIRAH DA9 or ASHRAE.
- ┆ Electronic methods, ACADS-BSG Camel, or Carrier E20.

1.10 AIR CONDITIONING DESIGN BASIS

Outside Design Conditions:

Use outdoor design conditions listed in publications from NIWA, ASHRAE, IRHACE or other reliable sources for weather data, for the location geographically closest and most relevant to the site.

Inside Design Conditions:

Summer: 22°C dry bulb, 50% relative humidity.

Winter: 21°C dry bulb.

Limit the temperature difference in air conditioned spaces served by the same zone or system to $\pm 1.5^{\circ}\text{C}$ when measured:

- ┆ Between any 2 points in the space from floor level to 1500mm above floor level, > 2000mm from cooking equipment and > 1000mm from any other appliance.
- ┆ When outside conditions are in the range specified above.
- ┆ After the plant has been operating for one hour.
- ┆ In the same 5 minute period.

Divide the systems into temperature controlled zones to meet the specified permissible temperature variation and documented system divisions.

Where ventilation requirements are not met by natural means and do not comply with [NZBC G4/AS1](#), supply fresh air to spaces with air conditioning systems via the air handling system, or separate mechanical ventilation system in accordance with [NZS 4303](#).

Heating:

Reverse cycle.

Noise:

Indoor noise emitted - to [AS/NZS 2107](#), depending on space served, occupancy and activity.

Noise received in all habitable rooms shall not exceed that permitted by the applicable Territorial Authority for the time of day or day of the week for the zoning of the site. Not more than L10: 35dbA between 2300 and 0700 hours. This shall apply to both the property in question and the neighbouring properties.

1.11 OPERATION AND MAINTENANCE MANUALS

Refer to the general section 1239 OPERATION & MAINTENANCE for the requirements for submission and review of operation and maintenance manuals.

1.12 MAINTENANCE CONTRACT PROPOSAL

Provide a proposed contract for the ongoing servicing of the heat pump system. Refer to SELECTIONS.

Compliance information

1.13 INFORMATION REQUIRED FOR CODE COMPLIANCE

Provide the following compliance documentation: -

- ┆ Manufacturer's, importer's or distributors warranty
- ┆ Installer's warranty
- ┆ Producer Statement - Construction from the installer
- ┆ Other information required by the BCA in the Building Consent Approval documents.

2 PRODUCTS

Generally

2.1 REVERSE CYCLE UNITS

Split system heat pumps shall meet the requirements of AS/NZS 3823.1.1 and AS/NZS 3823.1.2 with minimum energy performance standards (MEPS) in accordance with AS/NZS 3823.2.

Provide effective outdoor coil defrost facility that prevents room temperature dropping more than 2°C during defrost.

2.2 CABINETS

Aluminium, powder coated steel or moulded acrylonitrile-butadiene-styrene (ABS) plastic with zinc - coated steel or stainless steel fasteners. Insulate and vapour seal cabinet and drain trays to prevent external condensation under all operating conditions.

2.3 DRAIN TRAYS

Aluminium, stainless steel or plastic to collect all moisture inside indoor and outdoor units.

2.4 FILTERS

Washable panel type. 85% of arrestance when tested to AS 1324.2, Test Dust No.4 or Class EU2 rated.

2.5 COILS

Copper tube with aluminium plate fins.

2.6 CONTROLS

Provide as a minimum the following functions:

- ┆ Temperature control for each zone located to accurately sense zone temperature.
- ┆ Fan speed selection for multi and variable speed fans.
- ┆ Day/night zone changeover if scheduled.
- ┆ Time switch for each system with 8 temperature programmes per day, separate programmes for each day of the week, manual set point over ride and 'Vacation' or 'Holiday' temperature set back.

2.7 DUCTS

Metallic-coated sheet steel to AS 1397, coating class G2/Z275.

Flexible ducting shall be metallized fabric clamped on formed metal helix with polyester insulation blanket wrapped around duct and covered with an outer vapour barrier.

2.8 REFRIGERATION PIPEWORK KIT

Split system Mitsubishi Electrics standard pre-charged piping kit.

2.9 REFRIGERATION PIPEWORK CUSTOM

Copper tubing, de-oxidised seamless refrigeration quality, either half hard or soft drawn. Jointing shall be brazed or flared connections to equipment.

2.10 REFRIGERANT

Refrigerant HFC type with no phase out date, such as R410a or R407a, unless approved otherwise.

Mitsubishi Electric Heat Pumps

High Walls**2.11 DESIGNER SERIES**

DC inverter type unit, single split inverter, designed for heating or cooling. 230V single phase 50 Hz power supply.

Nano Platinum filter, automatic swing vanes.

Finish: Gloss Black, Matte Silver, Classic White.

Compatible 7 day controller supplied with unit.

1w standby power.

DC Inverter Outdoor Unit: Cooling/heating unit, single split, standard inverter type.

Accessories - Controllers

Many controllers/systems are available. Contact Black Diamond Technologies Ltd for advice on all suitable systems and information.

2.12 MAC-558IF-E WI-FI CONTROL ADAPTOR (7 DAY)

Unlocks Heat Pump from any location and connects the heat pump to a smart phone, tablet or online account.

Currently supported for use with GE, EF, KJ and FB Hypercore units only.

3 EXECUTION**Conditions****3.1 DELIVERY, STORAGE AND HANDLING**

Take delivery of materials and goods and store on site and protect from damage.

Protect finished surfaces, edges and corners from damage.

Move/handle goods in accordance with Mitsubishi Electrics requirements.

Reject and replace goods that are damaged or will not provide the required finish.

Installation/application**3.2 STANDARDS AND TOLERANCES**

Refer to the general section 1270 CONSTRUCTION for general requirements.

3.3 CONFIRM LAYOUT

Before commencing work confirm the proposed location of pipes, ducts and controls.

3.4 CONCEALED PIPING

All refrigeration and condensate piping shall be concealed within the building structure unless stated otherwise.

3.5 CO-ORDINATE SERVICES

Co-ordinate and co-operate with other sub-trades to avoid any conflict with the installation of the system with other subcontractors work.

3.6 PROTECT SURFACES

Protect surfaces, equipment and finishes already in place from the possibility of damage during the installation process.

Application**3.7 INSTALLATION DUCTWORK**

Install flexible duct as straight as possible with minimum number of bends. Maximise bend radius. Check for and rectify any crushed flexible duct.

Install and support to AS 4254.1, 2.5, limit sag to < 40mm/m.

Insulate ducts to reduce heat gain and prevent condensation. Provide continuous vapour barrier around ducts carrying conditioned air. Insulate flexible connections on ducts carrying air below ambient temperature.

Clean interior of ductwork progressively during installation.

3.8 INSTALLATION PIPE WORK

Install general pipe work to AS/NZS 1571.

Purge the system at all times with dry nitrogen when brazing or heating pipework.

Pipes to be installed to Mitsubishi Electrics requirements, adequately supported, also arranged and sized to prevent excessive pressure drop and ensure correct circulation of refrigerant and oil.

All refrigeration pipework test to 1800 kPa.

Insulate all refrigerant and drain piping that may sweat with chemically blown closed cell elastomeric insulation. Suction lines are to be insulated over the entire length between connections to indoor and outdoor units. Protect insulation from sunlight and mechanical damage.
Insulation thickness: 13mm for pipes < DN 20, 19mm otherwise.

Provide trapped DN 20 condensate drains to [AS/NZS 3666.1](#) from each indoor coil and safety tray, to an approved drain point. Provide drains from each reverse cycle outdoor coil unless casing freely drains to a roof or other location where condensate will not cause damage or pond.

3.9 INSTALLATION UNIT

Provide clearance around outdoor units for condenser air flow and maintenance access, to Mitsubishi Electrics requirements. Ensure discharge air does not short-circuit to condenser intake. For equipment at ground level, ensure they are mounted on 100mm level concrete plinth or equivalent impervious material.
Provide internal or external flexible duct connections at indoor unit.

For vibration isolation of suspended units, provide 4 metal spring or rubber-in - shear isolation mountings with 25mm static deflection and 98% isolation efficiency. For floor mounted units, provide neoprene waffle pads. Bolt in place.

If leaks or condensation from equipment could cause nuisance or damage to the building or its contents provide a galvanized steel safety tray under the equipment.

3.10 INSTALLATION REFRIGERANT

The completed system including all pipework, to be evacuated to 0.2mm Hg or better with a vacuum pump and maintained at this pressure for 2 hours, then broken with refrigerant.

Completion

3.11 ROUTINE CLEANING

Carry out routine trade cleaning of this part of the work including periodic removal of all debris, unused and temporary materials and elements from the site.

3.12 DEFECTIVE OR DAMAGED WORK

Repair damaged or marked elements. Replace damaged or marked elements where repair is not possible or will not be acceptable. Adjust operation of equipment and moving parts not working correctly. Leave work to the standard required for following procedures.

Commissioning

3.13 COMMISSIONING

Commission the systems to Mitsubishi Electrics recommendations using instruments calibrated in the last 12 months. Submit signed commissioning check list on completion.

3.14 CLEANING

Clean filters, outdoor coils, grilles and diffusers.
Remove debris, unused materials and elements from the site. Clean soiled or marked work. Replace damaged, cracked or marked elements. Leave the whole of this work to the standard required by following procedures.

4 SELECTIONS

For further details on selections go to www.mitsubishi-electric.co.nz/heatpump/
Substitutions are not permitted to the following, unless stated otherwise.

High Walls

4.1 MITSUBISHI ELECTRIC HEAT PUMPS - DESIGNER SERIES

Location:	Lounge
Type/Brand:	Designer Series
Model:	TBC
Colour:	Black
Controller:	WIFI
Multi room:	No

7701 ELECTRICAL BASIC

1 GENERAL

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

- | power
- | lighting
- | electrical automation
- | security system
- | complete with componentry
- | electrically-powered fittings
- | fire rated sealers, liners and accessories

1.1 ABBREVIATIONS AND DEFINITIONS

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

The following abbreviations apply specifically to this section:

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

Documents

1.2 DOCUMENTS

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

NZBC E2/AS1	External moisture
NZBC F6/AS1	Visibility in escape routes
NZBC F7/AS1	Warning systems
NZBC G4/AS1	Ventilation
NZBC G9/AS1	Electricity
AS/NZS 1125	Conductors in insulated electric cables and flexible cord
AS/NZS 1768	Lightning protection
AS/NZS 2201.1	Intruder alarm systems - Client's premises - Design, installation, commissioning and maintenance
AS 2293.1	Emergency escape lighting and exit signs for buildings - System design, installation and operation
AS 2293.3	Emergency escape lighting and exit signs for buildings - Emergency escape luminaires and exit signs
AS/NZS 3000	Electrical installations (known as the Australian/New Zealand Wiring Rules)
AS/NZS 3008.1.2	Electrical installations - Selection of cables - Cables for alternating voltages up to and including 0.6/1 kV - Typical New Zealand installation conditions
AS/NZS 3100	Approval and test specification-general requirements for electrical equipment
AS/NZS 3112	Approval and test specification - Plugs and socket-outlets
AS/NZS 3113	Approval and test specification - Ceiling roses
AS/NZS 3190	Approval and test specification - Residual current devices (current-operated earth-leakage devices)
AS/NZS 3350.1	Safety of household and similar electrical appliances - General requirements
AS/NZS 3439.3	Low-voltage switchgear and controlgear assemblies - Particular requirements for low-voltage switchgear and controlgear assemblies intended to be installed in places where unskilled persons have access for their use - Distribution boards
AS 3786	Smoke alarms
NZS 4514	Interconnected smoke alarms for houses
AS/NZS 5000.2	Electric cables - Polymeric insulated - for working voltages up to and including 450/750v
AS/NZS 60598.2.2:2001	Luminaires - Particular requirements - Recessed luminaires
IEC 61643	Components for low voltage surge protection devices
Electricity (Safety) Regulations 2010 (Reprint as at 4 April 2016)	
TCF Premises Wiring Code of Practice 2011	

Warranties

1.3 WARRANTY

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

1 year: Warranty period

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

Requirements

1.4 COMPLY

Comply with the Electricity (Safety) Regulations 2010, [AS/NZS 3000](#), [AS/NZS 3008.1.2](#) and [TCF](#) Premises Wiring Code of Practice for listed and prescribed work and with the utility network operator's requirements. Apply for the service connection. Arrange for the required inspections of listed work. Pay all fees.

1.5 QUALIFICATIONS

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

1.6 ELECTRICAL CERTIFICATE OF COMPLIANCE

Supply a certificate of compliance (CoC) to the owner, and if required the NUO, as required by the Electricity (Safety) Regulations (2010), prior to connection.

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

1.7 ELECTRICAL SAFETY CERTIFICATE

Provide an Electrical Safety Certificate (ESC), as required by the Electrical (Safety) Regulations 2010, to the owner and when required the BCA. To be provided no later than 20 working days after connection and prior to Practical Completion.

2 PRODUCTS

2.1 MAINS SUPPLY, SINGLE PHASE

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

2.2 CABLES

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

Lighting circuits:	Domestic: 1.5mm ² on 10 amp MCBs
Lighting circuits:	Commercial: 1.5mm ² on 16 amp MCBs
Power circuits:	2.5mm ² on 16 amp MCBs for domestic and unenclosed or unfilled cavity construction
	2.5mm ² on 16 amp MCBs for domestic insulated construction, or filled cavity
	2.5mm ² on 20 amp MCBs for unenclosed or unfilled cavity construction
	2.5mm ² on 16 amp MCBs for insulated construction, or filled cavity, or lengths over 30 metres

Hot water cylinder circuits: Single phase: 2.5mm² on 20 amp MCBs

Range/oven/hob circuits: Single phase: 6mm² on 32 amp MCBs

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

2.3 METER BOX

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

2.4 DISTRIBUTION BOARD

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

2.5 CIRCUIT PROTECTION

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

2.6 WALL BOXES

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

2.7 SWITCH UNITS

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

2.8 HOT WATER SYSTEM SWITCH

One way 20 amp switch complete with cable clamp for flexible PVC conduit to element enclosure.

2.9 SWITCHED SOCKET UNITS

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

2.10 SURGE PROTECTION

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

2.11 CEILING ROSES

White plastic mounting base with screwed cover, manufactured to [AS/NZS 3113](#). Terminal type. Cylindrical section TPS for suspended fittings.

2.12 BATTEN HOLDERS

Standard white plastic bayonet cap, with cap angled where wall mounted. Brass liners.

2.13 DOOR BELL SYSTEM

Complete with transformer for mounting on distribution board.

2.14 LIGHT FITTINGS

Fluorescent and High Intensity Discharge fittings with low loss control gear and power factor corrected to 0.95 minimum. Control gear suitable for dimming if this is required. All fittings complete with lamps; Incandescent GLS lamps pearl, coiled-coil 230v rated, bayonet cap; Fluorescent triphosphor 2700K; CFL; halogen ELV 12v dichroic reflector with cover glass unless detailed otherwise; integral/non-integral LEDs, reflectors, lenses, heatsinks and drivers - 3,000K to 4,000K, CRI >80, L70.

2.15 RESIDENTIAL RECESSED LIGHT FITTINGS

Residential recessed luminaires to [AS/NZS 60598.2.2](#), types IC-F, IC, CA-80 or CA-135 only.

2.16 EXHAUST FANS

Ceiling, wall or duct mounted exhaust fans for ventilation to [NZBC G4/AS1](#), and compliant with [AS/NZS 3350.1](#).

2.17 HEATED TOWEL RAILS

Fixed wired heated towel warmers, double insulated, IPX4 splash-proof, compliant with [AS/NZS 3350.1](#), scratch resistant powdercoated or chrome finish.

2.18 OUTDOOR SWITCHES & SOCKETS

Using materials with superior UV protection, impact strength, and addition chemical resistance when compared with interior polycarbonate fittings. Weather protected, switches to IP56 minimum, and sockets to IP53 minimum. Sockets fitted with safety shutters behind socket pins, and all products able to be padlocked off or on.

3 EXECUTION**3.1 MAIN SUPPLY**

Lay underground mains to the NUO requirements. Excavate trench, install cable and marker tape and backfill.

3.2 METER BOX

Fit to meter box manufacturer's and Electricity Retailer's requirements. Recess into external wall in sheltered area and flash to weatherproof to [NZBC E2/AS1](#) fig 69. Arrange for meter installation and connection.

3.3 DISTRIBUTION BOARD

Fit to [AS/NZS 3000](#) and board manufacturer's requirements. Recess into wall or surface mount and ensure fire containment properties of the enclosure are maintained.

3.4 CIRCUIT PROTECTION

Install MCBs at distribution board to AS/NZS3000 to protect each final sub circuit.

3.5 EARTH BONDS

Bond together and to earth all plumbing fittings not adequately isolated, to [AS/NZS 3000](#), the Electricity (Safety) Regulations 2010 and the fitting manufacturer's requirements.

3.6 MAIN EARTH

Provide a plastic toby box to contain and protect the earth electrode. Fix the connecting earth wiring closely and securely against wall surfaces.

3.7 EARTH LEAKAGE PROTECTION

Install RCD protection to [AS/NZS 3000](#).

3.8 RCD - DOMESTIC INSTALLATIONS

Install 30mA RCD protection at the switchboard for all final sub circuits to control outlets and lighting except for fixed or stationary cooking equipment, to [AS/NZS 3000](#).

3.9 RCD - SPECIFIC INSTALLATIONS

Install 30mA RCDs at the distribution board.

Install fixed wired RCD protected outlets (SRCD) in the following areas:

- ┆ Wet areas: bathrooms, laundries, kitchens.
- ┆ Near pools and water features.
- ┆ Where intended for use with cleaning equipment.
- ┆ Hand-held tools subject to movement in use, i.e. work-shops, garages.

3.10 SET-OUT

The position of outlets and equipment shown on drawings is indicative of requirements. Confirm documents and site conditions are not in conflict with other services or features. Resolve conflicts and discrepancies before proceeding with work affected. Confirm on site the exact location, disposition and mounting heights of all outlets, fittings, equipment, penetrations, and use of exposed wiring. Fix outlet items level, plumb and in line.

3.11 CABLING

Install wiring systems to [AS/NZS 3000](#). All cabling run concealed. No TPS cable laid directly in concrete. Locate holes in timber framing for the passage of cables at the centre line of the timber member. Install cable in conduits where required to pass through concrete or underground. In walls run cabling horizontally and vertically in straight lines. In ceilings either run cabling along ceiling framing or attached to catenary wires. Clip cabling to ceiling framing/catenary wires.

3.12 CABLING CIRCUITS

Install all circuits with the appropriately rated cable and circuit protection. Install with a maximum of 8 light switch units or 4 double or single switched socket units on any circuit. Minimum 2 lighting circuits per floor. Separate circuits for all electric heating appliances. Kitchen sockets to be on at least two different circuits.

3.13 WALL BOXES

Mount flush in cavity construction size to fit products selected. Fix vertically mounted wall boxes to studs. Screw fix horizontally mounted switched socket outlet wall boxes to solid blocking or nogs. Fix switch panel wall boxes to solid blocking.

3.14 SWITCH AND SOCKET UNITS

Fit all single and double switch units, all sockets to the following heights (to the centre of the unit) unless shown otherwise on the drawings.

Switch Units:	1000mm above finished floor
Socket Units:	150mm above work benches
	400mm above finished floor

Mount light switches and switch socket outlets vertically and socket units horizontally. Label all switch units that control electrical equipment or special lighting circuits by colour filled engraving on the switch. Use proprietary engraved switch mechanisms where applicable.

3.15 ISOLATING SWITCHES

Locate isolating switches in positions as confirmed by the owner, when not specifically shown on the drawings.

3.16 LIGHT FITTINGS

Install light fittings in locations and at heights specified and confirmed by the owner, in accordance with the fitting manufacturer's requirements.

3.17 EXTRA LOW VOLTAGE LIGHTING

Use electronic, transformers (halogen) or drivers (LED) for ELV lamps, one transformer/driver per lamp. Locate to manufacturer's requirements and as close as practicable to the lamp. Ensure transformers/drivers and rear of light fittings are adequately ventilated and appropriately clear of any building elements, to [AS/NZS 3000](#).

3.18 RECESSED LIGHT FITTINGS - CLEARANCE TO INSULATION

Non-residential applications;

The clearance between insulation and recessed downlights;

- ┆ Leave 100mm gap to [AS/NZS 3000](#), figure 4.9
- ┆ Provide larger gaps where required by the downlight manufacturer

Residential applications;

- ┆ Ensure new recessed downlights are one of the new classes classified in [AS/NZS 60598.2.2](#); CA 80, CA 135, IC and IC - F.
- ┆ Classification type CA 80, CA 135, to [AS/NZS 60598.2.2](#); insulation can abut the sides (wrapping around the sides)
- ┆ Classification type IC and IC - F, to [AS/NZS 60598.2.2](#); insulation can abut and cover over the top of the downlight
- ┆ Provide larger gaps where required by the light manufacturer
- ┆ In a retrofit situation where the insulation is non-approved or unknown, ensure 100mm clearance from the insulation to [AS/NZS 3000](#), figure 4.9.

3.19 ELECTRIC HOT WATER SYSTEM

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

3.20 SURGE PROTECTION

Install surge protection devices to manufacturer's requirements and in accordance with [AS/NZS 3000](#) and AS/NZS 1768. When fitting IEC 61643 Class II protection at the switchboard, protect the device by a dedicated MCB.

3.21 ELECTRIC POWERED FITTINGS AND EQUIPMENT

Install and wire fittings and equipment to individual fittings and equipment manufacturer's requirements. Refer to the drawings for required layouts and locations for equipment. Refer to SELECTIONS for schedules of fittings.

3.22 BATHROOM ELECTRICAL FIXTURES

Install all electrical fixtures. Connect the following bathroom and toilet electrical items:

- ┆ Heated towel rails: Install to manufacturers requirements and installed in accordance with [AS/NZS 3000](#) and the [NZBC G9/AS1](#)
- ┆ Mirror demisters: Locate centrally above the wash hand basin(s). Connect wiring to room lighting unless specified otherwise.
- ┆ Exhaust fans: Install exhaust fans to manufacturer requirements. Installed in accordance with [AS/NZS 3000](#) and [NZBC G4/AS1](#).

3.23 OUTDOOR/EXTERIOR SERVICES

Install all wiring systems in accordance with [AS/NZS 3000](#) and in accordance with the manufacturer's recommendations:

Provide circuits and connections for exterior installations, including ELV 12/24 Volt path lighting and electronic irrigation systems. Refer to drawings for connection points. Where underground, ensure appropriate protection, such as thickness of sheathing, conduit, depth of cabling, and proximity to other services.

Use the appropriate rated fittings for power control and power supply. Weather protected switches to IP56, and sockets to IP53 as a minimum. Install to manufacturer's specifications using recommended fittings and sealants to maintain the products integrity.

Earth leakage protection to be provided for in areas where there is increased risk to human safety in the form of either RCDs at the distribution board, or socket outlet. RCDs are recommended for visible awareness of protection.

3.24 LABELLING

Include label under each controller, switch and circuit breaker on distribution boards. Include a warning notice if light dimmers are used in the installation. List the rating of each circuit.

Completion

3.25 COMPLETION

Leave installation operating correctly, with equipment clean and operational.

4 SELECTIONS

Materials

4.1 SELECTIONS - FITTINGS AND HARDWARE

Confirm selections of all outlet fittings and hardware with the owner in writing before ordering. Refer to plans for selections

8231F FIRTH PAVING

1 GENERAL

This section relates to laying Firth concrete pavers on a sand bed to form paving for pedestrians and light vehicular traffic.

1.1 RELATED WORK

Refer to the 8212 SUB BASES TO SEALING AND PAVING for sub base preparation.

Documents

1.2 DOCUMENTS

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

NZS 3104	Specification for concrete production
NZS 3116	Concrete segmental and flagstone paving

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

1.3 MANUFACTURER'S DOCUMENTS

Firth Industries documents relating to work in this section are:

Firth Landscaping Solutions Brochure
Firth Ecopave System Installation Guide
Firth Paveware Paving Range

Copies of the above document is available from **Firth** Industries

Web: www.firth.co.nz
 Email: info@firth.co.nz
 Telephone: 0800 800 576
 Facsimile: 0800 800 530

Further information is available by phoning 0800 800 576.

Requirements

1.4 NO SUBSTITUTIONS

Substitutions are not permitted to any specified **Firth** pavers or associated **Firth** products.

1.5 QUALIFICATIONS

Paver installers to be experienced competent workers, familiar with **Firth** Industries materials and techniques specified.

1.6 CONFIRM APPEARANCE

Before commencing work confirm the layout and any elements affecting the visual appearance of the work. Pavers should be mixed on site from several pallets to ensure blending and avoid colour contrasts. Ensure extra paving is from the same batch to avoid colour variation.

2 PRODUCTS

Materials

2.1 CONCRETE PAVING BLOCKS

Firth concrete paving blocks to [NZS 3116](#), **table 1, Paver selection**, for application, materials, design shape and dimensions, skid resistance, physical condition. Refer to SELECTIONS for type and colour.

Accessories

2.2 BEDDING SAND

Hard, durable, angular particles to [NZS 3116](#) and to the grading limits of **table 4, Grading limits for bedding sand**.

2.3 JOINTING SAND

Dricon PaveSand™ to [NZS 3116](#).

2.4 CONCRETE

Prescribed mix to [NZS 3104](#) (except where specified otherwise).

Haunching concrete: 17.5 MPa.

Infill concrete: 25 MPa.

2.5 BASECOURSE

A granular base material to [NZS 3116](#) of approved screened crushed gravel graded in size from 20mm to 7mm, clean. No material is to pass when tested with a standard sieve of 4.75mm opening.

3 EXECUTION

Conditions

3.1 STORAGE

Take delivery of blocks and pavers on protected pallets, undamaged and dry. Store on level hard standings, protect from damage and keep dry until laid.

3.2 DELIVERY OF SANDS

Deliver to site only sufficient sands for current work. Keep dry until used.

3.3 INSPECTION

Before starting paving work inspect the area to ensure that kerbing, edge restraints, drainage, cesspits, channels, basecourse and other services are in place to correct falls and to allow work of the required standard. Refer to the 8212 SUB BASES TO SEALING AND PAVING section for sub base preparation.

3.4 PAVING PATTERN

Confirm paving pattern and header course.

3.5 SURFACE TOLERANCES

Final surface of paving:	±10mm of design level
Surface level above drainage:	5mm minimum above drainage channels or gully entries and continuously graded towards them
Maximum deviation:	8mm in 3 metres without ponding
Between adjacent blocks:	2mm - 4mm joint

Application

3.6 EXCAVATE AND PREPARE THE SUB-GRADE

Remove all top soil and excavate to the required depth. Fill as required using existing organic free material if available. Compact in 100mm layers maximum. Compact using a plate compactor or rammer. The finished sub-grade should match the exact contour for the final paving within a tolerance of ±20mm at any point.

3.7 PREPARE THE BASECOURSE

Construct basecourse to required thickness to [NZS 3116](#), **table 2, Basecourse thickness** in mm. Fill in and compact in 100mm layers maximum and compact to a uniform dense condition, particularly around manholes and kerbs. If the texture of the finished base course allows bedding sand to drain through, seal the base course with GAP7 before proceeding. The finished base course should match the exact contour for the final paving within a tolerance of ±10mm at any point.

3.8 FORM CONCRETE HAUNCHING

Excavate and cut away base course to at least 50mm below bedding sand and place haunching concrete. Set paver soldier course in concrete haunching to the levels shown. Allow concrete to cure before making good the adjoining basecourse. Do not allow traffic on adjacent paving while work is being carried out and until concrete has set.

3.9 LAY BEDDING SAND

Loose lay sand using screeds over the prepared basecourse to a depth dependent on the sand and its water content to give a nominal compacted thickness of 30mm. Compact to give a uniform density and thickness. Check the finished level over a small area using paving and then correct the total area before proceeding. Screenshot the compacted surface to finish completely level.

3.10 LAY PAVERS

Set up string lines in 2 directions at 5 metre centres maximum to ensure joint lines are straight and square. Lay whole pavers first within the string line grid with joint widths in the range of 2mm to 4mm. For segmental pavers compact to [NZS 3116](#), **clause 310.4 Laying and Initial Compaction**.

Pedestrian areas: Standard plate compactor

Private driveways: 60 - 120 kg static weight and 10 - 24 kN centrifugal force

3.11 CUTTING PAVERS

Cut pavers, neat and tidy with a diamond-tipped saw blade. Do not use cut units less than half a paver. Adjust pattern to suit as necessary.

3.12 JOINT FILLING AND COMPACTION

On completion of the paver compaction, spread joint filling sand dry over the surface and broom in to fill joints completely. Once haunching has set, compact the pavers using a suitable vibrating plate compactor.

Compact pavers 450mm x 450mm and larger using a rubber mallet. Keep topping up the joints as the jointing sand settles until they are completely full and the pavers locked in. Sweep off the excess sand and compact again. Inspect after 3 days and re-sand and re-vibrate again as necessary.

Repeat at 2 week intervals once the pavers have had traffic, until 2 such inspections show no loss or settlement of joint sand.

Finishing

3.13 PROTECTION

Protect the completed work from damage and from dropping other materials during the remainder of the construction period. Do not use the completed work as a building platform or for material storage. Do not sandblast to remove any site contamination.

Completion

3.14 REPLACE

Replace damaged, cracked or marked elements.

3.15 ON COMPLETION

Leave work to a high standard. Ensure all joints are completely filled and compacted.

3.16 REMOVE

Remove debris, unused materials and elements from the site.

4 SELECTIONS

4.1 FIRTH CONCRETE PAVING UNITS

Brand: **Firth Industries**
 Type:
 Thickness:
 Colour:
 Finish:
 Laying pattern:

**** APPENDIX**

- 1 StoClear Coating Systems
- 2 Sto specs
- 3 Thermakraft
- 4 Ardex insulation manual
- 5 Membrane roof manual
- 6 Spanlok Manual
- 7 Cedar cladding manual



STOPROTECT CLEAR COATING SPECIFICATION OVER EXTERIOR ARCHITECTURAL CONCRETE BLOCK CONSTRUCTION

Complies with CCANZ CP 01: 2011 (E2/AS3) ACAD Details www.sto.co.nz building with Sto

Project:

Prepared for:

StoProtect Clear Coating System

This specification details the application of a clear coating system over exterior concrete block construction incorporating; **StoFlexyl waterproofing** as required, sealing the exterior blocks with **S-Protect WS405 Silane sealer** before finishing in three coats of **StoProtect transparent** to leave a clear durable finish. **Note:** The **StoProtect Clear Coating System** can be used on other masonry surfaces but a specific specification is required.

1. CONSTRUCTION

Responsibility

All work in this section shall be the responsibility of the Main Contractor. All concrete block masonry construction must in accordance with the relevant New Zealand standards, NZ Building Code and the applicable manufactures specifications and details. Any dissimilar material joins shall be in strict accordance with the project specifications & drawings. The Specifier must be advised of any anomalies and approve of all such details prior to work commencing.

Concrete Block Construction

The concrete block installation, including reinforcement and concrete infill shall be made in strict accordance with the project specifications & drawings and the **manufactures design & installation manual for coated blocks**. In particular the blocks shall be laid true in both vertical and horizontal planes laid in a minimum 45mm ground floor foundation rebate using 12.5 MPa mortar in a nominal 10 mm width compressed by tooling with all window, door and services cutouts correctly made using rebated blocks for all joinery openings. At least 28 drying days shall be allowed after concrete placement as per AS/NZS 2311:2000, for curing and stabilization to take place before application of the Sto coating system. Any minor surface damage or defective pointing shall be repaired before commencing. All maximum tolerances shall be in strict accordance with NZS 4210: 2001 2.7.1.4 Table 2.2, i.e. No more than 3mm surface alignment deviation over a 1200mm radius. The main contractor shall ensure concrete blocks are clean, dry and free of all surface contaminants before the coating applicator commences and that any areas, details or flashings above or adjacent to the Sto Coating System have been adequately waterproofed to prevent water migration behind the Sto Coating System. All mortar joints are to be tight tooled and neatly pointed, rebated joinery blocks must be waterproofed as necessary especially sill blocks and joinery must be installed as per Sto ACAD details for concrete block using StoFlexyl waterproofing as required - www.sto.co.nz all construction contaminates must be removed.

Note: Certain concrete blocks or block profiles may be unsuitable for clear coating check with the block manufacturer prior to construction

Concrete Block Construction - Clear Coating Systems

- 45mm minimum rebate required in foundations for residential projects.
- Joinery openings are to be waterproofed and formed with rebated blocks & sill blocks.
- Clear coated block faces must be of an even colour & consistency.
- Blocks must be covered on site and laid dry. Where honed Architectural blocks are used ensure any on site honing matches the manufactures honing to achieve continuity.
- Before starting be conscious that certain soils, clays, vegetation etc can cause staining.
- Control joints are placed at maximum 6.0metre centres refer to the project documentation and NZS 4229 for placement and detailing.
- Mortar to be minimum 12.5MP, with an expansion agent tooled smooth and compressed as per NZS 4210.
- Where specified use the manufactures bagged mortar.
- Mortar to full depth of webbing up to 20mm thick in first course and then 10mm +/- 3mm.
- Washout ports to have block face removed, mortared back after and braced for grout.
- Ensure there is no impediment to grout flow remove ends or biscuits to prevent air pockets
- Blocks, especially stack bonded and insulated blocks – must have full mortar joints both horizontally and vertically any voids created by leaving ends in etc need to be mortared by the block layer during the laying process to achieve a continuous solid fill.
- Blocks laid open end to depressed web end at all times.
- Inverted blocks are to be fully mortared across the web and any block end such as insulated blocks that have a vertical void at the join are to mortar filled.
- Column blocks must only be used on the ends of wall and must be cut to allow grout flow to every course
- Block layer to ensure a solid fill is achieved throughout the entire wall. Blocks should be filled in 1.200mm lifts and mechanically vibrated to eliminate air pockets that can cause structural weak points or efflorescence.
- Sill blocks should be filled by leaving one sill block out to avoid air entrapment.
- Remove any mortar or grout slurry from block faces before it sets.
- Drying times vary according to block thickness, grout and weather a minimum 28 days is required for settlement and curing – the blocks must be completely dry before coating.
- Where walls are back filled a manufactures certified tanking membrane is required.
- Always waterproof blocks behind or adjacent to any overlays or abutments such as staircases especially adjoining concrete stairs or separate garden walls etc.
- Exposed tops of walls must be waterproofed with StoFlexyl mesh and finished with block caps before coating commences.

Cleaning – Visual Presentation

The finished concrete blocks must be clean and visually acceptable. It is the responsibility of the main contractor and their appointed block layer to ensure a clean unified surface is achieved with an acceptable continuity of block faces. If the blocks are defective, stained or discoloured the block manufacturer must be notified before any blocks are laid. The coating system is transparent therefore it is essential to ensure that the block layer has **left the concrete block walls clean with no marks, stains, slurry, uneven pointing, or defects and that the continuity of colour in the laid blocks is acceptable to the client or specifier.** Any repairs or specialist cleaning required **must** be undertaken before the Sto Coatings Applicator commences.

2. BLOCK COATING PREPARATION

Responsibility

All coating work in this section shall be the responsibility of the nominated Sto Coatings Applicator

The information contained in this Specification is based on our experience and testing and represents the latest information available at the date of production. No responsibility is taken for uses to which this information may be put, but we advise that where application of products and processes is in complete conformity with this specification an appropriate warranty is available. We reserve the right to alter or update information parameters and formulations at any time without prior notice.

Joinery Rebates, Parapet & Balustrade Caps - horizontal surfaces

Joinery shall be fixed over rebated concrete blocks that have been **StoFlexyl waterproofed** prior to the coating application. Before fixing joinery **StoFlexyl** shall be used to waterproof the rebates mixed correctly 1/1 with fresh Portland cement and brushed on in two (2) coats over the concrete block rebated openings to fill all the block holes. Additionally **sills** are required to be **StoFlexyl meshed waterproofed** from the bottom of the rebate out to the exterior with the mesh taken 40mm up the jambs. Jointing the installed joinery perimeter with **MS Sealant** at the **head & jambs** then forms the primary seal with the **sill** left open to allow for a 5mm drainage gap after the finishing plaster has been applied. Note; the visual **StoFlexyl** component on the rebates is to be primed with **Sto Putzgrund** and plastered in the **Stolit K plaster system** taking care to avoid marring the face of the blocks. The main contractor must incorporate **air seals** around all interior joinery openings and the MS Sealant joints to the exterior joinery shall be the responsibility of the nominated joinery installer. The main contractor shall ensure all joinery openings are formed using rebated concrete blocks and sill blocks.

Alternatively: Where a clear finish is required on the head and jamb rebates the **StoFlexyl waterproofing** is applied approximately 15/18mm out from the rebate step onto the exterior rebate to sit 3mm past the installed joinery flange that is then covered by the sealant joint (window 6mm + 5 mm air gap + 5mm). The sill blocks are normally **StoFlexyl meshed waterproofed** finished neat to the jamb sides (not taken 40mm up jambs as previously detailed) and then primed and plastered. Where solid filled sill blocks are used the **StoProtect** clear coating system can be used but an additional two (2) coats are required on the sills.

Note: Parapets caps, balustrade caps and horizontal surfaces must also be waterproofed using **StoFlexyl meshed waterproofing** which can be installed under concrete block finishing caps.

Finishing of exposed StoFlexyl waterproofing

All exposed **StoFlexyl** surfaces are to be finished in the selected **Stolit** plaster system. To clean dry **StoFlexyl** surfaces apply one coat of **Sto Putzgrund** primer tinted to the selected colour and plaster in the selected **Stolit** coloured finishing render ensuring adequate masking is undertaken before coating in **StoProtect Transparent**.

Foundation Splash Zone

The blocks must be laid in a minimum 45mm rebated floor slab to ensure this transition remains watertight the **StoProtect Clear System** then extends down over the foundation a minimum 100mm past the interior floor level. Foundations can alternatively be plastered in a **Sto Plaster System**.

Note: **StoFlexyl Meshed waterproofing** has been evaluated by BRANZ to meet **AS/NZS 4858** for a waterproof membrane as required by **E2/AS3 & CCANZ CP 01: 2011**

3. STOPROTECT CLEAR COATING SYSTEM

All work in this section shall be the responsibility of the Sto Coating Applicator who must check the blocks are clean, dry and adequate masking has been undertaken before commencing.

Clear Coating Procedure

Before commencing **check the block wall surfaces are clean, visually acceptable, pointing is tight and any flashings, dissimilar material overlays, parapets or joinery rebates are waterproofed**. Though the coatings are clear appropriate masking must be undertaken to protect joinery and adjacent surfaces.

Note application rates will vary depending on the blocks being treated the spreading rates are based on tight honed block - standard blocks and pumice blocks etc all have different matrixes and porosities that may require additional product.

S-Protect WS 405 Silane Sealer

To cured, dry, clean exterior surfaces apply a flood coat of **S-Protect WS 405 Silane** at 4 - 6 square metres per litre applied with low-pressure back pack sprayer using a block brush to control the wet edge and remove lingering drops, allow to dry a **minimum 2 hours** before applying a second coat of **S-Protect WS 405** at 7 - 8sqm per litre. Then **leave a minimum 5 days** for full catalysis reaction all in accordance with the TDS sheets before applying the **StoProtect Transparent**.

Note: Spray gun application is not recommended unless a low pressure delivery system is used.

Note; **S-Protect WS 405** Silane will not etch glass but leaves a film that can be difficult to remove once it dries ensure adjacent surfaces and dissimilar materials are masked off with plastic.

StoProtect Clear Coating System

To clean dry honed blocks sealed with **S-Protect WS405** apply three (3) coats of **StoProtect Transparent** thinning the first coat by adding approximately 1.5 - 2 litres of clean fresh water and applying by brush and roller at approximately 7 – 8 square metres per litre for honed blocks. Allow the first coat to dry completely before applying the second and third coat un-thinned at approximately 7 - 8 square metres. Always maintain wet edges when applying to prevent shadow lines especially between cutting in and roller applications. Ensure the surface is well coated and that the mortar joints are brushed, and any block pit holes, voids and joints are well filled before applying the final coat. Depending on the block profile and porosity the spreading rate will vary accordingly. The **StoProtect** is not to be spray applied as the surface must be well coated with the coating worked into the block profile to fill block pit holes and the pointing to achieve a minimum dry film thickness of 150 microns.

Note: The spreading rates are based on **honed dry blocked surfaces** allowances must be made for other blocks depending on their porosity and profile. Where the blocks haven't been honed or the matrix is particularly porous an additional coat of **StoProtect** will be required. On negative pointing clear coated sills or horizontal caps additional coats are required to give a minimum dry film build of 180 microns.

For interior use the Silane sealer is not required though the coating applicator must ensure wet edges are maintained to avoid shadow lines. Where a hard interior finish is required such as service areas StoPur WV 200 transparent is recommended.

4. GENERAL

Before removing the masking check all the block faces are evenly sealed and that any blemishes have been rectified.

5. MAINTENANCE**Refer; Sto Maintenance Schedule for comprehensive guide**

The **StoProtect Transparent System** must be checked and cleaned annually by low pressure washing or chemical cleaning to remove all surface contaminants, with special attention to non-rain washed areas. When recoating is required at seven year cycles to maintain long-term integrity this can be carried out using **StoProtect Transparent** over a cleaned surface.

Block Substrate Maintenance Inspections

The owner is to arrange for an initial inspection of the block surfaces six months after practical completion to ensure there are no fractures in the block surface from the concrete curing process or settlement. After the six month inspection the exterior is to be cleaned and checked annually to clearly identify any faults relating to substrate stress, sealant beads, flashings and other penetrations. A repair process must be implemented immediately to address any faults discovered so the warranty is not compromised.

The information contained in this Specification is based on our experience and testing and represents the latest information available at the date of production. No responsibility is taken for uses to which this information may be put, but we advise that where application of products and processes is in complete conformity with this specification an appropriate warranty is available. We reserve the right to alter or update information parameters and formulations at any time without prior notice.

6. WARRANTY

The **StoProtect Clear Coating System** described in this specification is warranted for a period of ten (10) years from the date of practical completion to comply with the coating requirements of the NZBC for this type of building element provided the maintenance requirements as set out in the StoProtect Specification & Maintenance Schedule are followed.

A five (5) year workmanship warranty is issued by the Sto Applicator carrying out the work, and is backed by the Manufacturer as to the suitability for use of the material supplied, provided that.

- (a) The approved Sto Applicator who must adequately complete the Sto QA Compliance Procedure Form and PS3 Applicator Warranty carries out all specified work.
- (b) All work is carried out in accordance with this Specification or any written amendments issued by Stoanz Limited.
- (c) The warranty does not cover situations where the coating system is subject to physical disturbance, structural stress, chemical spillage or interference.





STOPROTECT CLEAR COATING SPECIFICATION OVER EXTERIOR ARCHITECTURAL CONCRETE BLOCK CONSTRUCTION

Complies with CCANZ CP 01: 2011 (E2/AS3) ACAD Details www.sto.co.nz building with Sto

Project:

Prepared for:

StoProtect Clear Coating System

This specification details the application of a clear coating system over exterior concrete block construction incorporating; **StoFlexyl waterproofing** as required, sealing the exterior blocks with **S-Protect WS405 Silane sealer** before finishing in three coats of **StoProtect transparent** to leave a clear durable finish. **Note:** The **StoProtect Clear Coating System** can be used on other masonry surfaces but a specific specification is required.

1. CONSTRUCTION

Responsibility

All work in this section shall be the responsibility of the Main Contractor. All concrete block masonry construction must in accordance with the relevant New Zealand standards, NZ Building Code and the applicable manufactures specifications and details. Any dissimilar material joins shall be in strict accordance with the project specifications & drawings. The Specifier must be advised of any anomalies and approve of all such details prior to work commencing.

Concrete Block Construction

The concrete block installation, including reinforcement and concrete infill shall be made in strict accordance with the project specifications & drawings and the **manufactures design & installation manual for coated blocks**. In particular the blocks shall be laid true in both vertical and horizontal planes laid in a minimum 45mm ground floor foundation rebate using 12.5 MPa mortar in a nominal 10 mm width compressed by tooling with all window, door and services cutouts correctly made using rebated blocks for all joinery openings. At least 28 drying days shall be allowed after concrete placement as per AS/NZS 2311:2000, for curing and stabilization to take place before application of the Sto coating system. Any minor surface damage or defective pointing shall be repaired before commencing. All maximum tolerances shall be in strict accordance with NZS 4210: 2001 2.7.1.4 Table 2.2, i.e. No more than 3mm surface alignment deviation over a 1200mm radius. The main contractor shall ensure concrete blocks are clean, dry and free of all surface contaminants before the coating applicator commences and that any areas, details or flashings above or adjacent to the Sto Coating System have been adequately waterproofed to prevent water migration behind the Sto Coating System. All mortar joints are to be tight tooled and neatly pointed, rebated joinery blocks must be waterproofed as necessary especially sill blocks and joinery must be installed as per Sto ACAD details for concrete block using StoFlexyl waterproofing as required - www.sto.co.nz all construction contaminates must be removed.

Note: Certain concrete blocks or block profiles may be unsuitable for clear coating check with the block manufacturer prior to construction

Concrete Block Construction - Clear Coating Systems

- 45mm minimum rebate required in foundations for residential projects.
- Joinery openings are to be waterproofed and formed with rebated blocks & sill blocks.
- Clear coated block faces must be of an even colour & consistency.
- Blocks must be covered on site and laid dry. Where honed Architectural blocks are used ensure any on site honing matches the manufactures honing to achieve continuity.
- Before starting be conscious that certain soils, clays, vegetation etc can cause staining.
- Control joints are placed at maximum 6.0metre centres refer to the project documentation and NZS 4229 for placement and detailing.
- Mortar to be minimum 12.5MP, with an expansion agent tooled smooth and compressed as per NZS 4210.
- Where specified use the manufactures bagged mortar.
- Mortar to full depth of webbing up to 20mm thick in first course and then 10mm +/- 3mm.
- Washout ports to have block face removed, mortared back after and braced for grout.
- Ensure there is no impediment to grout flow remove ends or biscuits to prevent air pockets
- Blocks, especially stack bonded and insulated blocks – must have full mortar joints both horizontally and vertically any voids created by leaving ends in etc need to be mortared by the block layer during the laying process to achieve a continuous solid fill.
- Blocks laid open end to depressed web end at all times.
- Inverted blocks are to be fully mortared across the web and any block end such as insulated blocks that have a vertical void at the join are to mortar filled.
- Column blocks must only be used on the ends of wall and must be cut to allow grout flow to every course
- Block layer to ensure a solid fill is achieved throughout the entire wall. Blocks should be filled in 1.200mm lifts and mechanically vibrated to eliminate air pockets that can cause structural weak points or efflorescence.
- Sill blocks should be filled by leaving one sill block out to avoid air entrapment.
- Remove any mortar or grout slurry from block faces before it sets.
- Drying times vary according to block thickness, grout and weather a minimum 28 days is required for settlement and curing – the blocks must be completely dry before coating.
- Where walls are back filled a manufactures certified tanking membrane is required.
- Always waterproof blocks behind or adjacent to any overlays or abutments such as staircases especially adjoining concrete stairs or separate garden walls etc.
- Exposed tops of walls must be waterproofed with StoFlexyl mesh and finished with block caps before coating commences.

Cleaning – Visual Presentation

The finished concrete blocks must be clean and visually acceptable. It is the responsibility of the main contractor and their appointed block layer to ensure a clean unified surface is achieved with an acceptable continuity of block faces. If the blocks are defective, stained or discoloured the block manufacturer must be notified before any blocks are laid. The coating system is transparent therefore it is essential to ensure that the block layer has **left the concrete block walls clean with no marks, stains, slurry, uneven pointing, or defects and that the continuity of colour in the laid blocks is acceptable to the client or specifier.** Any repairs or specialist cleaning required **must** be undertaken before the Sto Coatings Applicator commences.

2. BLOCK COATING PREPARATION

Responsibility

All coating work in this section shall be the responsibility of the nominated Sto Coatings Applicator

The information contained in this Specification is based on our experience and testing and represents the latest information available at the date of production. No responsibility is taken for uses to which this information may be put, but we advise that where application of products and processes is in complete conformity with this specification an appropriate warranty is available. We reserve the right to alter or update information parameters and formulations at any time without prior notice.

Joinery Rebates, Parapet & Balustrade Caps - horizontal surfaces

Joinery shall be fixed over rebated concrete blocks that have been **StoFlexyl waterproofed** prior to the coating application. Before fixing joinery **StoFlexyl** shall be used to waterproof the rebates mixed correctly 1/1 with fresh Portland cement and brushed on in two (2) coats over the concrete block rebated openings to fill all the block holes. Additionally **sills** are required to be **StoFlexyl meshed waterproofed** from the bottom of the rebate out to the exterior with the mesh taken 40mm up the jambs. Jointing the installed joinery perimeter with **MS Sealant** at the **head & jambs** then forms the primary seal with the **sill** left open to allow for a 5mm drainage gap after the finishing plaster has been applied. Note; the visual **StoFlexyl** component on the rebates is to be primed with **Sto Putzgrund** and plastered in the **Stolit K plaster system** taking care to avoid marring the face of the blocks. The main contractor must incorporate **air seals** around all interior joinery openings and the MS Sealant joints to the exterior joinery shall be the responsibility of the nominated joinery installer. The main contractor shall ensure all joinery openings are formed using rebated concrete blocks and sill blocks.

Alternatively: Where a clear finish is required on the head and jamb rebates the **StoFlexyl waterproofing** is applied approximately 15/18mm out from the rebate step onto the exterior rebate to sit 3mm past the installed joinery flange that is then covered by the sealant joint (window 6mm + 5 mm air gap + 5mm). The sill blocks are normally **StoFlexyl meshed waterproofed** finished neat to the jamb sides (not taken 40mm up jambs as previously detailed) and then primed and plastered. Where solid filled sill blocks are used the **StoProtect** clear coating system can be used but an additional two (2) coats are required on the sills.

Note: Parapets caps, balustrade caps and horizontal surfaces must also be waterproofed using **StoFlexyl meshed waterproofing** which can be installed under concrete block finishing caps.

Finishing of exposed StoFlexyl waterproofing

All exposed **StoFlexyl** surfaces are to be finished in the selected **Stolit** plaster system. To clean dry **StoFlexyl** surfaces apply one coat of **Sto Putzgrund** primer tinted to the selected colour and plaster in the selected **Stolit** coloured finishing render ensuring adequate masking is undertaken before coating in **StoProtect Transparent**.

Foundation Splash Zone

The blocks must be laid in a minimum 45mm rebated floor slab to ensure this transition remains watertight the **StoProtect Clear System** then extends down over the foundation a minimum 100mm past the interior floor level. Foundations can alternatively be plastered in a **Sto Plaster System**.

Note: **StoFlexyl Meshed waterproofing** has been evaluated by BRANZ to meet **AS/NZS 4858** for a waterproof membrane as required by **E2/AS3 & CCANZ CP 01: 2011**

3. STOPROTECT CLEAR COATING SYSTEM

All work in this section shall be the responsibility of the Sto Coating Applicator who must check the blocks are clean, dry and adequate masking has been undertaken before commencing.

Clear Coating Procedure

Before commencing **check the block wall surfaces are clean, visually acceptable, pointing is tight and any flashings, dissimilar material overlays, parapets or joinery rebates are waterproofed**. Though the coatings are clear appropriate masking must be undertaken to protect joinery and adjacent surfaces.

Note application rates will vary depending on the blocks being treated the spreading rates are based on tight honed block - standard blocks and pumice blocks etc all have different matrixes and porosities that may require additional product.

S-Protect WS 405 Silane Sealer

To cured, dry, clean exterior surfaces apply a flood coat of **S-Protect WS 405 Silane** at 4 - 6 square metres per litre applied with low-pressure back pack sprayer using a block brush to control the wet edge and remove lingering drops, allow to dry a **minimum 2 hours** before applying a second coat of **S-Protect WS 405** at 7 - 8sqm per litre. Then **leave a minimum 5 days** for full catalysis reaction all in accordance with the TDS sheets before applying the **StoProtect Transparent**.

Note: Spray gun application is not recommended unless a low pressure delivery system is used.

Note; **S-Protect WS 405** Silane will not etch glass but leaves a film that can be difficult to remove once it dries ensure adjacent surfaces and dissimilar materials are masked off with plastic.

StoProtect Clear Coating System

To clean dry honed blocks sealed with **S-Protect WS405** apply three (3) coats of **StoProtect Transparent** thinning the first coat by adding approximately 1.5 - 2 litres of clean fresh water and applying by brush and roller at approximately 7 – 8 square metres per litre for honed blocks. Allow the first coat to dry completely before applying the second and third coat un-thinned at approximately 7 - 8 square metres. Always maintain wet edges when applying to prevent shadow lines especially between cutting in and roller applications. Ensure the surface is well coated and that the mortar joints are brushed, and any block pit holes, voids and joints are well filled before applying the final coat. Depending on the block profile and porosity the spreading rate will vary accordingly. The **StoProtect** is not to be spray applied as the surface must be well coated with the coating worked into the block profile to fill block pit holes and the pointing to achieve a minimum dry film thickness of 150 microns.

Note: The spreading rates are based on **honed dry blocked surfaces** allowances must be made for other blocks depending on their porosity and profile. Where the blocks haven't been honed or the matrix is particularly porous an additional coat of **StoProtect** will be required. On negative pointing clear coated sills or horizontal caps additional coats are required to give a minimum dry film build of 180 microns.

For interior use the Silane sealer is not required though the coating applicator must ensure wet edges are maintained to avoid shadow lines. Where a hard interior finish is required such as service areas StoPur WV 200 transparent is recommended.

4. GENERAL

Before removing the masking check all the block faces are evenly sealed and that any blemishes have been rectified.

5. MAINTENANCE**Refer; Sto Maintenance Schedule for comprehensive guide**

The **StoProtect Transparent System** must be checked and cleaned annually by low pressure washing or chemical cleaning to remove all surface contaminants, with special attention to non-rain washed areas. When recoating is required at seven year cycles to maintain long-term integrity this can be carried out using **StoProtect Transparent** over a cleaned surface.

Block Substrate Maintenance Inspections

The owner is to arrange for an initial inspection of the block surfaces six months after practical completion to ensure there are no fractures in the block surface from the concrete curing process or settlement. After the six month inspection the exterior is to be cleaned and checked annually to clearly identify any faults relating to substrate stress, sealant beads, flashings and other penetrations. A repair process must be implemented immediately to address any faults discovered so the warranty is not compromised.

The information contained in this Specification is based on our experience and testing and represents the latest information available at the date of production. No responsibility is taken for uses to which this information may be put, but we advise that where application of products and processes is in complete conformity with this specification an appropriate warranty is available. We reserve the right to alter or update information parameters and formulations at any time without prior notice.

6. WARRANTY

The **StoProtect Clear Coating System** described in this specification is warranted for a period of ten (10) years from the date of practical completion to comply with the coating requirements of the NZBC for this type of building element provided the maintenance requirements as set out in the StoProtect Specification & Maintenance Schedule are followed.

A five (5) year workmanship warranty is issued by the Sto Applicator carrying out the work, and is backed by the Manufacturer as to the suitability for use of the material supplied, provided that.

- (a) The approved Sto Applicator who must adequately complete the Sto QA Compliance Procedure Form and PS3 Applicator Warranty carries out all specified work.
- (b) All work is carried out in accordance with this Specification or any written amendments issued by Stoanz Limited.
- (c) The warranty does not cover situations where the coating system is subject to physical disturbance, structural stress, chemical spillage or interference.





SYNTHETIC WALL UNDERLAY

Ideal for timber framed buildings

Thermakraft 220 is a fire retardant, absorbent, breathable wall underlay. It is a white non-woven polypropylene, for use on timber framing behind exterior wall cladding. Thermakraft 220 offers a high degree of, water vapour permeability.

ADVANTAGES

- » Can be used as a wall underlay on timber framed buildings with absorbent wall claddings and non-absorbent P.V.C wall cladding direct fixed to framing.
- » Can be used as a wall underlay on timber framed buildings with absorbent and non- absorbent wall cladding installed over an 18mm minimum drained cavity.
- » Is suitable for use in all Wind Zones of NZS 3604 up to, and including, "Very High", when used as standalone flexible underlay, and Extra High when used as a flexible underlay over a rigid wall underlay.
- » Will provide temporary weather protection during construction. (Max 42 Days)
- » Can be used as a non-rigid backing material for Stucco Plaster*
- » May be used as a slip layer over rigid backing for Stucco *
- » Is fire retardant*
- » Unaffected by LOSP treated timber.
- » Not suitable as an air barrier in unlined walls.
- » For use on steel framing, Steelwrap 290 is recommended.

* Refer technical specifications



BRANZ Appraised
Appraisal No.912 [2016]

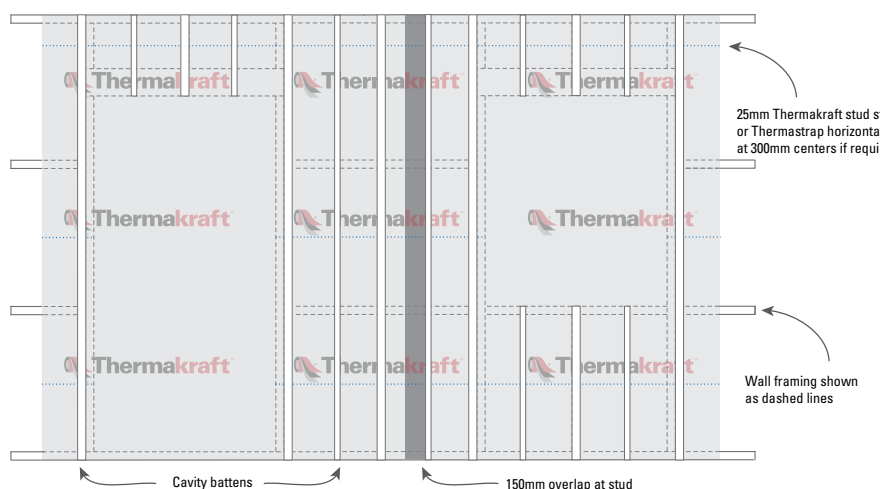


For additional details and latest specifications www.thermakraft.co.nz or scan QR code.

Thermakraft Wall Underlay

INSTALLATION PROCEDURES

1. Fix Underlay with printed side facing the exterior
2. Fix to all exterior walls from below bearers to the top plate. Pull the underlay tight and fix securely to the frame with fasteners such as galvanized Little Grippers, 6mm-8mm staples or 20mm large head galvanized clouts at 300mm centers horizontally and vertically. Additional fasteners should be used around each opening to be cut out.
3. Thermakraft underlays are available in two widths 2740mm and 1370mm. The 2740mm is generally wide enough to come from below the bottom plate to the top plate.
4. When fixing underlay to Steel framing the same procedures applies, use adhesive spray or tape or flat head screws to fasten to the framing, the exterior cladding fastenings will act as the permanent fixings.
5. Cover all windows and door openings with underlay.
6. It is recommended that the wall underlay is not cut and prepared for window installation until the arrival of the windows.
7. A minimum of 150mm lap is required at joins, all vertical laps must be made over studs. Horizontal laps to be laid ship lap style allowing water to be shed to the outer face of the membrane
8. When windows and doors are ready for installation, the underlay covering the openings should cut at 45 degree and folded into the opening and securely fastened Thermakraft Aluband Window Sealing System (BRANZ Appraisal No 803 (2013)) is recommended as the window flashing system.
9. NB. In accordance with NZBC Acceptable Solution E2/AS1 Paragraph 9.1.8.5, wall wrap must be prevented from bulging into the drained cavity. Where stud spacing is greater than 450mm Thermakraft stud strap run horizontal at 300 centers is an acceptable means of prevention.
10. Once installed Thermakraft underlays may be left exposed to the weather (refer table below for Maximum time) Thermakraft underlays will provide temporary weather protection during construction allowing work to continue. Internal linings may not be installed until the exterior cladding is completed
11. Fastenings behind Brick Veneer Cladding must have an equivalent service life to that of Brick Veneer (50 years). Refer to NZBC 3604 Table 4.1, and 4.3.
12. Make good any forced tears with Thermakraft White GP tape. Any large areas which require repair may be covered with a second layer of underlay, a lap of 150mm is required.



EXPOSURE TIME

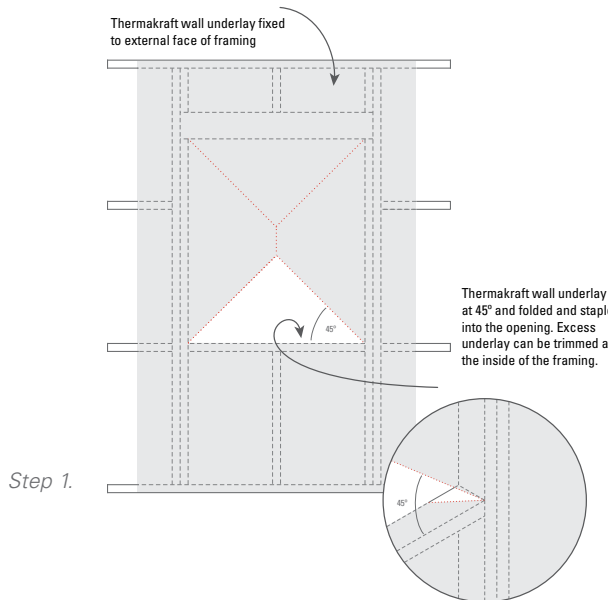
Product	Watergate Plus 295	SteelWrap 290	Thermakraft 220	Thermakraft 213/215	Covertex 403 Plus	Covertex 407/405
Max Days exposure	60	42	42	Wall application 28 Roof application 7	Wall Application: 42 Roof application: 7	Wall Application: 14 Roof application: 7

HANDLING AND STORAGE

- » Due to the width of the sheets care should be taken when installing in windy conditions due to the large sail effect.
- » Store in clean dry conditions, not in direct sunlight.
- » Ensure rolls are not damaged
- » There are no environmental issues associated with the use of Thermakraft underlays .

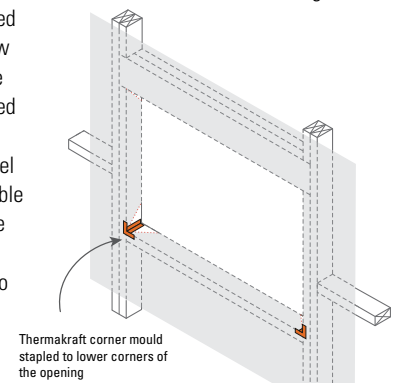
INSTALLATION DETAILS WINDOW FLASHING TAPE

1. Cut the wall underlay/air barrier at a 45° angle away from each corner. Fold flaps tightly into the window or door opening and fix with staples on the back faces of the framing.

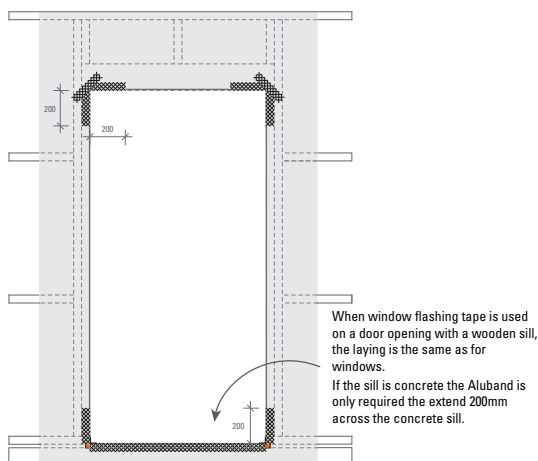
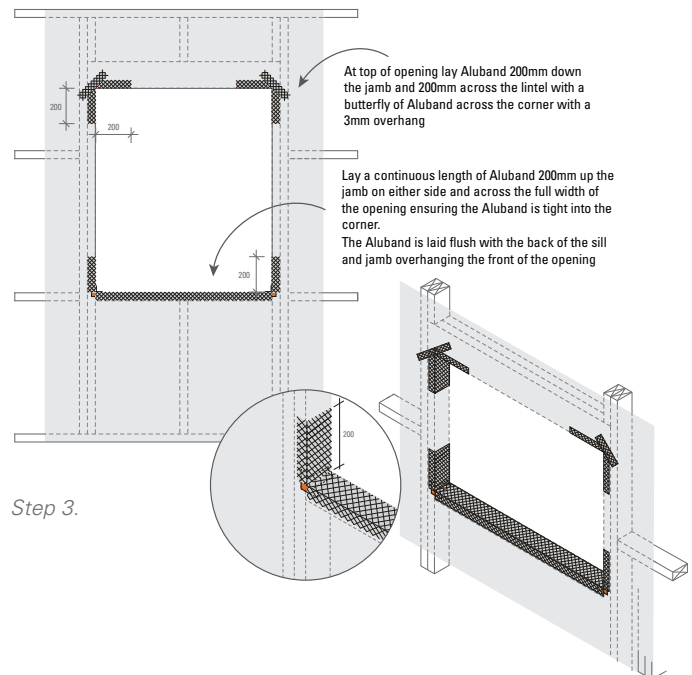


3. Cut a length of Thermakraft window flashing tape the length of the sill plus 400mm.
4. The tape is installed flush with the interior face of the opening and applied to the full length of the opening and 200mm up the jamb.
5. Using the Thermakraft Tool, firmly press the tape onto the wall underlay to ensure good adhesion and ensure the tape is fitted tightly into the jamb to sill corners.
6. At the sill/jamb corners cut the tape from the external edge of the frame (200mm across lintel x 200mm down jamb) and press tape firmly for good adhesion.
7. Proceed to fit the Window Flashing Tape to the top corners of the frame (200mm across lintel x 200mm down jamb).
8. For window or door lintel to jamb junction, apply a butterfly using the 75mm wide x 100mm long Aluband/Bulldog. Fix at a 45° angle to the jamb with an overlap at the corner of 3mm.

2. Fix the Thermakraft Corner Moulded Piece to the bottom corners by way of staples or clouts to the two jambs. Always ensure that Aluband/Bulldog is applied to surfaces that are clean and free of dust, contaminants, solvents, oils or waxes. Note the following: 150mm wide tape is used for 100mm wide window or door framing, and the 200mm wide tape is used for 140mm to 150mm wide framing. (With steel framed houses use Double Sided Tape to attach the Thermakraft Aluband Corner Moulded Piece to metal framing).



Step 2.



9. Door frames are to be treated similarly to window openings. The sill may be either a timber or a concrete floor.

Window and door frames

- a) Staple orange corner piece to the bottom corner sill. Place tape 200mm up the jambs and across the full width of the sill opening. Align tape with the back of the frame opening.
- b) At the top corner place tape 200mm down the jamb and 200mm across the lintel. Place a strip of 75mm tape across the top corner.

10. Meter boxes with built-in flanges to be taped with Window Flashing Tape along each flange to the building underlay.
11. Window Flashing Tape is used to seal the up stand of the window head flashing to the building underlay. (Refer to the cladding manufacturer's details).

Thermakraft 220 - Technical Specification

Fire Retardant | Breathable | Absorbent | Non Woven | Wall Underlay

Thermakraft 220 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 claddings directly fixed to timber framing; and,
- » With non-metallic, non-absorbent wall claddings directly fixed to timber framing; and,
- » With absorbent and non-absorbent wall claddings installed over an 18mm minimum drained cavity;
- » With masonry veneer in accordance NZBC Acceptable Solution E2/AS1; and,
- » Situated in NZS3604 Wind Zones up to, and including 'Very High' when used as standalone flexible underlay, and Extra High when used as a flexible underlay over a rigid wall underlay.
- » 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 Hand Held or wire at 150mm centres run across cavity battens to limit deflection to a maximum of 5mm.
- » May also be used as a slip layer over rigid backing for Stucco Plaster in accordance with the requirements of NZBC E2/AS1 Paragraph 9.3.3.1(b).
- » Refer BRANZ Appraisal No 912 (2016) for full details

Flammability Index

Thermakraft 220 Wall Underlay has an AS 1530 Part 2 Flammability Index of not greater than 5 and therefore meets the requirements of NZBC Acceptable Solutions C/AS2 to C/AS6, Paragraph 4.17.8 b), for the surface finish requirements of suspended flexible fabric used as an underlay to exterior cladding that is exposed to view in occupied spaces. It may therefore be used with no restrictions in all buildings.

Limitations

- » Must not be used as a roof underlay.
- » Is not suitable as an air barrier in unlined wall spaces
- » Is not suitable for use behind direct fixed metal cladding.

Durability

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), E2 External Moisture, and F2 Hazardous Building Materials F2.3.1/C, providing:

- » It is not damaged
- » Is installed in accordance with instructions
- » Is not left exposed for more than 42 days
- » Is installed by or under guidance of Licensed Building Practitioners
- » Is compatible with cladding system used.

Table 1: NZBC E2/AS1 Alternative Solution to Table NZS2295 AS wall underlay requirements

NZBC E2/AS1 TABLE 23 (NZS2295) WALL UNDERLAY PROPERTIES	PROPERTY PERFORMANCE REQUIREMENTS	PROPERTY PERFORMANCE
Absorbency	≥ 100gsm	Pass
Vapour Resistance	≤ 7 MN.s/g	Pass
pH of Extract	≥ 5.5 and ≤ 8	Pass
Shrinkage	≤ 0.5%	Pass
Water Resistance	≥ 20mm	Pass
Air Resistance	≥ 0.1 MN.s/m ³	220 can NOT be used as an air barrier

Roll Dimensions

WIDTH (MM)	LENGTH (M)	M ²
2740	36.5	100
1370	55	75



For additional details and latest specifications www.thermakraft.co.nz



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Fax +64 9 273 3726 **Email** info@thermakraft.co.nz **www.thermakraft.co.nz**

INTELLIGENT MEMBRANES FOR THE BUILDING INDUSTRY

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. Literature subject to change without notification. Latest documentation can be found on the website.



ARDEX WPM 3000X

Shelterseal 3000X

Self Adhesive SBS Membrane

DISCLAIMER The technical details, recommendations and other information contained in this data sheet are given in good faith and represent the best of our knowledge and experience at the time of printing. It is your responsibility to ensure that our products are used and handled correctly and in accordance with any applicable New Zealand Standard, our instructions and recommendations and only for the uses they are intended. We also reserve the right to update information without prior notice to you to reflect our ongoing research and development program. Country specific recommendations, depending on local standards, codes of practice, building regulations or industry guidelines, may effect specific installation recommendations. The supply of our products and services is also subject to certain terms, warranties and exclusions, which may have already been disclosed to you in prior dealings or are otherwise available to you on request. You should make yourself familiar with them.

ARDEX WPM 3000X

Shelterseal 3000X

Self Adhesive SBS Membrane



PRODUCT DESCRIPTION

Ardex WPM 3000X (Shelterseal 3000X) is a “peel and stick” bituminous/asphalt damp proof membrane protected by a cross laminated high-density polyethylene film.

Ardex WPM 3000X (Shelterseal 3000X) is made from two structural components

Bitumen/asphalt compound modified with SBS and high tack resins

This special compound has been formulated to make the product easy to install. The membrane can be adjusted should it initially be placed in the wrong position, as the adhesive on the sheet achieves final adhesion only after a few minutes.

Protective film

This is hot-laminated to the bituminous/asphalt compound and gives the membrane its mechanical and physical characteristics, such as heat stability, shape, chemical resistance, etc.

FEATURES/BENEFITS

Cold Application: installed without the use of open flames. Ideal for installation in restricted spaces.

Chemical resistance: the protective polymer film is highly resistant to acids, alkalis and other pollutants.

Flexibility and adaptability: this membrane will adapt easily to irregularly shaped surfaces, and will stretch up to 9% without breaking or cracking.

Self sealing: the membrane self seals on contact maintaining its watertightness.

Constant thickness: the membrane is manufactured using high-tech machinery which constantly monitors its thickness, and ensures that the films and synthetic materials are manufactured to the highest specifications and quality control requirements.

ACCEPTABLE SUBSTRATES

- Concretes, renders and screeds
- Fibre cement sheets
- Structural or marine plywood
- Polystyrene blocks

For use over other substrates including existing membranes contact Ardex.

TYPICAL APPLICATIONS

- Planter boxes
- Foundations
- Below-ground applications
- Retaining walls

BASIC APPLICATION INSTRUCTIONS

Surface Preparation

Surfaces to which the Ardex WPM 3000X (Shelterseal 3000X) systems are installed must be properly prepared prior to installation. All surfaces must be clean, dry, smooth, free of sharp edges, loose or foreign materials, oil, grease, and other materials that may damage the membrane. If concrete has moisture on surface use gas torch to dry and warm before priming.

Priming

Prior to the application of the membrane all prepared surfaces (except polystyrene blocks) should be primed with Ardex WPM 240 (Shelter Primer) at a rate of 5-6m² per litre and allowed to dry.

Membrane Installation

Starting at the lowest point, the membrane must be installed in accordance with the Technical Literature. Sheet edges must be overlapped a minimum of 60mm as marked on the sheets. End laps must be a minimum of 100mm, with upper sheets lapped over lower sheets. Internal and external corners of single layer systems must be reinforced with an extra layer of membrane 300mm wide. Where two layer systems are specified lap joints must be staggered. Protection material must be installed before backfilling. Backfilling must commence immediately after the membrane is installed to ensure the membrane is not left exposed to sunlight or UV radiation.

Installation of the membranes must be completed by tradespersons who have experience in the application of self-adhesive membranes.

Two Layer DPM System

In critical areas a specifier may require a second layer of Ardex WPM 3000X (Shelterseal 3000X) to be applied with laps staggered to the first layer.

PLASTERING OVER SHELTERSEAL

Coat affected area with Ardex WPM 320 (Retaining Wall 1 Part). Let coating dry then apply a second coat of Ardex WPM 320 (Retaining Wall 1 Part). While still wet broadcast dry sand onto the surface. Let Dry. When dry, plaster area with normal plaster system.

This is to cover any Shelterseal that is finished above ground due to slope of site. It is not intended to cover roofing applications.

SAFETY DATA

Ardex WPM 240 (Shelter Primer) is solvent based and classified as Dangerous Goods Class 3 Packaging Group II material. It is highly flammable and should be used with appropriate safety equipment. Avoid inhalation or contact with eyes.

First Aid: If swallowed do not induce vomiting, contact a doctor or Poisons Information Centre immediately. In case of contact with eyes rinse thoroughly with water.

Spills & Leaks: Restrict access to area. Prevent material entering sewers and restricted areas. If possible cover liquid with earth, sand or absorbent material. Flush area with water.

Fire: Eliminate all sources of ignition. Firefighters should wear full protective clothing and self contained breathing apparatus with full face mask. Use dry chemicals foam or carbon dioxide to extinguish fire.

STORAGE

All rolls of Ardex WPM 3000X (Shelterseal 3000X) whether palletised or loose should be stored in a covered area protected against sunlight and UV radiation. Rolls should be stored in a vertical position on a smooth floor so as not to damage the edges.

PACKAGING

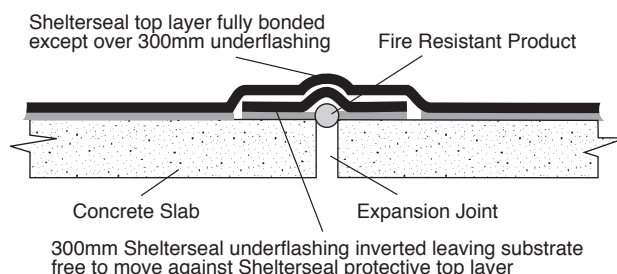
Roll size: 1m x 20m Roll weight: Approx 30kg

Other products: Shelter Primer 5 litres and 20 litres

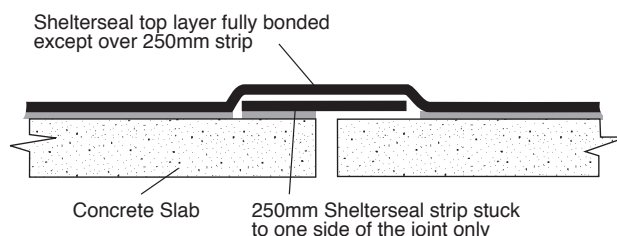
TECHNICAL PERFORMANCE DATA

Properties	Typical Values	Test Method
Thickness	1.5mm	UNI 8202
Weight	1.6kg	UNI 8202
Tensile strength long	4.35N/mm	ASTM D 638
Tensile strength trans	5.69N/mm	ASTM D 638
Longitudinal elongation of membrane	435%	ASTM D 638
Transverse elongation of membrane	380%	ASTM D 638
Tearing resistance long	83.01N	8202/9
Tearing resistance trans	73.74N	8202/9
Adhesion to primed concrete	4.9N/mm	ASTM D 1000
Adhesion to steel	5.8N/mm	ASTM D 1000
Puncture resistance	246N/65mm	ASTM E 154
Vapour transmission rate	0.3g/m/24hrs	ASTM E 96
Cold flexibility	-30°C	ASTM D 146
Environmental resistance	Conform	ASTM D 543

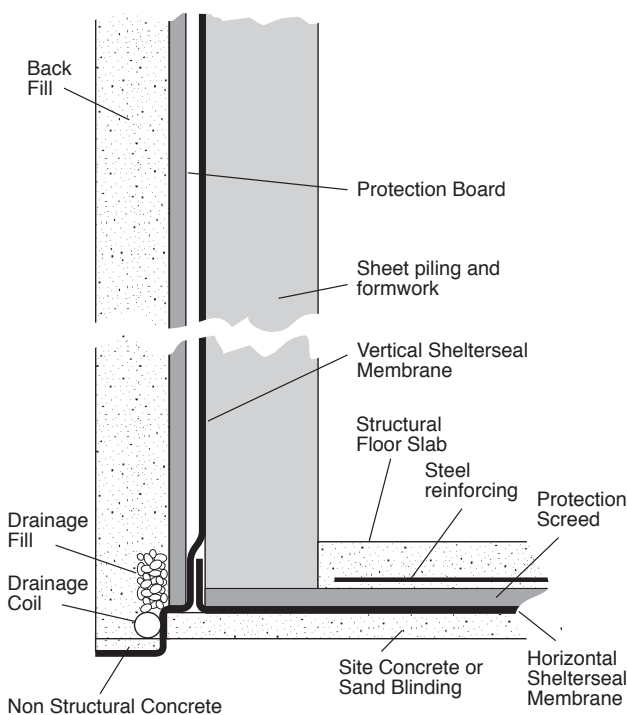
EXPANSION JOINT



CONSTRUCTION JOINT



BELOW GROUND DETAIL



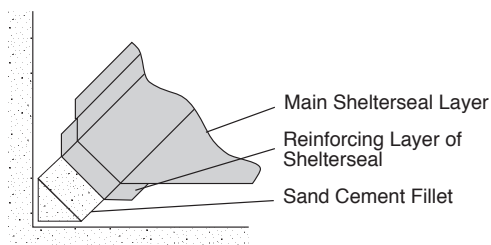
Typical details do not indicate number of layers required

ARDEX WPM 3000X

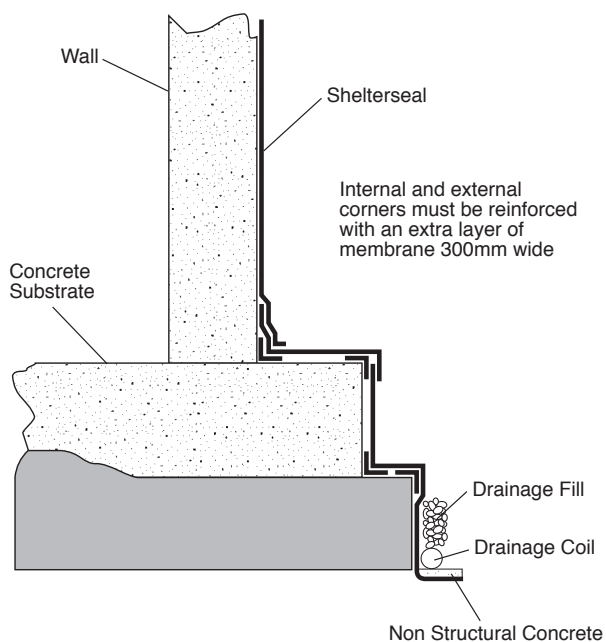
Shelterseal 3000X

Self Adhesive SBS Membrane

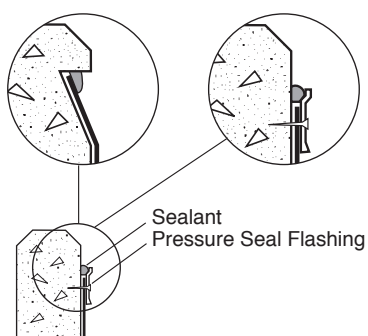
TYPICAL TURN UP DETAIL



REINFORCING OF CORNERS



FINISHING DETAIL OPTIONS



Roofspec
Viking

Taking care of detail

Viking Enviroclad

Absolute waterproofing integrity





Viking Enviroclad possesses all the necessary attributes of a truly world-class membrane from both waterproofing and environmental perspectives.

Viking Enviroclad has been a proven performer worldwide for over 25 years and is manufactured by one of the world's largest and most technologically advanced manufacturers of waterproofing membranes, Carlisle Construction Materials.

Viking Enviroclad, a thermoplastic membrane system (T.P.O.), is part of the world's fastest growing roofing membrane category.



Viking Enviroclad is a mesh-reinforced, thermoplastic, heat-weldable waterproofing membrane which can be installed on most new substrate surfaces as well as over existing butyl or liquid membranes. It possesses strong UV and puncture resistance properties, and the reinforcing mesh provides latitudinal strength, meaning Enviroclad is extremely forgiving of structural movement.

It is suitable for low-slope and pitched roofs, gutters and parapets, pond-liners, balconies, under floating decks and roof gardens of commercial and residential buildings.



Energy Saving

Viking Enviroclad is highly-reflective, with the white surface option reflecting over 90% of the solar radiation that hits it. This will directly contribute to a reduction in a building's energy use and cooling costs.

Viking Enviroclad can be used as the waterproofing membrane for Viking's WarmRoof and WarmSpan systems, which will achieve even greater energy savings through their insulation components.

In the USA, Enviroclad is US ENERGY STAR® rated and Cool Roof Rating Council certified. In New Zealand, Viking Enviroclad is CodeMark certified; BRANZ appraised; and the reduction in energy consumption has been proven to positively contribute points to a building's Green Star rating.

Innovation & Sustainability

Viking Enviroclad's heat-welded seams (vulcanised at 400+ degrees Celsius) create stronger and flatter laps (robust, vulcanised seams for maximum watertightness). This technology also renders quicker installation time, while assuring watertight integrity, even when fully immersed.

Viking Enviroclad possesses other environmental benefits in addition to the energy savings from its solar reflective properties:

It is potability certified, meaning drinking water can officially, but more importantly, safely be collected off a Viking Enviroclad roof.

During the manufacturing process, off-cuts are 100% recyclable. Aged, installed Enviroclad is 100% recyclable due to the absence of chlorinators and plasticisers in TPO's chemistry which can cause problems with many PVC membranes. Enviroclad is also supplied cut-to-length if requested, meaning minimal waste.

The fact that Enviroclad is heat-welded, negates the need for oil-based splicing systems like tapes and primers. It can also be installed using mechanical fastenings, negating the need for adhesive if desired.

Viking Enviroclad can be applied over existing roofs, saving uplift and filling of the local land-fill with the old membrane. Viking Enviroclad is also available as a fleece-backed system (FBS), which is a more comprehensive re-roofing overlay solution. Read more on Enviroclad FBS on the next page.

Wider & Longer

Viking Enviroclad sheets are up to 3.66m wide by 30.4m long (111m²) compared to traditional membranes ranging between 10m² – 25m². The greater width and length of Enviroclad sheets mean fewer seams and therefore a clean-looking, watertight, cost-effective solution.

Peace of Mind - CodeMark Certified

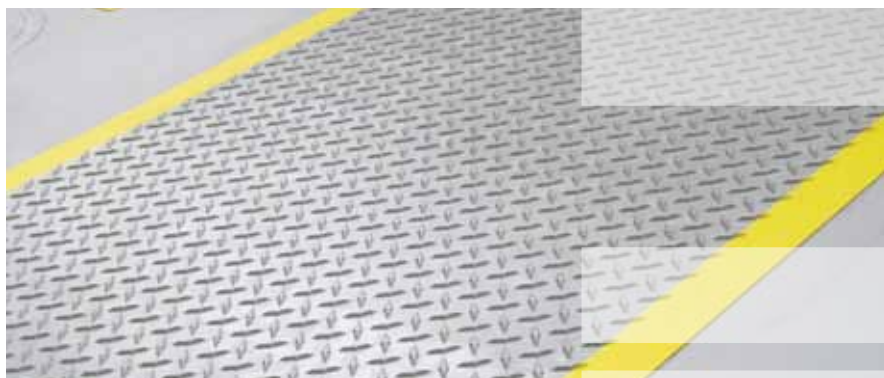
Viking Enviroclad is CodeMark certified. Viking Enviroclad's CodeMark assists specifiers and Councils by providing the highest level of assurance, reducing delays and additional information requests when submitting a consent application.

CodeMark certification means that compliance for the purpose of the building consent is guaranteed when specifying Viking Enviroclad in accordance with the stringent criteria of the CodeMark certificate.

A CodeMark certification provides you with peace of mind and quality assurance that you are choosing the right system.

BRANZ Appraised

Viking Enviroclad is BRANZ Appraised (no. 656, 2015).



BRANZ Appraised
Appraisal No.656 [2015]



CODEMARK
Australia & New Zealand



Before



After



Enviroclad FBS – Fleece-backed Re-roofing System

Enviroclad FBS (fleece-backed system) is a membrane re-roofing solution consisting of 1.4mm of polyester fleece-backing factory-laminated to 1.14mm of TPO (thermoplastic polyolefin). It is mostly used as a solution for overlaying on top of a wide-range of existing roof surfaces such as old bitumen, malthoid or rough substrates such as concrete and tongue and groove sarking.

“Silk Purse”

The fleece on the membrane's underside bonds with the substrate, partially forgiving the rough surface into which it “beds” itself; thus rendering a surprisingly smooth, aesthetic membrane surface finish. An unsightly, rough substrate would otherwise ‘telegraph’ more of its imperfection through the surface of any non-fleece backed single-ply membrane.

Reduction in Waste

In many instances, there is no need to dump the old roof surface, as FBS can be applied over a wide-range of existing roof surfaces such as bitumen, malthoid, concrete or tongue and groove sarking.* This leads to a reduction in waste, as the old roof surface doesn't fill-up landfills.

*(*Only if an invasive investigation has confirmed the integrity of the substrate. Please note: decayed substrates require complete replacement.)*

Reduction in Cost and ‘Churn’

Overlaying an existing membrane means there are no costs involved in stripping the current surface; redesigning, reconditioning or reconstructing the existing roof.

This also avoids the hassle of exposing the interior to adverse weather conditions – and therefore relocating people while the overlay takes place – an expensive process also known as ‘churn’.

Puncture Resistance

The fleece-backing of the FBS membrane adds additional puncture resistance to the existing puncture resistance of the Viking Enviroclad membrane, possessing a 33% greater puncture resistance than most high puncture resistant membranes.



**THE OWNERS
WERE THRILLED
WITH THE
TRANSFORMATION
THAT WOULD
PROLONG THE LIFE
OF THIS LOVELY
OLD LADY.**

HISTORICAL BUILDING GETS A FACELIFT – HANIA STREET, WELLINGTON

CHALLENGE: 21 HANIA ST IS THE ADDRESS OF A 71 YEAR-OLD BUILDING DESIGNED DURING THE DEPRESSION BY ARCHITECT EDMUND ANSCOMBE. THE BUILDING SERVED AS A CENTRE TO AID RETURNED SERVICEMEN AND WOMEN IN THEIR REINTRODUCTION TO CIVILIAN LIFE DURING WORLD WAR II.

It also became a factory for the manufacture of prosthetic limbs for disfigured soldiers. Its flat roof had been waterproofed several times using a bitumen-based liquid membrane; the layers of which had become brittle and cracked over the decades and had started to leak water through to the old sarking beneath.

Three years prior to the roofing project taking place, the building struggled to attract a purchaser because of the perceived exorbitant costs associated with re-cladding the 1300m² leaking flat roof (with next to no pitch). A church group eventually purchased the building with a view to embarking on its refurbishment. 21 Hania Street's heritage classification by the Historic Places Trust meant that the Wellington

City Council required a resource consent for any exterior work, with a view to keeping the building as close to the original design as possible.

Originally a quantity surveyor was commissioned to explore the option of pitching the roof for metal roofing which would require specially designed, engineered fixings to the original structure. This proved too expensive and troublesome, and as the building was occupied, opening the roof up meant too much cost and disruption. So another option was explored which involved a three layer torch-on system with the base sheet being mechanically-fastened. But Viking Roofspec put forward a better option...

Solution

The Property Manager Ian Kearney, eventually chose the Viking Enviroclad F.B.S. (fleece-backed system) for several reasons:

- It is designed to go over old membranes without having to tear them up. This means; (i) minimal disruption, none of the building's occupants would need to be re-located

- during the roofing process; (ii) labour and dumping costs would be saved and; (iii) the local landfill would be saved from 1300m² of asphalt.

- Removing all of the existing bitumen membrane in gutters. This allowed a more thorough inspection to take place in these

key areas whilst drying out any potential dampness and replacement of rotten substrate.

- Performing carpentry in a number of degraded areas including relining parapets, skylight plinths and new timber bracing for the high parapets.

See the results of this project on the next page

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The Viking Approved Applicator then set about installing 1300m² of Enviroclad F.B.S. with its 3.6m x 30.4m (109.8m²) rolls and F.A.S.T. adhesive system.

An additional insurance policy was adopted of mechanically fastening "Piranha" plates with screws (aluminium discs with teeth on the underside to grip the membrane), through to the original sarking just in case the bond between the old asphalt and sarking substrate wasn't as strong as perceived in some areas. These were installed at 300mm centres underneath the welded laps, and at 1.8m centres throughout the middle of the sheet.

To allow any residual moisture in the sarking to escape, no expense was spared on venting the roof. One-way, pressure release vents were installed and flashed with proprietary TPO pipe seals.

Result

In short, the 71 year-old building's roof had been given a "birthday". The owners were thrilled with the transformation of their tired; leaking; ugly; charcoal; asphalt roof, into a fully warranted; dove grey; cost-effective, but most importantly, watertight roof that would prolong the life of this

lovely old lady. They can have peace of mind seeing technical representatives from Viking Roofspec will be inspecting the roof not only post-installation, but on the 1st, 2nd, 5th, 10th and 15th years of the 20 year warranty period – all as part of the Viking Full System warranty process.

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Viking
Enviroclad
APEEL

Enviroclad APEEL is normal Enviroclad, coated with a durable protective film that is applied to the surface of the membrane at the time of manufacture. Viking Enviroclad's APEEL option with its inherent protective film, guards the surface of the Enviroclad membrane from scuffs and dirt accumulation during installation (and the construction process), eliminating the need to clean the roof surface with solvents once the project is complete.

Durable and easy to remove, APEEL protective film helps save time, labour and improves aesthetics as well as long-term reflectivity (which increases energy efficiency and helps to reduce cooling costs). Viking Enviroclad APEEL is ideal for re-roofing and new construction projects.

Enviroclad APEEL protective film will stay in place until it is ready to be lifted-off, at which time the film is easily removed by a single person. Strong adhesion levels allow the film to stay in place for up to three months, resisting the effects of heat, UV exposure, rain and wind. Once the film is removed, no residue remains on the membrane, providing the building owner with a clean, reflective roof that will continue to resist dirt pick-up long after installation.

Time and Labour Savings

It is understandably common practice for building owners to request that their new membrane roof be cleaned before they pay for it. But with Enviroclad APEEL, there is no need for an applicator to go through the labourious; sometimes toxic; and imperfect cleaning or power-washing process after installation. They simply remove the film, and the roof is ready for final inspection.

Enviroclad APEEL is available in both 1.14mm and 1.52mm thicknesses, in 3.05m wide and in grey (white is available on indent).



Before film removal



Before film removal



Film removal



Finished Roof





RhinoBond Mechanical Fastening

In line with the construction industry's continuous evolution, there are a growing number of substrate options onto which membranes are installed. A common question is whether Enviroclad can be laid over substrates other than plywood, concrete or rigid insulation. The main issue is adhesion. With the RhinoBond method of fixing, you can be certain that the strongest possible adhesion will be achieved...

What is RhinoBond?

RhinoBond is induction fastening technology, which is an alternative method of mechanically-fastening Enviroclad membrane to a wide range of substrates. The difference from other types of mechanical fastening is that it **doesn't** involve penetrating the membrane.

How does it work?

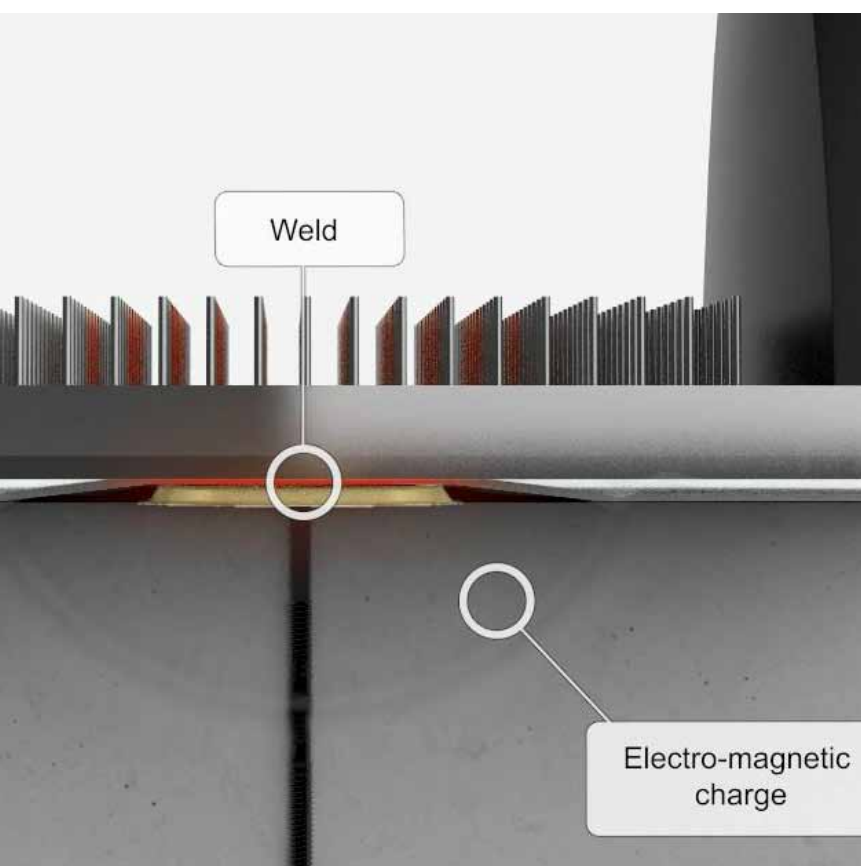
TPO-coated metal plates are fastened to the substrate in a grid pattern. Enviroclad membrane is laid over the plates and appropriately positioned on the roof as per a normal installation. The RhinoBond induction welding tool is placed above each of the RhinoBond plates (which are underneath the membrane surface).

The induction tool emits an electro-magnetic charge through the membrane, which activates the TPO coating on the surface of the plate below, resulting in a weld between the plate surface and the underside of the membrane (in less than five seconds). Weighted magnets are then placed over the plates to dissipate heat and ensure intimate contact between the bottom surface of the membrane and the integral hot-melt TPO coating on the plate's surface. This results in a superb weld.



Benefits of RhinoBond

- No adhesive required;
- No membrane penetration;
- Improved productivity – due to less fasteners and plates required than traditional mechanical fastening;
- Maximum wind uplift resistance;
- No narrow perimeter sheets required;
- Negates membrane flutter;
- Symmetrical wind load distribution;
- Negates membrane fatigue at seams;
- No weather or temperature dependence.



The Keys to Viking Enviroclad's Success

World Class Manufacturer

Carlisle Construction Materials of the USA (www.carlisleconstructionmaterials.com) is one of, if not the largest, manufacturer of EPDM and TPO waterproofing membranes in the world. Carlisle has been supplying the international market-place with world-class materials since the 1960s. It has a policy of aligning itself with distributors with similar values (like Viking); two of those values being a relentless emphasis on training along with the mantra of sticking with accredited 'systems' empirically tested in some of the world's most sophisticated laboratories.

Viking's Three-Staged Licensing Program

Viking Enviroclad is installed exclusively by Viking Approved Application companies. Every individual installer of Viking's single-ply membranes has been licensed at Viking's Licensing School. No installer has access to these materials unless he or she has been licensed. This policy has been instrumental in Viking Enviroclad having one of, if not the lowest, remedial rate in the industry.

Weldable Accessories

Viking Enviroclad is supplied as a complete system with a range of heat-weldable accessories to deal meticulously with changes in roof plane direction such as internal and external corners. It also comfortably flashes roof penetrations such as pipes; air conditioning units and substrate vents.

Weldable walkway rolls with a tread-plate pattern are specified to provide further protection to the roof surface by directing the flow of foot traffic when the roof is being inspected or serviced.

Proven Record

Having been launched internationally in 1990 and introduced in NZ in 2007, Viking Enviroclad has been successfully installed, and continues to perform superbly on buildings for significant organisations such as: Fonterra; Courier Post; Genesis Energy; Foodstuffs; Progressive Enterprises; Ryman Healthcare; Metlifecare; Ministry of Justice; Department of Corrections; Te Wananga O Aotearoa and Ballance Fertilisers to name a few.



Comprehensive Quality Assurance

Viking Enviroclad is backed by a 20 year warranty and your project may be eligible for the Viking Full System Warranty.*

The Full System Warranty covers both the materials and the installation in one document for the building owner.

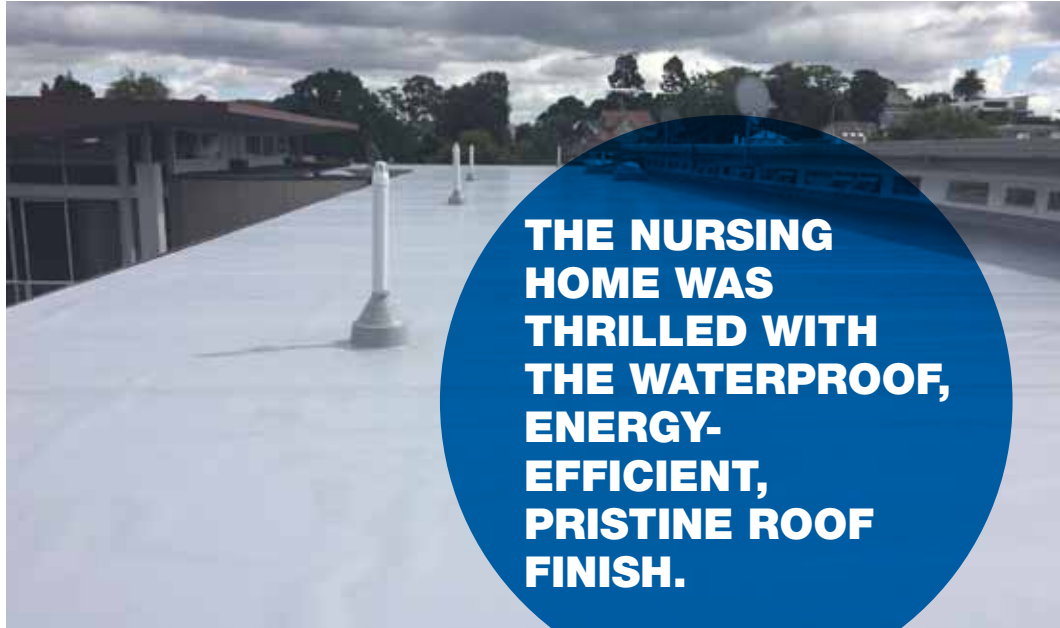
*Conditions Apply



Thermoplastic Competitor Comparison

	Viking Enviroclad	Competitor 1	Competitor 2	Competitor 3	Competitor 4	Competitor 5	Competitor 6
CodeMark Certified	✓						✓
BRANZ Appraised	✓	✓	✓		✓	✓	✓
Up to 3.66m wide	✓	✓					
1.14mm & 1.52mm thick	✓	✓					
Grey & White Options	✓					✓	
Fleece-back Option	✓	✓					✓
Cut-to-Length Service	✓	✓					
RhinoBond Technology	✓						
5000+ Projects	✓						
Water Potability	✓						
Manufacturer's Proprietary Adhesive	✓		✓	✓	✓		✓
Full System Warranty	✓	✓					
Training School	✓		✓				
APEEL Option	✓						
Custom-made Accessories Service	✓						

Solution	Viking Enviroclad	Viking Enviroclad FBS	Viking Enviroclad APEEL
Thickness	1.14mm and 1.52mm	2.5mm (including 1.4mm of fleece-backing)	1.14mm and 1.52mm
Roll width	3.05m and 3.66m	3.66m	3.05m
Roll length	30.4m	30.4m	30.4m
Colour	Grey and White (Tan available ex USA on indent)	Grey and White	Grey (White available on indent)
Cut-to-length	3.05m wide only	Yes	Yes



THE NURSING HOME WAS THRILLED WITH THE WATERPROOF, ENERGY-EFFICIENT, PRISTINE ROOF FINISH.

“I’D LIKE AN ‘APEEL – RHINO – WARM ROOF’ COMBO PLEASE!”

CHALLENGE – PART ONE:
A LARGE NURSING HOME IN CENTRAL AUCKLAND HAD THOUSANDS OF SQUARE METRES OF METAL TRAY ROOFING WITH MINIMAL PITCH; A FEW AREAS OF WHICH WERE IN A STATE OF DISREPAIR AND LEAKING.

These roofs needed to be sorted, but firstly, there were a few challenges:

Budget – the Trust Board didn’t have the income for the metal roof to be removed nor for carpenters to build a support structure to re-pitch a new one at the three degrees required for metal roofs. This would also affect existing window placements as well. Such work would be deemed as ‘Restricted Building Works’; all of which would require applying for a building consent.

Practicality – removal of a roof requires the relocation of people (called ‘churn’) which is inconvenient and expensive at the best of times, let alone when those people are elderly patients. Roof removal also requires the erection of shrink-wrapped scaffolding which adds to the above-mentioned costs.

Noise – projects like this can be noisy, which is the last thing people in the twilight of their lives need to be subjected to.

Solution – Part One:

One of Viking Roofspec’s Approved Applicators recommended that a Warm Roof overlay be installed on top of the existing roof. A Warm Roof is an insulation system (rigid panels) installed on top of a roof substrate with a membrane installed on top of it. The proposed solution would render several advantages:

The existing metal tray roof would remain in place, so the building would remain covered

and therefore no building inhabitants would need to be relocated.

No Restricted Building Works would be required for re-pitching the roof to three degrees, (seeing it had surpassed its minimum 15 year durability as required by the Building Code), so no windows would need to be replaced and no shrink-wrapped scaffold would be necessary.

Polyiso insulation would not only provide a flat surface for the membrane to be installed on, but it would render an R-value of R-3.0 which would make the building more energy efficient and comfortable for the patients. An additional bonus would be the fact that the insulation would reinforce the spanning strength of the existing metal roof as well.

See the results of this project on the next page

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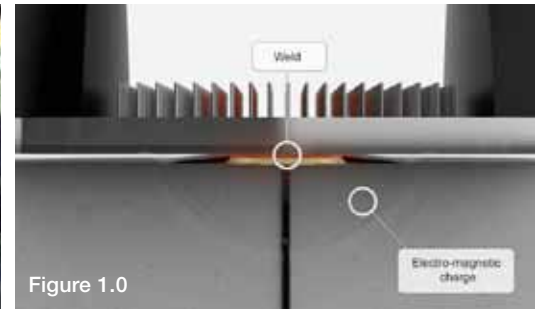
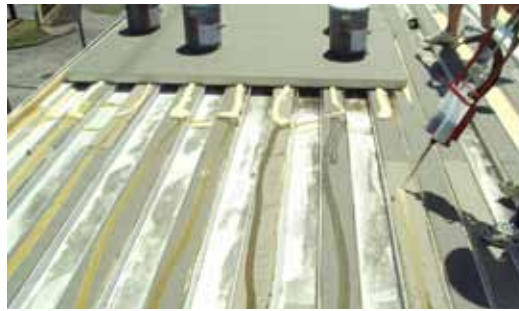


Figure 1.0



Before film removal



After film removal

CHALLENGE – PART TWO: THE BUILDINGS HAVE A NUMBER OF EXTRACTOR FANS, SO THE FUMES FROM AN ADHESIVE SYSTEM COULD FIND THEIR WAY INTO A BUILDING AND AFFECT THE PATIENTS AND STAFF.

A NUMBER OF OTHER TRADES (PLUMBING AND GLAZING) WOULD BE FOLLOWING THE ROOFING PROJECT, SO THERE WOULD BE A DANGER OF THE MEMBRANE SURFACE BEING DAMAGED (THE INSTALLER'S HANDY WORK BEING UNDONE).

Solution – Part Two:

Fumes! - To eliminate the use of potent adhesives, the RhinoBond system was commissioned. In short, RhinoBond is a method of mechanically-fastening a TPO membrane to the surface on which it will be installed (in this case, the Kingspan polyiso insulation layer), without penetrating the membrane. This is done with 75mm diameter TPO-coated Rhino-washers (plates), which are screwed through the insulation to the substrate in a grid pattern (600mm x 600mm) on top of which a roll of Enviroclad TPO membrane is then loose-laid. A RhinoBond induction machine is then positioned on top of the membrane above each plate, where it transmits an electromagnetic 'charge' through the membrane surface. This activates the polymers, thus fusing the TPO-coated plates to the underside of the membrane (see figure 1.0).

This state-of-the art system not only prevented any membrane penetration, but it maximised wind uplift resistance and most importantly for this customer, negated the use of potent adhesives.

Other bloody trades! - With plumbers and glaziers performing their work in behind the membrane installation team, it was important that the membrane remained protected and clean. To avoid gouging or puncturing from ladders and/or dropped chisels, hammers or knives etc, a geotextile protection course was loose-laid in strategic areas. But to avoid soiling of the whole roof; mostly from dirty boots which would then require solvent cleaning the whole area, Viking specified the use of Enviroclad 'APEEL'...Enviroclad APEEL is normal Enviroclad TPO membrane, but with a factory-applied protection film. This layer is left on – beyond the roofing installation for the duration of the building works until all trades have left. It is then simply peeled off, leaving a pristine membrane surface. The APEEL system was also developed so that a RhinoBond induction machine could still make a successful electromagnetic transmission through its film.

Result:

The Nursing Home Trust Board members were thrilled with the fact that they ended up with a low slope roof that was:

- Waterproof
- Energy-efficient though the Viking Warm Roof which uses Kingspan Polyiso board
- Solvent-free through the use of the RhinoBond mechanical fastening system
- Pristinely-finished thanks to the Enviroclad 'APEEL' TPO membrane with its protective film...
- Backed by warranties of substance.
- And all of the above had been achieved with minimal noise and disruption and most importantly, without the expensive and painful process of having to apply for consent and relocate its precious elderly inhabitants respectively.

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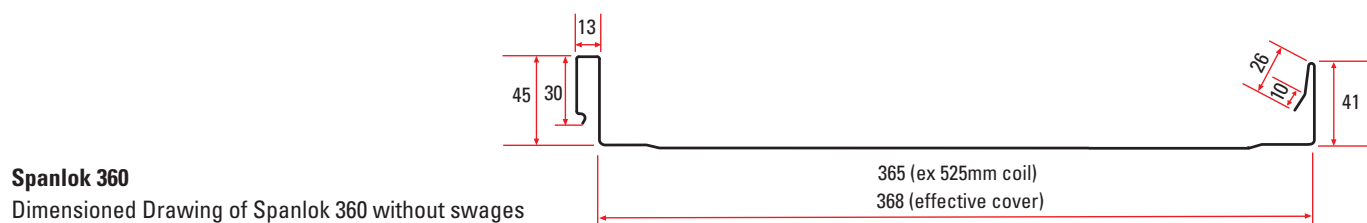
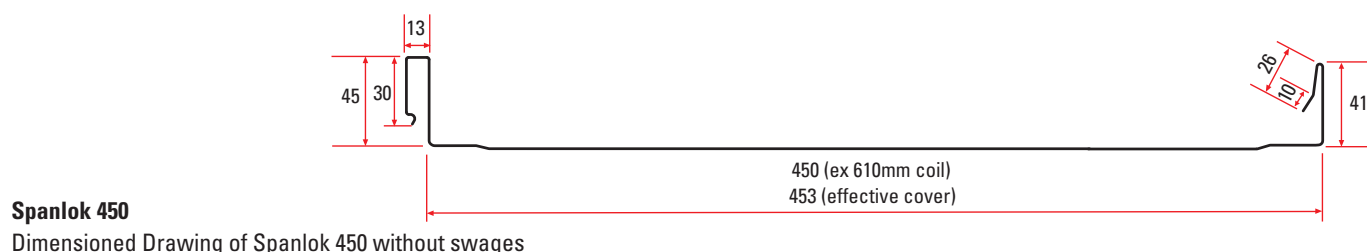
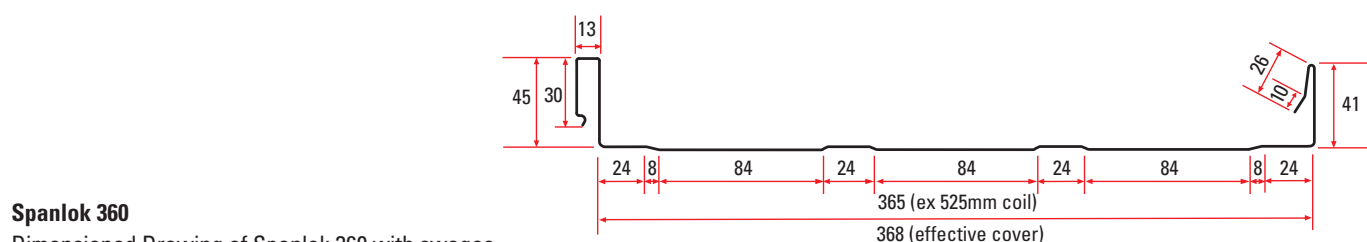
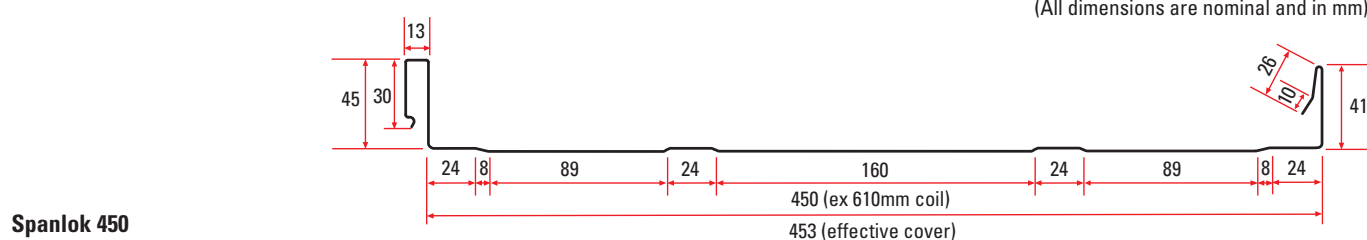
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PROFILE TECHNICAL SUMMARY

(All dimensions are nominal and in mm)



Description

Eurostyle Spanlok is the very latest wide tray roofing and walling system incorporating superior technology, with even greater wind loading capacity. Suitable for roof pitches down to 3° and with a profile height of 45mm it is arguably the most superior roof of its class.

Designed to be self supporting on purlins or girts it provides the very latest in architectural design at an economical price. Eurostyle Spanlok is manufactured principally for the North Island.

Branches: • Whangarei • Auckland • Pukekohe • Hamilton • Taupo • Tauranga • Palmerston North
• Wellington • Christchurch • Cromwell

EUROSTYLE SPANLOK ROOFING AND CLADDING

Design Considerations

The designer should take into account the following factors when specifying Eurostyle Spanlok:

- Preferred pan width
- Material type and finish
- Roof pitch
- Sheet lengths
- Wind Loadings (Refer to Wind Loadings Section)
- Snow design
- Reference to our detail drawings
- Swaged or non swaged
- Purlin spacing

Wide tray type roofing and walling profiles due to their inherent nature of a flat pan without the use of structural ribs can give rise to undulations in the wide flat pan. These are considered to be an architectural feature of the profiles. Normally, structural integrity is not affected. However, structural integrity must be reviewed if the distortion results from an extreme external influence. Since many uncontrollable factors are involved, Roofing Industries can not realistically assure the total elimination of undulation in the pan. Eurostyle Spanlok can offer the use of a double swage in each pan as an architectural feature which assists in eliminating this if required. Inclusion or exclusion of swages must be specified at the

time of order. Different swage options, including single swage, are also available on request. A clip relief swage at the pan edges is supplied standard unless otherwise requested.

Low gloss paint coatings are also available which assist in minimising any undulations but must be specified at time of coil ordering.

Penetration flashings for Eurostyle Spanlok must be installed by the Eurostyle Spanlok installation contractor only and other trades must not cut any holes unless under the supervision of the roofing contractor. The placement of penetrations should ensure that they do not interfere with the panel joints.

Eurostyle Spanlok falls outside the scope of E2/AS1 and is to be designed and installed to the manufacturers recommendations. Options apply around flashing details so these are best discussed with your local installer.

- Manufactured custom cut to length subject to transport and site limitations.
- Eurostyle Spanlok can be manufactured at our local branch or in cases where access or transportation is an issue can be manufactured on site.
- As sheet lengths increase higher transportation costs may be applicable.

MATERIAL RECOMMENDATIONS & STANDARD PAN WIDTHS TO SUIT STANDARD COILS

The use of the following sizes minimizes waste and cost and generally shortens lead times.

However other sizes are available and if other than standard sizes are required contact Roofing Industries for specific advice

Profile	.55 Plain and Prepainted Steel	0.90 Plain and Prepainted Aluminium	0.70 Copper Aluminium
Eurostyle Spanlok 450	450mm	445mm	N/A
Eurostyle Spanlok 365	365mm	N/A	335mm

The above pan widths are based on standard coil widths and are a nominal sizes only.

Material availability is subject to available stock and some material such as copper may have lead times of 3-4 months. For all other materials such as Titanium Zinc refer to Roofing Industries. All measurements are nominal. N/A - Not Readily Available

MINIMUM PITCH

The minimum pitch for Eurostyle Spanlok is 3°

Notes

- Minimum pitch may be affected by snow loadings in areas subject to snow. Refer to Roofing Industries
- Any transverse seams should be soldered or sealed in high or very high wind design load areas at pitches less than 20 degrees
- The building design pitch may need to be higher to take into account any cumulative deflections of the frame, purlin and roof sheeting.
- With curved roofing the roof cladding must not terminate at a pitch lower than permitted above. For any curved roof situation contact Roofing Industries prior to design.
- Refer to NZ Metal Roof and Wall Cladding Code of Practice for cross welt details and limitations.

SUBSTRATE

Eurostyle Spanlok Roofing and Cladding is secret fixed designed to be self supporting on purlins or girts and panels are joined by clipping and locking and do not have any external through fixings. Purlins are generally 75 x 50 or 100 x 50 purlins on the flat, fixed in accordance with NZ Building Regulations. It can also be laid over a continuous plywood substrate which is structurally fixed to the frame.

For aluminium or copper Spanlok the use of a plywood substrate is recommended.

If plywood is used it must be smooth, dimensionally stable and with a moisture content of <18% (generally CPD) and a minimum thickness of 15mm.

It must be H3.2 treated using a water based system, and of Stress Grade F11. A 2-3 mm expansion gap must be provided between sheets. Ventilation gaps to be provided at ridge, abutments and soffit areas.

Generally for 15mm plywood and rafters at 900mm centres the purlin spacing to which the plywood is fixed should be at 800mm centres and nogs provided to all sheet ends and edges (Not required on

edges if tongue and groove system used). With 17mm ply the purlin spacings may be increased to 900mm. Fixings for the plywood should be a minimum of 8g x 40mm for 15mm plywood and 10g x 40mm for 17.5mm plywood.

They must be countersunk screws manufactured from corrosion resistant material such as stainless steel fixed at 150mm centres to the perimeter of the sheet and 300mm to intermediate purlins. Fixings must not be closer than 10mm to sheet edges or 15mm when tongue and groove edges are used, and must not protrude above the surface.

Closer fixing centre may be required on high wind load areas such as gable ends. The plywood should be laid in a staggered pattern with the face grain at right angles to the supports.

The above is a guide only and reference should be made by the designer to the NZBC and plywood manufacturers technical information.

In some cases increased or decreased support spacing may be applicable depending on wind loads.

PURLIN AND GIRT SPACINGS

Recommended purlin and girt spacings are contained in the table below. Reference should also be made to the Wind Loading Section as this may limit purlin and girt spacing.

	Roof	Walls
Intermediate Span	600mm	1200mm
End Span	600mm	900mm

The size of purling shall generally be taken from NZS 3604 section 10, using spacing to suit the spanning capability of the cladding.

WIND LOADINGS

It is first necessary for the designer to calculate the design wind load for the roofing and cladding in accordance with generally acceptable practice, by reference to AS/NZS 1170, and/or NZS 3604 as appropriate. For a fuller explanation of this refer to the NZ Metal Roof and Wall Cladding Code of Practice.

The uplift forces on Eurostyle Spanlok roof and cladding are transferred through the building via the clips and fasteners to the structure. The performance criteria is the number of clips or fasteners per m², which can be varied by the spacing of the purlins and clips, or the width of the panels.

To improve the uplift resistance of Eurostyle Spanlok roof and cladding the design options are:

- To reduce the width of the end bays
- To place the clips and fasteners closer together with the latter being the standard option.

This requires extra clips and fasteners around the periphery because of the increased wind load on all buildings as required by the local pressure factor (K₁). Additional clips and fasteners are also required in exposed situations subject to high wind design load areas.

In these areas consideration should also be given to reducing the maximum gable or verge panel width.

Purlin spacing and ultimately the number of secret fix clips and fasteners per lineal metre and ultimately per m² for Eurostyle Spanlok roofing and cladding must be derived from the following graph compiled as a result of testing as per the NZMRM Metal Roof and Wall Cladding Code of Practice.

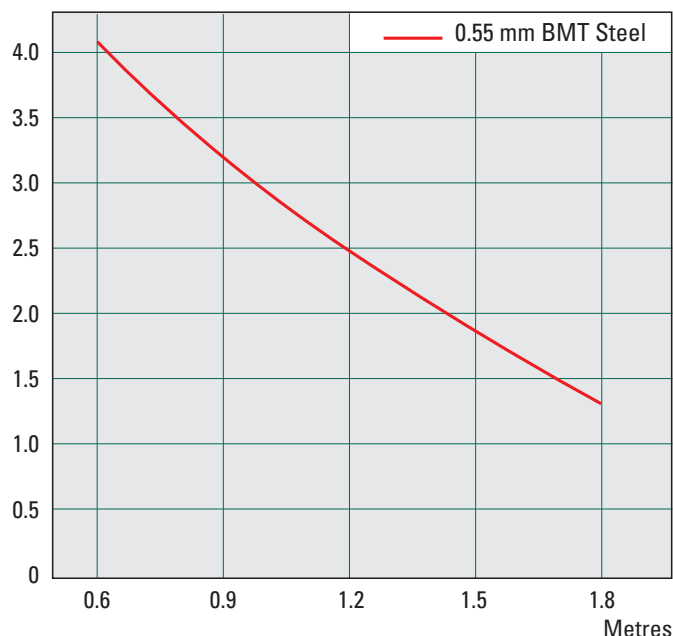
When fixing to a plywood substrate clips should be at or maximum spacing of 400mm.

It should be noted that for point load purposes when a roof can be walked on that purlin spacings should be at a maximum of 600mm unless otherwise approved by Roofing Industries. Spacing of clips for wind load only may be greater in accordance with the graphs but this should be done with caution to avoid any vibration to unclipped purlins.

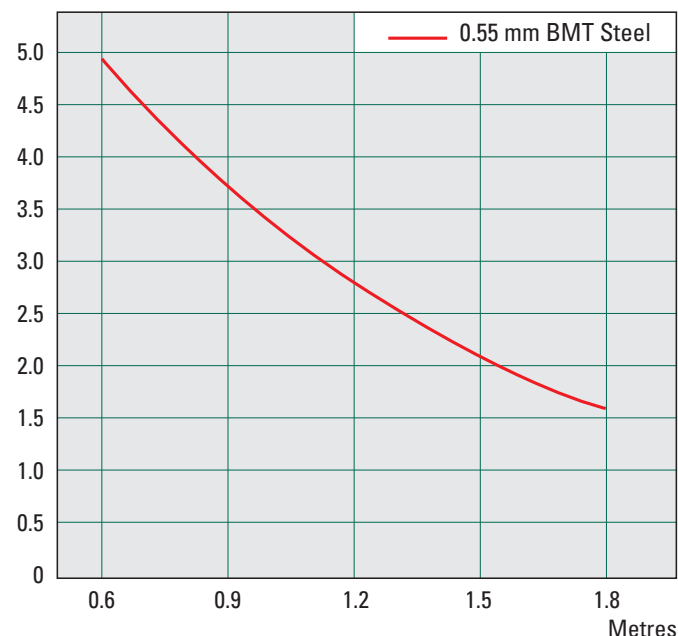
WIND LOAD DESIGN GRAPH

Roofing & Wall Cladding - Steel Based Material

kPa .55 Steel Based Material - 450mm Pan width



kPa .55 Steel Based Material - 365mm Pan width



Intermediate span in metres. End spans to be 2/3 of intermediate span. Intermediate span of 600mm can also use end span of 600mm. Testing confirms that .90mm Aluminium has similar results to .55mm Steel as shown above and these graphs can also be used for .90mm Aluminium loadings.

INFORMATION TABLE

Substrate Material	Steel	Aluminium	Copper
Thickness	.55mm	.90mm	.70mm
Aprox weight (Kgs) per lineal metre for 450mm pan	2.80	1.55	
Aprox weight (Kgs) per lineal metre for 365mm pan	2.40	N/A	3.10
Effective Cover for Standard Pan (mm) (Nominal)			
Eurostyle Spanlok - 450mm pan	453mm	448mm	N/A
Eurostyle Spanlok - 365mm pan	368mm	N/A	338mm
N/A = Not Readily Available			

Specifications

Refer to our Full Specification on Masterspec™ and/or Smartspec™, our website, or our Selection Guide.

Ventilation

Eurostyle Spanlok like any metal roof must have provisions for ventilation of the roof space to allow condensation to dissipate.

Ventilation should be provided at the eaves and ridge. Where a plywood substrate is used a ventilation space of 40mm minimum is recommended below the plywood with air flow to eaves and ridges.

An underlayment provided called Thermakraft Drainage Mat can also be used which provides a thin layer of scrambled nylon between the plywood and Eurostyle Spanlok to allow ventilation to occur.

Ventilation is particularly important with skillion type roofs.

Roof expansion provision

Thermal movement across the pan is taken up by the provision of a small gap at the base of the profile. Linear expansion is accommodated by the profile sliding on the clips.

Underlay

A breather type underlay is recommended under the roof and wall cladding. A self supporting grade is recommended due to its heavier grammage providing greater tear resistance and separation qualities. Thermakraft 407 is the recommended underlay for roofing.

PRIMARY FIXING CHART

Eurostyle Spanlok should be fixed in accordance with the following chart into the primary structure at purlin and girt spacing derived from the Windload Design Graph.

Product	Material	Clip Material	Screw Type Approved Timber Type	Screws per clip
Eurostyle Spanlok	Steelbased	Galvanised or Zam	10-12 x 45mm Class 4/5	2
	Aluminium	Stainless Steel	8g x 45mm Stainless c/s Sq. Drive	2
	Copper	Stainless Steel	8g x 45mm Stainless c/s Sq. Drive	2

Note: When fixing to a plywood substrate 8g x 25mm screws otherwise as above should be used and into the primary structure where possible with fixing clips as above.

Installation

Installation should be undertaken by experienced Eurostyle installers. Soft rubber soled shoes should be worn and foot traffic should be in the pan of the profile and on purlin lines. Other trades should be also be made aware of this by the main contractor.

Flashings should be notched over the ribs and all sheeting should be edge fixed. Packs on site should be kept dry and stored above ground level. If sheets become wet they should be fillet stacked to allow drying.

Maintenance

Maintenance should be performed as necessary to remove dirt, salt and pollutants in accordance with warranty conditions. In severe environments more regular maintenance may be necessary.

For further information on Eurostyle Spanlok roofing and cladding refer to the NZ Metal Roof and Wall Cladding Code of Practice, www.metalroofing.org.nz
Also refer to our suite of detail drawings available via www.roof.co.nz, NZ Steel Ltd, Pacific Coilcoaters Technical Helpline 0800 844 822, Ambro Metals Ltd and Mico Metals literature.

EUROSTYLE SPANLOK™

JSC VertiClad

Vertical Shiplap Weatherboard System

Cavity on Wrap

VERTICAL SHIPLAP WEATHERBOARD DRAWING INDEX - JV-C-00

Date 25.02.10

Product	Application	Detail	Description	Issued
JV	C	00	Drawing index	25.02.2010
JV	IG	01	Product installation guidelines	25.02.2010
JV	IG	02	Product installation guidelines	25.02.2010
JV	IG	03	Product installation guidelines	25.02.2010
JV	C	KN	General installation keynotes	21.12.2009
APJ		500	Custom cavity batten profiles	11.12.2009
JV	FRM		Frame setout	21.12.2009
JV	C	01	Internal corner detail - W flashing	21.12.2009
JV	C	02	J41 Internal corner detail - L flashing	21.12.2009
JV	C	03	External corner J40 detail - Exposed corner	21.12.2009
JV	C	04	External corner J42 detail - Flush corner	21.12.2009
JV	C	05	External corner detail - Cover boards	21.12.2009
JV	C	06	External corner - Powder coated external corner extrusion	21.12.2009
JV	C	07	Bottom plate detail	21.12.2009
JV	C	08	Top plate to soffit detail	22.02.2010
JV	C	09	Parapet detail	21.12.2009
JV	C	10	Internal corner detail - 135 degree wall	21.12.2009
JV	C	11	External corner detail - 135 degree wall	21.12.2009
JV	C	12	Pipe penetration detail	21.12.2009
JV	C	13	Horizontal joint detail	21.12.2009
JV	C	14	Soffit detail	21.12.2009
JV	C	15	Scarf Jointing detail	21.12.2009
JV	C	16	3D Internal corner detail - Horizontal joint detail	21.12.2009
JV	C	17	3D External corner detail - Horizontal joint detail	21.12.2009
JV	C	18	Internal corner detail	21.12.2009
JV	C	19	External corner detail	21.12.2009
JV	C	20	External corner detail	21.12.2009
JV	C	30	Aluminium window head detail	21.12.2009
JV	C	31	Aluminium window jamb detail	21.12.2009
JV	C	32	Aluminium window sill detail	21.12.2009

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JSC Timber

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General Installation Keynotes

Profiles

- Shall be machined to NZS3617 and/or Branz Bulletin 411.

Durability

- Timber weatherboards to comply with NZS3602 - B2 durability.

Compatibility of Materials

- To comply with Table 20 "Material selection" E2/AS1.
- To comply with Table 21 "Compatibility of materials in contact" E2/AS1.
- To comply with Table 22 "Compatibility of materials subject to run off" E2/AS1.

Building Wraps and Underlays

- To comply with Table 23 "Properties of Underlays and Building Wraps" E2/AS1.
- Fixings to comply with E2/AS1 9.1.8.5 "Wall framing behind cavities".

Fixings

- To comply with Table 24 "Fixings selection for wall claddings" E2/AS1, refer to B2 Durability requirements.

General Fixings

- Profiles shall be machined to NZ3617 and/or Branz Bulletin 411.
- All nail fixings pre-drilled minimum 1mm diameter smaller than the nail gauge.
- All products to be pre-coated and cut edges to be sealed to JSC Timber specifications.
- Provide PVC tape bond break between H3.2 battens and any aluminium flashing.
- Rusticated and Vertical Shiplap Weatherboards to be fixed with a minimum gap of 2mm at the overlap between boards.
- Rebated Bevel Back profiles to be fixed with a minimum gap of 2mm at the overlap between boards.
- Ensure Bevel Back Weatherboard weather grooves are in line with a minimum 32mm lap.
- All materials and fixtures are to comply with E2/AS1 Clause 2.2.
- All Aluminium joinery to comply with NZS/BC 4211.
- Option PBS Rigid Air Barrier to be sealed with SikaGuard 703w to manufacturer's specification.

CedarShield

- Weatherboards are to be factory coated to all sides prior to installation.
- Weatherboards shall be annually cleaned and recoated to manufacturer's recommendations and maintenance guidelines.

General installation keynotes

General keynotes

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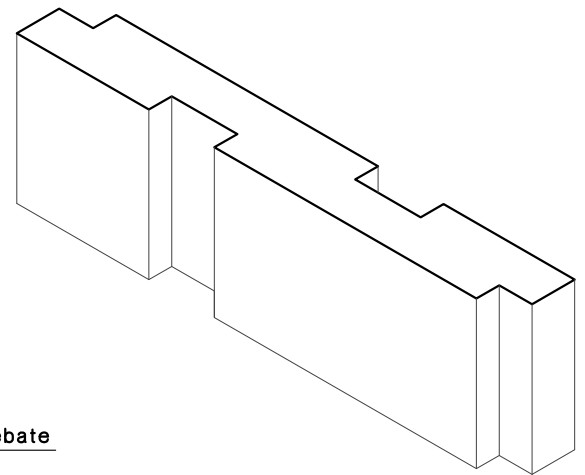
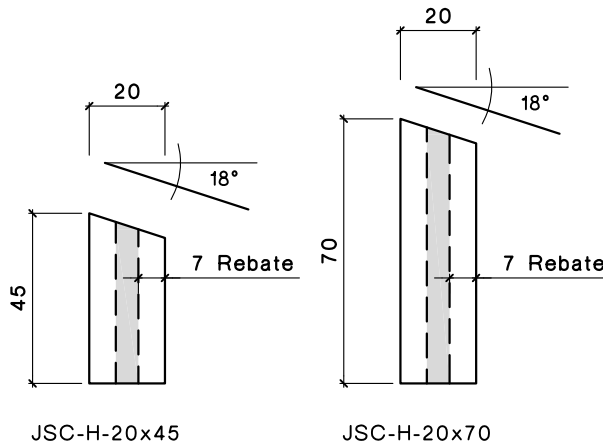
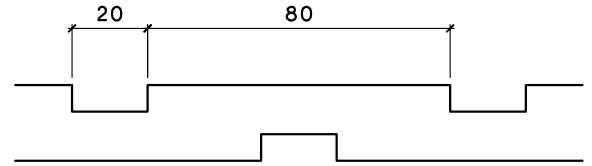
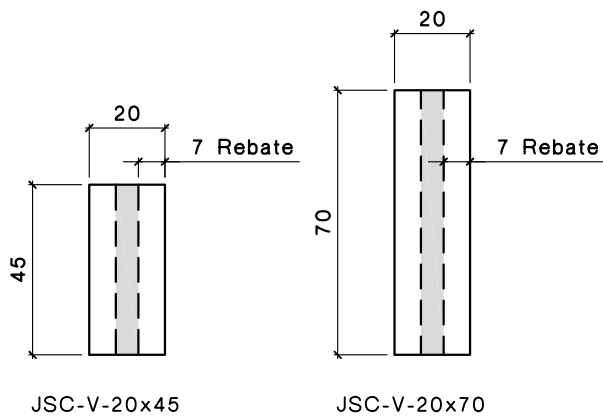
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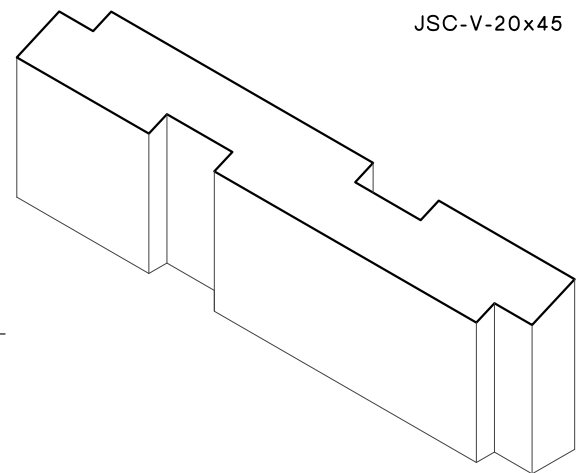
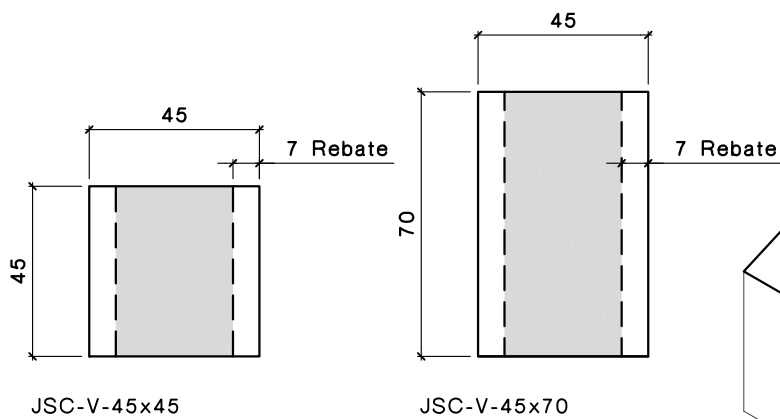
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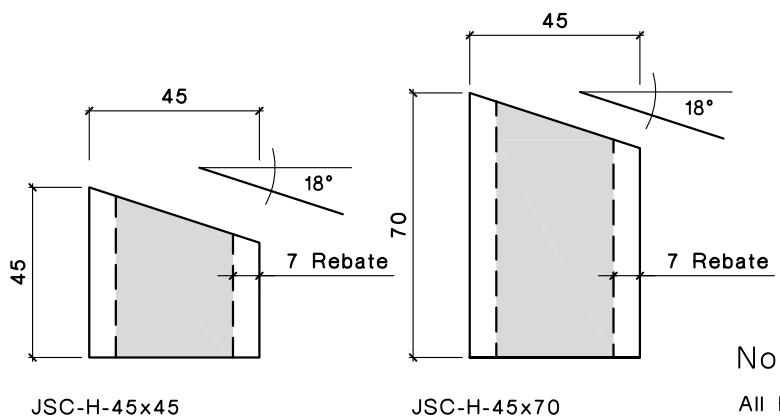
JV-C-KN



JSC-V-20x45



JSC-H-20x45



Note:

All Battens are CCA H3.2 Treated Cavity Battens

Cavity Battens

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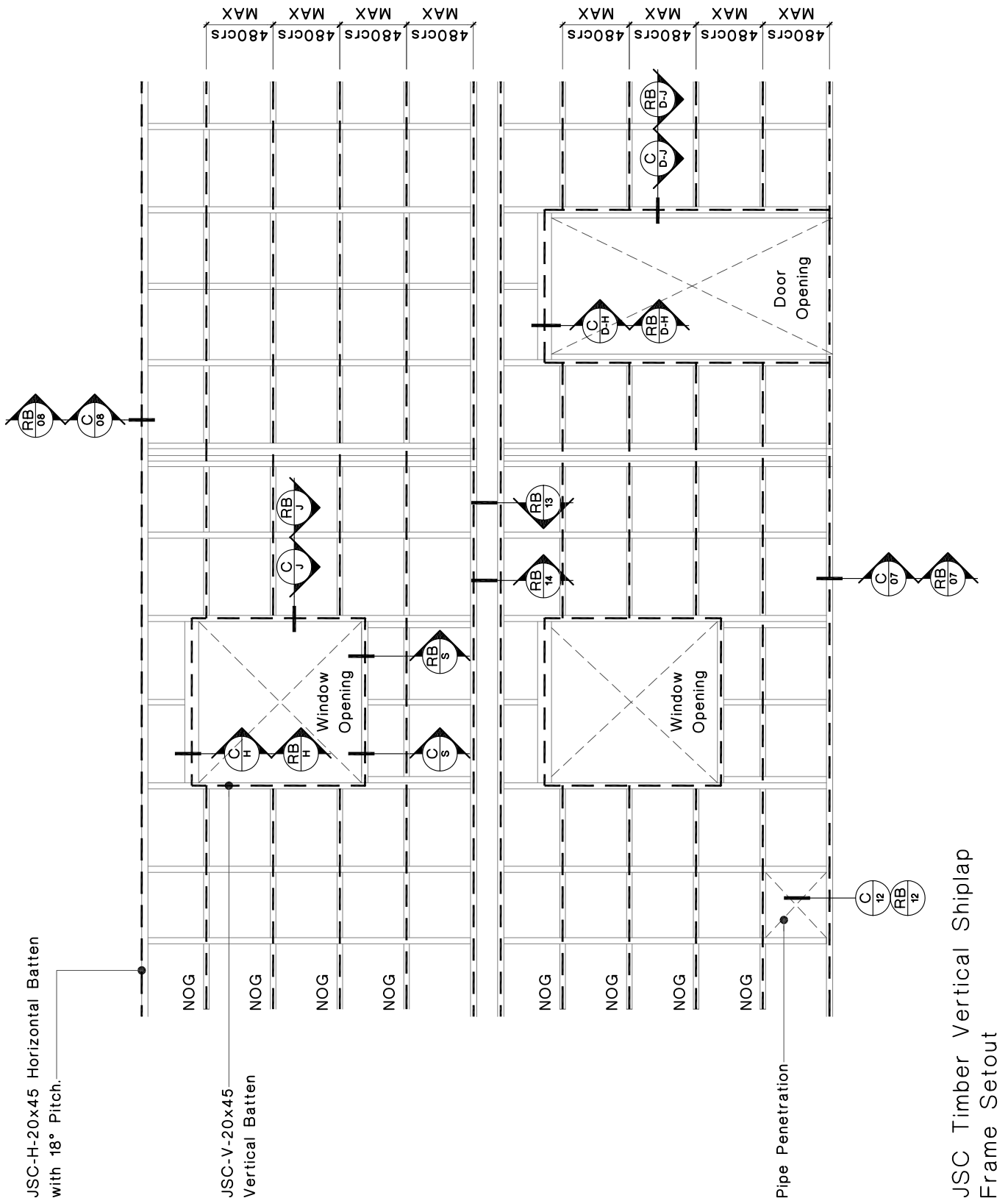
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Date: 25/03/10

Dwg:

APJ500



Frame and Batten Setout

Vertical Shiplap Weatherboards and Architectural Profile

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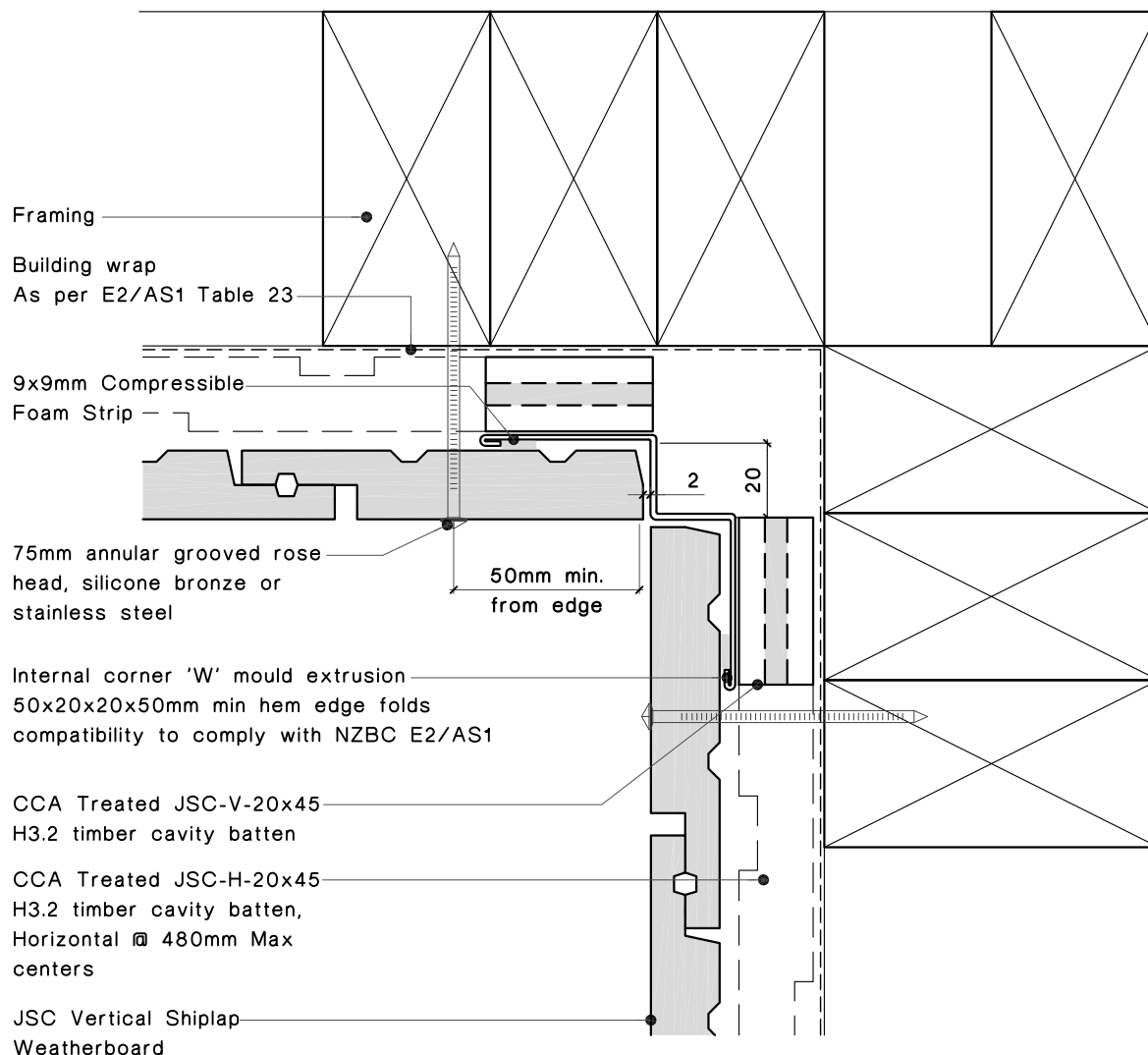
Date: 21/12/09

Dwg:

JV-FRAME

Notes:

- All nail fixings pre-drilled minimum 1mm diameter smaller than the nail gauge.
- All products to be pre-coated & cut edges to be sealed as per Branz Bulletin 411.
- All materials and fixtures are to comply with E2/AS1 Clause 2.2
- Provide PVC tape bond break between H3.2 battens and any flashing.
- Vertical Shiplap Profiles to be fixed with a minimum 2mm gap at the overlap between boards.



Internal corner detail

Vertical Shiplap Weatherboards Architectural Profile

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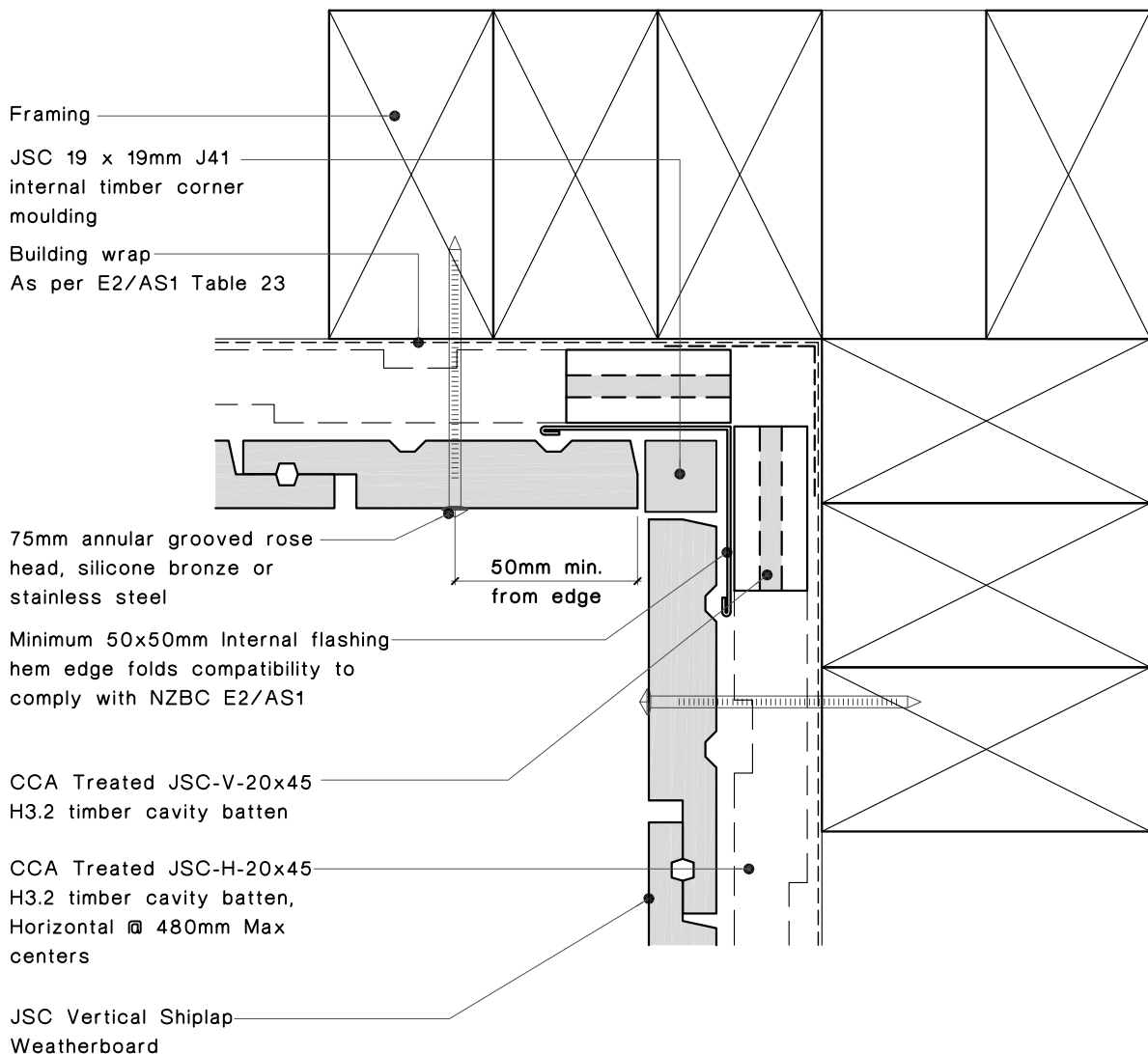
Date: 21/12/09

Dwg:

JV-C-01

Notes:

- All nail fixings pre-drilled minimum 1mm diameter smaller than the nail gauge.
- All products to be pre-coated & cut edges to be sealed as per Branz Bulletin 411.
- All materials and fixtures are to comply with E2/AS1 Clause 2.2
- Provide PVC tape bond break between H3.2 battens and any flashing.
- Vertical Shiplap Profiles to be fixed with a minimum 2mm gap at the overlap between boards.



Internal corner detail

Vertical Shiplap Weatherboards Architectural Profile

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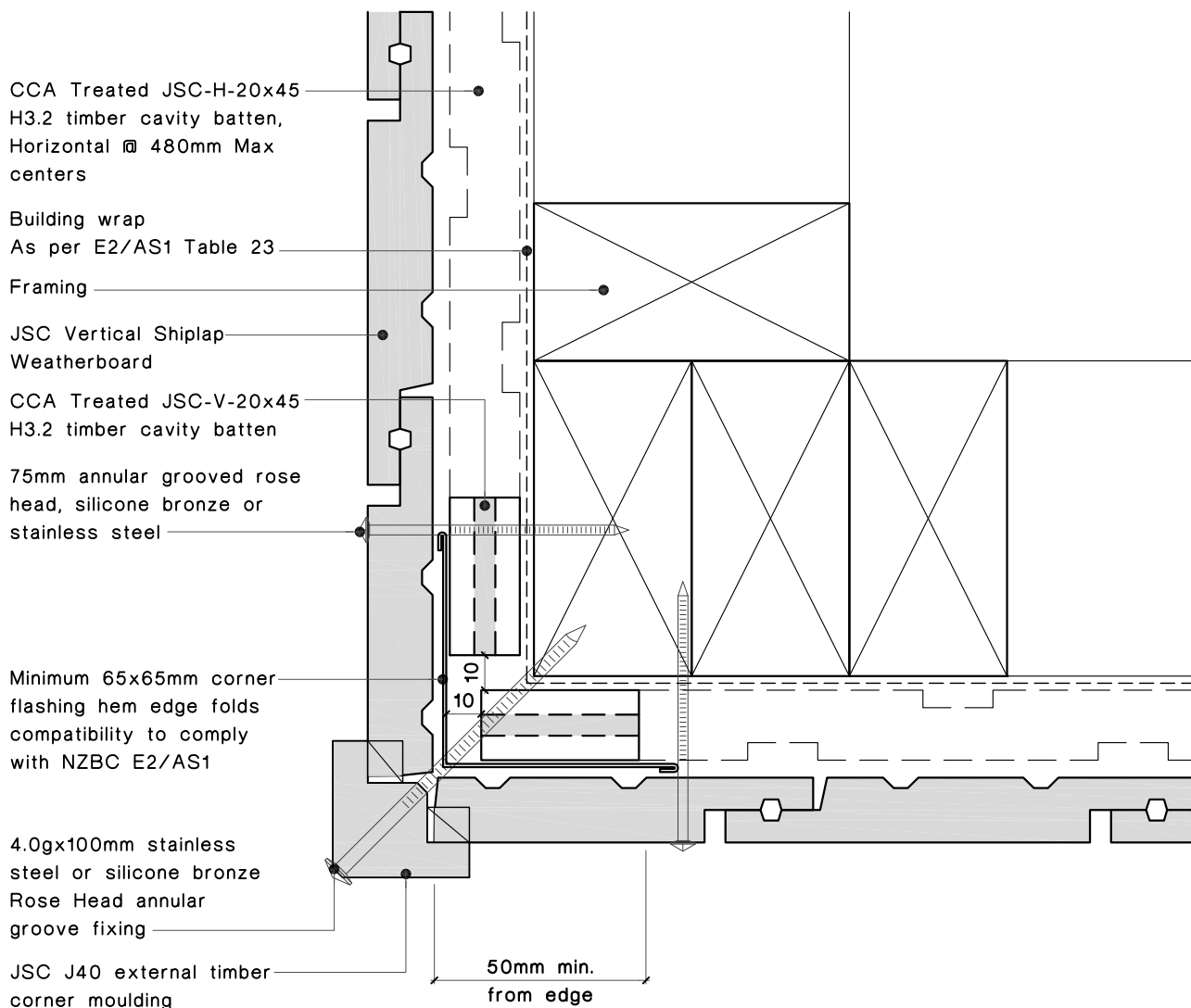
Date: 21/12/09

Dwg:

JV-C-02

Notes:

- All nail fixings pre-drilled minimum 1mm diameter smaller than the nail gauge.
- All products to be pre-coated & cut edges to be sealed as per Branz Bulletin 411.
- All materials and fixtures are to comply with E2/AS1 Clause 2.2
- Provide PVC tape bond break between H3.2 battens and any flashing.
- Vertical Shiplap Profiles to be fixed with a minimum 2mm gap at the overlap between boards.



External corner detail

Vertical Shiplap Weatherboards Architectural Profile

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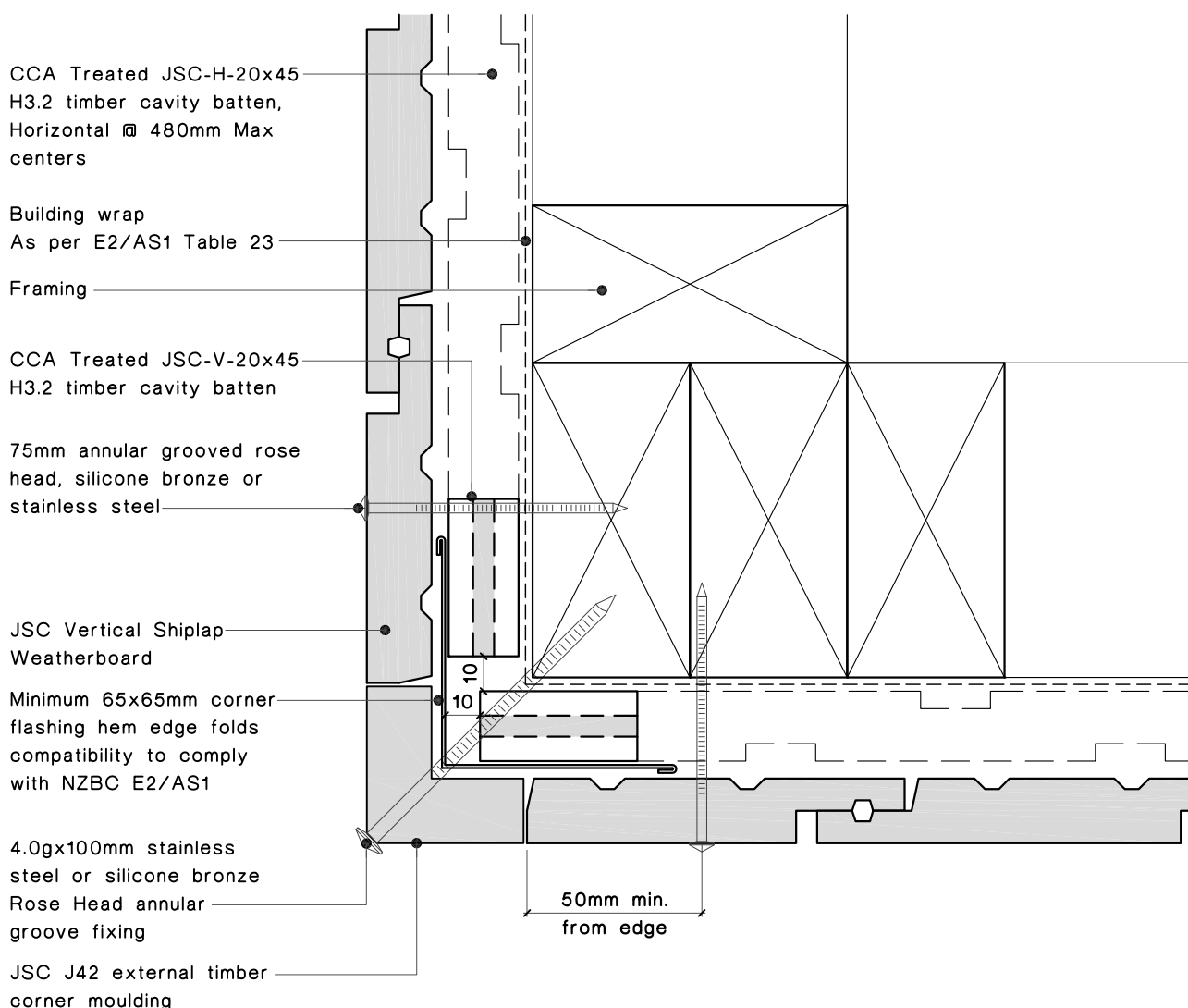
Date: 21/12/09

Dwg:

JV-C-03

Notes:

- All nail fixings pre-drilled minimum 1mm diameter smaller than the nail gauge.
- All products to be pre-coated & cut edges to be sealed as per Branz Bulletin 411.
- All materials and fixtures are to comply with E2/AS1 Clause 2.2
- Provide PVC tape bond break between H3.2 battens and any flashing.
- Vertical Shiplap Profiles to be fixed with a minimum 2mm gap at the overlap between boards.



External corner detail

Vertical Shiplap Weatherboards Architectural Profile

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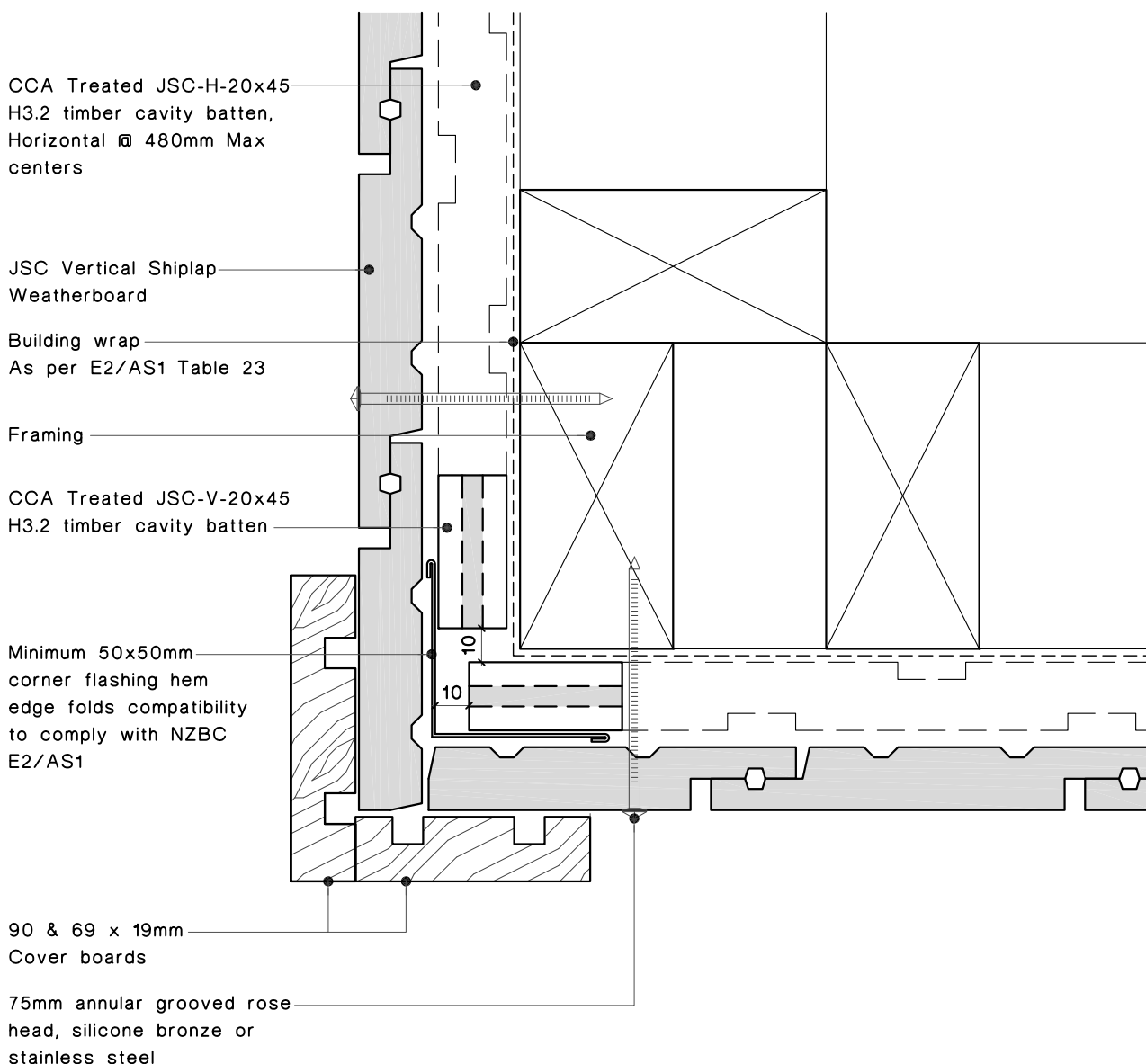
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Dwg:

JV-C-04

Notes:

- All nail fixings pre-drilled minimum 1mm diameter smaller than the nail gauge.
- All products to be pre-coated & cut edges to be sealed as per Branz Bulletin 411.
- All materials and fixtures are to comply with E2/AS1 Clause 2.2
- Provide PVC tape bond break between H3.2 battens and any flashing.
- Vertical Shiplap Profiles to be fixed with a minimum 2mm gap at the overlap between boards.



External corner detail

Vertical Shiplap Weatherboards Architectural Profile

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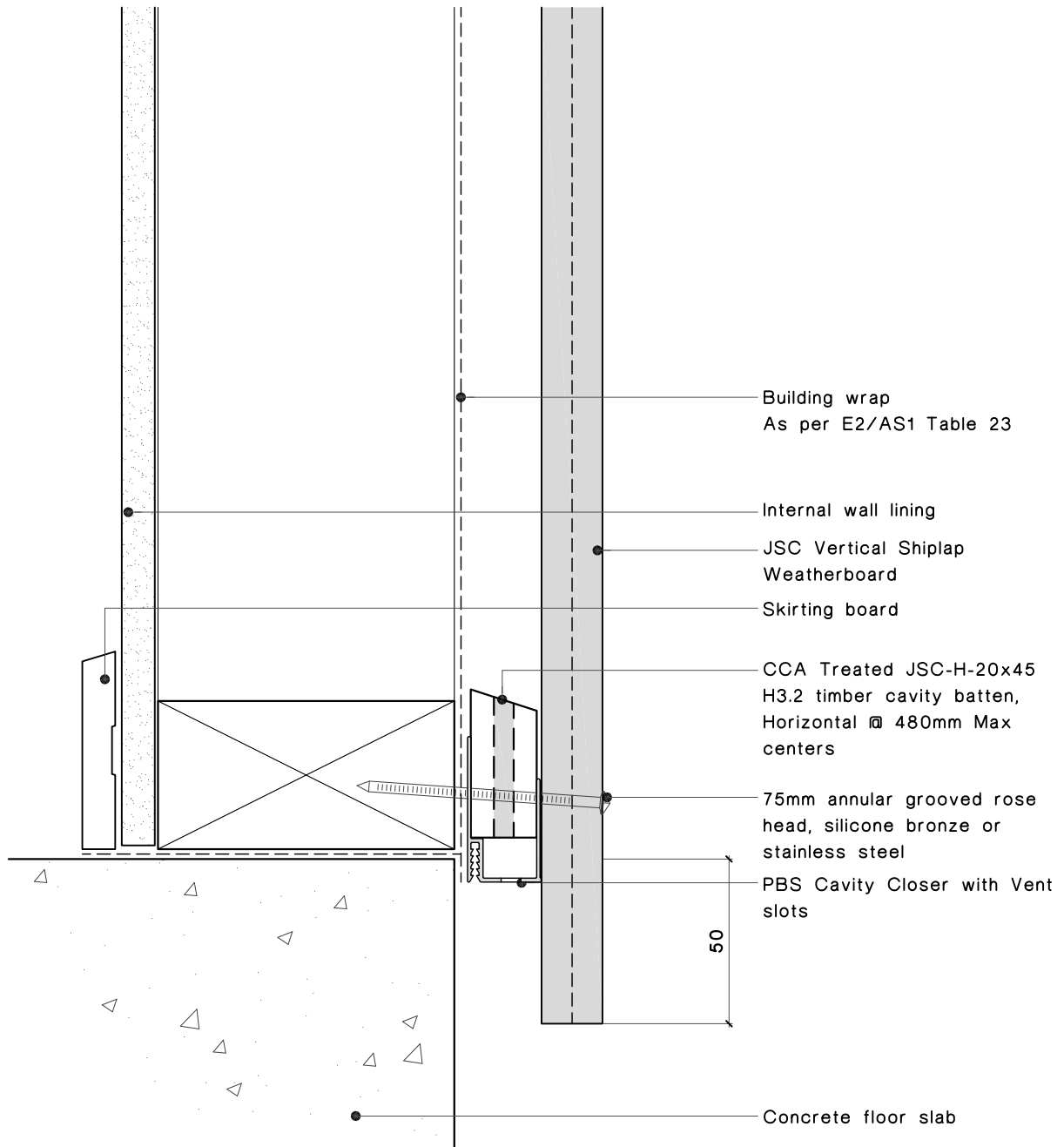
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Scale: 1:2

Date: 21/12/09

Dwg:

JV-C-05



Notes:

- All nail fixings pre-drilled minimum 1mm diameter smaller than the nail gauge.
- All products to be pre-coated & cut edges to be sealed as per Branz Bulletin 411.
- All materials and fixtures are to comply with E2/AS1 Clause 2.2
- Provide PVC tape bond break between H3.2 battens and any flashing.
- Vertical Shiplap Profiles to be fixed with a minimum 2mm gap at the overlap between boards.

Bottom Plate detail

Vertical Shiplap Weatherboards Architectural Profile

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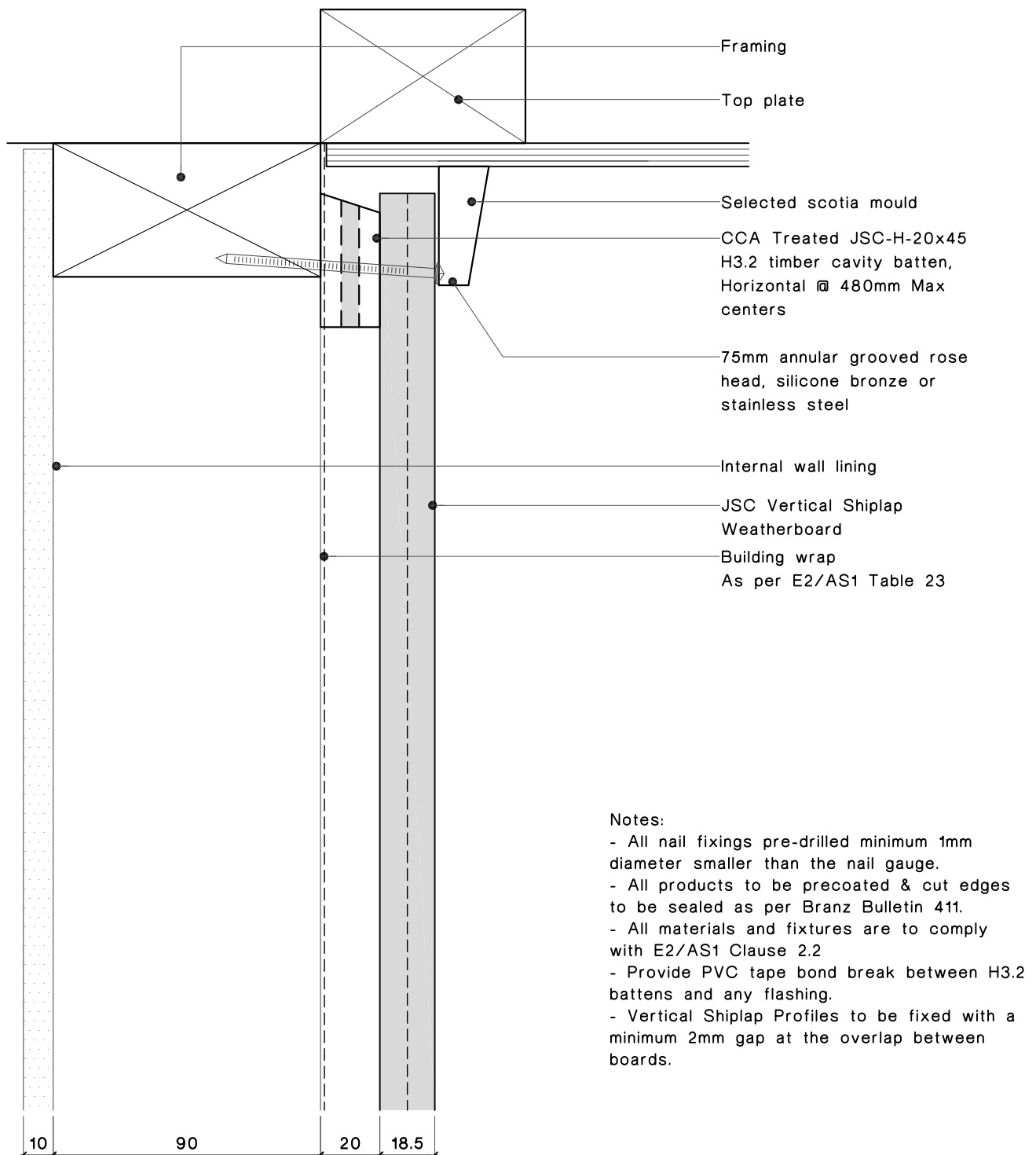
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Top Plate to Soffit detail

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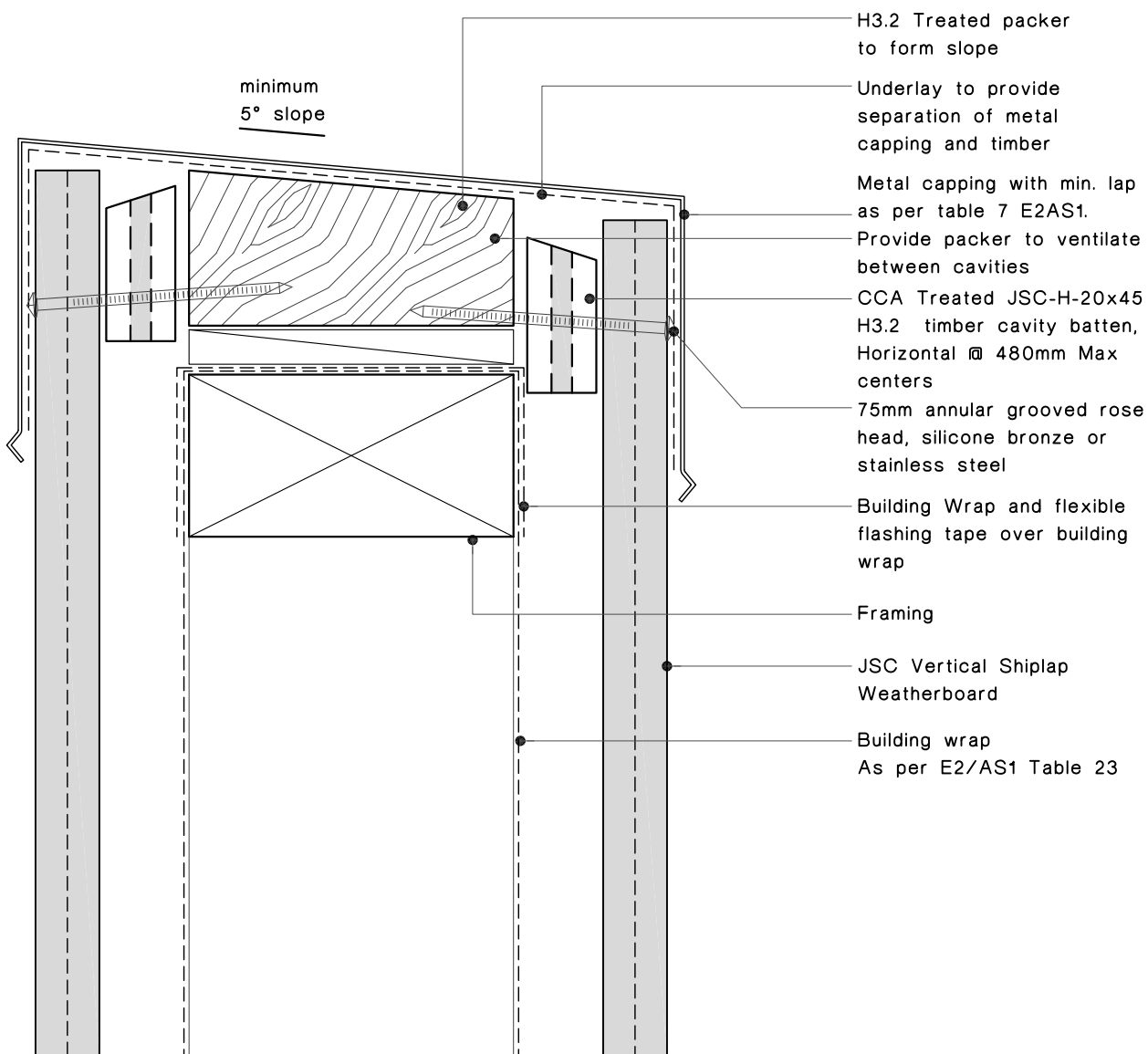
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Dwg:

JV-C-08

Notes:

- All nail fixings pre-drilled minimum 1mm diameter smaller than the nail gauge.
- All products to be pre-coated & cut edges to be sealed as per Branz Bulletin 411.
- All materials and fixtures are to comply with E2/AS1 Clause 2.2
- Provide PVC tape bond break between H3.2 battens and any flashing.
- Vertical Shiplap Profiles to be fixed with a minimum 2mm gap at the overlap between boards.



Parapet detail

Vertical Shiplap Weatherboards Architectural Profile

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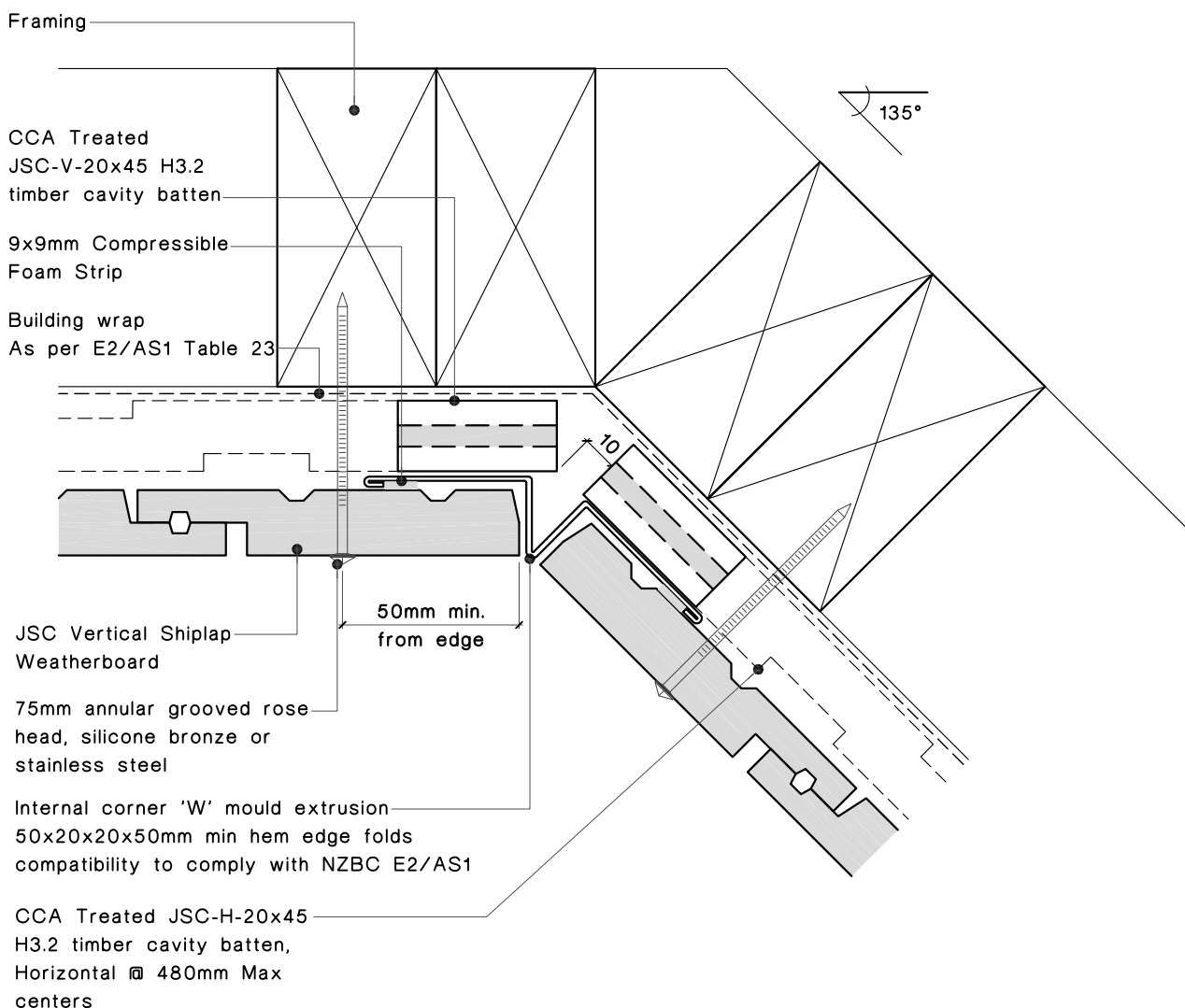
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Dwg:

JV-C-09

Notes:

- All nail fixings pre-drilled minimum 1mm diameter smaller than the nail gauge.
- All products to be pre-coated & cut edges to be sealed as per Branz Bulletin 411.
- All materials and fixtures are to comply with E2/AS1 Clause 2.2
- Provide PVC tape bond break between H3.2 battens and any flashing.
- Vertical Shiplap Profiles to be fixed with a minimum 2mm gap at the overlap between boards.



Internal corner detail

Vertical Shiplap Weatherboards Architectural Profile

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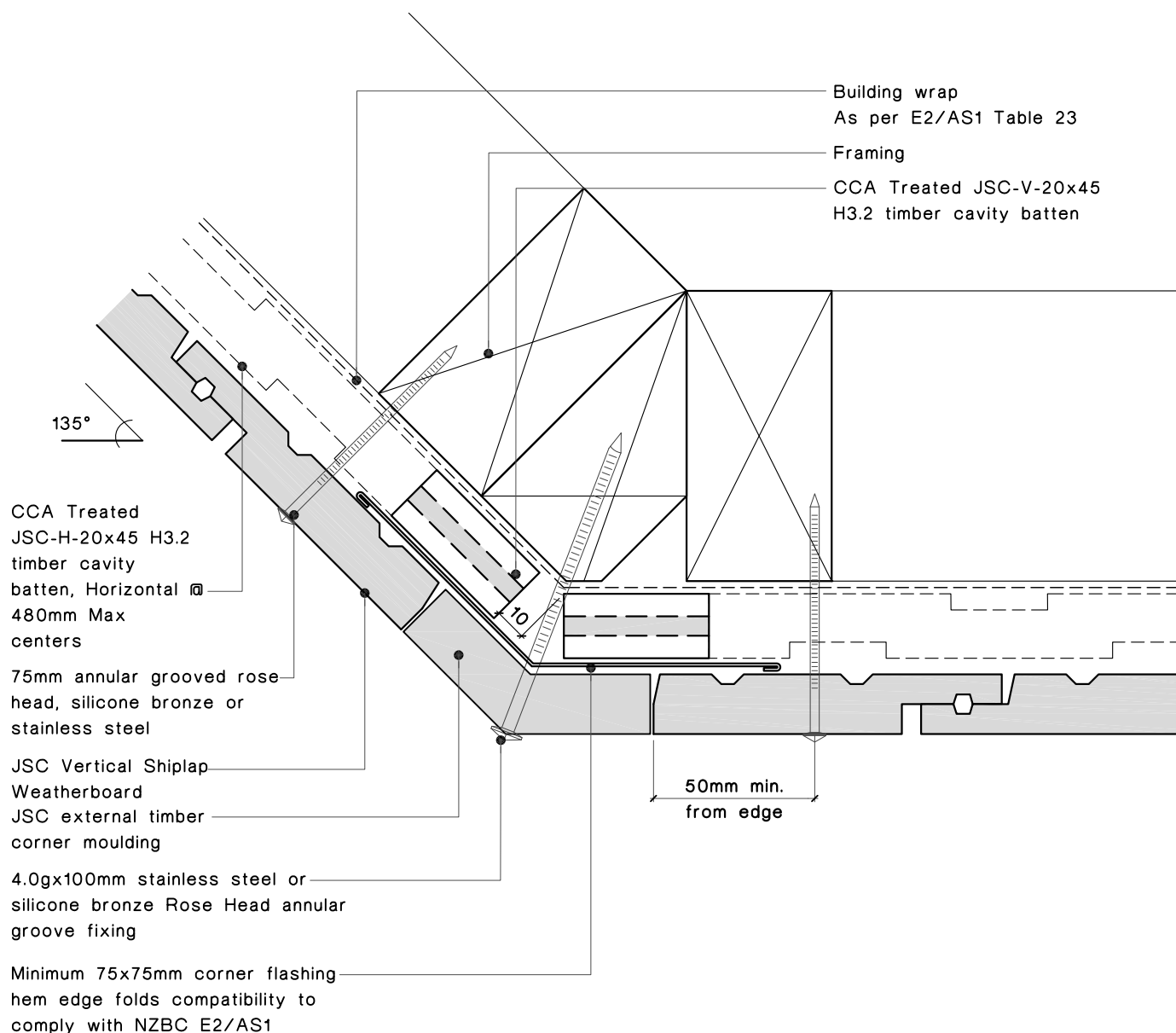
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JV-C-10

Notes:

- All nail fixings pre-drilled minimum 1mm diameter smaller than the nail gauge.
- All products to be pre-coated & cut edges to be sealed as per Branz Bulletin 411.
- All materials and fixtures are to comply with E2/AS1 Clause 2.2
- Provide PVC tape bond break between H3.2 battens and any flashing.
- Vertical Shiplap Profiles to be fixed with a minimum 2mm gap at the overlap between boards.



External corner detail

Vertical Shiplap Weatherboards Architectural Profile

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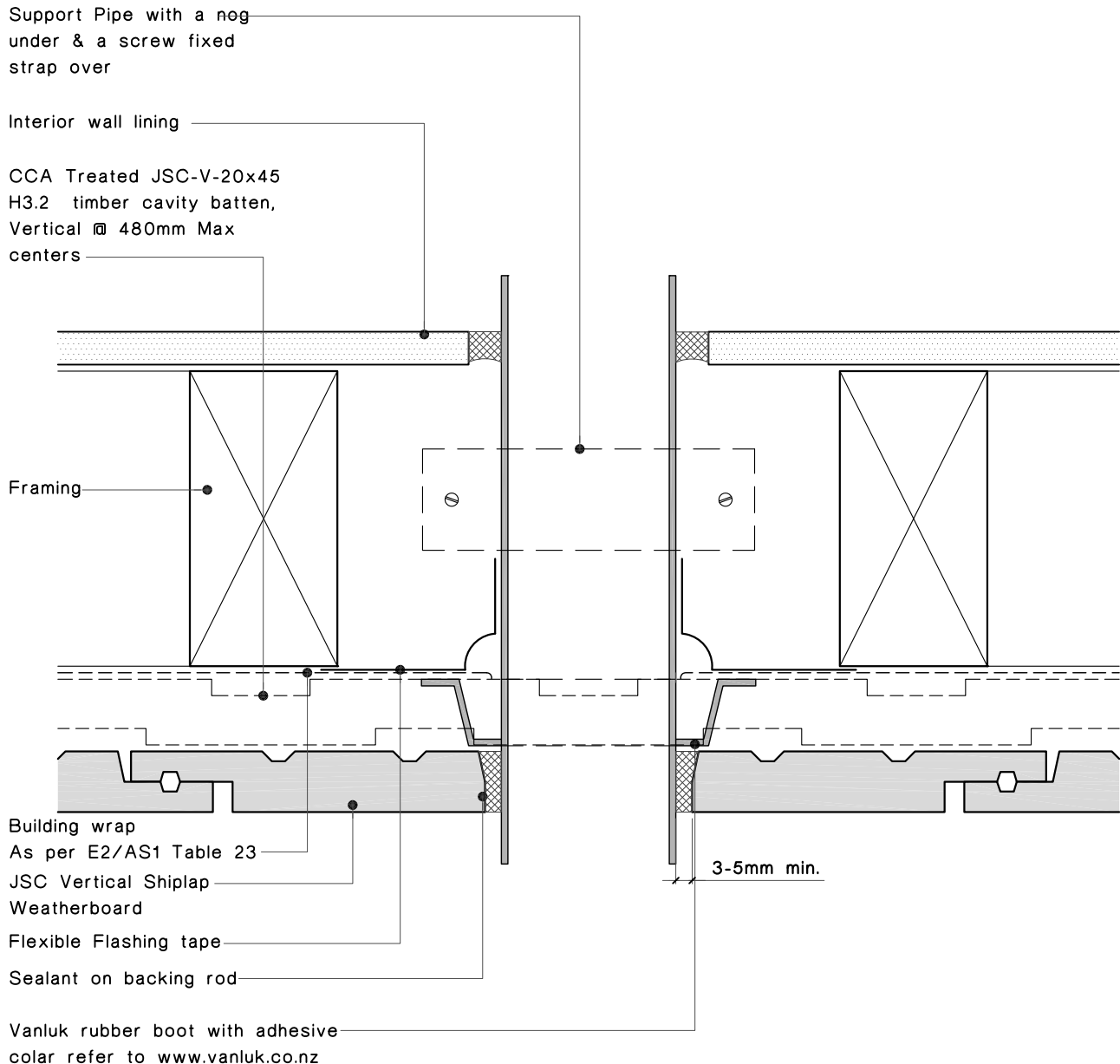
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Scale: 1:2

Date: 21/12/09

Dwg:

JV-C-11



Notes:

- All nail fixings pre-drilled minimum 1mm diameter smaller than the nail gauge.
- All products to be pre-coated & cut edges to be sealed as per Branz Bulletin 411.
- All materials and fixtures are to comply with E2/AS1 Clause 2.2
- Provide PVC tape bond break between H3.2 battens and any flashing.
- Vertical Shiplap Profiles to be fixed with a minimum 2mm gap at the overlap between boards.

Pipe Penetration detail

Vertical Shiplap Weatherboards Architectural Profile

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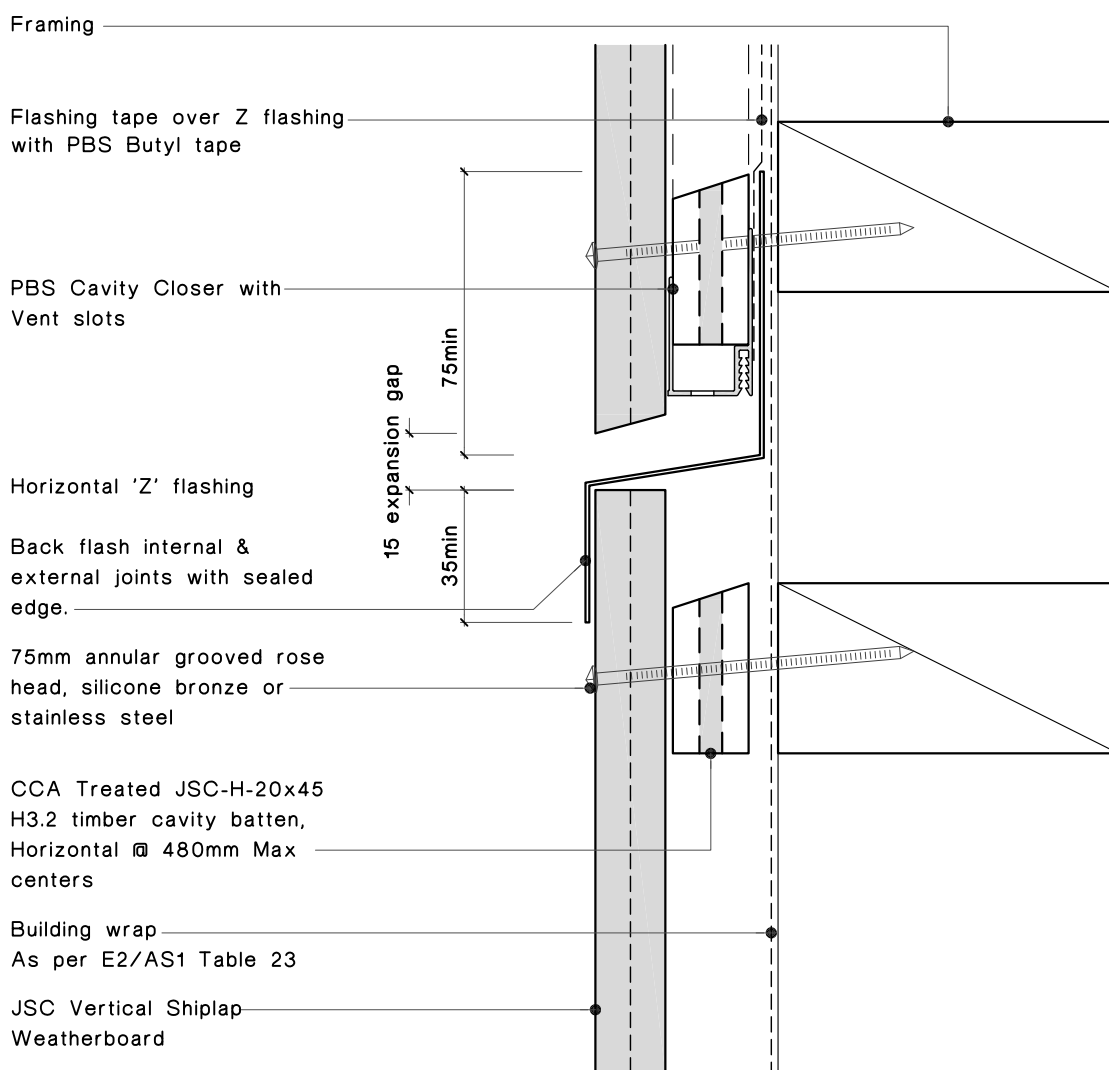
Date: 21/12/09

Dwg:

JV-C-12

Notes:

- All nail fixings pre-drilled minimum 1mm diameter smaller than the nail gauge.
- All products to be pre-coated & cut edges to be sealed as per Branz Bulletin 411.
- All materials and fixtures are to comply with E2/AS1 Clause 2.2
- Provide PVC tape bond break between H3.2 battens and any flashing.
- Vertical Shiplap Profiles to be fixed with a minimum 2mm gap at the overlap between boards.



Horizontal Joint Detail

Vertical Shiplap Weatherboards Architectural Profile

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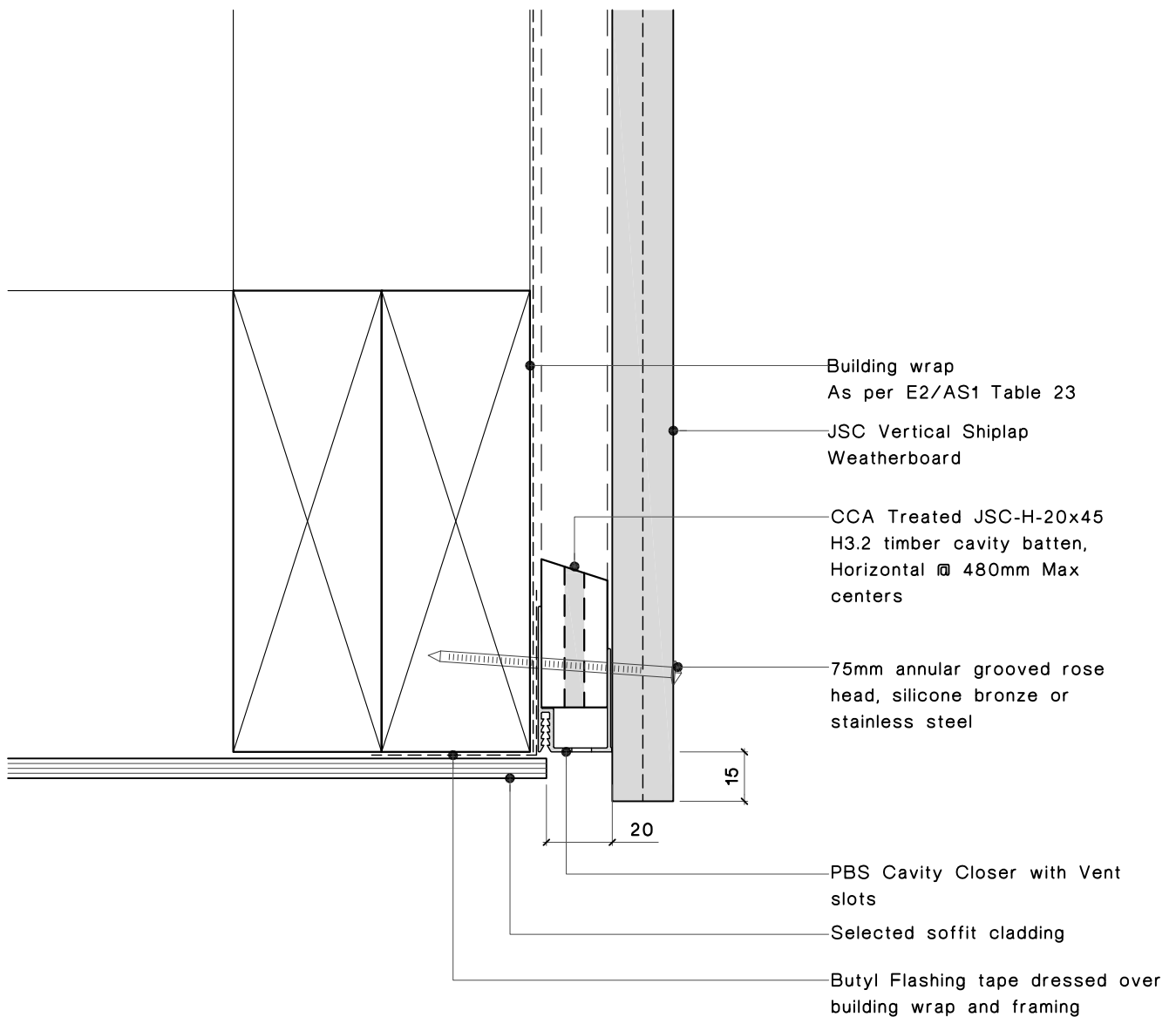
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Scale: 1:2

Date: 21/12/09

Dwg:

JV-C-13



Notes:

- All nail fixings pre-drilled minimum 1mm diameter smaller than the nail gauge.
- All products to be precoated & cut edges to be sealed as per Branz Bulletin 411.
- All materials and fixtures are to comply with E2/AS1 Clause 2.2
- Provide PVC tape bond break between H3.2 battens and any flashing.
- Vertical Shiplap Profiles to be fixed with a minimum 2mm gap at the overlap between boards.

Soffit detail

Vertical Shiplap Weatherboards Architectural Profile

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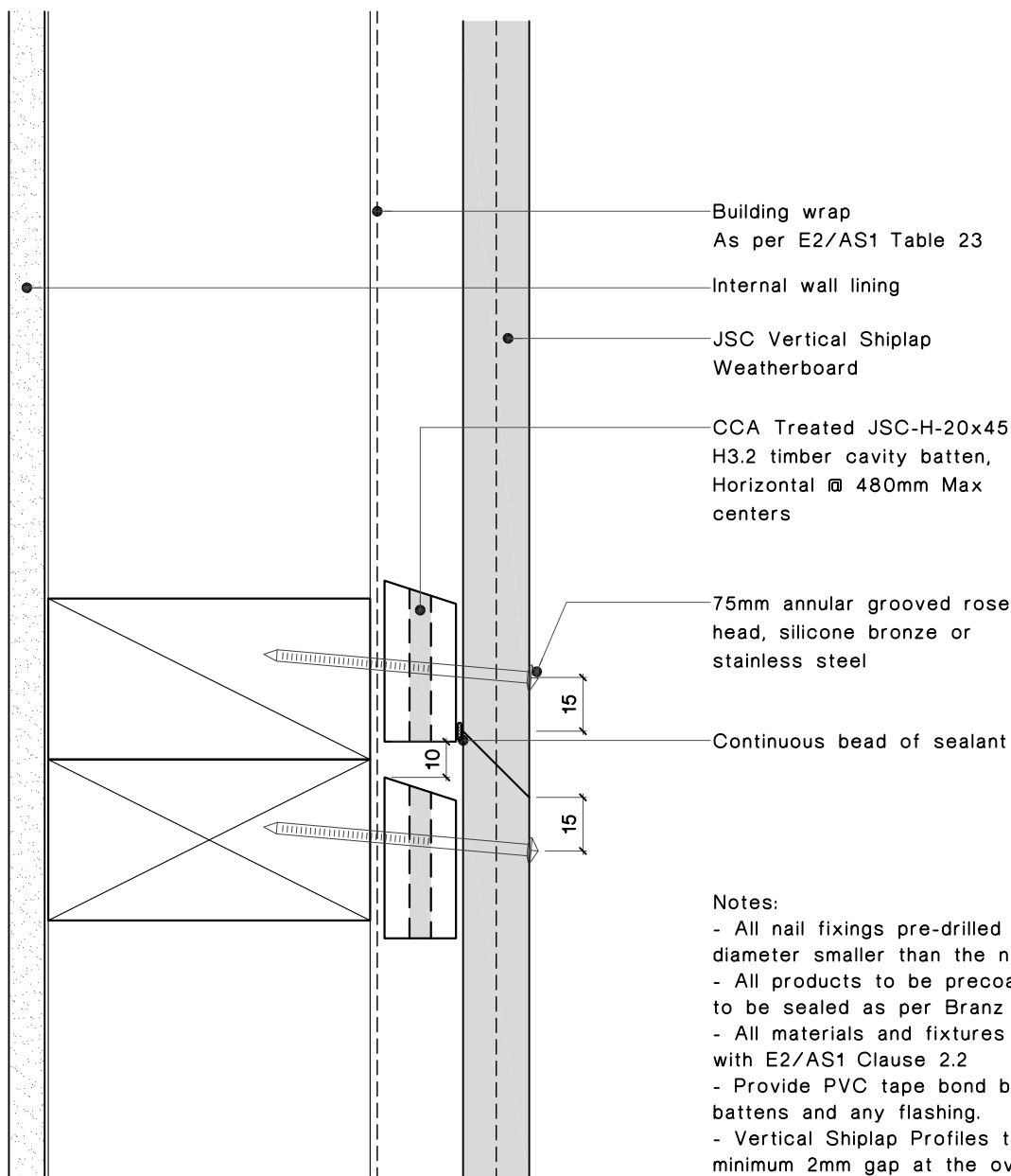
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Scale: 1:2

Date: 21/12/09

Dwg:

JV-C-14



Scarf Jointing detail

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Scale: 1:2

Date: 21/12/09

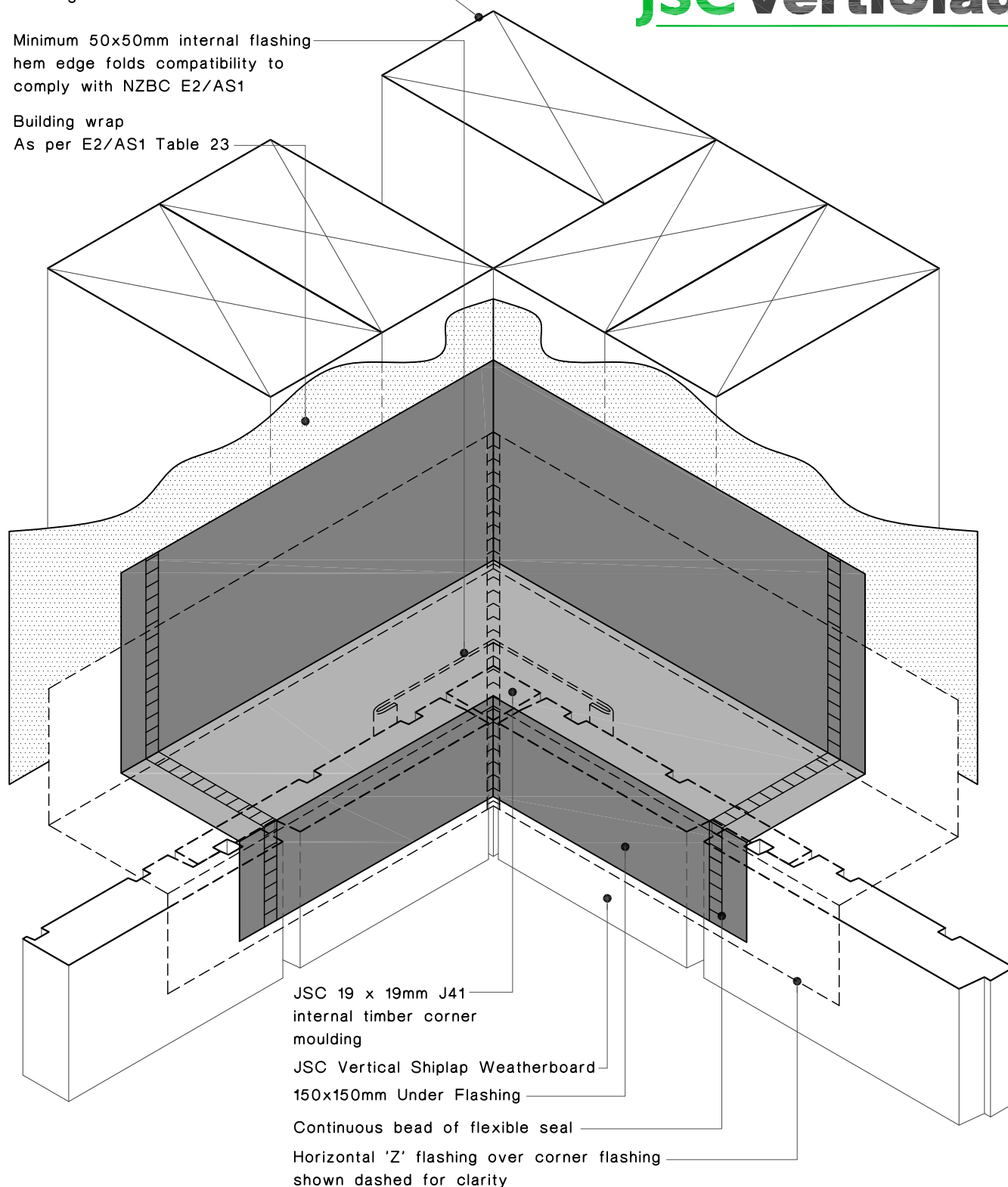
Dwg:

JV-C-15

Framing

Minimum 50x50mm internal flashing
hem edge folds compatibility to
comply with NZBC E2/AS1

Building wrap
As per E2/AS1 Table 23



Note:

JSC batten, Butyl tape removed for clarity

Internal Corner detail

Vertical Shiplap Weatherboards Architectural Profile

JSC Timber

102 Main Road, Kumeu, Auckland, New Zealand
PO Box 285 Kumeu, Auckland 0841, New Zealand
Note: Details may be subject to change without notification

T.09 412-7722
F.09 412-7723
www.jsctimber.co.nz

Scale: NTS

Date: 21/12/09

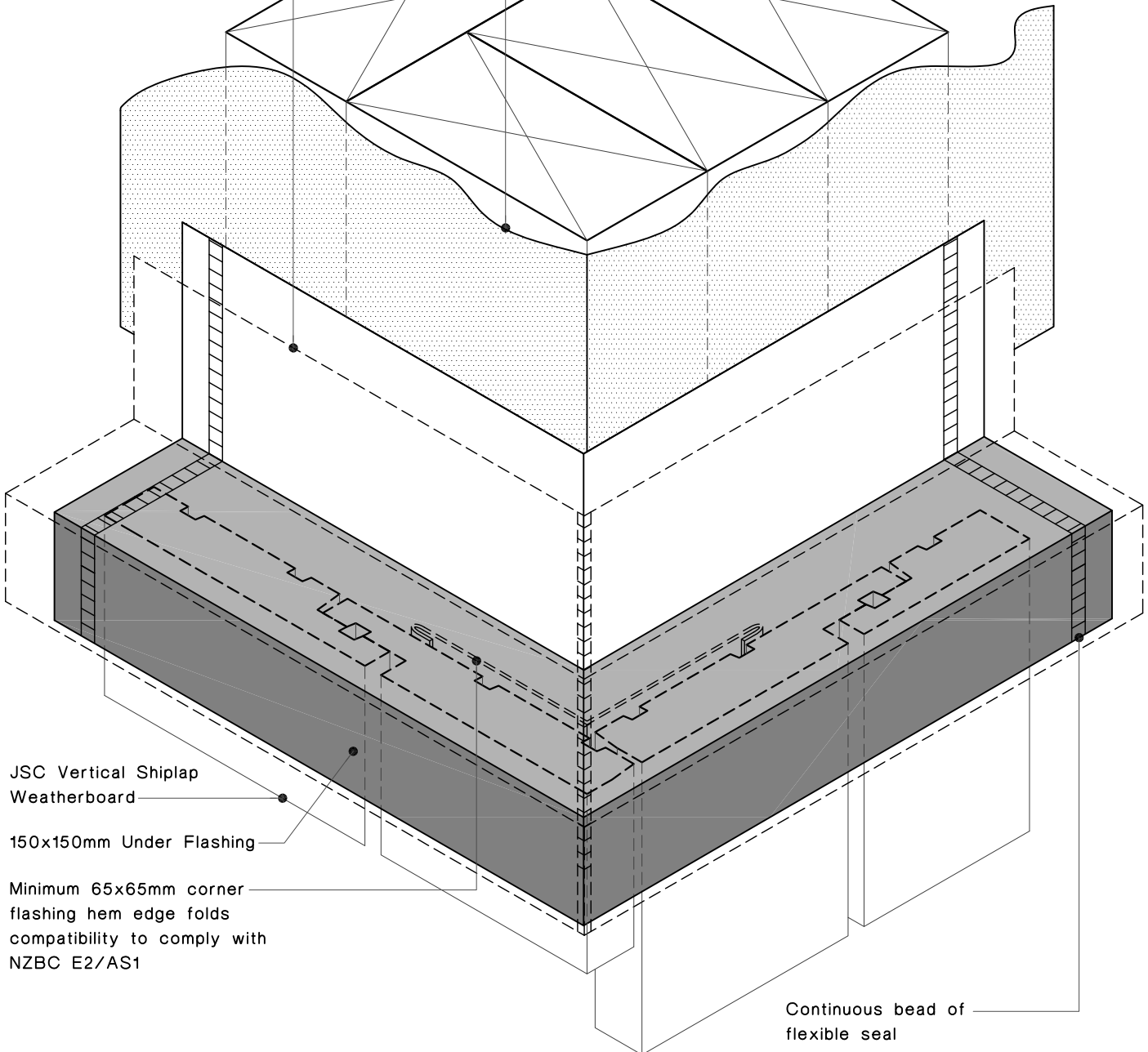
Dwg:

JV-C-16

Building wrap
As per E2/AS1 Table 23

Framing

Horizontal 'Z' flashing
over corner flashing shown
dashed for clarity



Note:
JSC batten, Butyl tape removed for clarity

External Corner detail

Vertical Shiplap Weatherboards Architectural Profile

JSC Timber

102 Main Road, Kumeu, Auckland, New Zealand
PO Box 285 Kumeu, Auckland 0841, New Zealand
Note: Details may be subject to change without notification

T.09 412-7722
F.09 412-7723
www.jsctimber.co.nz

Scale: NTS

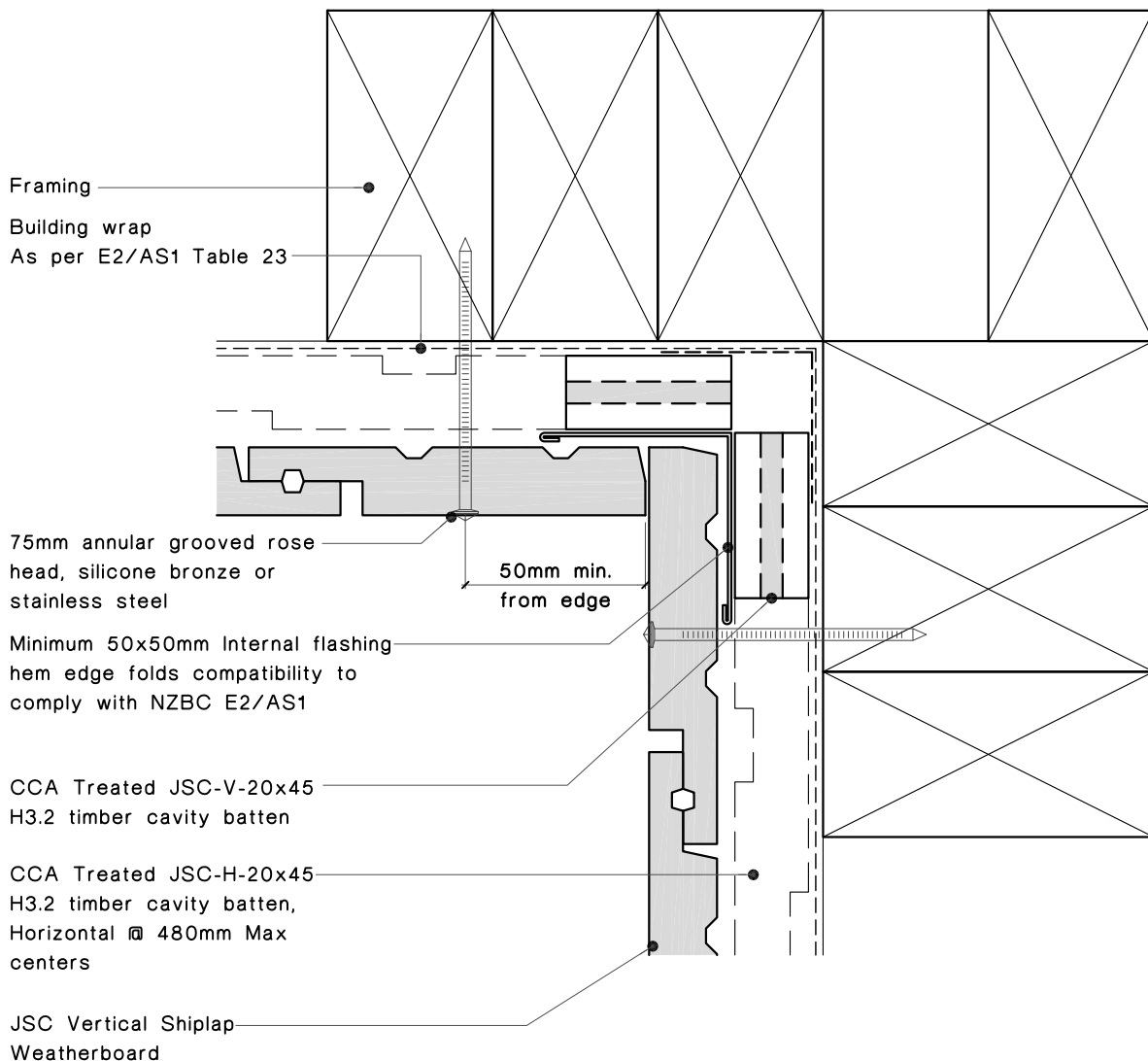
Date: 21/12/09

Dwg:

JV-C-17

Notes:

- All nail fixings pre-drilled minimum 1mm diameter smaller than the nail gauge.
- All products to be precoated & cut edges to be sealed as per Branz Bulletin 411.
- All materials and fixtures are to comply with E2/AS1 Clause 2.2
- Provide PVC tape bond break between H3.2 battens and any flashing.
- Vertical Shiplap Profiles to be fixed with a minimum 2mm gap at the overlap between boards.



Internal corner detail

Vertical Shiplap Weatherboards Architectural Profile

JSC Timber

102 Main Road, Kumeu, Auckland, New Zealand
PO Box 285 Kumeu, Auckland 0841, New Zealand

Note: Details may be subject to change without notification

T.09 412-7722

F.09 412-7723

www.jsctimber.co.nz

Scale: 1:2

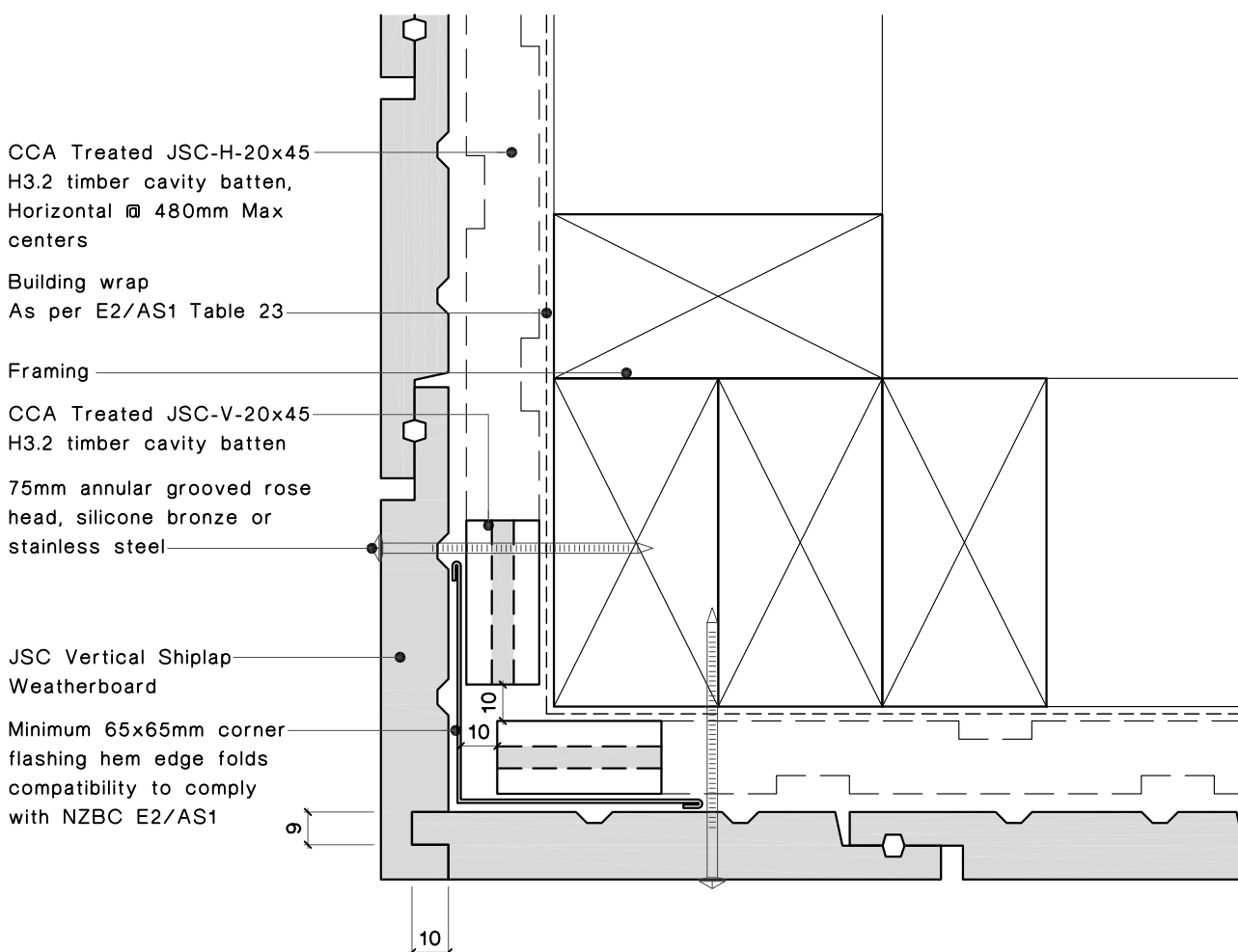
Date: 21/12/09

Dwg:

JV-C-18

Notes:

- All nail fixings pre-drilled minimum 1mm diameter smaller than the nail gauge.
- All products to be pre-coated & cut edges to be sealed as per Branz Bulletin 411.
- All materials and fixtures are to comply with E2/AS1 Clause 2.2
- Provide PVC tape bond break between H3.2 battens and any flashing.
- Vertical Shiplap Profiles to be fixed with a minimum 2mm gap at the overlap between boards.



External corner detail

Vertical Shiplap Weatherboards Architectural Profile

JSC Timber

102 Main Road, Kumeu, Auckland, New Zealand
PO Box 285 Kumeu, Auckland 0841, New Zealand
Note: Details may be subject to change without notification

T.09 412-7722
F.09 412-7723
www.jsctimber.co.nz

Scale: 1:2

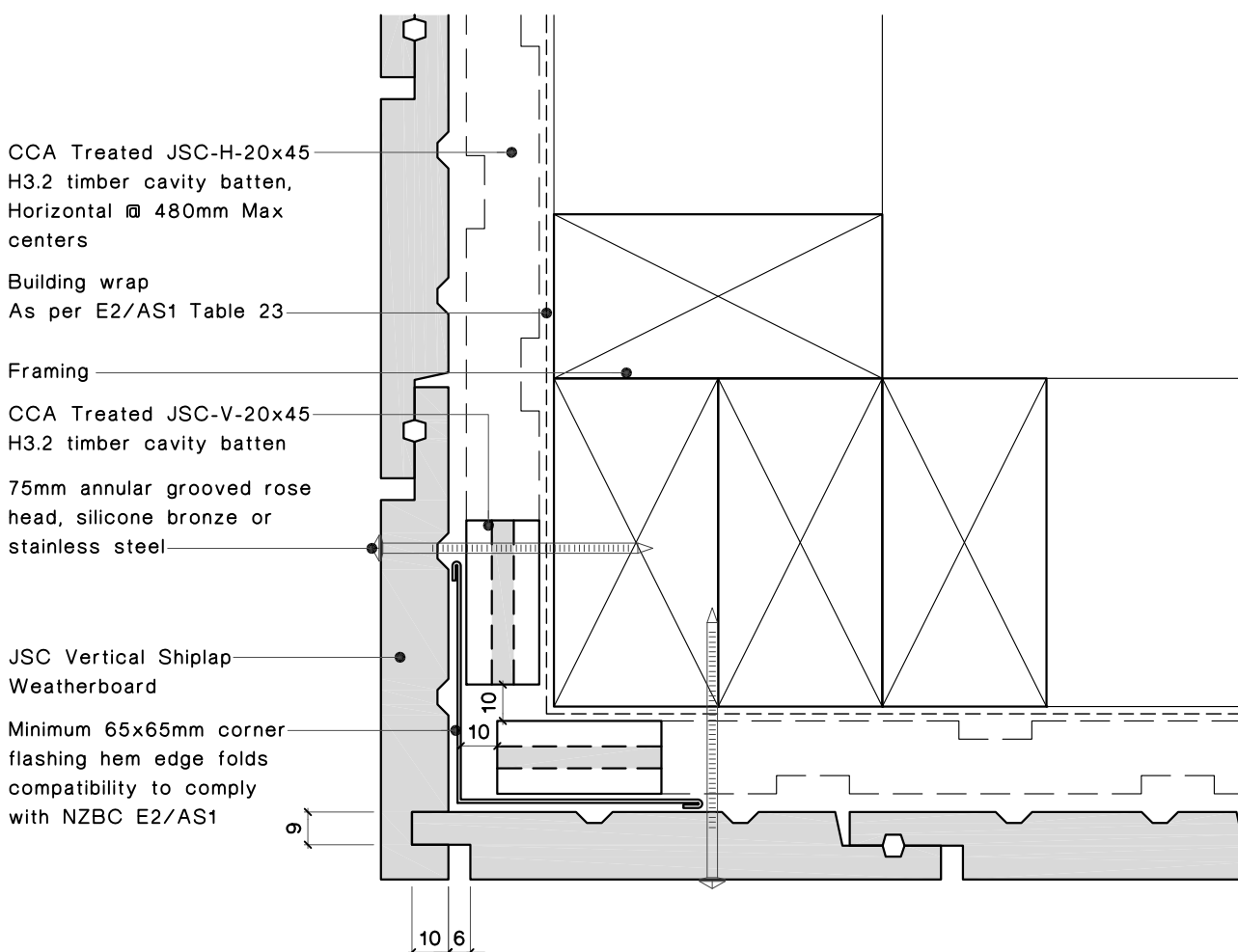
Date: 21/12/09

Dwg:

JV-C-19

Notes:

- All nail fixings pre-drilled minimum 1mm diameter smaller than the nail gauge.
- All products to be pre-coated & cut edges to be sealed as per Branz Bulletin 411.
- All materials and fixtures are to comply with E2/AS1 Clause 2.2
- Provide PVC tape bond break between H3.2 battens and any flashing.
- Vertical Shiplap Profiles to be fixed with a minimum 2mm gap at the overlap between boards.



External corner detail

Vertical Shiplap Weatherboards Architectural Profile

JSC Timber

102 Main Road, Kumeu, Auckland, New Zealand
 PO Box 285 Kumeu, Auckland 0841, New Zealand
 Note: Details may be subject to change without notification

T.09 412-7722
 F.09 412-7723
www.jsctimber.co.nz

Scale: 1:2

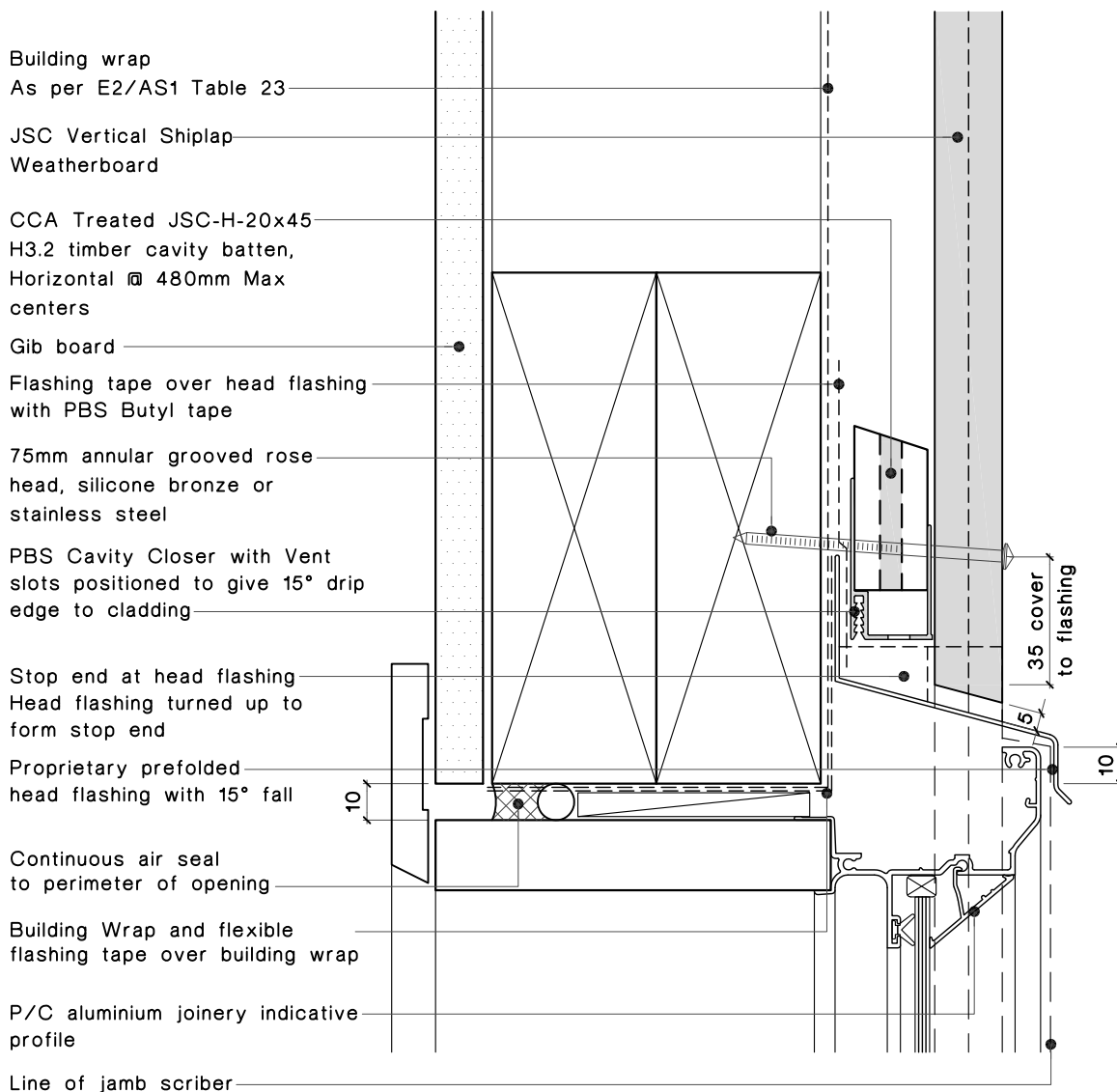
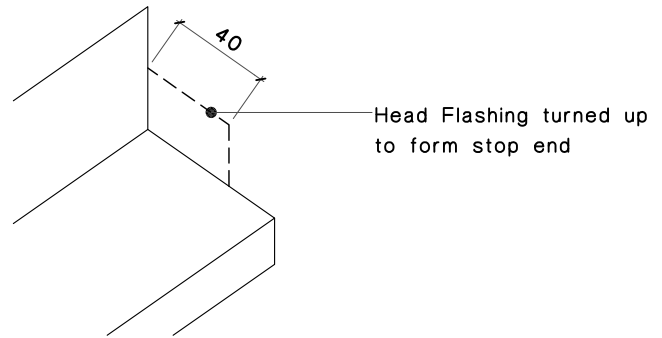
Date: 21/12/09

Dwg:

JV-C-20

Notes:

- All nail fixings pre-drilled minimum 1mm diameter smaller than the nail gauge.
- All products to be precoated & cut edges to be sealed as per Branz Bulletin 411.
- All materials and fixtures are to comply with E2/AS1 Clause 2.2
- Provide PVC tape bond break between H3.2 battens and any flashing.
- Vertical Shiplap Profiles to be fixed with a minimum 2mm gap at the overlap between boards.



Aluminium Window Head detail

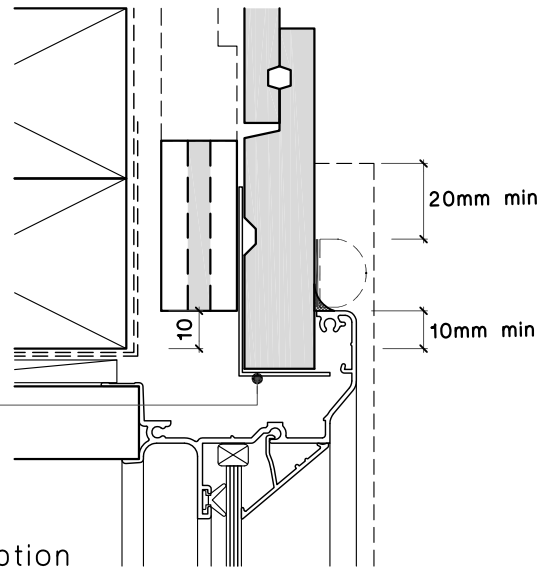
Vertical Shiplap Architectural Profile

Notes:

- All nail fixings pre-drilled minimum 1mm diameter smaller than the nail gauge.
- All products to be pre-coated & cut edges to be sealed as per Branz Bulletin 411.
- All materials and fixtures are to comply with E2/AS1 Clause 2.2
- Provide PVC tape bond break between H3.2 battens and any flashing.
- Vertical Shiplap Profiles to be fixed with a minimum 2mm gap at the overlap between boards.

Optional: folded 0.9mm jamb flashing. Allow to return flashing to suit weatherboard depth

Alternate Option



CCA Treated JSC-H-20x45
H3.2 timber cavity batten,
Horizontal @ 480mm Max
centers

Building wrap
As per E2/AS1 Table 23

Gib board

JSC Vertical Shiplap
Weatherboard

CCA Treated JSC-V-20x45 H3.2
timber cavity batten, Vertical @
480mm Max centers

18mm Scriber sealed to
Weatherboard

Sealant

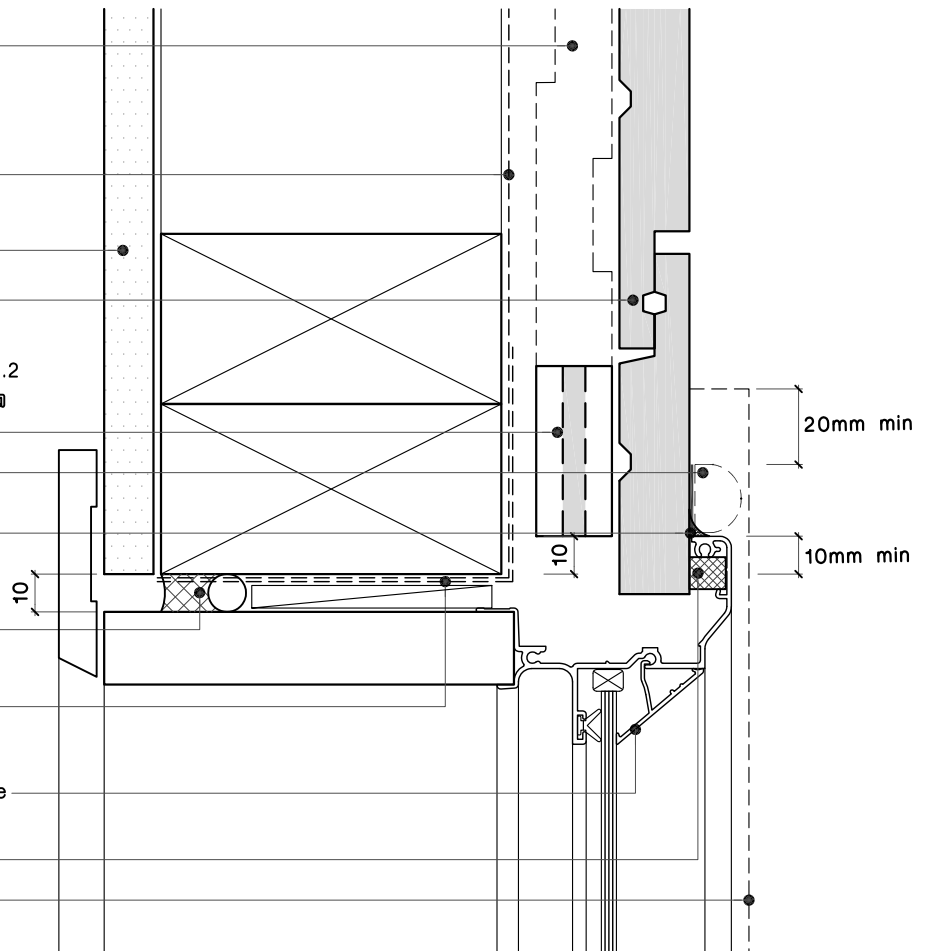
Continuous air seal to
perimeter of opening

Building Wrap and flexible
flashing tape over building
wrap

P/C aluminium joinery indicative
profile

Compressible foam tape seal

Line of head flashing above

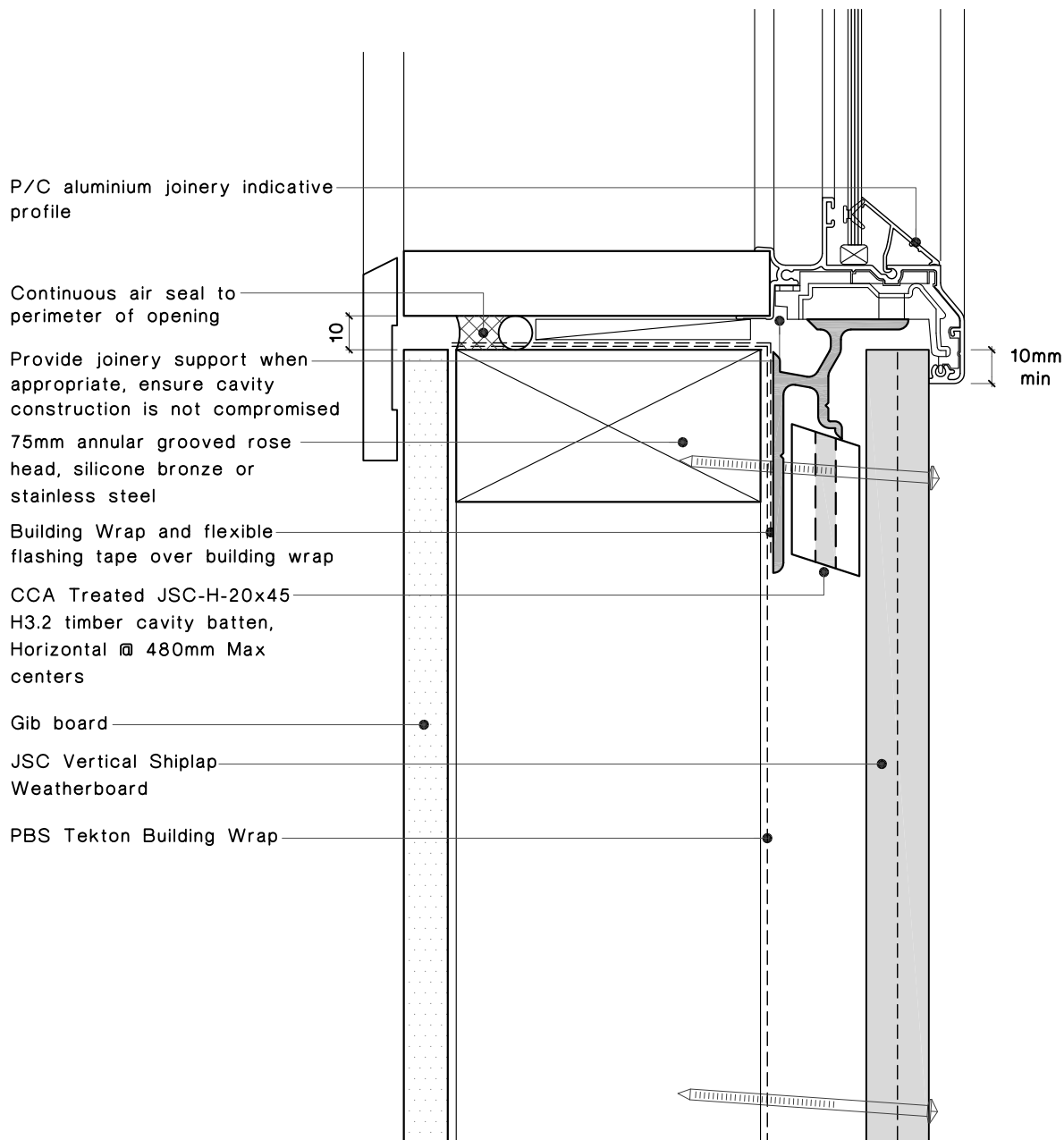


Aluminium Window Jamb detail

Vertical Shiplap Architectural Profile

Notes:

- All nail fixings pre-drilled minimum 1mm diameter smaller than the nail gauge.
- All products to be precoated & cut edges to be sealed as per Branz Bulletin 411.
- All materials and fixtures are to comply with E2/AS1 Clause 2.2
- Provide PVC tape bond break between H3.2 battens and any flashing.
- Vertical Shiplap Profiles to be fixed with a minimum 2mm gap at the overlap between boards.



Aluminium Window Sill detail

Vertical Shiplap Architectural Profile