Cornerstone Design Ltd

P R O J E C T S P E C I F I C A T I O N

26-140 Gerard

12 Herries Lane

Lake Hayes

Otago

Issued for Tender/Consent

67-55

PROJECT OVERVIEW

Scope

Residential Dwelling

MAXSLAB 320 Foundations & Timber Subfloor

Vertical Corrigae, Schist Claddings & LMA Timber shiplap

Corrugate Roofing.

GIB

Address

Site Address	12 Herries Lane
Suburb	Lake Hayes
Region	Otago
Lot #	426
DP #	372310

Site Conditions

Wind Zone	H - High Wind Speed
Earthquake Zone	Zone 3
Exposure Zone	Zone B - Low
Snow Loading Zone	Zone N5

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TABLE OF CONTENTS

Preliminaries & General 5
Project Overview 5
Siteworks 9
Site & Scope 9
Excavation & Filling 9
Drives, Paths & Paving 10
Concrete 12
MAXRaft® Fully Insulated Foundations 12
Stonework 24
Schistwork 24
Carpentry 26
Timber Framing 27
GIB® Plasterboard Sheets 31
GIB® Rondo® Metal Batten Systems 33
GIB® EzyBrace® Systems 38
GIB® Wet Area Systems 45
Profiled Metal Wall Cladding 51
Cladding & PreCladding 57
Timber Weatherboard Cladding 57
External Window & Door Joinery 58
Aluminium Windows & Doors 58
Glazing 62
Non-Structural Glazing 62
Insulation 65
Thermal Insulation 65
Roofing 67
Roofing Systems - Profiled Steel 67
Underlay, Foil & DPC 68
Tiling 73
Workmanship 73
Internal Doors & Joinery 74
Workmanship 74
Materials 75
Joinery Elements 76
Painting & Decorating 78
General 78
Floor Coverings 81
Carpet & Resilient Floor Coverings 81
Plumbing 85
Materials 87
Workmanship 87
Systems 89
Plumbing Elements 91
Drainage 92
Workmanship 92
Drainlaying Elements 93
Electrical 95
Elements 95
Workmanship 96

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Systems 98
Materials & Control 98
Appendix 99
BRANZ Appraisal No.1054 - MAXRaft Concrete Slab Floor System 99
MAXRaft Product Guide Dec 2024 99
MAXRaft Onsite Guide V62018 99
BRANZ Appraisal No.928 - GIB EzyBrace 99
BRANZ Appraisal No.427 (2021) - GIB Aqualine Wet Area Systems 99
GIB® Rondo® Metal Batten Systems Installation 99

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1 PRELIMINARIES & GENERAL

1.1 Project Overview

1.1.1 Contract Documents

The Contract Documents are complementary and comprise this Specification, the accompanying drawings, the Contract together with Schedules as specified below, any written documentation clarifications issued during tendering/estimating, any manufacturer/supplier information issued with this Specification, any list of agreed Subcontractors, the contract establishment letter and any other relevant correspondence, and any Site Instructions or additional details or instructions issued as Variations.

If the Architect/Designer has not been engaged to administer the Contract or observe the works, then the term Architect/Designer, where referred to in this specification, means Contract Administrator.

These Project Specific Conditions supersede the Standard Conditions where they are in conflict. Refer any ambiguity or apparent discrepancy within or between any Contract Documents to the Architect/Designer, whose interpretation shall be binding on all parties.

Ensure that all Trades are aware of all Conditions and that subcontract prices are accepted on this basis, and in a form acceptable to the Registered Master Builders Federation or the Certified Builders Association. Ensure that all persons engaged on the works are aware of all items in this specification and on the drawings that may in any way affect their section of the works.

1.1.2 Site

Relevant site conditions are believed to be correctly represented in the Contract Documents, however the Contractor (and Subcontractors where appropriate) are requested to inspect the site to ascertain for themselves the nature and extent of the works and the rights and interests that may be interfered with in the execution of the works, as no claims for additional payment will be recognised on the grounds of insufficient description.

1.1.3 Adjacent Owners

Carry out whatever actions or precautions are required to avoid or to absolutely minimise noise, dirt, dust, access, etc. inconvenience or disruption of any nature to the adjacent owners or tenants. Indemnify the Principal against any claims arising from this source.

1.1.4 Protection

Take all appropriate precautions to protect all third party property, services, etc., and indemnify the Principal against any claims arising from the construction operations. Any damage to third party property caused by construction activities or failure to protect shall be rectified as soon as possible by the person causing the damage, or by appropriately qualified trades-persons employed by the person responsible for the damage if necessary.
Suspend operations during weather which would affect the quality of work in progress. Secure the works as soon as possible against adverse weather, dust and vandals. Avoid structural damage that is

caused by overloading.
Adequately protect all finished work and maintain until the date of Practical Completion. Each trade shall protect the work of all other trades, and each trade is responsible for making good any damage they cause to finished works. Arrange special protection as required for windows and doors, finished timber work, plumbing fittings and hardware, cabinets and other joinery, and similar items.

1.1.5 Responsibility

The Contractor will be held responsible for the full period of their legal responsibility in connection with this Contract for ensuring that all work execution, materials, and fittings, are completely in accordance with Contract requirements.
The Contractor is responsible to the Principal for the appropriateness and fitness, in relation to a reasonable expectation or requirement, of all of the materials and workmanship incorporated into the works by themselves or their subcontractors; for this reason few specific guarantees are required in these contract documents. The terms and conditions of any warranty or guarantee required or provided shall not in any way negate the minimum remedies available under common law as if no warranty or guarantee had been furnished.
No apparent expression of the Architect's/Designer's reasonable satisfaction shall be deemed to be acceptance of defective materials or workmanship within the terms of the Contract or to be an authority for any Variation except where such Variation is authorised as provided for in the Contract. Instructions that are given verbally are deemed to be instructions for proper execution of the works and do not involve extra charges.

Workmanship in all trades is required to be equal to or better than recognised good trade practice. The Contractor shall provide all necessary setting out information and component dimensions for subcontractors and shall check and be responsible for the accuracy of their work.

Should any tradesperson consider that the surface finish or general conditions of previous work are unsatisfactory to ensure a proper finish for their own work thereon, that tradesperson shall give immediate notice to the Contractor or Architect/Designer as appropriate and shall not proceed until all necessary improvements have been made. Failing such notice the trade concerned will not be relieved of responsibility for a poor finish due to such unsatisfactory condition.
Specialist Finishes Subcontractors are responsible for ensuring that substrates are completely appropriate for them to achieve first class results, and to this end shall, in sufficient time, instruct the Contractor with regard any fixings, primings, sealings or whatever for the substrate that vary in any way from the substrate manufacturer's standard recommendations. The Contractor shall advise the Architect/Designer with regard these variances, and not proceed until the Architect/Designer has agreed to them.

The Contractor and all Subcontractors affected shall be jointly and severally responsible for completion of the whole of the works in a completely watertight condition and shall therefore examine all details to be satisfied that this condition can be achieved. If any detail is considered unsatisfactory the Architect/Designer shall be notified immediately and he/she will then either interpret the detail to the Contractor's satisfaction, or accept responsibility for watertightness at the points in question, always assuming reasonable workmanship.

Ensure that all materials or items incorporated into any particular construction or finish are compatible and that their individual use is approved by the manufacturers and/or suppliers of the other parts of the system.
For all electronic/electrical/mechanical operating systems all work and all necessary materials and items incidental to the primary item specified, that are incorporated into the works, shall be such as to leave a neat, efficient, easily maintained and robust installation, completely in accordance with all of the recommendations of the primary items' manufacturers. Where appropriate, source all parts of a system from a single supplier or manufacturer.

The Contractor shall make provision for all temporary works and services required for the satisfactory completion of the contract works. The Contractor shall pay all associated costs and fees; carry out all necessary maintenance, alterations and servicing requirements; and remove temporary works and services on completion of the contract works. Temporary works and services shall comply with the requirements New Zealand Building Code.

1.1.6 Specification

This Specification covers contract administration, standards, materials quality, workmanship and the scope of works only: the exact nature of the works and all specialist items, descriptions, etc., are contained on the drawings, which also take full precedence.
All clauses in all specification sections apply to their full extent and meaning to the entire Contract.
Trade sections and paragraphs have been introduced into this specification for reference only and it shall not be construed that each trade section is a complete segregation of the materials and labour of that trade. The onus is on all trades to be conversant with any and all clauses which in any way affect their work.
(Be aware that the ‘scope’ noted in the ‘Project Overview’, and scope and general extent clauses within this specification, are included to provide a general indication only and must NOT be interpreted as schedules of quantities - the exact nature and extent of all aspects of the works are shown on the drawings).

1.1.7 Standards

New Zealand Standards (NZS), Australian Standards (AS), Joint Standards (AS/NZS), British Standards (BS), Acts of Parliament, Regulations made thereunder, Codes of Practice, and any specific Manufacturer's Instructions or Manufacturer's Recommendations that are referred to in these Contract Documents shall all be deemed to be the latest published edition thereof at the time of drawings issue, and shall be followed by the Contractor and all Subcontractors to the full extent applicable consistent with the intent of this Contract. Documents cited within other cited publications are deemed to form part of this specification.
Where Standards have a number of Divisions, e.g. AS/NZS 3500.1, AS/NZS 3500.2, etc., each of the Divisions relevant to this project is deemed to form part of this specification.
Retain current copies of significant cited documents and manufacturer's technical literature on the site.

1.1.8 Authorities and Charges

Comply with all relevant provisions of the NZ Building Code, and with all relevant territorial or statutory authority regulations, by-laws, obligations, etc. Give all required notices.

The Principal has obtained a Land Use Consent. The Principal has applied for and paid for the Project Information Memoranda, the Building Consent and other approvals required for the works to start. The PIM and Building Consent will be forwarded to the Contractor as quickly as possible after they are issued by the Territorial Authority. Note: It is an offence under the Building Act to carry out work not in accordance with a Building Consent.
Should the Building Consent be subject to any conditions which modify the requirements of the Contract Documents in any way, the Architect/Designer reserves the right to negotiate any or all of these modifying conditions with the Building Consent Authority. If after these negotiations additional work is required, it will be handled as a Variation to the Contract.

1.1.9 Code Compliance Certificate

The Principal will apply for the Code Compliance Certificate (CCC) and any other licenses or approvals for the building to be used. However, Practical Completion will NOT be certified until the CCC inspection has occurred and any additional works required by the local Building Consent Authority have been completed. To this end it is recommended that the Contractor obtains all required certificates, guarantees, Producer Statements, as-built drawings, etc., required for the CCC application as work proceeds, to facilitate application for the CCC as soon as the works are completed. For their part, the Principal hereby undertakes to apply for the CCC within one day of all required material being in hand. Likewise, the Contractor should have capacity available to attend as quickly as possible to any items identified by the Building Consent Authority as being required prior to the issue of the CCC.

1.1.10 Documents Interpretation

Except where they are clearly to the contrary, all dimensions are deemed to be to the bare surface of concrete, masonry, timber framing or other basic construction material. All figured dimensions take precedence over scaled sizes. Where any detail is included in more than one drawing the larger scale detail takes precedence. Where any ambiguity exists refer to the Architect/Designer for interpretation.
The word ‘provide' and the word ‘fix' used separately in the Documents shall be taken to mean ‘provide and fix' unless otherwise stated.
When the term ‘allow' occurs in the Documents, except with reference to Monetary Allowances, the cost of the item shall be at the risk of the Contractor.
The terms ‘approved', ‘directed', and ‘selected' when used in the Documents refers to the approval, direction or selection of or by the Architect/Designer. Please give adequate notice of when these decisions are required. ‘Architect/Designer' shall mean the Architect or Designer, their representative or any Consulting Engineer engaged by the Architect/Designer.

1.1.11 Work Shown and Mentioned

The Contract Documents show the extent and nature of the works but there is no warranty expressed or implied that they show each and every minor detail or item required to be included by the Contractor. Should any material, structural member, fixing, or item or work appear to be inadequately described, yet obviously necessary for the neat, strong and satisfactory completion of the work, it shall be incorporated into the Contract Works.

2 SITEWORKS

2.1 Preliminary

Refer to General Conditions of Contract and the Special Conditions in this Specification as appropriate. Read this section in conjunction with all other trade sections.

2.2 Compliance

Comply with the New Zealand Building Code 1992 including all revisions and amendments, Verification Methods where appropriate, and construction principles that are embodied in the Acceptable Solutions.

2.3 Site & Scope

2.3.1 Site

Note that no claims will be recognised on the grounds of insufficient description of existing site conditions in the Contract Documents.

Take great care to excavate/cut up to the boundary, but not over.

2.4 Excavation & Filling

2.4.1 Excavation

Excavation work shall be carried out in accordance with the OSH Excavation Code of Practice. Co-ordinate with other trades as to set-out and timing to ensure that all cut faces are covered or finished etc. as soon as possible after the excavation is complete.

Plan the excavation carefully to ensure that stockpiles will not interfere with concrete construction, to stockpile just sufficient material for the filling, backfilling and reshaping required later, and to avoid overlaying areas outside the works area with material.

As the bulk scope of excavations works will have been carried out prior to commencing work on site, advise and co-ordinate with the separate contractor to ensure that the main building platform is consistent with what is expected. If any concerns are raised please immediately advise the Architect for direction.

Noisy excavation equipment shall be used only during hours which will avoid undue nuisance to the occupants of adjacent properties.

Excavate accurately in position and true to line and minimum sizes and to levels and grades required for all slabs, footings and foundations, and over the rest of the areas shown for levels adjustment.

Excavations down to firm undisturbed ground, and footings and foundations 200mm minimum into solid, except where shown otherwise.

Below slabs on ground the general intent is to excavate to a stable undisturbed subgrade (of 300 kPa ultimate bearing capacity).

Trim slab benches as required to allow for hardfill and blinding.

Batter all excavation cuts at a stable slope.

From the excavated material select the most appropriate material for compacted filling and stockpile it in appropriate positions sufficient for filling and backfilling (but NOT for hardfilling).

Remove all surplus material from the site as soon as it is excavated, taking care to avoid damaging the footpath or streets or spilling material on to them.

Keep excavations free of water - remove foundation trench material which becomes water-softened.

Ensure that rainwater runoff from excavated surfaces does not carry material onto adjacent properties.

Report for instruction when any unexpected voids, made-up ground or similar are encountered.

Report the finding of antiquities or other items of value, and leave them undisturbed until approval (and instruction) is given for their removal - they remain the property of the Principal.

2.4.2 Hardfill & Blinding

Blind hardfill under all slabs to a minimum 25mm thickness with clean damp sand.

2.5 Drives, Paths & Paving

2.5.1 Driveway

Check that the excavated surface is accurately to the gradients and levels required and then install 100mm of standard basecourse M4 compacted to 95% relative compaction, and cover this with a 30mm depth of 20mm no-fines chips.

2.5.2 Insitu Concrete Paving

Check that the stormwater sump, Telecoms/Telstra, power, water and gas service lines are correctly in place and have been fully operationally tested.
Accurately setout the drive ensuring that all gradients are correct.

Reinforce with 665 grade 500E mesh, as per AS/NZS 4671:2001, plus a grade 500E D12 bar to all edges, and pour the Ordinary Grade (20MPa) concrete slab, with all aspects of the work to the requirements of the Concretor section of this specification.

Slab thickness:

While still wet, steel trowel finish concrete to a true surface and carefully apply a broom finish laterally across the direction of the driveway/path before setting takes place. Broom finishes shall be

left uniform with straight markings and be in accordance with NZS 3114:1987 Concrete Surface Finishes.
Unless noted or shown otherwise, crack control joints shall be at maximum 4.0m centres (maximum 16m2 area).
Cover finished concrete when set with plastic sheeting to prevent rapid drying and allow to fully cure. Protect from freezing conditions for minimum 3 days. Avoid pedestrian traffic for minimum 7 days after installation.

Steel trowel finish to a true surface and immediately spread an even layer of the finishing aggregate and press it into the surface. Lightly spray the top surface with a cure retarder and, when the cement has fully bound the aggregate, sweep and wash the top surface to expose it. Ensure the finishing aggregate is spread before the initial set of the concrete to obtain a good bond - to achieve this it may be necessary to finish the slab progressively.
A very well-bonded and well cleaned finished surface with clean straight edges is required. To this end the operative carrying out the exposed aggregate paving must be experienced in work of this nature – if so requested provide two or three location references where his earlier similar work may be inspected.

2.5.3 Asphalt

Check the setout, gradients, alignments and compaction of the hardfill. Sweep surplus fine hardfill material off the surface.

Apply approved long term weedkiller to the compacted hardfill surface, with the application exactly to the Manufacturers Recommendations. Apply a tack priming coat of bituminous emulsion at the rate of 1sq.m/litre onto the prepared hardfill - mask adjacent surfaces as required, and completely remove any accidental marks. Install Mix 5 hotmix asphaltic concrete, with minimum compacted thickness 40mm to the full area.

Workmanship shall be to Transit Specification P9. Spread and thoroughly roll to a smooth, even surface that is evenly graded with true alignments and smooth transitions and has no local pondings. Finish with clean lines. Clean up thoroughly on completion and competently make good any damage to adjacent surfaces.

2.5.4 Vehicle Crossing

The contractor shall arrange for the construction of a new vehicle crossing (complete with adjacent kerb and channel reinstatement and making good etc.) to replace the existing crossing, all in compliance with ACC rules.

The consent for and adjustment to the existing road edge planter kerbing will be arranged separately by the Principal.

3 CONCRETE

3.1 Preliminary

Refer to General Conditions of Contract and the Special Conditions in this Specification as appropriate. Read this section in conjunction with all other trade sections.

3.2 Compliance

Comply with the New Zealand Building Code 1992 including all revisions and amendments, Verification Methods where appropriate, and construction principles that are embodied in the Acceptable Solutions.

Comply with all relevant provisions and recommendations of:

3101.1&2:2006(NZS)	Concrete Structures Standard
3104:2003(NZS)	Specification for concrete production
3109:1997(NZS)	Concrete construction
3112.1:1986(NZS)	Methods of test for concrete - Tests relating to fresh concrete
3112.2:1986(NZS)	Methods of test for concrete - Tests relating to the determination of strength of concrete
3114:1987(NZS)	Specification for concrete surface finishes
3121:2015(NZS)	Water and aggregate for concrete
3122:2009(NZS)	Specification for Portland and blended cements (General and special purpose)
3604:2011(NZS)	Timber-framed buildings
4431:1989(NZS)	Code of practice for earth fill for residential development
NZBC B1/VM1	Structure
NZBC B2/AS1	Durability

3.3 MAXRaft® Fully Insulated Foundations

3.3.1 Scope

Supply and install MAXRaft® Fully Insulated Foundations, as specified herein, to the location, layout and details as shown on the design drawings, complete with all necessary components and accessories required for proper installation and performance. All aspects of this work shall be in complete accordance with MAXRaft® technical literature, including the MAXRaft® Technical Details and MAXRaft® Installation Manual and detail drawings (check www.maxraft.co.nz, or email info@maxraft.co.nz, or call 0800 629 7238 for the latest editions) within the conditions and limitations of the MAXRaft® Fully Insulated Foundations CodeMark Certificate of Conformity, BRANZ Appraisal 1054, and other relevant product manufacturers' recommendations.

The MAXRaft® Fully Insulated Foundations system is CodeMark assured to comply with the NZ Building Code subject to specific conditions and limitations - refer to CodeMark Certificate of Conformity No: CMA-CMA40124-101-R02, issued by CertMark International Pty Ltd.

No substitutions are permitted for MAXRaft® Fully Insulated Foundations.

For the purpose of this specification, MAXRaft® Fully Insulated Foundations is referred to as 'MAXRaft® Floor'. All associated MAXRaft® technical literature, including the MAXRaft® Technical Details and MAXRaft® Installation Manual and detail drawings and the Code Mark Certificate, are collectively referred to as the 'Technical Literature'.

All MAXRaft® Floors are fully engineered by independent engineers on a site-specific basis to ensure the design of the MAXRaft® system is appropriate for the ground conditions and building type.

This specification should be read in conjunction with other relevant specification sections as they are interrelated, in particular, Siteworks and relevant services - i.e. Drainlaying, Plumbing, Electrical, etc.

3.3.2 Requirements

3.3.2.1 Safety

Comply with the Health and Safety at Work Act 2015 (HSWA), and with all relevant Health and Safety at Work Regulations 2016, and with all relevant WorkSafe New Zealand (WorkSafe) Approved Codes of Practice and WorkSafe Information and Guidance, particularly those for construction and building maintenance.

3.3.2.2 Substitutions

The MAXRaft® Floor shall be as specified herein and on the design drawings. The substitution of the MAXRaft® Floor for an alternative brand or system is not permitted under any circumstances.

The substitution of a specified MAXRaft® Floor system/material for an alternative MAXRaft® Floor system/material by the Contractor shall only be permitted with the Contract Administrator's written authorisation and shall be at no additional cost to the Principal. Should any resultant extra work and/or redesign work be required to accommodate an alternative MAXRaft® Floor system/material to satisfy design, performance and compliance requirements, then the cost of these shall be borne by the Contractor.

3.3.2.3 Geotechnical Report

A geotechnical investigation of the site has been carried out - refer to the Geotechnical Report appended.

3.3.2.4 Producer Statement PS1

Furnish a fully completed Producer Statement PS1 (Design) as confirmation that the MAXRaft® Floor as designed and documented complies with the relevant clauses of the New Zealand Building Code. The Producer Statement PS1 shall be submitted with the Building Consent documentation. The PS1 Producer Statement shall not serve as a product warranty or guarantee of compliance.

3.3.2.5 Producer Statement PS4

Furnish a fully completed Producer Statement PS4 (Construction Review) as confirmation that the MAXRaft® Floor as constructed complies with the relevant requirements of the Building Consent and Building Consent Amendments, with respect to the relevant clauses of the New Zealand Building

Code. The Producer Statement PS4 shall be submitted by the Contractor with the application for Code Compliance Certificate of the contract works.

3.3.2.6 Certificate of Design Work

Provide all necessary Certificates of Design Work (CoW) required by the BCA for Building Consent as confirmation that the MAXRaft® Floor as designed and constructed complies with respect to the relevant clauses of the New Zealand Building Code.

3.3.2.7 Inspections & Reporting

BCA inspections of the works shall take place at each of the stages as scheduled in the Building Consent. Confirm a written programme to facilitate these inspections, including notification when each stage of the work is ready for inspection.

Carry out all necessary pre-installation and installation inspections for each area and stage of the works.
Complete all necessary Pre-Installation Checklists, and all necessary Installation Checklists.
Complete all necessary Sign-Off Certificates before handing over completed work.
Complete and sign the MAXRaft® Polystyrene Installation Quality Assurance Form.

Notify the BCA and the Contract Administrator for all required inspections of the MAXRaft® Floor construction, including the excavations. All inspections and test results shall be properly recorded and documented by the Contractor and made available on request.

The Contractor shall provide all necessary quality control checklists to the Contract Administrator prior to pouring and with sufficient time for their pre-pour inspection.

The Contract Administrator and BCA shall be notified and given reasonable opportunity to inspect the section of work prior to pouring. The Contractor shall give at least one working day's notice of intention to place concrete in any area.

The Contract Administrator's and/or BCA's instructions shall be carried out before concrete placing commences. Instructions issued by the Design Engineer must be authorised by the Contract Administrator. Unless approval is given by the Contract Administrator, Design Engineer (or their agent) and/or BCA, no concrete shall be placed in that section of work. Any concrete placed without authorisation may require removal from the works at the Contractor's expense.

3.3.2.8 Quality Assurance

Maintain and comply with industry-recognised quality control and assurance procedures to ensure that all stages of the works are carried out to the highest standard. Ensure that the construction of the MAXRaft® Floor complies in all respects with the design drawings and specifications.

A signed quality assurance form must be provided from MAXRaft® confirming that the polystyrene has been installed in accordance with the Producer Statement - PS1.

If requested, prepare and submit to the Contract Administrator details of the quality assurance procedures for concrete work for approval.

The quality assurance procedures shall encompass all aspects of the MAXRaft® Floor construction including, but not limited to:

- Concrete quality; and
- Formwork quality; and
- Construction tolerances; and
- Reinforcing steel placement; and
- Cast-in items; and
- Concrete finishes.

The Contractor shall advise the Contract Administrator in writing the name of a suitably experienced and qualified representative to be responsible for the quality control of concrete work.

The Contractor's nominated representative shall be required to complete and sign a written quality control checklist for each on-site concrete pour. A copy of each completed checklist shall be provided to the Contract Administrator before pouring commences and with sufficient time for the pre-pour inspection. The format and detail of the checklist shall be agreed to by the Contract Administrator and the Contractor prior to the commencement of any concrete work.

The Contractor shall supply evidence of concrete production quality standards to the Contract Administrator in advance of construction in accordance with the requirements of NZS 3109.

3.3.2.9 Tolerances

Except where specified otherwise herein or on the drawings, dimensional tolerances of the MAXRaft® Floor shall be within 5mm of the position shown on plan and conforming to NZS 3109, Table 5.2 - 'Tolerance for *in situ* construction' for all other aspects, and to NZS 3114 for off-the-form and unformed surface tolerances.

To ensure that elements such as external claddings, window and door joinery etc will properly fit the building, the Contractor shall maintain accurate control of the overall set-out and construction of the MAXRaft® Floor.

3.3.2.10 No-Slab Heating Systems

No embedded underfloor heating in slab. MAX85 is not designed to work in conjunction with embedded Underfloor Heating.

3.3.2.11 Applied Coatings & Finishes

The MAXRaft® polystyrene insulation system exterior requires protection from physical damage, UV rays and water absorption. MAXRaft® polystyrene insulation should be protected by the use of a coating that protects the insulation and is suitable for use in the subgrade.

Refer to the Technical Literature for guidance, and to the project design drawings and specification for coatings and finishes to be applied to MAXRaft® polystyrene insulation exterior surfaces.

3.3.3 Ground Classification

3.3.3.1 Good Ground

The ground conditions have been established as good ground, as defined by NZS 3604, by a geotechnical investigation compliant with local Territorial Authority requirements and NZS 3604. Refer to the Geotechnical Report.

3.3.4 Materials - MAXRaft® Insulation

MAXSlab® 300 Polystyrene Insulation Components - including, but not limited to 500mm wide x 50mm thick Perimeter Profiles, 200mm S Grade insulation, 50mm VH EPS Thickening insulation - selected according to MAXRaft® project-specific design requirements and installed to the layout shown on the project-specific MAXRaft® Panel Plan.

Load-bearing insulation material, including perimeter footings, shall be from 300kPa extruded polystyrene (XPS) or 165kPa Class-VH expanded polystyrene (EPS). All other insulation material shall be from Class-S expanded polystyrene (EPS) with a density between 16-30kg/m³.

3.3.5 Materials - Concrete

3.3.5.1 Concrete Mix

Concrete shall be 20MPa, 140mm slump mix, in either a 13mm or 19mm nominal aggregate size, Normal Concrete (N) produced in accordance with NZS 3104 from a New Zealand Ready Mixed Concrete Association audited plant, with sufficient cement quantity to ensure satisfactory finish and durability.

3.3.6 Materials - Steel Reinforcement

3.3.6.1 Steel Reinforcement

Steel Mesh:
- SE62 Ductile Mesh (or minimum 2.29kg/m²) Grade 500E welded steel mesh, complying with AS/NZS 4671 and subject to the requirements of NZBC B1/VM1 Paragraph 14.0.
- Machine-welded wire mesh; 500 MPa minimum yield strength; 6.1mm wire diameter; 200 x 200mm wire centres.
- Installed as slab topping reinforcement in accordance with the Technical Literature and the design drawings.

Steel Bar:
- Grade 500E to AS/NZS 4671.
- Except where otherwise specified on the design drawings, reinforcing bars shall be HD12.
- Grade 500E reinforcing bar shall be manufactured by Pacific Steel micro-alloy process. *Alternative manufacturers of Grade 500E reinforcing will only be approved if written evidence is provided, including test certificates, verifying the product*.
- Installed as main reinforcement and sundry bars; all in accordance with the Technical Literature and the design drawings.

General Requirements:
- Mill certificates must be provided to the Contract Administrator for all reinforcing steel used.
- All bundles of reinforcing steel supplied to the job shall be clearly marked with numbers relating to the Bending Schedule and related design drawing.
- Ensure that all reinforcing is adequately supported off the ground while stored on-site.
- Reinforcing bars shall be cut, bent, placed and fixed by suitably trained and experienced personnel to the requirements of NZS 3109.
- Ensure that all preparatory works and formwork have been completed to the specified requirements prior to placing reinforcing.
- Steel reinforcement shall be installed to the locations and spacings shown on the design drawings, and supported with the use of proprietary bar chairs and spacers to ensure correct placement and cover is achieved.
- All reinforcing bar laps shall be minimum 50 x the bar diameter.
- Where Ductile 500E mesh is lapped, the lap length between outer cross bars shall be to the manufacturer's requirements.
- Minimum concrete cover to reinforcement shall be as specified on the design drawings or otherwise as specified in NZS 3109 - the design drawings shall take precedence over those specified in NZS 3109.
- The ends of wire ties shall be turned away from the concrete face to maintain cover.
- Do not tie wire ties to formwork.

3.3.7 Materials - Damp Proof Membrane

3.3.7.1 Polyethylene Sheet - 250µm thick

Damp Proof Membrane (DPM) - 250µm. A 250 micron thick, tear-resistant, polyethylene (polythene) film sheet damp-proof membrane. Installed over a maximum 25mm thick layer of compacted sand blinding, in accordance with the Technical Literature and the design drawings.

The DPM shall be laid over the entire building platform directly on top of a sand blinding layer, and extend 100mm beyond the foundation perimeter to a straight line. All DPM joints shall be lapped minimum 150mm and tape-sealed with minimum 50mm wide pressure sensitive PVC tape. Tape-seal around penetrating pipes and sleeves.

Take all reasonable measures to protect the DPM from damage during construction, and repair any perforations or other damage.

Do not leave the DPM exposed for more than the maximum period recommended by the manufacturer.

3.3.8 Concrete Finishes

3.3.8.1 General

Unless specified otherwise herein or on the design drawings, concrete finishes shall comply with the provisions of NZS 3114 applicable to the surface finish class specified.

Surface finishes not specified in this specification or on the design drawings shall be in accordance with Table 1 or Table 2 of NZS 3114, as appropriate for location and use.

Arrange the pouring to allow adequate time for floating and finishing to the specified finish class.

Floating and any subsequent finishing shall be at the correct time to obtain the quality of compaction and finish required. No finishing work shall be carried out on a surface where there is free surface water. The application of dry cement or sand to absorb free surface water is not permitted.

All trowelling ridges shall be removed while soft, or by subsequent light grinding where appropriate. Slabs not fulfilling the standard of finish required shall be ground smooth or otherwise treated to the satisfaction of the Contract Administrator.

3.3.8.2 Schedule of Concrete Finishes

MAXRaft® Floor Schedule of Concrete Finishes:
- Slab Surface: *U3 Class Finish*.
- Unformed Surfaces to take Plaster or Tiles: *U2 Class Finish.*
- Off-the-Form Surfaces to take Plaster or Tiles: *F2 Class Finish*.
- Off-the-Form Surfaces Exposed (inside or outside the finished building): *F5 Class Finish*.

3.3.9 Formwork

3.3.9.1 Formwork

Formwork shall conform to NZS 3109 Section 5, and comply with the provisions of NZS 3114 according to the specified off-the-form-finish classification.

Formwork shall have sufficient strength to retain and support the wet concrete being placed to the required profiles and tolerances.

The formwork surface finish shall be of suitable quality necessary to produce the specified concrete finish. Any formwork with a deteriorated or damaged surface that does not meet the requirements of the surface finish shall not be used.

Fair-faced formwork shall be constructed so as to provide straight and true angles, and so as to produce cast surfaces within a maximum tolerance of 5mm of the given dimensions, and without visible offsets, bulges, or misalignment of the concrete. Form neat arrised edges, except where chamfers are indicated on the drawings or required to match existing detail.

Plywood formwork shall be constructed from Formply plywood sheets or C-grade faced standard plywood sheets (according to concrete finish), placed in a regular pattern and tightly butted together to avoid grout loss. Plywood formwork shall not be permitted to stain visually-exposed concrete.

The formwork face shall be adequately clean and treated with a general purpose concrete form release agent in accordance with the manufacturer's requirements. Diesel and oil-based products are not permitted. Care shall be taken to ensure that the release agent is kept out of contact with the reinforcement and is compatible with any subsequent coating system applied to the concrete.

Erected formwork shall be set and checked for dimensional accuracy and alignment before, during and after concreting, and any damaged formwork replaced. All debris shall be removed from formed voids immediately before concrete is placed.

Do not remove formwork for at least 12 hours after concrete placement. Formwork shall be removed without shock or vibration and in such a manner as to prevent damage. Do not permit bars or other tools to lever against the MAXRaft® Insulation or set concrete when removing formwork. Any damage to the concrete occurring during removal shall be repaired to the required standard by an approved method at the Contractor's expense.

3.3.10 Co-operation

Co-operate with other trades to ensure that all preliminary and preparatory works are completed to specification and as shown on the design drawings.

Coordinate with other trades, as required, the installation of all cast-in items and piped and cabled services, including drains, conduits, in-slab heating system, etc, within the MAXRaft® Floor.

3.3.11 Workmanship

Where required by the NZ Building Act 2004 it is the building contractor's responsibility to ensure that all restricted building work is carried out by a Licensed Building Practitioner.

MAXRaft® Floor construction work, including sand-blinding, DPM laying, formwork erection, reinforcing placement, and concrete placing and finishing techniques, shall be carried out by experienced and competent workers, familiar with the specified products and construction techniques, under the direct supervision of a Licensed Building Practitioner, in accordance with the Technical Literature and NZS 3109 and NZS 3114, and to fully comply with all warranty requirements.

All work shall be such as to leave a neat, efficient, robust and structurally sound installation, to the required standard.

3.3.12 Delivery & Handling

Take delivery of materials undamaged. Reject any item found to be defective or damaged and contact the manufacturer/supplier for replacement.

Store MAXRaft® Insulation components and reinforcing steel clear of the ground and in a manner that prevents damage and distortion in accordance with the manufacturer's requirements. Protect these materials from damage, distortion and contamination until use.

Do not use damaged or defective materials, or products that are beyond their designated shelf life.

Should a problem be encountered with any MAXRaft® Floor product during use or delivery, immediately contact MAXRaft® on 0800 629 7238. Do not continue to use the product that is not performing to specification or expectation. Keep the product in question and where possible, the document batch numbers and/or manufacturing details.

Handle materials and products in accordance with the manufacturer's recommendations and in a manner that prevents damage.

Installers shall be familiar with and comply with the manufacturer's Material Safety Data Sheet precautions for use, and use appropriate safety gear when handling materials.

Installers shall conform with all relevant WorkSafe NZ Guidelines and Codes of Practice - including the OSH Guidelines For the Provision of Facilities and General Safety in the Construction Industry.

3.3.13 Preparation

3.3.13.1 Site Clearing, Stripping, Excavation & Earthfill

Site Clearing, Stripping, Excavation & Earthfill - refer to separate specification section - Siteworks.

3.3.13.2 Piped & Cabled Services

Except where shown otherwise on the design drawings, piped and cabled services shall be run in-ground beneath the MAXRaft® Floor and returned vertically, at right angles through the floor at the required exit/entry points shown on the design drawings.

All service pipes in direct contact with concrete shall be lagged with a minimum 6mm thick, compressible, impermeable material.

In-ground services installations, including trenching, bedding, backfilling, ducting and sleeving, gradients, etc., shall be as specified for the applicable service (Drainlaying, Plumbing, Electrical), and must comply with the requirements of the New Zealand Building Code and the conditions of the Building Consent.

Plumbing and drainage fixtures installed in or on the MAXRaft® Floor shall be to the locations dimensioned on the design drawings, and shall not deviate from these without written prior approval from the Contract Administrator.

IMPORTANT:
- Service pipes are not permitted to be run lengthways within any MAXRaft® Floor footing or rib under any circumstance, nor shall they penetrate vertically through a footing without specific detailing.
- A service pipe is only permitted to pass perpendicular through a footing or rib according to the requirements of the specific design drawings.

3.3.13.3 Granular Basecourse to NZS 3604

Granular base to the underside of the MAXRaft® Floor shall consist of granular fill material conforming to NZS 3604 Section 7.5.3, and shall be systematically placed and compacted in horizontal layers no thicker than 150mm over the area beneath the slab and extending minimum 1.0m beyond the slab perimeter. Each layer shall be placed and compacted as a separate operation to subsequent layers.

The total thickness of the granular base shall be in relation to the finished slab level indicated on the design drawings, and no less than 75mm and no more than 600mm.

Compact each layer until the material is tightly bound together and does not visibly deform under the weight of a pressed adult heel. Compaction shall only be carried out with approved, special-purpose compaction equipment appropriate for the application. Compaction equipment shall follow systematic patterns of travel and make sufficient passes to ensure that the required compaction has been uniformly obtained everywhere for each layer. Care should be taken not to overwork the subgrade or to cause weaving.

3.3.13.4 Sand Blinding

Blind the finished subgrade with a 5-25mm thick layer of clean, compacted sand or approved blinding material, covering the entire area and extending 500mm beyond the perimeter footing. Ensure the sand blinding is compacted and levelled to within +/- 3mm of the required level, without deviation. Do not leave sand blinding exposed to the elements any longer than necessary, and install the DPM immediately or as soon as practicable.

3.3.14 Installation

Damp Proof Membrane
Lay the DPM over the entire platform and extending at least 100mm beyond the perimeter footing, with joints overlapped minimum 150mm and tape-sealed, and any services penetrations tape-sealed. Tape repair any damaged DPM as soon as it occurs - check the DPM for damage during all stages and repair as necessary.

Formwork
Erect perimeter formwork to straight and true to lines, and to the slab dimensions, levels and details shown on the design drawings. Form all edge rebates, set-downs, block-outs and sloping falls as dimensioned and detailed. Do not strike formwork for at least 12 hours after concrete placement.

MAXRaft® Insulation - MAXSlab® 300

Install individual, pre-cut and numbered MAXSlab® 300 polystyrene insulation components (perimeter edge beam panels, slab thickening panels, standard panels) over the DPM according to the MAXRaft® Panel Plan layout and the Technical Literature, with all components tightly butted together without gaps or voids, and the perimeter edge beam firmly supported by formwork. Install MAXRaft Spacers at edge beam as per panel plan (remove prior to concrete pour)
Carry out any necessary site-cutting, including holes for service pipes, with a saw or suitable hot wire as required.

A signed quality assurance form must be provided from MAXRaft® confirming the polystyrene has been installed in accordance with the Producer Statement - PS1."

Steel Reinforcement - MAXSlab® 300

Do not install reinforcing steel and mesh until all polystyrene perimeter and interior panels have been installed, and all required piped services works within the slab are complete.

Steel reinforcement types, sizes and placement must be as specified and in accordance with the layout and details shown on the specific design drawings. Reinforcing bars and mesh shall be accurately positioned and firmly secured to the specified placement and cover.

Install reinforcing bars to perimeter edge beam and slab thickenings as detailed using bar chairs to achieve the specified cover. Install reinforcing mesh using mesh chairs OR pod sticks to achieve the specified concrete cover.
Install shrinkage control bars across re-entrant corners only where specified on the specific design drawings.

3.3.15 Concreting

3.3.15.1 Handling, Placement & Compaction

The handling, placement, and compacting of MAXRaft® Floor concrete shall conform to NZS 3109 and the requirements of the Technical Manual.

Concrete shall be transported, handled, placed and compacted so as to:
- Prevent segregation or loss of materials;
- Produce a monolithic mass between planned joints or the extremities of the floor slab, or both;
- Completely fill the formwork to the intended level, expel entrapped air, and closely surround all reinforcement and embedments; and
- Provide the specified finish to the formed surfaces of the floor slab;
- Ensure there is no contamination of the concrete;
- Ensure that the transporting, handling, placing and compaction of the concrete is complete before setting reactions have passed the point which prevents the concrete from attaining its potential fully cured properties.

Take all necessary precautions and measures during unfavourable conditions, as required by NZS 3109 Section 7.2, to ensure the quality and finish of the concrete is not compromised or reduced in any manner.

Immersion vibrators shall be used for the compaction of the concrete and shall be moved to new positions as frequently as necessary to ensure uniform vibration of the whole mass and fully compacted concrete. On no account shall immersion vibrators be allowed to come into contact with the face of formwork. Vibrators should not be used to transport concrete along footings.

3.3.15.2 Curing & Protection

Concrete shall be cured in accordance with NZS 3109 Section 7.8. The use of concrete curing compounds shall be only as agreed with the Contract Administrator before it is used or applied. Ensure that any agreed concrete curing compound is compatible with subsequent floor coverings or surface treatments, including any sealers, paints, waterproofing membranes, etc.

The finished concrete slab shall be protected from damage during subsequent stages of the building contract. Repairs and remedial work to the slab shall be carried out to the satisfaction of the Contract Administrator.

No loads are to be placed on the concrete slab or MAXRaft® insulation before the concrete has cured sufficiently over 4 days. When the perimeter formwork has been struck and removed, check all exposed perimeter polystyrene insulation surfaces for concrete slurry leaks and spills and clean down immediately.

3.3.16 Saw Cutting

3.3.16.1 Saw-Cut Shrinkage Control Joints

Saw-cut shrinkage control joints shall be cut into the MAXRaft® Floor within 24 hours after pouring and when the slab is sufficiently hard, and according to the control joint layout, dimensions and details shown on the design drawings.

Unless specified otherwise on the design drawings, saw cuts shall be 25mm deep for an 85mm thick concrete topping. For thicker toppings, deeper saw cuts will be required of approximately ⅓ of the topping thickness - to the cut depth specified on the design drawings.

Early-entry soft cutting is recommended. Saw cutting shall be carried out without excessive chipping, spalling or tearing of the concrete. Saw cuts shall be straight and true and within +/-5mm of correct alignment.

3.3.17 Completion

Check the MAXRaft® Floor has been correctly formed to the required setout, dimensions, levels, alignment and detailing as shown on the specific design drawings, and that any deviation from these is within the specified tolerances.

Check that all required cast-in items and provisions for services are correctly located and positioned as shown on the design drawings.

Check that concrete surfaces have been properly finished to the required finish level.

Check for any damage and defective work. Carry out any necessary repairs and/or remedial work as specified and/or instructed by the Contract Administrator to the required standard.

Leave all of this work complete and structurally sound, and to the required standard.

Leave the slab surface and surrounding work areas clean and free of rubbish. Remove all associated rubbish and excess material from site.

Provide all necessary Producer Statements.

4 S T O N E W O R K

4.1 Preliminary

Refer to General Conditions of Contract and the Special Conditions in this Specification as appropriate. Read this section in conjunction with all other trade sections.

4.2 Compliance

Comply with the New Zealand Building Code 1992 including all revisions and amendments, Verification Methods where appropriate, and construction principles that are embodied in the Acceptable Solutions.

Comply with all relevant provisions and recommendations of:

3604:2011(NZS)	Timber-framed buildings
4210:2001(NZS)	Masonry construction: Materials and workmanship
4236:2002(SNZHB)	Masonry veneer wall cladding

4.3 Schistwork

4.3.1 Scope

Supply the specified Schistwork and install as shown on the drawings.

4.3.2 Materials

Schist stone shall include variable colours ranging through ochres, umbers and greys. The schist shall be broken (and edge guillotined) into the finished stones before delivery to the site.

Mortar - Refer NZS 4210, strength 12.5 MPa at 28 days. Incorporate admixture exactly to the manufacturer's recommendations. Sand correctly graded to NZS 3103 and kept clean.

4.3.3 Workmanship

Where required by the NZ Building Act 2004 it is the building contractor's responsibility to ensure that all restricted building work is carried out by a Licensed Building Practitioner.

All work shall be by or under the direct supervision of Registered Masons certified by the NZ Mason's Registration Committee or, through reference to several completed projects, the Main Contractor must show that the proposed Subcontractor is fully competent to produce the required results. All aspects of the schistwork shall be to generally recognised best (local) trade practice.

Co-operate with the Contractor to ensure that all support foundations, nibs, and framed substrates are completely appropriate for the schistwork required, and that blockwork walls and fireplace insitu concrete walls have been fully waterproofed. Co-ordinate with all trades to build all necessary fixings, sleeves, or electrical or plumbing devices etc. into the schistwork and check that positions are correct before finish grouting. Coordinate with all trades to form all required holes, openings etc. in their exact positions.

Carefully select schist stones for sizes and faces and position to produce a well bonded (approximating stretcher bond) mass with the required face finish. Finish jambs and ends to clean straight lines.

Use mortar dry enough to avoid slurry trickles on the finished schist faces but moist enough to provide a good bond with the schist. No retempering of partially set or dried mortar. Keep the wall faces clean as work proceeds and regularly inspect for mortar droppings etc. Turn back scaffold planks at night and during rain. On completion thoroughly clean all surfaces affected by this work.

5 CARPENTRY

5.1 Preliminary

Refer to General Conditions of Contract and the Special Conditions in this Specification as appropriate. Read this section in conjunction with all other trade sections.

5.2 Compliance

Comply with the New Zealand Building Code 1992 including all revisions and amendments, Verification Methods where appropriate, and construction principles that are embodied in the Acceptable Solutions.

Comply with all relevant provisions and recommendations of:

1170.2:2011(AS/NZS)	Structural design actions - Wind actions
1170.5:2004(NZS)	Structural design actions - Earthquake actions - New Zealand
2295:2006(NZS)	Pliable, permeable building underlays
2588:2018(AS|NZS)	Gypsum plasterboard
2589:2017(AS/NZS)	Gypsum linings - Application and finishing
2728:2013(AS|NZS)	Prefinished/prepainted sheet metal products for interior/exterior building applications - Performance requirements
3604:2011(NZS)	Timber-framed buildings
4200.1:2017(AS|NZS)	Pliable building membranes and underlays - Part 1: Materials
4200.2:1994(AS/NZS)	Pliable building membranes and underlays - Installation requirements
4219:2009(NZS)	Seismic performance of engineering systems in buildings
4859.1:2018(AS|NZS)	Thermal insulation materials for buildings - Part 1: General criteria and technical provisions
AWCI Code of Practice	For Design, Installation and Seismic Restraint of Suspended Ceilings
NASH Standard	Residential and Low-rise Steel Framing - Part 1: Design Criteria
NZMRM Code of Practice	NZ Metal Roof and Wall Cladding Code of Practice - Version 3.0

5.3 General

This section includes the receiving, stacking and storage of all Carpenter's materials and the fabrication, erection and fixing of all framing, sheathings and finishing timbers, including all work incidental to neatly finishing in other trades and all temporary work and temporary bracing.

The Carpenter shall attend upon all trades, and shall supply and fix all obviously necessary but not specifically mentioned fixings and materials.

5.4 Timber Framing

5.4.1 Scope

Supply and install timber framing to the walls, roofs, and other timber framed elements, as identified and detailed on the drawings. All aspects of this work shall be in accordance with NZS 3604, product manufacturers' recommendations, and as shown on the drawings and the specification.

5.4.2 Workmanship

Where required by the NZ Building Act 2004 it is the building contractor's responsibility to ensure that all restricted building work is carried out by a Licensed Building Practitioner.

All work shall be carried out to current best trade practise by experienced and competent tradesmen, familiar with the materials and installation techniques, in accordance with NZS 3604 and as shown on the drawings.

Co-operate with other trades to ensure that all preliminary and preparatory works are completed to specification and as shown on the drawings prior to installing timber framing.
Co-ordinate with other trades to install timber framing as required.

5.4.3 Timber Framing

5.4.3.1 Timber Grade and Quality

Unless otherwise noted or specified on the drawings or specification, all framing timber shall be minimum structural grade SG 8 Radiata pine in accordance with NZS 3622.
Framing timber shall be seasoned or kiln dried, and be straight and true and free from wind, warp and distortion, and in lengths suitable for the members required, and shall have a moisture content of between 12% and 18% before installation.
Do not used damaged, faulty or defective materials.

5.4.3.2 Timber Treatment

All non-durable timber framing shall be appropriately treated against moisture and/or insect decay by treatment plants with recognised quality assurance systems that are administered by the Timber Preservation Council (NZTPC). Treatment of timber and wood-based building products shall be to the requirements of NZS 3602 as an absolute minimum, and all treated timber shall be identified and marked as required.
Carefully manage treated framing during installation to avoid accidental use of timber with a lower performance or durability treatment than that required or specified.

5.4.3.3 Storage & Handling

Check timber framing upon delivery and reject sub-standard or damaged material.
Store timber framing dry under cover, fillet stacked and well clear of the ground, and protect from damage, moisture, and contamination.
Ensure all appropriate personal protection equipment is worn at all times when handling and cutting treated framing.

5.4.3.4 Framing Installation

All timber framing members, including all dwanging, strutting, blocking, bracing etc, shall be sized, setout, fitted and fixed to the requirements of NZS 3604 and as shown on the drawings to accommodate structural loadings, cladding and lining setout and support, and the installation of other building components, fixtures and fittings.

All framing shall be erected without deviation, true to line, level, angle and plumb, and evenly aligned and square, and within the tolerances allowed in NZS 3604 Table 2.1. Framing members accurately cut, lapped, housed, joined, and seated so as to provide full contact over the bearing surfaces.

Temporarily prop, brace, tie, and secure framing members and elements as required until the framing is complete and self supporting. Leave in place for safety purposes as long as required.

Protect timber framing as required during installation against damage and moisture, and against significant variation of moisture content until ready for lining. Avoid ponding of water around floor plates.

5.4.3.5 Concrete Separation

Separate timber framing with an approved continuous damp proof course when in direct contact with concrete or masonry. Ensure that the DPC material is compatible with the timber treatment.
Free draining separations to external vertical faces shall be 12mm minimum and as noted on the drawings.

5.4.3.6 Timber Re-treatment

All cut or drilled surfaces of H4 and H5 treated timber framing shall be flood coat re-treated, with a suitable product recommended by the original treatment plant, before installation.

5.4.3.7 Edge Notching and Centre Holes

The notching, checking, and boring of framing members shall be in strict accordance with the requirements of NZS 3604.
Avoided checking and cutting where possible and keep to such dimensions so as not to prejudice the purpose for which the member is used. Keep edge notching to a minimum and where possible use centrally bored holes instead.
Concealed services pipes and wiring shall not project beyond the framing face and where possible shall be beyond the lining's fixing reach.

5.4.3.8 Framing Protection

Protect timber framing as required during installation against damage and moisture, and against significant variation of moisture content until ready for lining. Avoid ponding of water around floor plates.

5.4.3.9 Built-up Framing Members

Except for jack studs, bottom plates and top plates, framing members may be substituted with built-up members in accordance with the limitations of NZS 3604 2.4.4.7 with the prior approval of the Architect/Designer only.

5.4.4 Steel Fixings

5.4.4.1 Fastenings and Connectors

Unless otherwise noted or specified, timber framing fastenings and connectors shall be as specified in the relevant fixing schedules of NZS 3604 or have an equivalent capacity as specified therein. Timber framing connectors and fixings shall comply with the product information as required in NZS 3604 2.4.6, and shall be used and installed in accordance with the manufacturer's recommendations. Pre-drill nail holes in split-prone framing as necessary.

5.4.4.2 Durability of Fixings & Fastenings

Unless otherwise noted or specified, the minimum durability of timber framing fixings and fastenings, excluding nails and screws, shall comply with the durability requirements of NZS 3604 Table 4.1.
Galvanised steel fixing components, excluding nails and screws, shall have galvanised coating masses in accordance with NZS 3604 Table 4.2.
Unless noted or specified otherwise, the materials for nails and screws shall be as given in NZS 3604 Table 4.3.
Steel fixings and fastenings in contact with timber treated with copper based timber preservatives (H3.2 or higher) shall be in accordance with NZS 3604 4.4.4.
Stainless steel nails shall be minimum Grade 304 unless otherwise specified or noted.

5.4.4.3 Bolts and Coachscrews

Unless specified or shown otherwise, all bolted and coach screwed connections shall be M12 or M16 in accordance with the relevant fixing requirements given in NZS 3604.
Bolted and coach screwed connections shall have either a 50mm x 3mm square, or a 55mm x 3mm round, washer to each head and nut for M12 and M16 fixings. Washers shall be of the same material and durability as the bolt or coach screw.

5.4.5 Wall Framing

5.4.5.1 Plates

Top and bottom plates shall be to the dimensions and layout shown on the drawings. Unless specified or shown otherwise, top and bottom plates shall be fixed in accordance with NZS 3604 7.5.12 and Tables 8.18 and 8.19, true to line and level or angle.
Joints in top plates shall be made over a stud or over blocking between studs, and all top plate connections shall be in accordance with NZS 3604 8.7.3. Form all holes and edge notches in top and bottom plates in accordance with NZS 3604 8.7.5.

5.4.5.2 Studs

Studs shall be to the dimensions and spacings shown on the drawings, and installed true to line and plumb in both directions between top and bottom plates.
Unless noted otherwise, non-load bearing wall studs shall be to the spacings given in NZS 3604 Table 8.4, stud width as shown on the drawings.
Form all holes and edge notches in studs in accordance with NZS 3604 8.5.1.5. Do not notch, check, cut, or bore holes in the middle third of any trimming stud.
Should the need arise, studs shall be straightened in accordance with NZS 3604 8.5.3 with prior approval from the Architect/Designer only.

Unless noted otherwise, studs in loadbearing walls for 3 kPa floor loads shall be in accordance with NZS 3604 Table 14.10.

5.4.5.3 Lintels

Lintels shall be to the dimensions and locations shown on the drawings, and installed true to line and level, and shall be supported by a 45mm thick doubling stud or jack stud fixed to a trimming stud, and secured against uplift in accordance with NZS 3604 8.6.1.8 as required.
The thickness of a lintel may be made from two or more members, where each member is the length of the lintel, in accordance with NZS 3604 2.4.4.7.

5.4.5.4 Sill & Head Trimmers

Unless specified or shown otherwise, sill and head trimmers to openings shall be the same width as the wall stud and to the thickness given in NZS 3604 Table 8.15, and installed at the required opening height true to line and level, and supported by a 45mm thick doubling stud or jack stud fixed to a trimming stud.

5.4.5.5 Dwangs

Dwangs shall be the same width and thickness as the wall stud, and installed at the centres noted on the drawings, and accurately cut and fixed in place true to line and level and flush with stud edges. Dwangs fixed in accordance with NZS 3604 Table 8.19.

5.4.5.6 Ribbon Boards

Ribbon boards shall be as dimensioned and located on the drawings, and installed on edge and checked 25mm into studs at the required height, true to line and level, and fixed in place in accordance with NZS 3604 Table 8.19.

5.4.6 Roof Framing

5.4.6.1 Ridge Boards

Ridge boards shall be to the dimensions and locations shown on the drawings, and installed true to line and level.

5.4.6.2 Valley Boards

Valley boards shall be sized to the dimensions and installed to the supporting framing as detailed on the drawings.

5.4.6.3 Tile Battens

Tile battens shall be to the dimensions and spacings shown on the drawings and to suit the roofing tiles, and fixed to rafters and/or trusses in accordance with NZS 3604 Table 10.12. Tile battens shall be continuous over a minimum of two spans.
Tile battens laid directly over sheet sarking, or ceiling lining, shall be fixed and installed as shown on the drawings.

5.4.6.4 Roof Trusses

Roof trusses shall be Specific Engineering Design (SED) in accordance with NZBC B1/VM1 and manufactured by an accredited fabricator, and shall comply with all aspects of NZS 3604 10.2.2. Roof

trusses shall be fabricated to meet the specific design requirements of the roof including, but not limited to; roof layout, pitch, and details, in accordance with the drawings and specification.
Roof trusses shall be supported and fixed to the truss fabricator's specifications but shall be no less than that required by NZS 3604 Tables 10.14 and 10.15. Roof trusses shall be braced as shown on the drawings and in accordance with NZS 3604 10.3.

5.4.6.5 Roof Bracing

Roof bracing shall be as shown on the drawings and in accordance with NZS 3604 10.3 and 10.4 as necessary.

5.4.7 Ceiling Framing

Ceiling framing shall be to the dimensions, layout, spacings, and details shown on the drawings, and shall be installed true to line, level and plane, and securely fixed in accordance with NZS 3604 Table 13.3.

5.5 GIB® Plasterboard Sheets

5.5.1 Scope

Supply and install the selected GIB® Plasterboard sheets, complete with all accessories, as sheet lining material to the walls, ceilings and other elements identified on the drawings. All aspects of this work shall be in complete accordance with Winstone Wallboards Ltd technical literature and installation guidelines (call Winstone Helpline on 0800 100 442 or check www.gib.co.nz for the latest editions) and other relevant product manufacturers' recommendations.

Substitution of any specified GIB® system, GIB® System component or GIB® plasterboard is not permitted..

5.5.2 Performance

To the areas noted on the drawings as ‘General Plasterboard Wall or Ceiling Lining’, comply with all relevant aspects of the GIB® Site Guide (2018) publication, complete with all recommended components and accessories, and other relevant manufacturers recommendations.

Wet Area Plasterboard Linings - GIB Aqualine® Wet Area Systems. To the areas noted as ‘Wet Area’ on the drawings, additionally comply with all relevant aspects of the GIB Aqualine® Wet Area Systems Specification and installation manual (2021) publication, BRANZ Appraisal No.427, and other relevant product manufacturers' recommendations. Refer to separate specification GIB Aqualine® Wet Area Systems.

Bracing Performance - GIB EzyBrace® Systems - Timber Framing. To the timber framed elements noted as 'Bracing' on the drawings, additionally comply with all relevant aspects of the GIB EzyBrace® Systems (2016) publication and GIB Ezybrace® Bracing Software according to the specified bracing unit rating, BRANZ Appraisal No.928, and other relevant product manufacturers' recommendations. Refer to separate specification GIB EzyBrace® Systems.

5.5.3 GIB Plasterboard

GIB® Standard plasterboard, 10mm thick.

Location:

GIB® Standard plasterboard, 13mm thick.

Location:

GIB Aqualine® plasterboard, 10mm thick.

Location:

GIB Aqualine® plasterboard, 13mm thick.

Location:

5.5.4 Fixings

Fix sheets with adhesive and GIB® Grabber® drywall screws in accordance with Winstone Wallboards Ltd requirements.

Fix sheets with GIBFix® adhesive and GIB® Nails in accordance with Winstone Wallboards Ltd requirements.

GIBFix® All-Bond adhesive. Use to adhere the sheets and accessories to the framing in accordance with Winstone Wallboards Ltd requirements.

GIBFix® One. Use to adhere the sheets to the timber framing and battens in accordance with Winstone Wallboards Ltd requirements.

5.5.5 Level of Plasterboard Finish

To the areas noted as a specific Level of Finish (3-5) on the drawings, additionally comply with all relevant aspects of Winstone Wallboards Ltd literature and AS/NZS 2589, complete with all system accessories, and other relevant product manufacturers' recommendations.

NOTE: Unless stated otherwise, Level 4 is the default Level of Finish.

To the areas noted as ‘control joint’, comply with all relevant aspects of Winstone Wallboards Ltd literature and AS/NZS 2589.

5.5.6 Co-operation

Co-operate with other trades to ensure that all preliminary and preparatory works are completed to specification and as shown on the drawings.

Coordinate with other trades to ensure that appropriate clearances are allowed from adjacent internal linings, fixtures, products, and associated services, etc, that the sheets correctly allow for

door and window installation, and that services penetrations are correctly handled to maintain sheet integrity.

5.5.7 Workmanship

All installation work shall be carried out by experienced tradesmen familiar with the techniques and materials specified and in accordance with the current requirements of Winstone Wallboards Ltd.

5.5.8 Delivery & Handling

Store GIB® plasterboard sheets undercover inside a watertight building and keep sheets dry at all times. Stack sheets flat on a dry level surface in accordance with Winstone Wallboards Ltd recommendations. Avoid damage to sheet edges, ends, and surfaces. Carry all sheets on edge.
Do not use damaged or faulty sheets.

5.5.9 Preparation

Check that the timber framing elements are in accordance with NZS 3604, or in accordance with NZS 3603 and AS/NZS 1170 for specific design, and otherwise in accordance with the specified Level of Finish and Winstone Wallboards Ltd requirements. Framing shall be plumb and in true alignment, complete and suitable for the sheets, and maximum moisture content 18% or as recommended by Winstone Wallboards Ltd. Ensure that the framing is true to line and plane and with no projections due to structural and bracing bracketry etc. Ensure that all framing brackets, plates, braces and hold-downs etc. are correctly installed.

Check that the building has been completely finished to all penetrations including doors, windows, services, etc so that the sheets can be installed without being affected by any weather conditions. Check junctions to all other building elements and ensure that all necessary works have been completed eg. flooring, setout of services, etc. that will enable the sheets and accessories to be installed. Clear building debris and rubbish from framing voids and keep clean until GIB sheet linings are installed.

5.5.10 Installation

Install the sheets, complete with all accessories, to the framing in accordance with the relevant Winstone Wallboards Ltd recommendations and literature, and as noted and detailed on the drawings.

5.5.11 Completion

Ensure that the sheets have been cut, fitted and joined, and fixed correctly. Check for damage and replace as necessary.
Clean up thoroughly on completion and remove all waste and rubbish from site.
Provide a copy of the Winstone Wallboards Ltd maintenance requirements to the owner.

5.6 GIB® Rondo® Metal Batten Systems

5.6.1 Scope

Supply and install the specified GIB® Rondo® Metal Batten Systems to the locations identified on the drawings, incorporating all system components and accessories required for proper installation and

performance. All aspects of this work shall be in complete accordance with the GIB® Rondo® Metal Batten Systems - System and Installation Manual publication and the current GIB® Site Guide (check www.gib.co.nz, or call 0800 100 442 for the latest editions), other relevant product manufacturers' recommendations, and as shown on the drawings.

No substitutions are permitted for GIB® Rondo® Metal Batten Systems.

This specification section should be read in conjunction with the GIB® Plasterboard Linings specification and relevant GIB® Systems specifications, and other specification sections, as they are interrelated.

For the purpose of this specification, the GIB® Rondo® Metal Batten Systems - System and Installation Manual publication is referred to as the 'GIB® Rondo® Metal Batten Systems Manual'..

5.6.2 Requirements

5.6.2.1 Safety

Comply with the Health and Safety at Work Act 2015 (HSWA), and with all relevant Health and Safety at Work Regulations 2016, and with all relevant WorkSafe New Zealand (WorkSafe) Approved Codes of Practice and WorkSafe Information and Guidance, particularly those for construction and building maintenance.

5.6.2.2 Warranty

GIB® Product & System Warranty:
- 10 Years Warranty - for all GIB® Products and Systems installed, according to warranty conditions.
- Provide the GIB® Product & System Warranty on the manufacturer's standard warranty form.
- Commence the warranty from the date of practical completion of the contract works.

5.6.2.3 Producer Statement PS1 - GIB® Rondo® 308 Ceiling Suspension System

Producer Statement PS1 - GIB® Rondo® 308 Ceiling Suspension System. Furnish a fully completed Producer Statement PS1 (Design) as confirmation that the GIB® Rondo® 308 Ceiling Suspension System as designed and documented complies with the relevant clauses of the New Zealand Building Code. The PS1 Producer Statement shall not serve as a product warranty or guarantee of compliance.

5.6.3 GIB® Rondo® Metal Batten Systems

5.6.3.1 GIB® Rondo® 310 Ceiling Batten System

GIB® Rondo® 310 Ceiling Batten System. Incorporating 35mm deep, concealed metal ceiling battens that are either fastened with proprietary metal support clips (recommended) to the support frame or fixed directly to the support frame.

Suitable for 10mm,13mm,16mm and 19mm thick GIB® plasterboard ceiling linings for residential and commercial applications. Plasterboard ceiling linings are generally screw-fixed directly to the underside of the ceiling battens. Maximum 130mm clearance from the underside of the support frame (joist/rafter) to the top of the ceiling batten.

GIB® Rondo® System Components:
- 310 Batten: 35mm deep, galvanised steel furring channel (batten).
- 340 Perimeter Channel: 35mm deep, galvanised steel perimeter 'U' channel.
- NZ18 Perimeter Angle: 32 x 32mm, galvanised steel perimeter angle.
- 311 Clip: 92mm long, galvanised steel batten fastening clip. Provides 30mm max. clearance from supporting joist or truss.
- 313 Clip: 192mm long, galvanised steel batten fastening clip. Provides 130mm max. clearance from supporting joist or truss.
- A311 GIB Quiet Clip®: 92mm high, galvanised steel batten fastening clip with rubber cushioning grommets.
- 312 Jointer: Galvanised steel batten jointing clip.

GIB® Rondo® 311 or 313 clips can be installed to provide additional restraint and accurate batten alignment when the battens are direct-fixed to the support frame. Use GIB Quiet Clip® for GIB® Noise Control Systems.

When installed as a ceiling diaphragm, the battens must be fixed directly to the support framing. If GIB® Rondo® clips are used, then a timber block (min 300mm) or a continuous timber member must be fixed alongside the support framing to create a direct connection.

Installed with all system components and accessories required for proper installation and performance, in accordance with the GIB® Rondo® Metal Batten Systems Manual, to the locations, layout, levels and details shown on the drawings.

Where electrical earthing of GIB® Rondo® 310 Ceiling Batten System is required, the electrical earthing shall be carried out by a qualified electrician in accordance with the electrical standards and regulations.

Installed Location:

5.6.4 Co-operation

Co-operate with other trades to ensure that all preliminary and preparatory works are completed to specification and as shown on the drawings.

Coordinate with other trades to ensure that the GIB® Rondo® Metal Batten System correctly allows for ceiling lining installation, and for the locations of recessed lights and other fittings installed by others, and to install GIB® Rondo® Metal Batten Systems as required.

5.6.5 Workmanship

Where required by the NZ Building Act 2004, it is the building contractor's responsibility to ensure that all restricted building work is carried out by a Licensed Building Practitioner.

Installation of GIB® Rondo® Metal Batten Systems shall be carried out by experienced and competent tradespersons, who are familiar with the specified systems and installation techniques, in accordance with the GIB® Rondo® Metal Batten Systems - System and Installation Manual, to fully comply with all warranty requirements, and relevant requirements of AS/NZS 2785 (suspended systems). Submit

evidence of experience on request, e.g. National Certificate of Interior Systems, or Certified Business Member of AWCINZ.

All cutting, jointing, fixing and supporting techniques shall be exactly as recommended by the manufacturer. All work shall be such as to leave a neat, efficient and robust installation, to the required standard, free from damage and defects.

5.6.6 Delivery & Handling

Store all materials and accessories indoors, off the floor, on a flat, level surface in accordance with the manufacturer's requirements. Keep materials and accessories dry and protected from damage, distortion, moisture and contamination at all times.

Do not use damaged or defective materials and products.

Handle all materials in accordance with the manufacturer's requirements and Product Data Sheets, and in a manner that prevents damage and distortion to the component.

Installers shall be familiar with and comply with the manufacturer's Material Safety Data Sheet precautions for use, and use appropriate safety gear when handling materials.

Installers shall conform with all relevant WorkSafe NZ Guidelines and Codes of Practice - including the OSH Guidelines For the Provision of Facilities and General Safety in the Construction Industry.

5.6.7 Preparation

5.6.7.1 General

The building must be fully enclosed, weathertight and suitably dry before installation commences.

Check that all preliminary and preparatory building works have been completed to specification and as shown on the drawings.

Check that any required building services installations, including electrical, plumbing, mechanical, fire, or other service located behind the ceiling line and/or wall line, have been completed.

Supporting timber framing shall comply with NZS 3604, or with NZS 3603 and AS/NZS 1170 for specific design, and have a maximum moisture content 18% at the time of installation.

Supporting light structural steel framing shall comply with the requirements of AS/NZS 4600 or the NASH Standard for Residential and Low-rise Steel Framing, Part 1: Design Criteria. All light structural steel framing members shall satisfy the requirements of AS/NZS 1170.

Supporting steel stud partitioning shall comply with AS 1397 and as specified and shown on the drawings.

Supporting steel structures shall comply with NZS 3404.

Supporting concrete structures shall comply with the CCANZ CP 01:2011 or with NZS 3109. New concrete must have aged for a minimum of 28 days.

Supporting concrete masonry structures shall comply with NZS 4229, or with NZS 4230 and AS/NZS 1170 for specific design.

Carry out all necessary substrate inspections and preparatory work in accordance with the GIB® Rondo® Metal Batten System Manual and the GIB® Site Guide prior to installation.

Confirm the location and details of movement control joints, as indicated on the drawings, prior to installation.

The commencement of work on each section/area shall be deemed to indicate full acceptance by the installer that all preparatory works by other trades is complete.

5.6.8 Installation

5.6.8.1 GIB® Rondo® 310 Ceiling Batten System (600mm c/c battens)

GIB® Rondo® 310 Ceiling Batten System. Installed in accordance with the GIB® Rondo® Metal Batten Systems Manual, to the locations, layout, levels and details shown on the drawings. Suitable for 13mm thick, single layer, internal plasterboard ceiling linings for residential applications.

Ceiling Batten Set-out:
- Batten Spacing: Maximum 600mm centreto-centre spacings.
- Batten Span: Maximum 1200mm for multi-span battens. Maximum 900mm for single-span battens (non-jointed), and for garage ceilings.

Confirm the ceiling lining fixing and installation requirements prior to installing GIB® Rondo® 310 Metal Ceiling Battens. Make allowance for the lining thickness when establishing the finished batten datum level.

For Multi-span Battens: Set-out GIB® Rondo® 310 Metal Ceiling Battens at maximum 600mm centre-to-centre spacings, with a maximum batten span of 1200mm, to the areas, levels and details shown on the drawings.

For Single-span Battens (non-jointed): Set-out GIB® Rondo® 310 Metal Ceiling Battens at maximum 600mm centre-to-centre spacings, with a maximum batten span of 900mm.

Screw-fix GIB® Rondo® perimeter angle and/or channel to walls, true to line and level, with 32mm x 8g x GIB® Grabber® wafer head needle tip screws at 300mm centres max.

Fix GIB® Rondo® batten clips along the batten lines, 900mm or 1200mm apart (as above), to the support framing with 32mm x 8g GIB® Grabber® wafer head needle tip screws or pairs of 40 x 2.8mm GIB® Nails. Batten clip fixings and set-out shall be to the manufacturer's installation requirements for the clip type, batten type and batten set-out.

Securely fasten the clips in place so that the battens are fixed at the correct datum level and are parallel, straight and true to line. Support batten ends on perimeter angle or channel, or alternatively, cut, fold and fix the batten end to the top plate.

Use full length battens. When jointing is necessary, joint battens using the manufacturer's proprietary batten jointer for the batten type.

Do not fix batten clips directly to H3.2, CCA, CuAz or ACQ treated timber - fully separate the clips from timber with DPC or other approved material.

Where required, provide additional battens for ceiling-mounted fixtures and fittings at the set-out shown on the drawings.

Ceiling Diaphragms:
- When installed as a ceiling diaphragm, the battens must be fixed directly to the support framing.
- If GIB® clips are used then a timber block (min 300mm) or a continuous timber member must be fixed alongside the support framing to create a direct connection.

5.6.9 Completion

Carry out a final inspection immediately after installation. Check that the GIB Rondo Metal Batten System has been installed correctly in accordance with the GIB® Rondo® Metal Batten Systems Manual and installation tolerances, to the correct set-out and details shown on the drawings, and that the installations are accurately aligned true to line, level (and/or plumb) and plane.

Check that the installed layout allows for the correct positioning and installation of all penetrations and services fixtures and fittings as indicated on the drawings.

Check for any damage and defective work - repair or replace as necessary to the required standard.

Leave all of this work complete and to the required standard in accordance with the manufacturer's warranty requirements, as shown on the drawings.

Leave completed works and surrounding surfaces clean and free of rubbish and debris. Remove all rubbish and excess material from the site.

Issue to the Owner a copy of the a copy of the GIB® Product and System Warranty.

Provide all necessary Producer Statements.

5.7 GIB® EzyBrace® Systems

5.7.1 Scope

Supply and install the specified GIB EzyBrace® Systems to the locations identified on the drawings, incorporating GIB® plasterboards and all system components and accessories required for proper installation and performance. All aspects of this work shall be in complete accordance with the GIB EzyBrace® Systems publication, GIB EzyBrace® Bracing Software and the current GIB® Site

Guide (check www.gib.co.nz, or call 0800 100 442 for the latest editions), BRANZ Appraisal No.928, other relevant product manufacturers' recommendations, and as shown on the drawings.

No substitutions are permitted for GIB EzyBrace® Systems, GIB® Plasterboard Linings, or GIB® System components and accessories.

This specification section must be read in conjunction with the GIB® Plasterboard Linings specification and relevant GIB® Systems specifications, and other specification sections, as they are interrelated..

5.7.2 Requirements

5.7.2.1 Safety

Comply with the Health and Safety at Work Act 2015 (HSWA), and with all relevant Health and Safety at Work Regulations 2016, and with all relevant WorkSafe New Zealand (WorkSafe) Approved Codes of Practice and WorkSafe Information and Guidance, particularly those for construction and building maintenance.

5.7.2.2 Warranty

GIB® Product & System Warranty:
- 10 Years Warranty - for all GIB® Products and Systems installed, according to warranty conditions.
- Provide the GIB® Product & System Warranty on the manufacturer's standard warranty form.
- Commence the warranty from the date of practical completion of the contract works.

Include with the warranty: a copy of the completed GIB® Installation Sign-Off sheet, and the GIB® Plasterboard Lining Systems Care and Maintenance bulletin.

5.7.2.3 Quality Assurance

Ensure that the installation and finishing of GIB EzyBrace® Systems comply in all respects with the approved design drawings and specifications, and Building Consent.

Maintain and comply with industry-recognised quality control and assurance procedures to ensure that all stages of work are carried out to the highest standard.

5.7.2.4 Inspection & Acceptance of GIB EzyBrace® Systems

Carry out all necessary pre-installation, installation and finishing inspections necessary for GIB EzyBrace® Systems for each area of work in accordance with the requirements of the GIB EzyBrace® Systems Manual, GIB® Site Guide, and BRANZ Appraisal No.928.

Complete the GIB® Site Guide Pre-Installation Checklist prior to installing GIB® plasterboard linings.

Complete the GIB® Interior Plasterer/Stopper Installation Sign-Off Certificate upon completion and before handover for subsequent decoration.

5.7.2.5 Defective Materials & Work

Should defective materials and/or work be found at any time before the final acceptance of the work, it shall be rejected. Rejected GIB EzyBrace® System materials and/or work shall be repaired and/or

replaced to the satisfaction of the Architect/Designer, without delay and at no additional cost to the Principal.

5.7.2.6 Producer Statement (other manufacturer's system)

Producer Statement PS1 - where required. Where GIB® plasterboard linings are installed as a component of another manufacturer's proprietary system, the system manufacturer shall furnish a completed Producer Statement PS1 (Design) as confirmation that the specified proprietary system as designed and documented complies with the relevant clauses of the New Zealand Building Code. The PS1 Producer Statement shall not serve as a product warranty or guarantee of compliance.

5.7.2.7 Substitution of GIB® Plasterboard Linings

GIB® plasterboard linings shall be as specified herein and as indicated on the approved drawings. The substitution of GIB® branded plasterboard linings and GIB EzyBrace® Systems components for alternative brands is not permitted under any circumstances.

The substitution of a specified GIB® plasterboard lining for an alternative GIB® plasterboard lining by the Contractor shall be in strict accordance with the requirements of the GIB EzyBrace® Systems Manual and GIB® Site Guide: 2.3 - Board Substitution Options. Such substitutions shall only be permitted with the Architect's/Designer's written authorisation, and shall be at no additional cost to the Principal. Should any resultant extra work and/or redesign work be required to accommodate alternative GIB® plasterboard linings to satisfy design, performance and compliance requirements, then the cost of these shall be borne by the Contractor.

5.7.3 Performance

5.7.3.1 Limitations of GIB® Plasterboard

GIB® plasterboard products must NOT be:
- used in external situations, or
- exposed to water or be installed in situations where extended exposure to humidity above 90% RH can reasonably be expected, or
- exposed to temperatures in excess of 52°C for prolonged periods.

GIB EzyBrace® Systems must NOT be used in showers or behind baths. GIB EzyBrace® Systems may be used in watersplash areas provided they are protected with an impervious finish in accordance with the requirements of NZBC E3/AS1, and the GIB Aqualine® Wet Area Systems publication.

5.7.3.2 Bracing Performance - Timber Framing

Bracing Performance - GIB EzyBrace® Systems - Timber Framing. To the timber framed elements noted as 'Bracing' on the drawings, additionally comply with all relevant aspects of the GIB EzyBrace® Systems (2016) publication and GIB Ezybrace® Bracing Software according to the specified bracing unit rating, BRANZ Appraisal No.928, and other relevant product manufacturers' recommendations. Refer to separate specification GIB EzyBrace® Systems.

5.7.3.3 Wet Areas

Wet Area Plasterboard Linings - GIB Aqualine® Wet Area Systems. To the areas noted as ‘Wet Area’ on the drawings, additionally comply with all relevant aspects of the GIB Aqualine® Wet Area Systems

(2007) publication, BRANZ Appraisal No.427, and other relevant product manufacturers' recommendations. GIB EzyBrace® Systems must not be located in shower cubicles or behind baths or the like. Refer to separate specification GIB Aqualine® Wet Area Systems.

5.7.4 GIB EzyBrace® Systems - Timber Frame

5.7.4.1 GS1-N

GIB EzyBrace® System - GS1-N. A timber frame, external or internal wall bracing system incorporating one layer of any 10mm or 13mm GIB® Standard Plasterboard on one side. Refer to the GIB EzyBrace® Systems literature.

Installed Location:

5.7.4.2 BL1-H

GIB EzyBrace® System - BL1-H. A timber frame, external or internal wall bracing system incorporating one layer of 10mm or 13mm GIB Braceline® on one side with panel hold downs. Refer to the GIB EzyBrace® Systems literature.

Installed Location:

5.7.4.3 BLG-H

GIB EzyBrace® System - BLG-H. A timber frame, internal wall bracing system incorporating one layer of GIB Braceline® on one side, and one layer of any 10mm or 13mm GIB® Plasterboard on the other, and panel hold-down fixings with panel hold downs. Refer to the GIB EzyBrace® Systems literature.

Installed Location:

5.7.5 Components & Accessories

5.7.5.1 Components & Accessories

GIB EzyBrace® Systems components and accessories, including, but not limited to:
- GIB® Plasterboard Linings;
- GIB® Plasterboard Fasteners;
- Plywood Sheathing;
- GIB® HandiBrac® Panel Hold-down Bracket with Bowmac® Blue Head Screw Bolt;
- Galvanised Steel Strap Plate Connectors;
- Ceiling Diaphragm Ceiling Battens;
- GIB® Adhesives - GIBFix® One and/or GIBFix® All-Bond;
- GIB® Metal Trims & Paper Faced Trims;
- GIB® Plasterboard Control Joints;
- GIB® Joint and Finishing Compounds;
- GIB Soundseal® Acoustic Sealant;
- Fire Resistant Sealant.

Refer to the GIB EzyBrace® Systems literature and the GIB® Site Guide for further information.

5.7.6 Co-operation

Co-operate with other trades to ensure that all preliminary and preparatory works are completed to specification and as shown on the drawings.
Co-operate with the Decorator to ensure that the specified Finish Levels for plasterboard jointing and finishing is achieved before decorating commences.

Coordinate with other trades to install GIB EzyBrace® Systems to the required set-out and standard, and to ensure:
- appropriate tolerances and clearances allow for adjacent internal linings, fixtures, fittings, services, etc; and
- GIB® plasterboard linings correctly allow for proper door and window installation; and
- penetrations for building services are correctly handled to maintain sheet integrity and system performance.

5.7.7 Workmanship

Where required by the NZ Building Act 2004, it is the building contractor's responsibility to ensure that all restricted building work is carried out by a Licensed Building Practitioner.

Installation of GIB EzyBrace® Systems shall be carried out by experienced and competent tradespersons, who are familiar with the specified materials and installation techniques, in accordance with the manufacturer's installation requirements, and to fully comply with all warranty requirements. Submit evidence of experience on request, e.g. National Certificate of Interior Systems, or Certified Business Member of AWCINZ.

Carry out all necessary installation inspections in accordance with the GIB EzyBrace® Systems Manual and the GIB® Site Guide, and to fully comply with the manufacturer's warranty requirements as the works progress.

All cutting, jointing, fixing and sealing techniques shall be exactly as recommended by the manufacturer. All work shall be such as to leave a neat, efficient and robust installation, to the required standard, free from damage and defects.

Make all necessary provisions to protect adjacent work and surfaces from damage during installation.

On Completion:
- Check that GIB EzyBrace® Systems have been correctly installed and finished in accordance with the requirements of the GIB EzyBrace® Systems Manual and GIB® Site Guide, to the correct set-out, dimensions and details shown on the drawings.
- Check for any damage and defective work - repair or replace as necessary to the required standard.
- Ensure that inspection and assessment of the plasterboard Finish Level have been carried out, and that written agreement stating the completed jointing and finishing is acceptable for subsequent surface sealing and decoration has been provided.
- Ensure that the GIB® Installation Sign-Off Certificate has been completed and signed by the Interior Plasterer/Stopper.
- Leave all of this work complete and to the required standard in accordance with the manufacturer's warranty requirements, as shown on the drawings and the conditions of the Building Consent.

- Clean up thoroughly and leave the finished work and surrounding surfaces clean and free of contamination from compound splashes and sanding dust. Remove all associated rubbish and excess material from the site.
- Issue to the Owner a copy of the GIB® Plasterboard Lining Systems Care and Maintenance bulletin, and a copy of the GIB® Product and System Warranty.

5.7.8 Delivery & Handling

Store all GIB EzyBrace® Systems plasterboard linings and system components indoors, off the floor, on a flat, level surface in accordance with the manufacturer's requirements. Keep stored plasterboard linings and system accessories dry, out of direct sunlight, and protected from damage, moisture and contamination at all times.

Do not use damaged or defective materials and products, or products that are beyond the designated shelf life. Cracked or damaged GIB Aqualine® sheets must never be used.

Should a problem be encountered with any GIB® product during installation or delivery, immediately contact the GIB® Helpline on 0800 100 442. Do not continue to use the product that is not performing to specification or expectation. Keep samples of the product in question and where possible, document batch numbers and/or manufacturing dates.

Handle all materials in accordance with the manufacturer's requirements and relevant Product Data Sheets, and in a manner that prevents damage.

Installers shall be familiar with and comply with the manufacturer's Material Safety Data Sheet precautions for use, and use appropriate safety gear when handling materials. Carry plasterboard sheets on edge, and avoid damage to sheet edges, ends, and surfaces.

Installers shall conform with all relevant WorkSafe NZ Guidelines and Codes of Practice - including the OSH Guidelines For the Provision of Facilities and General Safety in the Construction Industry.

5.7.9 Preparation

5.7.9.1 General

All framing shall be complete and ready for GIB® Ezybrace Systems and associated GIB® plasterboard linings installation.

Timber framing shall comply with NZS 3604, or with NZS 3603 and AS/NZS 1170 for specific design, and have a maximum moisture content 18% at the time of plasterboard lining installation.

Light structural steel framing shall comply with the requirements of AS/NZS 4600 or the NASH Standard for Residential and Low-rise Steel Framing, Part 1: Design Criteria. All light structural steel framing members shall satisfy the requirements of AS/NZS 1170. Comply with the steel framing fabricator's specifications and requirements for plasterboard installation.

Steel stud partitioning shall comply with AS 1397 and as specified and shown on the drawings. Comply with the manufacturer's specifications and requirements for plasterboard installation.

Concrete substrates shall comply with the CCANZ CP 01:2011 or with NZS 3109. New concrete must have aged for a minimum of 28 days. Ensure that concrete surfaces are within the tolerances specified.

Concrete masonry structures shall comply with NZS 4229, or with NZS 4230 and AS/NZS 1170 for specific design.

Carry out all necessary moisture readings. Do not commence installation until the moisture readings are below the required level.

Carry out all necessary substrate inspections and preparatory work in accordance with the manufacturer's recommendations and the GIB® Site Guide prior to installation. Complete and sign the GIB® Site Guide Pre-Installation Checklist.

Check that the building envelope has been finished at all penetrations including doors, windows, services, etc., and the building is weathertight.

Check junctions to all other building elements and ensure that all necessary works have been completed, including cavity insulation.

Check that all fixtures, fittings and built-in items are correctly installed, and that all framing and substrate edges are completed as detailed.

Confirm the location and details of movement control joints, as indicated on the drawings, prior to installation.

Ensure all pre-wiring and service piping is installed and complete.

Check that any required cavity insulation has been installed correctly and its bulk thickness does not exceed the framing thickness.

Remove all debris and rubbish from framing voids prior to installing linings.

The commencement of work on each section/area shall be deemed to indicate full acceptance by the installer that all preparatory works by other trades is complete.

5.7.9.2 Framing Check

Framing - check all aspects of preparatory works, including but not limited to:
- Check that the framing is straight and true to line, and is plumb/level and correctly aligned.
- Check that the framing is within the required deviation tolerances defined in AS/NZS 2589 according the specified Finish Level.
- Check that vertical and horizontal framing members are at the spacings shown on the drawings, and that any required battens or furring channels are installed to the required layout.

- Check that the framing has no projections due to structural and bracing bracketry, etc. Ensure that framing brackets, plates, braces, hold-downs, etc., are correctly installed.

5.8 GIB® Wet Area Systems

5.8.1 Scope

Supply and install the specified GIB Aqualine® Wet Area Systems to the locations identified on the drawings, incorporating GIB® plasterboards and all system components and accessories required for proper installation and performance. All aspects of this work shall be in complete accordance with the GIB Aqualine® Wet Area Systems publication and the current GIB® Site Guide (check www.gib.co.nz, or call 0800 100 442 for the latest editions), BRANZ Appraisal No.427, other relevant product manufacturers' recommendations, and as shown on the drawings.

No substitutions are permitted for GIB Aqualine® Wet Area Systems, GIB® Plasterboard Linings, or GIB® System components and accessories.

This specification section must be read in conjunction with the GIB® Plasterboard Linings specification and relevant GIB® Systems specifications, and other specification sections, as they are interrelated.

For the purpose of this specification, the GIB Aqualine® Wet Area Systems publication is referred to as the GIB® Wet Area Systems Manual..

5.8.2 Requirements

5.8.2.1 Safety

Comply with the Health and Safety at Work Act 2015 (HSWA), and with all relevant Health and Safety at Work Regulations 2016, and with all relevant WorkSafe New Zealand (WorkSafe) Approved Codes of Practice and WorkSafe Information and Guidance, particularly those for construction and building maintenance.

5.8.2.2 Warranty

GIB® Product & System Warranty:
- 10 Years Warranty - for all GIB® Products and Systems installed, according to warranty conditions.
- Provide the GIB® Product & System Warranty on the manufacturer's standard warranty form.
- Commence the warranty from the date of practical completion of the contract works.

Include with the warranty: a copy of the completed GIB® Installation Sign-Off sheet, and the GIB® Plasterboard Lining Systems Care and Maintenance bulletin.

5.8.2.3 Quality Assurance

Ensure that the installation and finishing of GIB Aqualine® Wet Area Systems comply in all respects with the approved design drawings and specifications, and Building Consent.

Maintain and comply with industry-recognised quality control and assurance procedures to ensure that all stages of work are carried out to the highest standard.

5.8.2.4 Inspection & Acceptance of GIB® Wet Area Systems

Carry out all necessary pre-installation, installation and finishing inspections necessary for GIB Aqualine® Wet Area Systems for each area of work in accordance with the requirements of the GIB® Wet Area Systems Manual, GIB® Site Guide, and BRANZ Appraisal No.427.

Complete the GIB® Wet Area Systems Manual and GIB® Site Guide Pre-Installation Checklists prior to installing GIB® plasterboard linings.

Complete the GIB® Interior Plasterer/Stopper Installation Sign-Off Certificate upon completion and before handover for subsequent decoration.

5.8.2.5 Defective Materials & Work

Should defective materials and/or work be found at any time before the final acceptance of the work, it shall be rejected. Rejected GIB Aqualine® Wet Area System materials and/or work shall be repaired and/or replaced to the satisfaction of the Architect/Designer, without delay and at no additional cost to the Principal.

5.8.2.6 Producer Statement (other manufacturer's system)

Producer Statement PS1 - where required. Where GIB® plasterboard linings are installed as a component of another manufacturer's proprietary system, the system manufacturer shall furnish a completed Producer Statement PS1 (Design) as confirmation that the specified proprietary system as designed and documented complies with the relevant clauses of the New Zealand Building Code. The PS1 Producer Statement shall not serve as a product warranty or guarantee of compliance.

5.8.2.7 Substitution of GIB® Plasterboard Linings

GIB® plasterboard linings shall be as specified herein and as indicated on the approved drawings. The substitution of GIB® branded plasterboard linings and GIB Aqualine® Wet Area Systems components for alternative brands is not permitted under any circumstances.

The substitution of a specified GIB® plasterboard lining for an alternative GIB® plasterboard lining by the Contractor shall be in strict accordance with the requirements of the GIB Aqualine® Wet Area Systems Manual and GIB® Site Guide: 2.3 - Board Substitution Options. Such substitutions shall only be permitted with the Architect's/Designer's written authorisation, and shall be at no additional cost to the Principal. Should any resultant extra work and/or redesign work be required to accommodate alternative GIB® plasterboard linings to satisfy design, performance and compliance requirements, then the cost of these shall be borne by the Contractor.

5.8.3 Performance

5.8.3.1 Limitations of GIB® Plasterboard

GIB® plasterboard products must NOT be:
- used in external situations, or
- exposed to water or be installed in situations where extended exposure to humidity above 90% RH can reasonably be expected, or
- exposed to temperatures in excess of 52°C for prolonged periods.

In addition to the limitations above, GIB Aqualine® plasterboard must NOT be:
- used for bracing purposes in shower cubicles or above baths; or
- applied directly to solid plaster (gypsum or cement), wood based sheet linings or similar materials, masonry or concrete; or
- installed over a vapour barrier or a wall acting as a vapour barrier.

5.8.4 GIB Aqualine® Non-Tiled Wall Systems

5.8.4.1 Non-Tiled Walls - Timber Frame

GIB Aqualine® Wet Area Systems - Non-Tiled Walls - Timber Framing. A timber frame, wet area lining system for non-tiled walls incorporating one layer of 10mm or 13mm GIB Aqualine® on the wet area side. Refer to the GIB® Aqualine® Systems literature.

5.8.5 GIB Aqualine® Tiled Wall Systems

5.8.5.1 Tiled Walls (tile weight - max. 26kg/m²) - Timber Frame

GIB Aqualine® Wet Area Systems - Tiled Walls - Timber Frame. A timber frame, wet area lining system for tiled walls with a maximum tile weight of 26kg/m², incorporating one layer of 10mm GIB Aqualine® on the wet area side. Refer to the GIB® Wet Area Systems literature.

5.8.6 GIB Aqualine® Ceiling Systems

5.8.6.1 Metal Ceiling Battens

GIB Aqualine® Wet Area Systems - Ceilings - Metal Ceiling Battens. A wet area drywall ceiling lining system over metal ceiling battens incorporating one layer of 10mm or 13mm GIB Aqualine®. Refer to the GIB® Wet Area Systems literature.

5.8.7 Components & Accessories

5.8.7.1 Components & Accessories

GIB Aqualine® Wet Area Systems components and accessories, including, but not limited to:
- GIB® Plasterboard Linings;
- GIB® Plasterboard Fasteners;
- GIB® Adhesives - GIBFix® One and/or GIBFix® All-Bond;
- GIB® Rondo® NZ18 Perimeter Angle: shower corner reinforcing, 32 x 32 x 0.55mm thick galvanised steel angle.
- GIB® Metal Trims & Paper Faced Trims;
- GIB® Plasterboard Control Joints;
- GIB® Joint and Finishing Compounds;
- Wet Area Sealant.

Refer to the GIB® Wet Area Systems literature and the GIB® Site Guide for further information.

5.8.8 Co-operation

Co-operate with other trades to ensure that all preliminary and preparatory works are completed to specification and as shown on the drawings.

Co-operate with the Decorator to ensure that the specified Finish Levels for plasterboard jointing and finishing is achieved before decorating commences.

Coordinate with other trades to install GIB Aqualine® Wet Area Systems to the required set-out and standard, and to ensure:
- appropriate tolerances and clearances allow for adjacent internal linings, fixtures, fittings, services, etc; and
- GIB® plasterboard linings correctly allow for proper door and window installation; and
- penetrations for building services are correctly handled to maintain sheet integrity and system performance.

5.8.9 Workmanship

Where required by the NZ Building Act 2004, it is the building contractor's responsibility to ensure that all restricted building work is carried out by a Licensed Building Practitioner.

Installation of GIB Aqualine® Wet Area Systems shall be carried out by experienced and competent tradespersons, who are familiar with the specified materials and installation techniques, in accordance with the manufacturer's installation requirements, and to fully comply with all warranty requirements. Submit evidence of experience on request, e.g. National Certificate of Interior Systems, or Certified Business Member of AWCINZ.

Carry out all necessary installation inspections in accordance with the GIB® Wet Area Systems Manual and the GIB® Site Guide, and to fully comply with the manufacturer's warranty requirements as the works progress.

All cutting, jointing, fixing and sealing techniques shall be exactly as recommended by the manufacturer. All work shall be such as to leave a neat, efficient and robust installation, to the required standard, free from damage and defects.

Make all necessary provisions to protect adjacent work and surfaces from damage during installation.

On Completion:
- Check that GIB Aqualine® Systems have been correctly installed and finished in accordance with the requirements of the GIB® Wet Area Systems Manual and GIB® Site Guide, to the correct set-out, dimensions and details shown on the drawings.
- Check for any damage and defective work - repair or replace as necessary to the required standard.
- Ensure that inspection and assessment of the plasterboard Finish Level have been carried out, and that written agreement stating the completed jointing and finishing is acceptable for subsequent surface sealing and decoration has been provided.
- Ensure that the GIB® Installation Sign-Off Certificate has been completed and signed by the Interior Plasterer/Stopper.
- Leave all of this work complete and to the required standard in accordance with the manufacturer's warranty requirements, as shown on the drawings and the conditions of the Building Consent.
- Clean up thoroughly and leave the finished work and surrounding surfaces clean and free of contamination from compound splashes and sanding dust. Remove all associated rubbish and excess material from the site.

- Issue to the Owner a copy of the GIB® Plasterboard Lining Systems Care and Maintenance bulletin, and a copy of the GIB® Product and System Warranty.

5.8.10 Delivery & Handling

Store all GIB Aqualine® Wet Area Systems plasterboard linings and system components indoors, off the floor, on a flat, level surface in accordance with the manufacturer's requirements. Keep stored plasterboard linings and system accessories dry, out of direct sunlight, and protected from damage, moisture and contamination at all times.

Do not use damaged or defective materials and products, or products that are beyond the designated shelf life. Cracked or damaged GIB Aqualine® sheets must never be used.

Should a problem be encountered with any GIB® product during installation or delivery, immediately contact the GIB® Helpline on 0800 100 442. Do not continue to use the product that is not performing to specification or expectation. Keep samples of the product in question and where possible, document batch numbers and/or manufacturing dates.

Handle all materials in accordance with the manufacturer's requirements and relevant Product Data Sheets, and in a manner that prevents damage.

Installers shall be familiar with and comply with the manufacturer's Material Safety Data Sheet precautions for use, and use appropriate safety gear when handling materials. Carry plasterboard sheets on edge, and avoid damage to sheet edges, ends, and surfaces.

Installers shall conform with all relevant WorkSafe NZ Guidelines and Codes of Practice - including the OSH Guidelines For the Provision of Facilities and General Safety in the Construction Industry.

5.8.11 Preparation

5.8.11.1 General

All framing shall be complete and ready for GIB Aqualine® Wet Area Systems and associated GIB® plasterboard linings installation.

Timber framing shall comply with NZS 3604, or with NZS 3603 and AS/NZS 1170 for specific design, and have a maximum moisture content 18% at the time of plasterboard lining installation.

Light structural steel framing shall comply with the the requirements of AS/NZS 4600 or the NASH Standard for Residential and Low-rise Steel Framing, Part 1: Design Criteria. All light structural steel framing members shall satisfy the requirements of AS/NZS 1170. Comply with the steel framing fabricator's specifications and requirements for plasterboard installation.

Steel stud partitioning shall comply with AS 1397 and as specified and shown on the drawings. Comply with the manufacturer's specifications and requirements for plasterboard installation.

Concrete substrates shall comply with the CCANZ CP 01:2011 or with NZS 3109. New concrete must have aged for a minimum of 28 days. Ensure that concrete surfaces are within the tolerances specified.

Concrete masonry structures shall comply with NZS 4229, or with NZS 4230 and AS/NZS 1170 for specific design.

Carry out all necessary moisture readings. Do not commence installation until the moisture readings are below the required level.

Carry out all necessary substrate inspections and preparatory work in accordance with the manufacturer's recommendations and the GIB® Site Guide prior to installation. Complete and sign the GIB® Site Guide Pre-Installation Checklist.

Check that the building envelope has been finished at all penetrations including doors, windows, services, etc., and the building is weathertight.

Check junctions to all other building elements and ensure that all necessary works have been completed, including cavity insulation.

Check that all fixtures, fittings and built-in items are correctly installed, and that all framing and substrate edges are completed as detailed.

Confirm the location and details of movement control joints, as indicated on the drawings, prior to installation.

Ensure all pre-wiring and service piping is installed and complete.

Check that any required cavity insulation has been installed correctly and its bulk thickness does not exceed the framing thickness.

Remove all debris and rubbish from framing voids prior to installing linings.

The commencement of work on each section/area shall be deemed to indicate full acceptance by the installer that all preparatory works by other trades is complete.

5.8.11.2 Framing Check

Framing - check all aspects of preparatory works, including but not limited to:
- Check that the framing is straight and true to line, and is plumb/level and correctly aligned.
- Check that the framing is within the required deviation tolerances defined in AS/NZS 2589 according the specified Finish Level.
- Check that vertical and horizontal framing members are at the spacings shown on the drawings, and that any required battens or furring channels are installed to the required layout.
- Check that the framing has no projections due to structural and bracing bracketry, etc. Ensure that framing brackets, plates, braces, hold-downs, etc., are correctly installed.

5.9 Profiled Metal Wall Cladding

5.9.1 Scope

Supply and install Profiled Metal Wall Cladding, as specified herein, to the locations identified on the drawings complete with all components and accessories required for proper installation and performance. All aspects of this work shall be in complete accordance with the roofing manufacturer's technical literature and installation requirements, the NZ Metal Roof and Wall Cladding Code of Practice, other relevant product manufacturers' recommendations, and as shown on the drawings.

No substitutions are permitted for the specified Profiled Metal Wall Cladding.

5.9.2 Cladding Profile

Corrugated profiled metal wall cladding. Standard corrugated profile; 18mm deep; 76mm crest pitch.
Manufactured from the material type, thickness and finish as specified below.
Installed as vertically-orientated and/or horizontally-orientated profiled metal wall cladding in accordance with the NZMRM Code of Practice and the manufacturer's requirements to the locations and details shown on the drawings.

Location:

5.9.3 Material Type, Thickness & Finish

Corrugated-profiled metal wall cladding shall be manufactured from COLORSTEEL® Endura - 0.55mm BMT. Pre-painted hot-dipped galvanised zinc coated steel coil conforming with AS/NZS 2728.

Colour:

5.9.4 Components & Accessories

Cavity Battens. Refer to the Cavity Battens clause.

Cavity Closure Strip. Refer to the Cavity Closure Strip clause.

Metal Flashings. Metal flashings shall be in accordance with the details shown on the drawings and to the requirements of the NZMRM Code of Practice, and shall include all folded metal sections required to make the specified profiled metal wall cladding weathertight at:
- the building periphery,
- roof and wall junctions,
- changes of direction,
- intersections with other buildings,
- any wall penetration,
- junctions with other materials.

Metal flashings shall be fabricated from ductile grade metal of same material and coating as the cladding material, to maintain durability and compatibility requirements.

Metal flashings shall be designed for lateral strength by folding, stiffening or ribbing on external edges, and have a maximum un-stiffened width of 300mm.

The minimum thickness for metal flashings shall be:
- Coated steel: 0.55mm
- Aluminium: 0.9mm
- Copper: 0.6mm
- Zinc: 0.7mm
- Stainless steel: 0.45mm.

Flashing fastenings and fastening frequency shall be in accordance with the NZMRM Code of Practice.
Do not fix flashings to timber with a moisture content greater than 18%.
Do not construct flashing joints and flashing junctions in a manner that rely entirely on sealant to maintain weathertightness.

Compressible Foam Sealing Tape. Self-adhering, compressible foam sealing tape for sealing metal flashings and generally as required in accordance with the NZMRM Code of Practice recommendations and as shown on the drawings.

Sealant. Use only neutral-curing silicone sealant, compatible with the specified metal cladding and flashing materials and finishes, that is suitable for the required application and use in accordance with the sealant manufacturer's instructions and to NZMRM Code of Practice recommendations.
All sealed joints must be mechanically fastened, and excess sealant neatly removed to prevent unnecessary dirt buildup.
Sealant shall only be used to seal between two metal surfaces, do not fill holes or gaps with sealant.

5.9.5 Co-operation

Co-operate with other trades to ensure that all preliminary and preparatory works are completed to specification and as shown on the drawings.
Co-ordinate with other trades to ensure that the specified Profiled Metal Wall Cladding correctly allows for joinery installation, the location of pipes, outlets, meter boards and other fixtures and fittings installed by others, and to install the specified Profiled Metal Wall Cladding as required.

5.9.6 Workmanship

Where required by the NZ Building Act 2004 it is the building contractor's responsibility to ensure that all restricted building work is carried out by a Licensed Building Practitioner.

All installation work shall be carried out by experienced and competent tradespersons, familiar with the specified products and installation techniques, to fully comply with all warranty requirements in accordance with the roofing manufacturer's requirements. All work shall be such as to leave a neat, efficient, robust and weathertight installation.

All cutting, fixing and installation techniques, fastenings and sealants shall be exactly as recommended by the roofing manufacturer in accordance with the NZMRM Code of Practice and with the use of suitable tools and equipment appropriate for the application.

Always maintain isolation of dissimilar materials in accordance with the NZMRM Code of Practice. Isolate dissimilar materials (metal and non-metal) in close proximity as necessary by painting the surfaces or fitting separator strips. Place isolators between metals and treated timber or cement-based materials. Do not use unpainted lead-sheet or copper materials to come in contact with, or allow water run-off from these onto, galvanised or Zincalume® materials.

5.9.7 Delivery & Handling

Store profiled metal wall cladding, flashings and accessories undercover, clear of level ground, on bearers at evenly spaced centres as recommended by the roofing manufacturer. Keep stored materials and accessories dry and protected from damage and contamination at all times.
Do not used damaged or defective materials or products, or products that are beyond their designated shelf life.

Handle materials in accordance with the manufacturer's requirements and in a manner that prevents damage to or deterioration of the material, including surface marking.

Installers shall be familiar with and comply with the manufacturer's safe handling requirements and precautions for use, and shall use appropriate safety gear when handling materials.

Installers shall conform with all relevant WorkSafe NZ Guidelines and Codes of Practice - including the Worksafe Guidelines For the Provision of Facilities and General Safety in the Construction Industry.

5.9.8 Preparation

Vertically-Orientated Profiled Metal Wall Cladding - installed over a 20mm drained cavity and fixed to timber framing - check all aspects of preparatory works, including but not limited to:
Check that the timber wall framing complies with NZS 3604, or is in accordance with NZS 3603 and AS/NZS 1170 for specific design, and in accordance with the cladding manufacturer's requirements.
Check that the framing has studs at maximum 600mm centres and nogs/dwangs at maximum 480mm centres, is plumb and in true alignment, includes all blocking required for cavity battens and fixing at openings, joints, corners and soffits etc., and has a maximum moisture content of 20% at the time of cladding installation.
Check that the specified absorbent breather type building underlay (to NZS 2295) has been installed in accordance with NZBC requirements and the manufacturer’s recommendations, and with all finishing tapes, flashings etc. at windows, doors, corners and penetrations all correctly incorporated to provide a continuous seal. Where the studs are at greater than 450mm centres, check that appropriate additional restraint is correctly installed over the underlay to keep bulk insulation from pushing the underlay into the cavity space.
Check that all preparatory materials are lapped such that any water will run down to the exterior.
Check that any rigid air barrier to unlined gables and external garage walls is installed with an absorbent flexible underlay in accordance with E2/AS1 Table 23 and the manufacturer's recommendations.
Check that the ground levels are sloping away from the building so that there will be no ponding water against the building, and that the ground will be remain clear of the cladding by at least 100mm at all times in accordance with E2/AS1.

5.9.9 Cavity Battens

Plastic Cavity Battens for Vertically-Orientated Profiled Metal Wall Cladding installed over Timber Framing. Cavibat Cavity Battens, or similar-approved, 45 x 18mm polypropylene ventilating (fluted) cavity battens. Installed horizontally over the wall underlay and directly over nog/dwang lines at maximum spacing to suit the cladding profile and as shown on the drawings. Fix to timber framing with 40 x 2.5mm hot-dipped galvanised flat head nails spaced at maximum 800mm centres.

5.9.10 Cavity Closure Strip

Aluminium Cavity Closure Strip. Installed to the details shown on the drawings.

PVC Cavity Closure Strip. Installed to the details shown on the drawings.

5.9.11 Installation

Install Profiled Metal Wall Cladding in accordance with the NZMRM Code of Practice and the cladding manufacturer's requirements and as shown on the drawings.
As shown on the drawings, confirm the layout and location of all control joints; the layout of the cavity battens; and any specific cladding detailing requirements prior to installation.

Accurately set-out the planned cladding layout prior to fixing to ensure true and accurate cladding lines and incorporate correct relationships with other design features shown on the drawings; maintain this accurate set-out throughout installation.

Keep cladding lines consistent and true along walls and around corners; with side-laps of vertically orientated sheets directed away from the prevailing wind and/or line of sight; to straight, true and accurately aligned lines in both directions - vertical and horizontal. Check for and eliminate any creep and/or spread of sheets during installation.

Carefully set-out and fix the specified cavity battens and cavity closure strip to the framing, level along the base-line - 50mm minimum or as detailed - below the bottom plate or floor structure. Back-flash all internal and external corners to the details shown on the drawings prior to installing cladding sheets.

Cut Profiled Metal Wall Cladding and flashings by shear only – do not use abrasive cutting tools. Do not use black lead pencils for marking pre-finished metal cladding and flashings.

Prevent contact with, or run-off from, incompatible materials in accordance with the recommendations in the NZMRM Code of Practice.
Protect the coated surface from damage at all times; replace the whole sheet where a significant depth of the coating has been damaged (including flashings).

Screw-fixed sheets shall be fixed with fasteners appropriate for the cladding profile and material, substrate/structure and the environment in accordance with the cladding manufacturer's requirements and the NZMRM Code of Practice (minimum Class 4).
Screw fastening placement and spacings shall be strictly in accordance with the cladding manufacturer's requirements and the NZMRM Code of Practice to fully comply with the Wind Zone requirements, support frame spacings etc. Ensure the fastener layout is balanced to other

architectural features.
Screw fastenings for pre-painted metal must be pre-painted prior to installation for an accurate colour match.
Use fixing systems that will accommodate due allowance for dynamic local wind pressures on the building and thermal movement in the sheet.

Clip-fastened sheets shall be fixed with concealed fastening clips appropriate for the cladding profile and material, substrate/structure and the environment in accordance with the cladding manufacturer's requirements.

All cladding jointing techniques and sealants shall be in accordance with the cladding manufacturer's recommendations and the NZMRM Code of Practice, and shall be compatible with the cladding material and finish. Joints shall be sealed with an approved neutral-cure sealant or approved closed-cell lap tape.
Metal flashings generally, shall be in accordance with the NZMRM Code of Practice and as shown on the drawings.

Install flashings to internal and external corner junctions, window/door and other openings, eave and soffit junctions, parapets and at junctions with other cladding systems and building elements as detailed on the drawings and in accordance with the cladding manufacturer's requirements and the NZMRM Code of Practice.
All flashings shall be neatly formed and finished, securely fastened to the structure, weatherproof, and lapped such that any water will run down to the exterior.
For highly visible flashings, plan each flashing joint and/or junction with specific regard to aesthetic requirements.
Penetrations in the cladding that are greater than 150mm in any direction must have support framing installed around the perimeter of the penetration. Penetration flashings shall not rely solely on silicone sealant to achieve weathertightness of the flashing.
Flash pipes penetrating the roofing with a proprietary pipe collar flashing.

Completely clean off any swarf as the work proceeds.

5.9.12 Fixing

Pan-fix Corrugated profiled metal wall cladding - manufactured from COLORSTEEL® Endura and fixed to timber framing - with minimum AS 3566 Corrosion Class 4, Hex.Head-with-seal Self-drilling Screws in accordance with the NZMRM Code of Practice and cladding manufacturer's requirements. Class 5 or non-ferrous fasteners are recommended for severe or very severe marine environments.
Primary screw fastener embedment into timber framing must be a minimum of 35mm and greater than 6 times the screw thread diameter. Where a rigid underlay/sheet bracing is installed over the support framing, increase the screw length by the thickness of the rigid underlay/sheet bracing accordingly.
Pre-painted screws shall be factory pre-painted for an accurate colour match with the cladding.

5.9.13 Completion

Check that the Profiled Metal Wall Cladding and associated flashings and accessories have been installed and finished correctly.

Check for defective work, damage and surface marking - replace and/or repair as necessary.
Ensure that the work of other trades does not reduce the cladding to ground, deck or roof clearances that are required by the NZ Building Code.

Leave all of this work complete and weathertight and to the required standard in accordance with the NZMRM Code of Practice.
Leave the completed works and surrounding surfaces clean and free of debris and rubbish. Remove all rubbish and excess material from the site.

Issue to the Owner a copy of the cladding manufacturer's maintenance requirements upon completion of the contract works.

Provide the cladding material manufacturer's/supplier's 'Product Warranty' for the installed metal cladding product on the cladding manufacturer's Standard Warranty Form. Warrant this work under normal conditions and use against failure of coating and for weatherproofing by material penetration. Commence the warranty from the date of practical completion of the contract works. Factory applied coatings; the warranty period is determined by the specified product and the site location and environment - contact the cladding manufacturer to evaluate the warranty conditions.

Provide the installer's 'Installation Warranty' on the installer's Standard Warranty Form. Warrant this work under normal environmental conditions and use against weatherproofing failure. Commence the warranty from the date of practical completion of the contract works.

6 CLADDING & PRECLADDING

6.1 Preliminary

Refer to General Conditions of Contract and the Special Conditions in this Specification as appropriate. Read this section in conjunction with all other trade sections.

6.2 Compliance

Comply with the New Zealand Building Code 1992 including all revisions and amendments, Verification Methods where appropriate, and construction principles that are embodied in the Acceptable Solutions.

Comply with all relevant provisions and recommendations of:

3602:2003(NZS)	Timber and wood-based products for use in building
3604:2011(NZS)	Timber-framed buildings
3617:1979(NZS)	Specification for profiles of weatherboards, fascia boards, and flooring
3631:1988(NZS)	New Zealand timber grading rules
NZBC B2/AS1	Durability

6.3 Timber Weatherboard Cladding

6.3.1 Scope

Supply and install the selected Timber Weatherboard Cladding type(s) to the locations shown on the drawings, complete with all accessories. All aspects of this work shall be carried out to comply with the requirements of the New Zealand Building Code, relevant Standards, and in accordance with any specific manufacturer's requirements, other relevant product manufacturers' recommendations, and as noted and detailed on the drawings.

The following is a list and a general description of the extent of Timber Weatherboard Cladding work, which are more specifically defined in the contract documents, required for the completion of the contract works:

6.3.2 Vertical Weatherboard Profile

Vertical Shiplap Weatherboard: to the profile dimensions specified herein or on the drawings, machined to NZS 3617 and/or BRANZ Bulletin 411. Manufactured from the selected timber species to the finish specified.

Profile Dimensions:
Installed Location:

7 EXTERNAL WINDOW & DOOR JOINERY

7.1 Preliminary

Refer to General Conditions of Contract and the Special Conditions in this Specification as appropriate. Read this section in conjunction with all other trade sections.

7.2 Compliance

Comply with the New Zealand Building Code 1992 including all revisions and amendments, Verification Methods where appropriate, and construction principles that are embodied in the Acceptable Solutions.

Comply with all relevant provisions and recommendations of:

1734:1997(AS/NZS)	Aluminium and aluminium alloys - Flat sheets, coiled sheet and plate
1866:1997(AS/NZS)	Aluminium and aluminium alloys - Extruded rod, bar, solid and hollow shapes
2208:1996(AS/NZS)	Safety glazing materials in buildings
4211:2008(NZS)	Specification for performance of windows
4223.1:2008(NZS)	Code of practice for glazing in buildings - Glass selection and glazing
4223.2:2016(NZS)	Glazing in buildings - Part 2: Insulating glass units
4223.3:2016(NZS)	Glazing in buildings - Part 3: Human impact safety requirements
4223.4:2008(NZS)	Glazing in buildings - Part 4: Wind, dead, snow, and live actions
4667:2000(AS/NZS)	Quality requirements for cut-to-size and processed glass
4668:2000 (AS/NZS)	Glossary of terms used in the glass and glazing industry
AS/NZS 4666:2012	Insulating glass units

7.3 Aluminium Windows & Doors

7.3.1 Alternatives

The materials and elements specified indicate the required standards for these works. Alternatives which are equal to or superior to these materials and elements may be tendered for approval.

Thermal performance (NZBC H1/AS1) must be as required to meet the Designer's Thermal Evaluation.

7.3.2 Installation Type

7.3.2.1 Timber Frame Installation - Cavity Construction

All windows (and aluminium frame external doors) installation work shall be exactly in accordance with NZBC E2/AS1, the Windows Association's Windows Installation System (WANZ:WIS), and details on the drawings or supplied by the windows manufacturer.
Check framing alignment, and that window openings are square and the correct size for fitting tolerances.
Prepare framing openings by neatly cutting the building wrap at 45º into the corners, turning wrap through the frame depth and fixing to the inside face, flashing the bottom corners with moulded

plastic and over-flashing the full sill and 200mm up the jambs with the specified flexible flashing tape, stapled to hold the stretched external corners. At head corners install flashing tape 200mm each way from the corners.

Install the WANZ extruded aluminium support bar with built in drainage and ventilation to NZBC E2, to provide continuous support to the window unit. Install the head cavity closer, positioned to provide a 15mm drip edge to the cladding.

Set shims or pack as necessary and install the frames exactly true and square, blocked-up off the support bar as required. Use appropriate separators between aluminium and other materials, and fix securely with due regard for any anticipated movements and for linings, trim etc.

Install the head flashing, extending 35mm up behind the cladding (and in turn over-flashed with an additional piece of wrap cover extended up under the wrap or flashing or eaves above), sloping at 15º down to the exterior, and turning down to cover the top of the aluminium frame by at least 10mm, before finishing with a 5mm 45º 'kick out'. Upstand the head flashing ends as detailed. Install jamb flashings/ sealant or scribers as detailed.
After frames installation install closed cell backing rods as required and expanding foam air-seal the gap between framing and liners.

7.3.3 Interior Finish

GIB Groove.

7.3.4 Reveal

Timber reveals for paint finish with all sides primed.

7.3.5 Glass Platform

Double Glazed.

7.3.6 Finish

7.3.6.1 Powder Coated Aluminium - Matt

Polyester powder coating in accordance with WANZ Powder Coating Quality Assurance System and AAMA 2603-98 performance is required.

7.3.7 Hardware

Hardware colour matched to Aluminium Joinery.

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

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

7.3.8 Workmanship

These windows will be manufacturerd in workshops containing all mechanical equipment appropriate for the work, and by experienced and competent tradesmen who are familiar with the techniques and materials specified.

The manufacturer will co-ordinate with other trades to establish the exact sizes for all frames before fabrication. Frames and sashes will be fabricated true, square, rigid, and 'out of wind', with all joints strongly mechanically fixed, and with mitres tight and fully sealed. Potential thermal, wind and seismic movements will be accommodated within the construction. All cavities will drain to the exterior, and all drilling swarf etc. will be removed during fabrication.

Stays, hinges, running gear and glazing will be installed as scheduled (the Designer will be notified if any scheduled hardware of fixing position appears to be inappropriate for this project).

Hardware will be fixed true to line and position, and adjusted and oiled as required for correct operation.

Glass will be cut true and square, sized to provide correct edge clearances, blocked into place as required, and all units will be delivered either pressure fit, pocket glaze, or beaded/wedged, unless site glazing is required. Glazing gaskets will be compatible with all adjacent materials, and cut 1% over-length to absolutely avoid stretching during installation. Frames will be braced etc. as necessary for transportation to the site.

Flashings as detailed will be supplied. Flashing materials will be compatible with the windows.

7.3.9 Delivery and Installation

Comply with the New Zealand Building Code 1992 including all revisions and amendments, Verification Methods where appropriate, and the construction principles that are embodied in the Acceptable Solutions.

Arrange for delivery of windows to the site only when a suitable storage situation is available for them, handle the windows in accordance with the manufacturers requirements, avoid any frame distortion, avoid rubbing damage, avoid contact with concrete, plaster, mud etc. and keep them dry. Retain protective coverings for as long as possible, and remove them at completion.

Experienced and competent tradesmen who are familiar with the techniques and materials specified shall carry out all installation work. Fix in accordance with the manufacturer's instructions. Take utmost care to avoid damage to anodized or powder coated surfaces - correction of any such disfigurement requires written authority - replace any badly damaged items.

Use fixings compatible with the materials involved, as recommended by the windows manufacturer and to comply with the DWP requirements, basically aluminium or Type 316 stainless steel where exposed externally; galvanized to AS/NZS 4680, 610g/m2, may be used where not exposed.

Thoroughly check all preparatory work to openings prior to installation, including underlay, corner seal tapes, adjacent cladding, pre-installed flashings, waterproofing systems etc. as appropriate. Use

inert barriers or coatings to prevent contact between dissimilar metals or between aluminium and concrete.

Install flashings as detailed and supplied by the windows manufacturer, installed tightly and neatly with absolute minimum tolerances, with head weathering jamb, jamb weathering sill, and sill open (draining) to exterior. Except where the window is recessed all head flashings shall extend 30mm minimum beyond the frame.

Air-seal all frame perimeters to adjacent structure to a depth of 15 - 20mm with expanding foam or appropriate sealant including a PEF rod at head, sill and jambs to retard the spread of sealant.

Weather-seal frame jambs etc. to adjacent surfaces (or to each other) as detailed or as required by the windows manufacturer, to achieve a fully watertight installation. In preparation for sealant the joints shall be clean, dry, and primed if necessary. Insert closed cell polyethylene backer rods or a polyethylene tape slip layer if required. Mask adjacent surfaces if appropriate, install the sealant fully in accordance with the sealant manufacturer's recommendations, and finish to even smooth surfaces.

Remove trade debris progressively, appropriately clean any affected adjacent surfaces, thoroughly clean the windows, check that all hardware is in full working order, and provide safety indication of the glass for the balance of adjacent works.

8 GLAZING

8.1 Preliminary

Refer to General Conditions of Contract and the Special Conditions in this Specification as appropriate. Read this section in conjunction with all other trade sections.

8.2 Compliance

Comply with the New Zealand Building Code 1992 including all revisions and amendments, Verification Methods where appropriate, and construction principles that are embodied in the Acceptable Solutions.

Comply with all relevant provisions and recommendations of:

3604:2011(NZS)	Timber-framed buildings
4223.1:2008(NZS)	Code of practice for glazing in buildings - Glass selection and glazing
4223.3:2016(NZS)	Glazing in buildings - Part 3: Human impact safety requirements
4223.4:2008(NZS)	Glazing in buildings - Part 4: Wind, dead, snow, and live actions

8.3 Non-Structural Glazing

8.3.1 Scope

Supply and install the selected glass products to the windows, doors, curtain wall systems, roofs and canopies, balustrades and barriers, partitions and screens, and other non-structural glazing elements, as noted and shown on the drawings. All aspects of this work shall be in accordance with the glass manufacturer's installation requirements and recommendations, other relevant product manufacturers' recommendations, and as shown on the drawings.

8.3.2 Co-operation

Co-operate with other trades to ensure that all preliminary and preparatory works are completed to specification and as shown on the drawings.
Co-ordinate with other trades for all necessary holes and cut-outs etc. for glass mounted hardware, fittings and fixtures, and to install all glass and glazed elements as required.

8.3.3 Workmanship

All installation work shall be carried out by experienced and competent tradesmen familiar with the products specified and installation techniques, to the manufacturer's requirements and recommendations, and the requirements of the relevant Glazing Standards, and to the layout and details shown on the drawings.
Handle and store glass in accordance with the manufacturer's recommendations.
Provide temporary safety markings to all glass panes as the installation work progresses.
Finish all external glazing wind and watertight.
Do not use damaged, marked or faulty materials.

8.3.4 Glass Type

Clear Float Glass: Clear annealed float glass, in accordance with NZS 4223, to the locations identified on the drawings.

Tinted Float Glass: Tinted annealed float glass, in accordance with NZS 4223, to the locations identified on the drawings.

Obscure and Patterned Glass: Surface patterned glass and obscured glass, in accordance with NZS 4223, to the locations identified on the drawings.

Toughened Safety Glass: Toughened Grade 'A' Safety Glass, in accordance with AS/NZS 2208 and NZS 4223, to the locations identified on the drawings. All cutting and drilling and other processing requirements shall be done prior to toughening. Install safety glass in accordance with the manufacturer's recommendations and NZS 4223.

Mirrored Annealed Glass: Clear annealed float glass, in accordance with NZS 4223, with reflective silvered coating and manufacturer-applied protective backing.

8.3.5 Components & Accessories

Provide all necessary glazing components and accessories including glazing tape, setting and distance blocks, sealants, gaskets, etc., to complete aluminium framed glazing as required.

8.3.6 Mirrors

Frameless mirrors to the dimensions noted on the drawings, all edges finished as specified. Install to the locations indicated on the drawings with an approved adhesive and double sided adhesive tape in accordance with the glazing manufacturer's recommendations.

8.3.7 Splashbacks

Splashbacks to the dimensions and shapes noted on the drawings, all edges finished as specified. Install to the locations indicated on the drawings with an approved adhesive and double sided adhesive tape in accordance with the glazing manufacturer's recommendations.

8.3.8 Edge Finishing

Flat polished edges to frameless mirrors.

Flat polished edges to exposed splashback edges.

8.3.9 Back-Painted Glass

Back-painted glass, to the locations shown on the drawings. The specified product shall be factory applied in accordance with the paint manufacturer's specifications and requirements. Do not install scratched or defective back-painted glass.

8.3.10 Completion

Check that all glass has been installed correctly to the required standard and as shown on the drawings. Check for damage and surface marking and replace as necessary. Clean off and remove all

temporary safety markings, as programmed and when instructed, and leave glass trade clean.
Remove all rubbish and waste material from site.
Issue to the Owner a copy of the Glass Manufacturer's maintenance requirements and all necessary Manufacturer Warranties.

9 INSULATION

9.1 Preliminary

Refer to General Conditions of Contract and the Special Conditions in this Specification as appropriate. Read this section in conjunction with all other trade sections.

9.2 Compliance

Comply with the New Zealand Building Code 1992 including all revisions and amendments, Verification Methods where appropriate, and construction principles that are embodied in the Acceptable Solutions.

Comply with all relevant provisions and recommendations of:

3604:2011(NZS)	Timber-framed buildings
4218:2009(NZS)	Thermal insulation - Housing and small buildings
4220:1982(NZS)	Code of practice for energy conservation in non-residential buildings
4243.1:2007(NZS)	Energy efficiency - Large buildings - Building thermal envelope
4246:2016(NZS)	Energy efficiency - Installing bulk thermal insulation in residential buildings
4859.1:2018(AS|NZS)	Thermal insulation materials for buildings - Part 1: General criteria and technical provisions

9.3 Thermal Insulation

9.3.1 Scope

Supply and install the selected products as thermal insulation to the specified R-values, complete with all accessories, to the floors, walls, ceilings, roofs, and other thermally insulated building elements, as noted and shown on the drawings. All aspects of this work shall be in accordance with the product manufacturer's technical literature and installation requirements, other relevant product manufacturers' recommendations, and as shown on the drawings.

9.3.2 Co-operation

Co-operate with other trades to ensure that all preliminary and preparatory works are completed to specification and as shown on the drawings.
Co-ordinate with other trades to install all thermal insulation as required.

9.3.3 Workmanship

All installation work shall be carried out by experienced and competent tradesmen, familiar with the specified products and installation techniques, in accordance with the manufacturer's installation requirements, and as noted and detailed on the drawings.
Store and handle products in accordance with the manufacturer's recommendations, keep dry and protect from damage. Do not compress fibre insulation bales. Do not use damaged or defective insulation products and accessories.
The building must be completely enclosed and water tight before installation commences with the

exception of roof insulation when installed with roofing. Ensure the moisture content of timber framing is no greater than 18% prior to installing insulation to timber framed elements. Always maintain the full insulation thickness to ensure the required thermal values are achieved. Do not install insulation pads or blankets into closed cavities that are less than the stated insulation nominal thickness.

9.3.4 Product

9.3.4.1 Glass Fibre Pads

Glass fibre thermal insulating pads.

Manufacturer, brand name & type:
Thickness & R-Value:
Location:

9.3.5 Installation

9.3.5.1 Wall Insulation - Glass Fibre Pads

Install glass fibre insulation pads, complete with accessories, friction fitted between wall studs and dwangs etc. and held in place in accordance with the manufacturer's installation recommendations. Completely fill the framing voids, leave no gaps at the edges or at penetrations etc, and maintain full insulation pad thickness. Support external wall insulation with vertical strapping tape at 400mm centres to the outside face, stainless steel stapled to the framing.

9.3.5.2 Ceiling Insulation, Truss/Framed Roof - Glass Fibre Pad

Install glass fibre insulation pads, complete with accessories, friction fitted between the ceiling joists, over the ceiling lining in accordance with the manufacturer's installation recommendations. Leave no gaps along the insulation pad edges and joints, and at the ceiling perimeter/wall junction.

For recessed luminaires LEDs & Control-gear, rated IC, IC-F & IC-4 to cover, follow manufactures instruction on insulation in line with NZS4246.

For all other separate ceiling insulation 200mm from recessed light fittings and other recessed electrical fittings; refer to the drawings for containment requirements around recessed electrical fittings.

9.3.6 Completion

Check that all insulation has been installed correctly and is correctly supported and that all edges, joins and ends are fully closed without gaps. Check for damage and faults and repair or replace as necessary. Collect and remove from site all rubbish and waste material.
Issue to the Owner a copy of any product maintenance requirements and a copy of the Thermal Insulation Product and Installation Warranties for the completed works.

10 ROOFING

10.1 Preliminary

Refer to General Conditions of Contract and the Special Conditions in this Specification as appropriate. Read this section in conjunction with all other trade sections.

10.2 Compliance

Comply with the New Zealand Building Code 1992 including all revisions and amendments, Verification Methods where appropriate, and construction principles that are embodied in the Acceptable Solutions.

Comply with all relevant provisions and recommendations of:

2295:2006(NZS)	Pliable, permeable building underlays
2904:1995(AS/NZS)	Damp-proof courses and flashings
3604:2011(NZS)	Timber-framed buildings
4200.1:2017(AS|NZS)	Pliable building membranes and underlays - Part 1: Materials
4389:2015(AS/NZS)	Roof safety mesh
4534:2006(AS/NZS)	Zinc and zinc/aluminium-alloy coatings on steel wire
NZMRM Code of Practice	NZ Metal Roof and Wall Cladding Code of Practice - Version 2.2

10.3 Roofing Systems - Profiled Steel

10.3.1 Scope

Supply standard corrugated profile 0.55BMTxG300 galvanized steel roofing and install it to the areas shown on the Roof Plan. All handling and fixing techniques, and all jointing and sealing materials and techniques, shall be exactly as recommended by the roofing manufacturer.

10.3.2 Preparation

Co-operate to ensure that roof framing has appropriate spacings and fixings, is in accordance with NZS 3604, and coordinate to ensure that all timber members required for ridges, hips, valleys, barges, penetrations, junctions with vertical faces, etc. are correctly in place. Lap sheets away from the prevailing wind. Set-out the roofing sheets exactly square to the building axis and maintain this throughout the works.

10.3.3 Fixings

10.3.3.1 Fixings - Corrugated Steel Roofing

Screw fix with screws that comply with AS 3566 (Self-drilling construction screws) Class 3 or 4. Use only low carbon (15% or less content) non-conductive sealing washers. Screw at centres as advised by the local Rollformer, to fully comply with the Wind Zone requirements, purlins spacings etc. Use fixing systems that will accommodate thermal expansion for long lengths. NO use of abrasive disc cutters.

10.3.4 Flashing

Ridges, hips, and barge flashings etc. shall all be matching galvanized steel, and as detailed. Soft edge flashings very neatly dressed down where required, plumbing penetrations custom flexible rubber flashed (fully sealed), and instruct the Plumber that no copper (or brass) pipes are to discharge on to the roof.

10.3.5 Completion

Protect the galvanizing from damage at all times; replace the whole sheet where a significant depth of the coating has been damaged. Completely clean off all drill and power saw swarf and pop-rivet shanks as the work proceeds (at least daily, and keep them and other rubbish out of the spoutings).

10.4 Underlay, Foil & DPC

10.4.1 Scope

Supply and install Underlays, Foil and DPC materials, as specified herein, to the locations identified on the drawings, complete with all accessories required for proper installation and performance. All aspects of this work shall be in accordance with the product manufacturer's technical literature and installation requirements, other relevant product manufacturers' recommendations, and as shown on the design drawings.

This specification should be read in conjunction with other relevant specification sections as they are interrelated.

10.4.2 Requirements

10.4.2.1 Safety

Comply with the Health and Safety at Work Act 2015 (HSWA), and with all relevant Health and Safety at Work Regulations 2016, and with all relevant WorkSafe New Zealand (WorkSafe) Approved Codes of Practice and WorkSafe Information and Guidance, particularly those for construction and building maintenance.

10.4.2.2 Inspections

Inspections shall take place at each of the stages as scheduled in the Building Consent. Confirm a written programme to facilitate these inspections, including notification when each stage of the work is ready for inspection.

10.4.2.3 Co-operation

Co-operate with other trades to ensure that all preliminary and preparatory works are completed to specification and as shown on the drawings.

Coordinate with other trades as required to install underlays, foils and DPC.

10.4.2.4 Workmanship

Where required by the NZ Building Act 2004 it is the building contractor's responsibility to ensure that all restricted building work is carried out by a Licensed Building Practitioner.

All installation work shall be carried out by experienced and competent tradespersons, familiar with the specified products and installation techniques, in accordance with the manufacturer's requirements, and to fully comply with all warranty requirements.

All cutting, joining, fixing and sealing techniques shall be exactly as recommended by the manufacturer, and carried out with the use of suitable tools and equipment appropriate for the application. All work shall be such as to leave a neat, efficient, and weathertight installation.

10.4.2.5 Delivery & Handling

Inspect materials for damage and defects upon delivery; reject any damaged or defective products, and immediately contact the supplier for replacement. Do not used damaged or defective products, or products that are beyond their designated shelf life.

Store underlay rolls on end, under cover in a clean, dry environment, in accordance with the manufacturer's recommendations. Keep stored products dry, out of direct sunlight, and protected from damage, moisture and contamination at all times.

Handle products in accordance with the manufacturer's requirements, and in a manner that prevents damage to the product and does not reduce its performance.

Installers shall be familiar with and comply with the manufacturer's safe handling requirements and precautions for use, and shall use appropriate safety gear when handling materials.

Installers shall conform with all relevant WorkSafe NZ Guidelines and Codes of Practice - including the OSH Guidelines For the Provision of Facilities and General Safety in the Construction Industry, and the Best practice guidelines for working on roofs for roofing installations.

10.4.2.6 Completion

Check underlay, flashing tape, etc., have been installed correctly, and that all edges, joins and ends are correctly finished prior to closing off with wall/roof cladding.

Check for damage and defective work - replace and/or repair as necessary to the required standard in accordance with the manufacturer's requirements.

Leave all of this work complete, free of damage and defects, and to the standard required for the installation of subsequent cladding and/or roofing, and in accordance with all warranty requirements.

Remove all associated rubbish and excess material from the site.

10.4.3 Roof Underlay

10.4.3.1 Bituminous Kraft Roof Underlay - Self-Supporting

Self-Supporting Kraft Roof Underlay. NZS 2295 Type R2 Kraft. A self-supporting, breathable, absorbent, non-fire retardant, bituminous roof underlay. Installed as a roof underlay in accordance with the manufacturer's requirements, AS/NZS 2295:2006 and NZBC E2/AS1. Maximum 1200mm unsupported span. When support spans are greater than 1200mm and / or, the roof pitch is less than 10 degrees, the roof underlay must be supported with galvanised wire netting or safety mesh (as

specified). The installation of roof underlay must be considered as part of the overlaying cladding system, not in isolation.
Brand:
Material:
Nominal Weight (g/m²):
Roll Width:
Installed Location:
Support material:

10.4.4 Accessories

10.4.4.1 Roof Underlay Support - Galvanised Wire Netting

Roof Underlay Support - Galvanised Wire Netting. 50mm or 75mm hexagonal, galvanised, mild steel wire netting. 1.0mm diameter wire, 150g/m² galvanised coating, 380-550 kPa tensile strength. Galvanised in accordance with AS/NZS 4534, Class W10. Installed in accordance with the manufacturer's requirements.

10.4.5 Preparation

10.4.5.1 Framed Structures - Underlays & Foils

Prior to installation, carry out all necessary inspections and preparatory work required, and ensure that all preliminary works by other trades has been completed to specification and as shown on the approved drawings.

Do not commence installation until all necessary preliminary works by others is complete and to the required standard. The commencement of work shall be deemed to indicate full acceptance by the installer that all preliminary works by other trades is complete.

Supporting timber framing shall comply with NZS 3604, or with NZS 3603 and AS/NZS 1170 for specific design, and have a maximum moisture content of 20% at the time of cladding installation. Allow LOSP treated timber to sufficiently flash-off before installing building underlays and foils.

Supporting light structural steel framing shall comply with the requirements of AS/NZS 4600 or the NASH Standard for Residential and Low-rise Steel Framing, Part 1: Design Criteria. Comply with the light structural steel framing fabricator's specifications and requirements for fixing cladding and roofing components.

Supporting heavy steel structures shall comply with NZS 3404.

10.4.5.2 Roof Structure Check - Roof Underlay

Roof Structure - prior to roofing underlay installation check all aspects of preparatory works, including but not limited to:
- Check that the supporting purlins or battens are set-out to the required set-out and spacings, are straight and true to line and plane, and are securely fixed.
- Check that all barge and fascia boards have been installed to the correct line and plane with all edge blocking complete and secure.

- Check that valley gutter and hidden gutter framing is to the required dimensions with solid backing supports securely fixed, true to line and plane.
- Check that internal gutter membrane linings are complete, and dressed back and adhered to a solid substrate along the roof edge as shown on the approved drawings.
- Check that all trimming for roof penetrations, all roof/wall junction blocking, and all necessary work by other trades is complete.
- Check that solid sarking required for fully-supported roofing is complete and securely fixed in accordance with the approved drawings.
- Check that any required anti-ponding boards for masonry tiled roofs have been correctly installed to a minimum 5° (1:12) fall to the eaves gutter.

10.4.6 Installation - Roof Underlay

10.4.6.1 Wire Netting

Wire netting shall be run across rafters/truss chords or across purlins, and fixed in place. On masonry tiled roofs where the roof underlay is required to have a sag to facilitate drainage, the wire netting shall be laid with a sag to accommodate the underlay. In all other cases the wire netting must be pulled taut.

Fixings:
- Timber Framing: fix with 25mm stainless steel staples or 25mm galvanised clouts.
- Steel Framing: fix with hot-dipped galvanised or stainless steel self-tapping screws, with a minimum 10mm embedment beyond the drill point into the steel framing.
- Placement: fixings must be at 150mm centres and must anchor the wire netting such that it cannot pull through the fixings when loaded between adjacent framing members. Elsewhere fix the wire netting at edge wires and in the centre to each framing member it passes over. Wire tie the side edges of wire netting together at 300mm centres, between roof framing fixings.

10.4.6.2 Self-Supporting Roof Underlay - profiled metal roof

Install self-supporting roof underlay in accordance with the manufacturer's requirements, to the locations and details shown on the design drawings.

Roof Pitches above 10º:
Unless otherwise specified on the design drawings, lay roof underlay horizontal or vertical to the roof slope, starting from the gutter/lowest point up to the ridge/highest point, overhanging fascia boards 20-25mm, and with minimum 150mm side-laps and end-laps, and lapped away from the prevailing wind, and sufficiently tensioned to prevent ponding of condensation. All end-laps must be made over solid framing. Individual lengths shall not exceed the maximum run length permitted by NZS 2295.

Roof Pitches below 10°:
- Unless otherwise specified on the design drawings, lay roof underlay horizontal to the roof slope, starting from the gutter/lowest point up to the ridge/highest point, overhanging fascia boards 20-25mm, with minimum 150mm side-laps and end-laps, lapped away from the prevailing wind, and sufficiently tensioned to prevent ponding of condensation. All end-laps must be made over solid framing. Individual lengths shall not exceed the maximum run length permitted by NZS 2295.

Fix roof underlay at maximum 300mm centres across the width of the underlay and capturing all edges using 8mm stainless steel staples, or 20mm large-head galvanised clouts, or proprietary underlay fasteners, or self-drilling wafer head screws.

Finish roof underlay along roof edges and junctions, valley gutters, and at the ridge as shown on the drawings. Extend the underlay over ridges by at least 150mm.

Carefully cut roof underlay at openings and penetrations, at 45º angle away from each corner, and lap-tape closed to framed up-stands, ducts and other services penetrating the underlay, in accordance with the manufacturer's requirements and as detailed.

Flue penetrations in the roof must have a minimum distance of 50mm from the outer liner to the underlay.

11 TILING

11.1 Preliminary

Refer to General Conditions of Contract and the Special Conditions in this Specification as appropriate. Read this section in conjunction with all other trade sections.

11.2 Compliance

Comply with the New Zealand Building Code 1992 including all revisions and amendments, Verification Methods where appropriate, and construction principles that are embodied in the Acceptable Solutions.

11.3 Workmanship

11.3.1 Co-operation

Co-operate with the Contractor and other Subcontractors to ensure that substrates are completely appropriate for the tiling required, particularly with regard to concrete surface finish, the use of retarders, release agents or curing compounds, and with regard fixing and finishing of sheet substrates and their support.

11.3.2 Workmanship

No retempering of partially set or dried mortar, adhesive or grout. Prior to grouting rake out any excess bedding material. Grout shall be coloured as directed, placed full depth, and finish tooled to a dense, uniform surface. Clean excess grout off tiles and adjacent surfaces.

Form control joints at tiling edges abutting concrete or masonry, within the tiled surface to give a maximum panel dimension of 2m, and over any control joints in the substrate. Rake control joints full depth to the substrate as work proceeds, mask edges and clean out just prior to placing filler, and fill full depth and flush. Clean excess filler off the tiles or other surfaces.

On completion thoroughly clean the full tiled surfaces, and lightly buff where appropriate. Protect finished work from subsequent damage.

Delay tiling to allow maximum curing and settling and initial creep of the substrates, particularly to load bearing structural elements.

All work by competent and experienced tilers. Co-ordinate with other trades and instruct them as necessary to ensure appropriate substrate conditions to assure first class tiling results.

Set out tiles as detailed or for even margins with patterns to register in all directions. The finished surfaces shall be true and even and with lines accurate, level and plumb, or to even falls as noted, and finished flush with adjoining work as appropriate. Cut edges to the manufacturers instructions, and stone arris where the cut edges are not concealed under adjoining work.

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12 INTERNAL DOORS & JOINERY

12.1 Preliminary

Refer to General Conditions of Contract and the Special Conditions in this Specification as appropriate. Read this section in conjunction with all other trade sections.

12.2 Compliance

Comply with the New Zealand Building Code 1992 including all revisions and amendments, Verification Methods where appropriate, and construction principles that are embodied in the Acceptable Solutions.

Comply with all relevant provisions and recommendations of:

1491:1996(AS/NZS)	Finger jointed structural timber
1859.1:2017(AS|NZS)	Reconstituted wood-based panels - Specifications - Part 1: Particleboard
2208:1996(AS/NZS)	Safety glazing materials in buildings
2924.1:1998(AS/NZS)	High pressure decorative laminates - Sheets made from thermosetting resins - Classification and specifications
3601:1987(NZS/BS)	Specification for carbon steel pipes and tubes with specified room temperature properties for pressure purposes
3602:2003(NZS)	Timber and wood-based products for use in building
3610:1979(NZS)	Specification for profiles of mouldings and joinery
3619:1979(NZS)	Specification for timber windows
3631:1988(NZS)	New Zealand timber grading rules

12.3 Workmanship

12.3.1 Workmanship

All work shall be carried out by or under the direct supervision of competent and experienced joiners in accordance with recognised good trade practice, and shall be carried out in a properly established workshop complete with all mechanical equipment appropriate for the work. All work shall be in strict accordance with the drawings.

Confer with the Main Contractor to check openings sizes, fittings limiting dimensions and available access dimensions (and make provision for site assembly if appropriate). Additional dimensions will be supplied by the Architect/Designer if required.

All items assembled by appropriate joints customarily employed in good quality work. Joints shall be accurately cut, fitted and full surface glued and shall be tongued, mortice and tenon, doweled or housed in preference to scarfed or mitred. Use screws in preference to nails or brads. Install glue blocks in appropriate locations. Unavoidable screw pockets matching buttoned in clear finished work.

Fine machine sand all visible surfaces and handsand finish to a clean, even surface all clear finished cabinets. Lightly sand arris all projecting edges.

All veneers shall be A grade, completely free of bark pockets, checks, gum streaks, resin pockets, stains, knots (of any size), or pith. Adjacent veneers and boards in clear finished work shall be carefully selected to provide good continuity of colour and grain pattern; this particularly applies to clashing strips on veneered MDF which shall be 2mm thickness solids.

The following are unacceptable defects and will most likely result in rejection of cabinets specified for clear finishing:
a) Scratches, bruises, machine or hammer marks on exposed surfaces;
b) Glue stains on clear finish specified work;
c) Iron-on veneers;
d) Corrugated fasteners and machine staples;
e) Baseboard showing through veneers through excessive sanding (to remove marks presumably).

12.3.2 Delivery

Brace and / or crate all items as required to prevent distortion or disfigurement during transit. Arrange for delivery to site, not during inclement weather. Attend upon the carpenter to identify items and instruct in assembly procedures.

12.4 Materials

12.4.1 Timber

All timber true to NZS 3631 and equal or better than dressing A for all joinery work. Items fabricated from timber which in the opinion of the Architect/Designer is substandard shall be removed from the site.

All timber shall be seasoned to the stable moisture content (approximately 12% for most joinery applications) suitable for its location in the finished work; if the use of inadequately seasoned timber results in winding, warping, twisting or shrinkage opening of joints in the finished work the item shall be replaced (by the Joiner, excepting where the damage has resulted from excessive heating, placing in direct sun or other improper handling). Installation of cabinets shall be delayed until the building is watertight and has dried sufficiently to allow for the maximum settling of substrates.

All timber shall be to nominal sizes shown or specified subject only to normal cutting and dressing tolerances. All non-heart timber used, including cores to doors, etc. shall be treated, and shall be re-seasoned to the correct moisture content after treatment. Joinery timber shall have all machine marks, stains and roughness removed and shall all be sanded smooth.

Ensure that all enclosed surfaces of exterior joinery frames are fully primed before fixing. (If this trade carries out the priming it shall be to the standards required of the Painter).

Unless noted otherwise timbers as follows (use of alternate grades and varieties to those specified is subject to approval in each specific case):

H3.2 Finishing Radiata - Exterior joinery frames, Exterior glazed doors
H1.2 Finishing Radiata - Interior door frames painted
H1.2 Radiata clears - Cabinets specified painted

D.A. Rimu - Interior door frames varnished
D.A. Ht. Rimu and Ht. Rimu veneered board - Cabinets clear finished
D.A. Victorian Ash - Interior doors and stair balustrade capping, varnished.

12.4.2 Hardware

Nails and screws for construction shall be of appropriate gauge, thread design, corrosion resistance, length, material, and finish. Screws to hardware of material and finish to match the hardware item.

Refer to drawing notes for all finishing hardware.

Unless otherwise noted hang the exterior doors on three stainless steel fixed pin 100mm butts, broad butt where 180 degree opening is possible.

Unless otherwise noted interior doors hung on three stainless steel 100mm butts or four off 80x40 stainless steel hinges for 25mm thick doors.

Unless otherwise noted hang cabinet doors on Grass, Blum, Hafele, or Hettich where face fixed.

12.4.3 Hardware Finish

Unless specified or noted otherwise, architectural hardware and furniture shall be finished Polished Chrome.

Unless specified or noted otherwise, architectural hardware and furniture shall be finished Satin Chrome.

Unless specified or noted otherwise, architectural hardware and furniture shall be finished Brushed Satin Chrome.

12.5 Joinery Elements

12.5.1 Doors

All aspects of exterior and interior doors are specified and noted on the schedules.

12.5.2 Exterior Doors

Exterior quality solid-core-flush ply faced paint finished. Door frames rebates 8mm wide x 5mm deep weathergrooved as a minimum. Fabricate frames with housed and checked joints.

12.5.3 Windows / Exterior Doors

Fixed glazed panes beaded directly (no sub-sash). Beads square profile to heads and jambs and weathered to sills.

Glass as scheduled. Glass cut true and square, sized to give correct edge clearances, blocked in place as required, bedded fully, and securely beaded or sprigged and puttied. Bed large fixed panes in BR606.

12.5.4 Cabinets

Site check overall dimensions as appropriate. Allow positioning tolerances for cabinets full length between walls. Cabinets shall be assembled true and square. All cabinets to have full surface plain white prefinished backing board backs except where noted otherwise. All divisions between cupboards solid full depth. Use plain white Seratone drawer bottoms if not noted otherwise. Allow 2mm paint/varnish tolerance where appropriate. Supply all exposed shelves, etc. where specified varnished, and assemble shelves complete where finite dimensions are given.

13 PAINTING & DECORATING

13.1 Preliminary

Refer to General Conditions of Contract and the Special Conditions in this Specification as appropriate. Read this section in conjunction with all other trade sections.

13.2 Compliance

Comply with the New Zealand Building Code 1992 including all revisions and amendments, Verification Methods where appropriate, and construction principles that are embodied in the Acceptable Solutions.

Comply with all relevant provisions and recommendations of:

2310:2002(AS/NZS)	Glossary of paint and painting terms
2311:2017(AS/NZS)	Guide to the painting of buildings
3750.0:2008(AS/NZS)	Paints for steel structures - Introduction and list of Standards

13.3 General

13.3.1 Alternatives

The materials specified in this section or on the drawings indicate the required standards for these works. Alternatives which are considered equal to or superior to these may be tendered for approval (in writing, and they must NOT be used unless they are approved in writing).

13.3.2 Co-operation

Co-operate with all trades and attend upon Concretor, Joiner, Carpenter, etc. to ensure that the surfaces provided by these trades are completely suitable for the Painter works that are required.

13.3.3 Preparation

No painting or varnishing or other surface coating work shall be undertaken unless the surfaces to be coated are in a correct and proper condition to ensure first class results.

Inspect the works of other trades on which Painter work is scheduled and report to the Main Contractor and the Architect/Designer any defects or irregularities that would affect the permanency or finish of the painting work, and do not proceed until the defects or irregularities have been completely rectified. Failure to examine and report will be construed as an acceptance that all preparatory works are completely satisfactory.

This clause does not relieve the Painter of any of the usual preparatory work to surfaces customarily performed by this trade.

Clean down all surfaces with sugar soap, strippers, mould killers, etching agents, etc. as required. Sand or rub all sharp edges off exterior timbers and other materials as appropriate before painting. Finish rub down ALL surfaces. Ensure that the moisture content of all substrates is appropriate. Remove locks, fastenings, and similar hardware before painting and refix on completion. Remove all

electrical switch and power plates before painting and refix them on completion. Mask adjacent surfaces as required to a true line and remove the masking on completion. Dust and wipe down all surfaces for Painter work and completely remove all dust, rubbish, dirt etc. from areas involved immediately prior to commencement. To each area of the works complete all surface preparation before applying paint to any surface.

13.3.4 Protection

Take adequate precautions to prevent paint spots falling on prefinished or similar surfaces, and extreme care to keep absorbent materials (e.g. cedar, sawn framing, decking, paving) completely clean during all adjacent painting work. Correction of any such disfigurement shall be to the Architect/Designer's approval.

13.3.5 Qualifications

All work by the Painting Subcontractor shall be of the highest reasonable standard, and executed by experienced and competent tradesmen to the Architect/Designer's approval.

13.3.6 Workmanship

Strictly adhere to all Manufacturers' instructions.

Strictly observe Manufacturers' requirements with regard to surface and air temperatures for painting. No work shall be carried out on surfaces that are not completely dry, and no external work shall be carried out during damp or wet conditions.

In all finishes any irregularities or brushmarks or dust etc. in each preceding coat shall be rubbed down to provide a smooth clean surface for the following coat. Each coat shall be finished over all surfaces before a further coat is applied, and each coat shall be completely dry before subsequent coats. Finish broad areas before painting trim, paint ceilings before walls and walls before joinery, trim and other items.

Each coat and the full completed system shall be of uniform finish, colour, texture and sheen, shall have proper covering of thin edges, corners, end grain etc. and shall be free of blemishes such as runs, sags, fat edges, entrained hairs, brush marks, starved patches etc.

13.3.7 Wallpapers & Lining Papers

Wallpapers and lining papers, where scheduled, shall be hung plumb, true and square, and with precise butts. Patterns shall be accurately matched at each join. All rolls used in any one area shall be from the same batch. Use a fungicide incorporated adhesive that is recommended by the supplier. Edges neatly and precisely cut to the adjacent element. Finish free of air bubbles, wrinkles, gaps or stains.

13.3.8 General

The schedules indicate the general extent of the works to be carried out but are in no way exhaustive in their description of the actual items for painter work. Complete all work necessary for the proper and entire completion of the works. All items and portions of items reasonably inferable but not

specifically mentioned are deemed included, i.e. cupboard interiors, the top and bottom of doors, unseen cabinetry tops, etc. All doors shall have equal painter work on ALL surfaces.

Where timber work is specified for priming before fixing the priming shall be thoroughly brushed in to all surfaces, and all exterior timber work for paint finishing shall be fully primed within one week of fixing. Should more than one month elapse between priming and undercoating the timber shall be fully reprimed.

Stopping up work shall be carried out immediately the priming or sealing coat is dry, and shall be solidly placed to finish clean and dry. Stopping tinted to match the timber for clear finished work.

Paint putties within one month of glazing timber frames; paint to impinge on glass to assist sealing.

13.3.9 Materials

All Painter materials shall be ready mixed and delivered in unopened containers. Materials shall be used only for the purpose and in the manner intended by the manufacturer; any apparent scheduled discrepancy in this respect shall be referred to the Architect/Designer immediately for clarification.

Where surfaces are specified to be finished in a particular manner or material, all preparatory work, priming, or undercoating, that is necessary to ensure a proper finish shall be provided, irrespective of any apparent omission herein.

Thinning shall only be to manufacturer's specification. Thoroughly stir as required to lift any settled pigment and ensure the paint is homogeneous. Paints shall be factory or shop tinted to the colour required. Undercoats shall be fully tinted to match the final colour scheduled. All paints shall have the finished film thickness that is specified by the manufacturer (checked by monitoring the coverage per litre).

13.3.10 Completion

Allow to touch up to approval any Painter work which is damaged during the finishing works of other trades. Replace all hardware, remove all masking, covers, containers etc., thoroughly clean all affected surfaces, and leave all spaces ready for immediate occupation. Avoid scratching or abrading glass or hardware during any cleaning.

14 FLOOR COVERINGS

14.1 Preliminary

Refer to General Conditions of Contract and the Special Conditions in this Specification as appropriate. Read this section in conjunction with all other trade sections.

14.2 Compliance

Comply with the New Zealand Building Code 1992 including all revisions and amendments, Verification Methods where appropriate, and construction principles that are embodied in the Acceptable Solutions.

Comply with all relevant provisions and recommendations of:

1884:2013(NZS AS)	Floor coverings - Resilient sheet and tiles - Installation practices
2455.2:2007(AS/NZS)	Textile floor coverings - Installation practice - Carpet tiles
3661.2:1994(AS/NZS)	Slip resistance of pedestrian surfaces - Part 2: Guide to the reduction of slip hazards
4586:2004(AS/NZS)	Slip resistance classification of new pedestrian surface materials
NZBC D1	Access Routes

14.3 Carpet & Resilient Floor Coverings

14.3.1 Scope

Supply and install the specified Floor Coverings and flooring products to the areas and surfaces, layouts and details shown on the drawings, complete with all accessories. All aspects of this work shall be in accordance with the specified floor covering manufacturers' technical literature and installation requirements, relevant Standards and Code requirements, other relevant product manufacturers' recommendations, and as shown on the drawings.

No substitutions are permitted for the specified Floor Coverings and flooring products.

14.3.2 Floor Coverings

14.3.2.1 Carpet

Carpet flooring; to the specified product, pile style and content, and colour and pattern. Installed in accordance with the manufacturer's requirements and AS/NZS 2455.1 to the locations and layout shown on the drawings.

Manufacturer, brand name & range:
Pile style:
Pile content/fibre:
Pile thickness:
Construction:
Colour/Pattern code:

Grading:
Location:

14.3.3 Adhesives

Floor covering adhesives shall be as recommended by the floor covering manufacturer, and be suitable and compatible with the specified flooring product, substrate type and environment, and the flooring product's end use; and shall be applied in accordance with the adhesive manufacturer's instructions. Seal or prime porous substrates exactly as recommended by the adhesive manufacturer.

14.3.4 Co-operation

Co-operate with other trades to ensure that all preliminary and preparatory works are completed to specification and as shown on the drawings.
Co-ordinate with other trades as required to install the specified floor coverings and accessories.

14.3.5 Workmanship

All installation work shall be carried out by experienced and competent floor layers, familiar with the products specified and installation techniques, under the direct supervision of a Registered National Flooring Association (NFA) Member, in accordance with the manufacturer's installation requirements, NZS/AS 1884, AS/NZS 2455.1, AS/NZS 2455.2 and AS/NZS 4586 as relevant, and as noted and detailed on the drawings.
Use only approved adhesives that are compatible with the specified floor covering product and the substrate as recommended by the floor covering manufacturer.
The building must be fully enclosed and weathertight with all doors and necessary fittings and trim installed prior to laying floor coverings.

14.3.6 Delivery & Handling

Store and handle all floor covering products and accessories in accordance with the manufacturer's recommendations. Store products and accessories under cover and out of direct sunlight on a flat and level surface; keep dry and protect from damage and contamination at all times.
Do not use damaged or defective flooring products or accessories, or products that are beyond their designated shelf life. Do not damage or mark or distort flooring products and accessories during handling.
Allow floor coverings and accessories to properly condition for a minimum of 24 hours, or as recommended by the manufacturer, prior to laying in accordance with the manufacturer's requirements. Unless recommended otherwise by the manufacturer, do not lay floor coverings below 15^{o}C room temperature.

14.3.7 Substrate Preparation

14.3.7.1 General

Ensure the substrate surface is free of oil, grease and other contaminants, then sweep or vacuum as required to ensure it is absolutely clean. Ensure that any expansion or crack control joints are appropriately trimmed - do not install floor coverings over them.
The commencement of work on each section of floor shall be deemed to indicate a full acceptance by

the relevant Flooring Subcontractor that all preparatory works by other trades are appropriate to achieve the required finished results.

14.3.7.2 New Concrete Floors

New concrete substrates must be compliant with NZS 3114 'U3 Surface Finish' and with the floor covering manufacturer's requirements and must have aged for a minimum of 28 days prior to laying the floor coverings. Check for moisture content by hygrometer reading to BRANZ BU330 - do not commence laying floor coverings until the substrate is surface-dry and the moisture readings are less than 75% relative humidity over the entire surface.
Grind off any high spots on the concrete slab, and using the specified proprietary levelling compound repair flush with feathered edges any low spots or damaged areas then grind smooth.
Lightly grind or shot blast any surface that is glazed to the extent that may compromise the adhesive bond. Leave the surface clean and free of dust and contaminants etc.

Location:

14.3.8 Installation

14.3.8.1 Carpet Floor Coverings - Conventional Stretch-in

Install by conventional stretch-in method carpet floor coverings, and accessories, including all jointing, in accordance with the manufacturers' recommendations, procedures and techniques, AS/NZS 2455.1, and as shown on the drawings.

Allow the carpet underlay and carpet floor coverings to properly condition in accordance with the manufacturers' recommendations prior to laying. Turn underfloor heating systems off 48 hours prior to installation and leave off during installation and for a minimum of 48 hours after completion.
Thoroughly clean each area before commencing work. Seal or prime as necessary any porous surface receiving floor covering adhesive, and apply adhesive exactly to the manufacturer's recommendations.

Confirm the location of all carpet joints and seams prior to laying. Install carpet rolls in consecutive sequence and in the same direction. Do not install carpet underlay and carpet floor coverings over expansion joints - use only the specified expansion joint cover strip and neatly finish the underlay and carpet flooring in accordance with the cover strip manufacturer's requirements.

Install edge grippers and lay the carpet underlay at right angles to the direction of the carpet floor covering with joints no less than 300mm from any seam in the carpet. Staple or adhesive fix underlay to substrates in accordance with the manufacturer's recommendations.

Carpet flooring installed flat and taut and evenly tensioned both ways by power stretching sequence.
All seams and cross joins to be close-fitting and fused together with hot melt tape. Cut and properly prepare cross joins to ensure accurate pattern alignment.
Accurately install stair tread nosings and lay pre-cut carpet pieces to each stair tread and riser and finish neatly into or under the nosing edge as necessary.
Install any required carpet skirting, capping and edge trim, transition strips and naplock bars, as noted and detailed on the drawings; all finished straight and level and true to line.

Keep the working area cordoned off and protected during installation and protect completed installation work from damage and contamination until hand over of the works as programmed/scheduled.

14.3.9 Completion

Ensure that the specified floor coverings have been installed correctly, and that all seams, joints and accessories have been and completed correctly. Check for damage and defects and repair or replace as necessary.
Thoroughly clean the installed floor coverings in accordance with the manufacturers' recommended techniques and procedures.
Carry out any product specific finishing/polishing applications as recommended only by the floor covering manufacturer.
Leave the works area clean and remove all rubbish and waste material from the site.

Protect the completed works from damage, trafficable dirt and grime, and stains as necessary while other works are in progress.

Issue to the Owner a copy of the Manufacturers' maintenance requirements and a copy of the Manufacturers' Materials Warranties and the Applicators' Installation Warranties for all of the installed floor coverings.

15 PLUMBING

15.1 Preliminary

Refer to General Conditions of Contract and the Special Conditions in this Specification as appropriate. Read this section in conjunction with all other trade sections.

15.2 Compliance

Comply with the New Zealand Building Code 1992 including all revisions and amendments, Verification Methods where appropriate, and construction principles that are embodied in the Acceptable Solutions.

Comply with all relevant provisions and recommendations of:

1221:1997(AS/NZS)	Fire hose reels
1254:2010(AS/NZS)	PVC-U pipes and fittings for stormwater and surface water applications
1260:2017(AS|NZS)	PVC-U pipes and fittings for drain, waste and vent applications
1477:2017(AS|NZS)	PVC pipes and fittings for pressure applications
1546.1:2008(AS/NZS)	On-site domestic wastewater treatment units - Septic tanks
1596:2014(AS/NZS)	The storage and handling of LP Gas
2032:2006(AS/NZS)	Installation of PVC pipe systems
2033:2008(AS/NZS)	Installation of polyethylene pipe systems
2492:2007(AS/NZS)	Cross-linked polyethylene (PE-X) pipes for pressure applications
2537.1:2011(AS/NZS)	Mechanical jointing fittings for use with crosslinked polyethylene (PE-X) for pressure applications - Part 1: Plastics piping systems for hot and cold water installations - Crosslinked polyethylene (PE-X) - General
2642.2:2008(AS/NZS)	Polybutylene pipe systems - Polybutylene (PB) pipe for hot and cold water applications
2712:2007(AS/NZS)	Solar and heat pump water heaters - Design and construction
3500.1:2015(AS|NZS)	Plumbing and drainage - Part 1: Water services
3500.1:2018(AS|NZS)	Plumbing and drainage Part 1: Water services
3500.1:2021(AS/NZS)	Plumbing and drainage, Part 1: Water services
3500.2:2015(AS|NZS)	Plumbing and drainage - Part 2: Sanitary plumbing and drainage
3500.2:2018(AS|NZS)	Plumbing and drainage Part 2: Sanitary plumbing and drainage
3500.2:2021 (AS|NZS)	Plumbing and drainage Part 2: Sanitary plumbing and drainage
3500.2:2021(AS|NZS)	Plumbing and drainage, Part 2: Sanitary plumbing and drainage
3500.3:2018(AS|NZS)	Plumbing and drainage Part 3: Stormwater drainage
3500.3:2021(AS|NZS)	Plumbing and drainage, Part 3: Stormwater drainage
3500.4:2015(AS|NZS)	Plumbing and drainage - Part 4: Heated water services
3500.4:2018(AS|NZS)	Plumbing and drainage Part 4: Heated water services
3500.4:2021(AS|NZS)	Plumbing and drainage, Part 4: Heated water services

3500.5:2012(AS/NZS)	Plumbing and drainage - Part 5: Housing Installations
3501:1976(NZS)	Specification for copper tubes for water, gas, and sanitation
4020:2018(AS|NZS)	Testing of products for use in contact with drinking water
4121:2001(NZS)	Design for access and mobility: Buildings and associated facilities
4517:2010(NZS)	Fire sprinkler systems for houses
4602:1988(NZS)	Low pressure copper thermal storage electric water heaters
4603:1985(NZS)	Installation of low pressure thermal storage electric water heaters with copper cylinders (open-vented systems)
4606.1:1989(NZS)	Storage water heaters - General requirements
4607:1989(NZS)	Installation of thermal storage electric water heaters: valve-vented systems
4613:1986(NZS)	Domestic solar water heaters
4614:1986(NZS)	Installation of domestic solar water heating systems
4617:1989(NZS)	Tempering (3-port mixing) valves
4692.1:2005(AS/NZS)	Electric water heaters - Energy consumption, performance and general requirements
5601.1:2013(AS|NZS)	Gas installations - Part 1: General installations
7602:1977(NZS)	Specification for polyethylene pipe (Type 5) for cold water services
7643:1979(NZS)	Code of practice for the installation of unplasticized PVC pipe systems
7646:1978(NZS)	Specification for polyethylene pipes and fittings for gas reticulation
AS/NZS 3500.5:2012	Plumbing and drainage - Part 5: Housing installations
NZBC B2/AS1	Durability
NZBC G11	Gas as an Energy Source
NZBC G12	Water Supplies
NZBC G13/AS1	Sanitary Plumbing

15.3 General

Carry out all works necessary to leave the water, waste, vent and soil systems serving the sanitary fittings and the plumbing hardware shown on the drawings or specified below in correct working order complete with all ancillary systems (safetrays, floor drains, overflows, relief valves, etc.) required, and with all normal incidentals customarily installed by this trade.

Comply with the Building Code, Territorial Authority By-laws and statutory authority Regulations as appropriate. Obtain all necessary permits and consents, serve all necessary notices, arrange for all tests and pay all fees and customary charges in connection with the required works.

15.4 Materials

15.4.1 Materials

Materials shall be delivered with packaging and labeling intact. Incidentals (jointing compounds, PTFE tape, seals, washers, silfos, solvent cements, etc.) shall be completely appropriate for the application involved. The use of imperfect items or items damaged in any way is always subject to approval.

15.4.2 Alternatives

The materials and elements specified indicate the required standards for these works. Alternatives which are equal to or superior to these materials and elements may be tendered for approval.

15.4.3 Materials Separation

Separate dissimilar metals in any circumstances which could produce contact or electrolytic action by a water film, with thick plastic tape, bituminous felt or other inert material. Pipes in contact with or built into concrete or masonry shall be fully spiral wrapped in Denso tape or equal.

15.5 Workmanship

15.5.1 Co-operation

Co-operate with all other trades. Attend upon Concretor, Drainlayer and Carpenter to set out the exact positions of pipe runs before adjacent work is put in hand, and to ensure that all pipes, sleeves, fixings, flashings etc. are correctly incorporated into the structure as construction proceeds.

15.5.2 Workmanship

All plumbing work shall be carried out by, or under the direct control of, properly qualified tradesmen, and shall be to recognised high standards.

Observe best local trade practice to avoid problems which arise from freezing winter conditions.

The cutting away and checking of timbers shall be limited to such dimensions as will not prejudice the purpose for which the timber is used; observe NZS 3604 restrictions on the holing and checking of joists and beams. Chasing and checking of other materials only to approval. Install seismic restraints to storage tanks and HWCs.

Weatherseal wherever pipes, screws, bolts or other fastenings penetrate an external surface, and particularly roofing; seal with gaskets, flashings (and overflashings if necessary) or mastic as appropriate - any damage that results from failure of such seals will be made good at the Plumber's expense.

Adequately protect all surfaces. Any damage to fittings or surfaces made good by the appropriate trade at the Plumber's expense.

15.5.3 Pipework

Joints between pipes of different materials shall always be to the approval of the TA Plumbing Inspector.

Pipework set-out neatly with a minimum number of bends, and more or less parallel to and at right angles to structural elements - avoid diagonal piping.

All internal pipework shall be concealed except where otherwise is either shown or approved. Exposed pipework shall be accurately and neatly run. Arrange all pipework (and particularly traps) in a manner which will allow maximum future accessibility for repairs or maintenance. Arrange for access panels to any primary maintenance positions, and install conveniently located isolating valves for each group of fittings. Wingbacks securely and squarely fixed. Crox unions usually acceptable only at the final connection to fittings. Install white plastic flanges where pipes penetrate linings in visible locations.

Where pipes are covered with nail fixed linings and trim ensure that their positions are marked on the linings to minimise the risk of subsequent nailings penetrating the pipe. Any such damage shall be rectified immediately, with all consequential damage made good.

Set pipework out in straight runs to even gradients. Fix all pipes to the structure sufficiently to fully support and to prevent sagging or vibration. Clips and saddles shall be the same material as the pipe. Exterior pipes on stand-off brackets. Fixings to the exterior or damp locations shall all be hot dip galvanized unless otherwise noted. Sleeves for pipes or drains penetrating concrete or masonry shall be uPVC, 20mm minimum larger internal diameter than the external diameter of the pipe, finished flush with concrete or masonry, and packed and mastic sealed.

Close open ends of the systems during construction to prevent the entry of foreign matter.

15.5.4 Temperature Movement

All work shall respect in full all probable thermal movements - layouts, fixings and jointings shall be arranged to allow thermal movement without risk of prejudice to watertight conditions, or risk of damage from straining of the pipes which will generate failures.
In particular, observe best local trade practice to avoid problems arising from freezing conditions.

15.5.5 Excavation

Allow to carry out all excavation that is required to suit the services installed by this trade. Check for other services before excavation. Trenches true to line and level, base of trenches clear of loose material, and shore trenches as required to suit the ground conditions. Backfilling shall be carried out by this trade, and be to the requirements specified in Siteworks.

15.5.6 Testing

All plumbing services shall be completed in stages which will allow for proper testing under normal working pressures prior to the application of insulation, concealment or other enclosure. Testing of piped water services shall be by hydrostatic testing in accordance with AS/NZS 3500.1 and shall not show any leakage when subjected to a hydrostatic pressure of 1500kPa for a period of not less than 30 minutes. All leaks remedied and retested. On completion the whole of the plumbing services to be subjected to full operational tests in the presence of the plumbing inspector, with any defects revealed in these tests properly remedied.

15.5.7 Warranties

Warranty cards and manufacturer's guarantees for all items supplied and installed by this trade shall be correctly filled in and handed over at Practical Completion.

15.6 Systems

15.6.1 Wastes & Vents

All traps sized to AS 3500.2. Wastes and vents all uPVC. Wastes shall be to AS 3500.2 falls as a minimum. Vents shall be generally as indicated, but avoid where permissible in compliance with AS 3500.2, or shall be combined above the flood level of the fittings.

Fit bird proof domes to all vents.

15.6.2 Cold Water System

15.6.2.1 Supply From New Connection to Reticulated Supply

All cold water supply pipework shall be medium/high-density polyethylene (MDPE/HDPE), arranged and fixed so that all joints are in a fully ‘relaxed' condition, without any stress or tension.
Make complete arrangements for the installation of a new connection to the reticulated supply in the street and the main feed and toby in the position shown. Lay on a 20mm main from the toby along the route shown on the Site Plan to the connection position noted on the Floor Plan (pipe depth, protection, backfilling, signal strip etc. to comply with all Supply Authority requirements). At the connection position take a branch feed off for the hosecocks (and reticulate to the positions shown and install angle hosecocks) and toilet cisterns and then take the main feed through an accessibly positioned cleanable in-line sediment and dirt filter.
Primary distribution from the water filter shall be in 20mm piping, reducing to 15mm for the final feed to individual items. Install conveniently located isolating valves to turn off each group of fittings, and install a small isolating valve alongside each toilet cistern not integrally fitted with one. (Note that these isolating valves and the hosecocks are not covered by the Plumbing Hardware Prime Cost Sum).

15.6.3 Hot Water System

15.6.3.1 Electric Storage, Mains Supply, Low Pressure Hot Water Cylinder

Supply the electric storage mains supply low pressure hot water cylinder noted on the drawings and install it where shown. Install the cylinder on a safetray, with its drain discharging in a visible location. Install pressure reducing valves, open ended vent pipes, flow control valves, line strainers, and non-return/isolating valves as required to leave the hot water system in full design operational order.
Install a tempering valve for each cylinder to control the hot water temperature at any sanitary fixture used for personal hygiene at not more than 50°C.
Pressure reducing valves shall be compatible with the mains supply pressure.
Pressure relief discharges shall be open ended copper and to the exterior in approved positions.
Flush all pipework before making the final connections. Lag the main distribution pipes full length with wall pipe insulation.
Showers shall have priority feeds, without 'tees', and the pipework layout shall ensure that the

showers temperature and pressure remain as even as possible.
Irrespective of whether a mixing device is installed, the storage water heater control thermostat shall be set at a temperature of not less than 60°C to prevent the growth of Legionella bacteria.

15.6.4 Gas Fitting

Is included in the Plumbing trade, although all work must be carried by Registered Gasfitters, and be in complete accordance with all relevant Regulations and standards and be in full accordance with best trade practice.

Obtain all necessary permits and pay all fees. If necessary obtain a Dangerous Goods Licence for the storage installation in the name of the Owner; and if the Owner's signature is required forward all relevant papers to the Architect/Designer.

Supply two 45kg (1220 x 380mm diameter) LPG storage cylinders and install them in the position shown on the drawings. Installation to allow straightforward switchover to the second cylinder.

Supply four 45kg (1220 x 380mm diameter) LPG storage cylinders and install them in the position shown on the drawings. Installation to allow for draw-off from two cylinders at a time, with automatic switchover to the second pair when required.

Supply six 45kg (1220 x 380mm diameter) LPG storage cylinders and install them in the position shown on the drawings. Install them in two banks of three with an appropriate manifolds, regulator with automatic changeover when required, and bleed valve etc. as required to comply with all relevant regulations.

15.6.5 Central Heating

Supply and install all materials, including all minor and incidental items necessary for proper completion of the central heating system specified and shown on the drawings.

Is included in the Plumbing trade, although all work must be carried by experienced tradesmen, be in complete accordance with relevant Regulations and standards, and be in accordance with the best trade practice. Obtain all necessary permits and pay all fees.

Cooperate with other trades to set out required penetrations and ensure that ducts and fittings are correctly incorporated as work proceeds. No account will be taken of abortive works which could have been avoided if full co-ordination had been carried out.

All work shall be such as to leave a neat, efficient, easily maintained and robust installation. Materials, fittings and equipment shall be installed exactly in accordance with the manufacturer's recommendations. Adequately protect all surfaces. Any damage to fittings or surfaces shall be made good by the appropriate trade.

All materials shall be delivered with packaging and labelling intact, shall be the latest appropriate technology but sufficiently service proven, shall be suitable for the intended purpose, and shall be supported by NZ available parts and servicing. Incidentals (tapes, fixings, seals, etc.) shall be appropriate for the application involved.

Leave the works clean and tidy with all discarded material removed, and in full operational order.

Any suggested modifications to improve the efficiency of the systems will be considered for approval, but it remains the Subcontractors responsibility to install neat, efficient, easily maintained and robust installations.

15.7 Plumbing Elements

15.7.1 Sanitary Fittings

Supply and fix all of the sanitary fittings as scheduled on the drawings. All fittings checked on delivery for 'perfect' condition, and all fittings plain white. Supply and fix all normal accessories that are not usually supplied with the fitting.
The Plumber is responsible for fittings from delivery until Practical Completion of the contract.

15.7.2 Flashings

Ridges, hips, barges, valleys, aprons etc. flashings all supplied and installed by the Roofer. Metal windows flashings (those installed during windows installation ONLY) will be supplied by the windows subcontractor and installed by the Carpenter. All other flashings including wall penetration flashings, soakers, etc. that are required to leave the building completely water and weathertight are the Plumber's responsibility.

All flashings shall be machine folded to profiles as shown or required, incorporating capillary breaks where appropriate, shall be formed in one piece where possible, and lead or other soft edged where required. Stop ends, external angles, junctions etc. soldered or sealed and blind riveted as appropriate.

16 DRAINAGE

16.1 Preliminary

Refer to General Conditions of Contract and the Special Conditions in this Specification as appropriate. Read this section in conjunction with all other trade sections.

16.2 Compliance

Comply with the New Zealand Building Code 1992 including all revisions and amendments, Verification Methods where appropriate, and construction principles that are embodied in the Acceptable Solutions.

Comply with all relevant provisions and recommendations of:

1254:2010(AS/NZS)	PVC-U pipes and fittings for stormwater and surface water applications
1260:2017(AS|NZS)	PVC-U pipes and fittings for drain, waste and vent applications
1546.1:2008(AS/NZS)	On-site domestic wastewater treatment units - Septic tanks
1547:2012(AS/NZS)	On-site domestic wastewater management
2032:2006(AS/NZS)	Installation of PVC pipe systems
3500.2:2018(AS|NZS)	Plumbing and drainage Part 2: Sanitary plumbing and drainage
3500.3:2018(AS|NZS)	Plumbing and drainage Part 3: Stormwater drainage
7643:1979(NZS)	Code of practice for the installation of unplasticized PVC pipe systems

16.3 General

Carry out all required works to leave the sewer and stormwater systems shown on the drawings in correct working order complete with all normal incidentals.

Comply with Local Authority By-laws and Health Department Regulations as appropriate. Obtain all necessary permits and consents, serve all necessary notices, arrange all tests and pay all fees and customary charges in connection with the works.

16.4 Workmanship

16.4.1 General

Carry out all required works to leave the sewer and stormwater systems shown on the drawings in correct working order complete with all normal incidentals. Comply with Local Authority By-laws and Health Department Regulations as appropriate. Obtain all necessary permits and consents, serve all necessary notices, arrange all tests and pay all fees and customary charges in connection with the works.

16.4.2 Co-operation

Cooperate with all trades and attend upon the Concretor and Plumber to set out exact pipe runs before any adjacent work is put in hand and ensure that all sleeves etc. are correctly incorporated as work proceeds.

16.4.3 Materials

All pipes and other materials shall comply with the appropriate Standards, and shall be protected from damage of any kind until installation is complete. All incidentals appropriate for the applications involved. Concrete shall be 17.5MPa and as specified under Concretor, Mortar shall be as specified in Blocklayer.

16.4.4 Workmanship

All drainlaying shall be carried out by, or under direct control of, properly qualified tradesmen, and shall be to recognised high standards. Ensure cast-in items are installed when required so that no delay is caused by this trade. Adequately protect all adjacent surfaces - clean down to remove dirt etc., and any damage shall be made good by the appropriate trade at the Drainlayer's expense.

On completion of drainlaying clean up full area affected by this trade to the condition it was in before drainlaying commenced.

Site is to be returned as close as possible to its present condition on completion of the contract.

16.4.5 Excavation

As required for sewer and stormwater. Check for other service lines before excavation - the Drainlayer is responsible for making good any damage. Trenches true to line and with even gradients between gullies, soil stack terminations or downpipes, etc.

Keep the bottom of trenches clear of loose material. All pipes shall be laid in appropriate bedding material, compacted as required. Shore trenches if required to suit ground conditions. Backfilling shall be by this trade, to the standards required in Siteworks.

16.5 Drainlaying Elements

16.5.1 Drainlaying

Commence drainlaying at the low end of even fall sections of drains and proceed in a continuous sequence to the fittings connections.

Sumps, gullies, etc. solidly bedded. Lay 110mm uPVC drains to connect gullies, sumps, stacks, and downpipes through to the street edge connections.

Every junction and bend shall be an inspection position. Temporarily seal the open ends of incomplete drains to prevent entry of foreign matter. Make appropriate provision for any anticipated differential settlement. Place signal strip above all drains.

Ensure that stormwater drains are very accurately positioned so that downpipes can drop directly into them, without offsets.

16.5.2 Testing

The sewer and stormwater systems shall both be fully tested to the approval of the Territorial Authority Inspector before being covered in. If any defects show rectify and then fully retest.

16.5.3 As Built Drawings

During drainlaying plot the location of all bends and changes in direction and all cleaning access positions. Locate each item by two diagonal measures from structure corners, etc. and record on a blank plan copy (supplied by Architect/Designer when requested).

Note that Practical Completion of the contract will not be certified until this as-built drawing has been produced (made available to the Contractor in time for the Code Compliance Certificate application.

17 ELECTRICAL

17.1 Preliminary

Refer to General Conditions of Contract and the Special Conditions in this Specification as appropriate. Read this section in conjunction with all other trade sections.

17.2 Compliance

Comply with the New Zealand Building Code 1992 including all revisions and amendments, Verification Methods where appropriate, and construction principles that are embodied in the Acceptable Solutions.

Comply with all relevant provisions and recommendations of:

2053.1:2001(AS/NZS)	Conduits and fittings for electrical installations - General requirements
2201.1:2007(AS/NZS)	Intruder alarm systems - Client's premises - Design, installation, commissioning and maintenance
2293.2:2019(AS|NZS)	Emergency lighting and exit signs for buildings - Part 2: Routine service and maintenance
3000:2018(AS|NZS)	Electrical installations - Known as the Australian/New Zealand Wiring Rules
3100:2009(AS/NZS)	Approval and test specification - General requirements for electrical equipment
3112:2011(AS/NZS)	Approval and test specification - Plugs and socket-outlets
5000.1:2005(AS/NZS)	Electric cables - Polymeric insulated - For working voltages up to and including 0.6/1 (1.2) kV
60335.2.30:2015(AS|NZS)	Household and similar electrical appliances - Safety - Part 2.30: Particular requirements for room heaters
60335.2.30:2015(AS|NZS)INCIEC	Household and similar electrical appliances - Safety - Part 2.30: Particular requirements for room heaters
60335.2.35:2013(AS/NZS)	Household and similar electrical appliances - Safety - Part 2.35: Particular requirements for instantaneous water heaters
60598.2.2:2016(AS|NZS)	Luminaires - Part 2.2: Particular requirements - Recessed luminaires
6104:1981(NZS)	Specification for emergency electricity supply in buildings

17.3 Elements

17.3.1 Appliances

All appliances are identified in drawing notes. The Electrician shall make all appropriate electrical connections to the following appliances, which will have been supplied and installed by others:

-lift
-gas hob
-dishwasher
-gas hot water cylinder
-water pump

The Electrician will supply the following items and install them completely in accordance with their manufacturers instructions, and protect them until Practical Completion:

-oven
-ironing centre
-kitchen exhaust unit
-bathroom exhaust fans
-bathroom wall heaters
-mirror demister pads
-cupboard heaters
-heated towel rails

17.3.2 Tele Communications

Workmanship shall be recognised best trade practice, and in accordance with the manufacturers' recommendations. All work shall be by competent and experienced operatives.

17.4 Workmanship

17.4.1 General

Supply and install all materials, including all necessary minor and incidental items, for proper completion of all of the electrical services specified or shown on the drawings. The contract will not be deemed to be complete until the Electrician has provided an Electrical Certificate of Compliance (made available to the Contractor in time for the Code Compliance Certificate application).

Obtain all necessary permits and consents, serve all notices and pay all fees in and customary charges connection with the works.

The position of switches, light and power outlets and other fittings, although shown specifically in some instances, are in general only shown diagrammatically. The exact location of each of these items will be as directed on site by the Architect/Designer; the Electrician shall give reasonable notice of when this information is required. Items positioned in contravention of this shall be repositioned if directed, including rewiring if necessary, all at the Electrician's expense.

Unless drawn (on 1:20 wall elevations) or specified otherwise the mounting height to the centreline of the following items above the floor shall be:

-1000mm for lighting switches;
-2000mm for wall mounted lights;
-2100mm for the bayonet of pendant lights;
-300mm for power points, except at benches.

(Notify the Architect/Designer if either the actual fitting or mounting position seem to make the mounting height noted above inappropriate).

Warranty cards and manufacturers guarantees for items supplied and installed by this trade shall be filled in correctly and handed over at Practical Completion. Arrange all circuits to obtain an optimum

balance of the system, and check and reconnect where necessary to achieve this on completion. Leave the works clean and tidy and in full operational order.

17.4.2 Co-operation

Co-operate with all other trades and attend upon the Concretor and Carpenter to set out all required penetrations and to ensure that all wiring and fittings are correctly incorporated as work proceeds. The Carpenter will provide and fix all necessary dwangs and timber supports in locations determined by the Electrician.

17.4.3 Workmanship

All electrical work shall be carried out by, or under the direct control of, registered tradesmen, and shall be to recognized high standards. All work shall be such as to leave a neat, efficient and robust installation. Neatly label switchboards to identify each circuit.

The cutting away and checking of timbers shall be limited to such dimensions as will not prejudice the purpose for which the timber is used; observe NZS 3604: 2011 restrictions on the holing and checking of joists and beams. Chasing and checking of other materials shall be only to approval.

Adequately protect all surfaces. Any damage to fittings or surfaces made good by the appropriate trade at the Electrician's expense.

17.4.4 Wiring

Joints within cable runs will not normally be accepted. TPS cable shall be adequately supported, and clipped at regular intervals. At terminations all strands of conductors shall be fully secured in a terminal block or clamped under a screw head washer; do not cut away any strands. Wiring which terminates in enclosed fittings and/or where subject to heat liable to cause deterioration, shall be high temperature type, with the tails made off with heat resisting sleeves, to protect the permanent wiring.

Wire lights in 1.5mm 3 core - 7.5 amps loading max per circuit (allow for 100w to all light fittings unless identified otherwise).
Wire power outlets in 2.5mm 3 core - 7 maximum GPO singles or doubles per circuit. Assess power outlets for specific equipment and allow accordingly.

Conceal all wiring except as noted on drawings or below. All wiring cast into concrete shall be run in conduit pipes. All cables shall be stranded (single core is unacceptable).

Wire more or less parallel to and at right angles to the structural elements - avoid any diagonal wiring. Layout of the principal distribution wiring shall be to approval. Position all wires to minimise the risk of damage from subsequent nailing of linings etc.

Generally, do not run TPS horizontally within timber walls except in the area up to 300mm above floor. Wire in the ceiling framing and drop vertically to outlets and switches.

Wire exterior lighting in screened cable.

17.5 Systems

17.5.1 Earth

Provide a driven main earth suitable for the full installation, close to the meterboard, complying fully with all appropriate regulations and to the complete approval of a certified inspector. Bond all exposed metals, including light fittings and piped services and provide earth conductors for the entire system. Sheathing to any neutral screened cables may be used for earthing.

17.5.2 Mains

Install a neutral screened 2 x 16mm main cable underground (depth, cover/protection, backfilling, signal strip etc. to comply with all relevant regulations) from the grid connection position noted on the Site Plan along the route indicated to the meterboard, positioned where shown on the Floor Plan, and make appropriate arrangements for the grid connection. Install pilot as required. The meterboard shall be metalclad with a meter reading window, recessed maximum depth into the wall and at 2m to the top of the board, with the meters and water heater controllers by the supply company nominated by the Principal. Install all switches and fuses that are necessary. From the meterboard run (route to approval) a neutral screened 2 x 16mm main plus controllers etc. to the main switchboard.

17.6 Materials & Control

17.6.1 Materials

All materials delivered with packaging and labeling intact. All required incidentals (insulating tape, seals, fixings, etc.) shall be completely appropriate for the application involved. The use of items damaged in any way is subject to approval in each instance.

17.6.2 Switchboard

The main switchboard and the subboard(s) shall be appropriate sized standard PDL DBF series boards installed fully recessed where shown and at 2m to the top of the boards. Install appropriate sized MCB's for all circuits, including a minimum of two power and one lighting RCDs as required to cover all outlets to each board. Submain(s) from the main switchboard to the subboard(s) shall be neutral screened 16mm or 2 x 16mm as appropriate, run along the routes indicated / as approved. Pay particular attention to spreading the distribution of the various probable loadings evenly across the phases to obtain an optimum balance of the system.

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1. BRANZ Appraisal No.1054 - MAXRaft Concrete Slab Floor System
2. MAXRaft Product Guide Dec 2024
3. MAXRaft Onsite Guide V62018
4. BRANZ Appraisal No.928 - GIB EzyBrace
5. BRANZ Appraisal No.427 (2021) - GIB Aqualine Wet Area Systems
6. GIB® Rondo® Metal Batten Systems Installation

BRANZ Appraised

Appraisal No. 1054 (2024)

MAXRAFT CONCRETE SLAB FLOOR SYSTEM



Appraisal No. 1054 (2024)

This Appraisal replaces BRANZ Appraisal No. 1054 (2019)

BRANZ Appraisals

Technical Assessments of products for building and construction.

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Product

1.1 The MAXRaft Concrete Slab Floor System is an insulated, concrete, slab-on-ground flooring system for use in residential and light commercial buildings. The MAXRaft Concrete Slab Floor System features a continuous polystyrene insulating layer beneath the slab and to the exterior perimeter surfaces. The MAXRaft Concrete Slab Floor System can be designed as an insulated slab-on-grade where ground conditions meet the requirements of 'good ground' as per NZS 3604. Alternatively, it can be designed as a waffle raft floor designed to suit ground conditions on the subject site.

Scope

2.1 The MAXRaft Concrete Slab Floor System has been appraised for use to construct steel reinforced, concrete slab-on-ground floors subject to specific engineering design for buildings within the following scope:

- ground floor slabs for timber-framed buildings, within the scope of NZS 3604, or other similar light weight constructions where they are subject to specific engineering design; and,
- built on 'good ground' as defined by Acceptable Solutions and Verification Methods for NZBC Clause B1 Structure; or,
- built on 'TC2' type ground within the 'Canterbury earthquake region', or moderately to highly expansive soils, subject to verification and assessment by a Chartered Professional Engineer.

Building Regulations

New Zealand Building Code (NZBC)

3.1 **In the opinion of BRANZ, the MAXRaft Concrete Slab Floor System, if designed, used, installed and maintained in accordance with the statements and conditions of this Appraisal, will meet the following provisions of the NZBC:**

Clause B1 STRUCTURE: Performance B1.3.1, B1.3.2 and B1.3.4. The MAXRaft Concrete Slab Floor System meets the requirements for loads arising from self-weight, imposed gravity loads, earthquake, wind, differential movements and time dependent effects including creep and shrinkage. [i.e. B1.3.3 (a), (b), (f), (h), (m) and (q)]. See Paragraphs 7.1–7.7.

Clause B2 DURABILITY: Performance B2.3.1 (a) not less than 50 years and B2.3.2. The MAXRaft Concrete Slab Floor System meets these requirements. See Paragraphs 8.1–8.3.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.3. The MAXRaft Concrete Slab Floor System meets these requirements. See Paragraphs 11.1–11.3.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. The MAXRaft Concrete Slab Floor System meets this requirement.

Clause H1 ENERGY EFFICIENCY: Performance H1.3.1 and H1.3.2E. The MAXRaft Concrete Slab Floor System contributes to meeting these requirements. See Paragraphs 12.1–12.2.

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

Technical Specification

4.1 The MAXRaft Concrete Slab Floor System consists of a range of proprietary expanded polystyrene (EPS) or high-density XPS foam forms that are used to provide insulated slab edges, and either a waffle raft floor configuration, or a fully insulated slab with a continuous polystyrene layer beneath the concrete. Overall slab thicknesses range from 250 to 400 mm, providing a varying degree of thermal insulation, dependent on the grade of polystyrene, insulation thickness and slab configuration.

4.2 All MAXRaft slabs are subject to specific engineering design, with a preference for waffle raft floors in instances where ground conditions do not meet the requirements of 'good ground' and insulated slab-on-grade in other cases.

4.3 MAXRaft provide a full design and install service in conjunction with their accredited installer network, with all materials supplied and constructed on site. Alternatively, MAXRaft offer a 'supply only' service, allowing for the use of their system in floor slabs structurally designed or constructed by others.

4.4 EPS perimeter components of the system are proprietary products and are available solely from MAXRaft. Substitution of MAXRaft EPS perimeter components with alternatives have not been assessed and is outside the scope of this Appraisal. Other components of the system such as concrete, reinforcing steel, bar chairs, pod spacers and damp-proof membranes (DPMs) are generically specified within the MAXRaft system and shall be selected and sourced to meet the particular specifications given in the specific engineering design for the slab.

4.5 All MAXRaft flooring types can be designed to readily accommodate detailing typical of slab-on-ground construction, such as recessed shower bases, under-slab plumbing, drainage and slab thickenings to allow for structural loads

Handling and Storage

5.1 The EPS forms must be stored so that they are secure on-site, are protected from damage and remain free from dirt. Protection from direct ultraviolet (UV) exposure should be provided. Installation of the EPS components must only be undertaken once the reinforcing steel and mesh is also ready to place, as it is useful to secure the EPS components in position and prevent them from being blown around.

5.2 Reinforcing steel should be stored supported, up off the ground and kept clean.

Technical Literature

6.1 This Appraisal must be read in conjunction with:

- MAXRaft® Installation Manual V6 2017
- Maxraft® Technical Details V3 24.11.14

6.2 All aspects of design, use, installation and maintenance contained in the Technical Literature and within the scope of this Appraisal must be followed.

Design Information

General

7.1 The MAXRaft Concrete Slab Floor System, when specifically designed and when constructed in accordance with the Technical Literature, will meet the requirements of NZBC Clause B1 Structure. MAXRaft Concrete Slab Floor System floors are intended for single and two-storey timber-framed buildings, or other similar lightweight constructions where they are subject to specific engineering design.

7.2 The MAXRaft Concrete Slab Floor System must be appropriately designed by the engineer, with due allowance made for the underlying ground conditions and soil bearing capacity. It is recommended in all cases that a geotechnical investigation of the subject site be carried out to inform the structural design.

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

7.3 Pipe and service penetrations through the slab must be specifically detailed by the design engineer, with consideration to the structural design of the slab.

7.4 Pipes penetrating concrete or under buildings must be installed in accordance with NZBC Verification Method G12/VM1, NZBC Acceptable Solution G12/AS1, NZBC Acceptable Solution G13/AS2 and NZBC Acceptable Solution G13/AS3, as applicable.

7.5 Shrinkage control joints in the MAXRaft Concrete Slab Floor System shall be specifically detailed by the engineer. Saw cutting where required should be carried out as soon as the concrete surface can endure the saw cutting process, but not later than 24 hours after placement.

7.6 Bottom plate fixings shall be selected with regard to the required installation depth and minimum edge distances specified by the fastening proprietor. Wall framing can be increased in depth to accommodate specific fixing installation requirements. Refer to the Technical Literature for additional information.

7.7 Exposed perimeter surfaces of the EPS foam forms must be protected from physical damage, UV light and water ingress. This is typically achieved by the application of a plastered coating that protects the insulation and is suitable to be in close proximity to the ground. Applied plaster coatings for use over the MAXRaft Concrete Slab Floor System have not been assessed by BRANZ and are outside the scope of the Appraisal.

Durability

Serviceable Life

8.1 The MAXRaft Concrete Slab Floor System is expected to have a serviceable life equal to that of standard concrete floors and slabs.

8.2 The minimum compressive strength of the concrete used in the construction of the MAXRaft Concrete Slab Floor System shall be determined by the NZS 3604 exposure zone, or otherwise nominated by the design engineer.

8.3 Cover to steel must meet minimum values set out in NZS 3604, Paragraph 4.5.1.

Maintenance

9.1 Conventional maintenance procedures typical of concrete slabs may be used for slabs constructed using MAXRaft Concrete Slab Floor System.

9.2 All exposed perimeter surfaces shall be inspected and cleaned at least annually, and any damage repaired immediately. Protective coatings must be maintained throughout the life of the building in accordance with the coating proprietor's instructions to ensure the ongoing protection of the slab.

Control of External Fire Spread

10.1 Where the MAXRaft Concrete Slab Floor System must meet specific exterior surface finish requirements in accordance with NZBC Acceptable Solutions C/AS1, Paragraph 5.3.1.1 or NZBC Acceptable Solution C/AS2, Paragraph 5.8.1, protective coatings applied to the exposed perimeter surface of the MAXRaft Concrete Slab Floor System shall be selected to meet these requirements based on information from the coating supplier. Applied plaster coatings for use over the MAXRaft Concrete Slab Floor System have not been assessed by BRANZ and are outside the scope of this Appraisal.

External Moisture

11.1 A suitable DPM in accordance with NZS 3604, Clauses 7.5.4–7.5.7 must be used under MAXRaft Concrete Slab Floor Systems.

11.2 Ground clearances in accordance with NZS 3604, Figure 7.11 and NZBC E2/AS1, Paragraph 9.1.3.1 must be maintained throughout the life of the building.

11.3 The exposed perimeter surface of the EPS foam forms must be protected from physical damage, UV light and water ingress. This is typically achieved by the application of a plastered coating that protects the insulation and is suitable to be in close proximity to the ground. Applied plaster coatings for use over the MAXRaft Concrete Slab Floor System have not been assessed by BRANZ and are outside the scope of this Appraisal.

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Energy Efficiency

12.1 Minimum construction R-values required by NZBC Clause H1 Energy Efficiency for slab-on-ground floors is dependent on the climate zone and if there is in-slab heating built into the foundations. Compliance with NZBC Clause H1 Energy Efficiency for slab-on-ground floors is dependent on project-specific details, including floor type, floor area to perimeter ratio, floor insulation type and external wall type. Construction R-values for concrete slab-on-ground floors, including floors of basements that contain certain conditioned spaces, shall be determined using either:

- the performance tables in Section F1.2 of NZBC Acceptable Solutions H1/AS1 or H1/AS2; or,
- the calculation methods in NZBC Verification Methods H1/VM1 or H1/VM2, Appendix F.

12.2 The MAXRaft Concrete Slab Floor System can be used to meet the NZBC Clause H1 requirements, refer to the relevant manufacturers websites for further information. The system and components have not been assessed for insulation contribution and this aspect is outside the scope of this Appraisal.

Installation Information

13.1 Installation of the MAXRaft Concrete Slab Floor System must be in accordance with the Technical Literature. The main items for consideration are summarised here:

- Site preparation – a flat, level platform must be prepared. Where fill material is used to prepare the site, it should be tested to ensure that it meets the ground bearing capacity specified by the engineer. Cut platforms should not be left exposed to dry out for any significant time, particularly where the underlying soils are identified as expansive.
- Piped services that are to be placed under the MAXRaft Concrete Slab Floor System must be installed by the drainage contractor with appropriate pipe bedding material and in accordance with the relevant NZBC Acceptable Solutions and Verification Methods. Refer to Paragraph 7.4.
- DPM – the DPM must be placed over a blinding layer of compacted sand/fines to a depth of 25 mm. The blinding layer must be laid over continuously over the building platform and extend a minimum of 500 mm beyond the perimeter of the slab. The blinding must be compacted and levelled to +/-3 mm of the desired level.
- Boxing – this must be set to correct height and levels and be accurately checked to ensure correct layout. All rebates for brickwork, garage door thresholds or joinery should be accommodated in the construction of the boxing.
- EPS foam forms – the forms shall be placed on the DPM as per the set-out drawings, which ensures the correct dimensions for all perimeter foundations and internal ribs. The MAXRaft system components are delivered with a panel plan, with all EPS components labelled correspondingly. All components should be placed as designated in the panel plan provided. Cutting of any required service holes should be carried out to a diameter of 20 mm larger than the size of the penetration using either a holesaw, sabre saw or a handsaw. This should be done away from the building footprint to ensure no free polystyrene beads 'float up' during concrete placement. Once all forms are positioned and penetrations are made, joints and gaps shall be filled with expanding foam to ensure containment of wet concrete.
- Reinforcing – all reinforcing steel shall be laid out as per the set-out drawings, adequately supported on bar chairs and spacers to ensure correct concrete cover.

13.2 The concrete for the MAXRaft Concrete Slab Floor System must be placed, finished and cured in accordance with the requirements of NZS 3109.

13.3 The exposed perimeter surface of the EPS foam forms must be protected from physical damage, UV light and water ingress. This is typically achieved by the application of a plastered coating that protects the insulation and is suitable to be in close proximity to the ground. Applied plaster coatings for use over the MAXRaft Concrete Slab Floor System have not been assessed by BRANZ and are outside the scope of this Appraisal.

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

Health and Safety

14.1 Wet concrete is a highly alkali substance and all necessary protective clothing should be worn when handling, placing and working with concrete.

Basis of Appraisal

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

BRANZ Investigations

15.1 A structural review of the MAXRaft Concrete Slab Floor System was undertaken by BRANZ structural engineers and found to be satisfactory.

15.2 A durability assessment has been provided by BRANZ technical experts.

15.3 The Technical Literature has been reviewed by BRANZ and found to be satisfactory.

15.4 Inspections of MAXRaft Concrete Slab Floor System installations being placed, and completed installations have been made by BRANZ to assess the practicability of installation, and to examine completed installations.

Quality

16.1 MAXRaft is responsible for the quality of the components supplied for the MAXRaft Concrete Slab Floor System.

16.2 Quality on-site is the responsibility of the building contractor.

16.3 Designers are responsible for incorporating the MAXRaft Concrete Slab Floor System into the design of buildings.

16.4 Building owners are responsible for the maintenance of the MAXRaft Concrete Slab Floor System in accordance with the instructions of MAXRaft.

Sources of Information

- AS/NZS 4671:2001 Steel reinforcing materials.
- NZS 3104:2003 Specification for concrete production.
- NZS 3109:1997 Concrete construction.
- NZS 3604:2011 Timber-framed buildings.
- NZS 4218:2009 Thermal insulation – Housing and small buildings.
- Ministry of Business, Innovation and Employment Record of amendments - Acceptable Solutions, Verification Methods and handbooks.
- The Building Regulations 1992.

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

BRANZ

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

The Appraisal is issued only to MBSS Limited T/A MAXRaft, and is valid until further notice, subject to the Conditions of Appraisal.

Conditions of Appraisal

1. This Appraisal:
   a) relates only to the product as described herein;
   b) must be read, considered and used in full together with the Technical Literature;
   c) does not address any Legislation, Regulations, Codes or Standards, not specifically named herein;
   d) is copyright of BRANZ.
2. MBSS Limited T/A MAXRaft:
   a) continues to have the product reviewed by BRANZ;
   b) shall notify BRANZ of any changes in product specification or quality assurance measures prior to the product being marketed;
   c) abides by the BRANZ Appraisals Services Terms and Conditions;
   d) warrants that the product and the manufacturing process for the product are maintained at or above the standards, levels and quality assessed and found satisfactory by BRANZ pursuant to BRANZ's Appraisal of the product.
3. BRANZ makes no representation or warranty as to:
   a) the nature of individual examples of, batches of, or individual installations of the product, including methods and quality of work;
   b) the presence or absence of any patent or similar rights subsisting in the product or any other product;
   c) any guarantee or warranty offered by MBSS Limited T/A MAXRaft.
4. Any reference in this Appraisal to any other publication shall be read as a reference to the version of the publication specified in this Appraisal.
5. BRANZ provides no certification, guarantee, indemnity or warranty, to MBSS Limited T/A MAXRaft or any third party.

For BRANZ



Claire Falck
Chief Executive

Date of Issue:
13 August 2024

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

MAXRaft®

PRODUCT GUIDE







ABOUT US

NZ owned and operated, MAXRaft specialises in fully insulated concrete foundation products. MAXRaft products deliver excellent thermal performance and energy efficiency for a range of projects from the foundation up – from schools, hospitals and retirement villages, to social housing developments and stand-alone residential homes.

MAXRaft offer products designed to suit different ground conditions. All MAXRaft products feature pre-cut polystyrene components which are manufactured off-site. All MAXRaft products are supplied with a panel plan to maximise on-site efficiency and minimise waste. Each component contains up to 15% recycled material and can be recycled at end of life.

MAXRaft products are suitable for Homestar and Passive House designs and have exceeded the building code requirements for over ten years, making them a reliable solution for easily meeting compliance and significantly reducing heat loss through the foundation.

The R-values achieved with MAXRaft products are dependant on project-specific design and area to perimeter ratio. MAXRaft products can also work in conjunction with Underfloor Heating where a minimum of R3* is required.

This guide will outline the suitable MAXRaft products for the building code requirements.

*See underfloor heating information



CONTENTS

H1 Compliance 4

Zone Map 5

PRODUCTS 7

- MAXEdge 8
- MAXSlab 10
- MAX85 12
- MAXRaft 14
- MAXRaft Plus+ 16

MAXRaft Engineering 18

MAXRaft with Underfloor Heating 19

Sustainability and Recycling 20

Summary R-Value Table 21

COMPLIANCE H1 INFORMATION

The current standards are set depending on building type. All residential (including apartments and wharenui) and other buildings under 300m² of lettable area refer to Table 1. For any non-residential buildings under 300m² that are not industrial warehouse or hangers, the new standards are reflected in Table 2.

H1/AS1 For all Residential and commercial buildings under 300m²

Table 2.1.2.2B: Minimum construction R-values for building elements that do not contain embedded heating systems

Paragraphs 2.1.2.2 b), 2.1.3.1

Construction R-values (m² K/W)(1)						
Building element	**Climate Zone1**	**Climate Zone 2**	**Climate Zone 3**	**Climate Zone 4**	**Climate Zone 5**	**Climate Zone 6**
Roof (2)	R6.6	R6.6	R6.6	R6.6	R6.6	R6.6
Wall	R2.0	R2.0	R2.0	R2.0	R2.0	R2.0
Floor slab-on-ground floors	R1.5	R1.5	R1.5	R1.5	R1.6	R1.7
Floors other than slab-on-ground floors	R2.5	R2.5	R2.5	R2.8	R3.0	R3.0
Windows and doors(3)	R0.46(3)	R0.46(3)	R0.46	R0.46	R0.50	R0.50
Skylights	R0.46	R0.46	R0.54	R0.54	R0.60	R0.60

H1/AS2 For all Non-Residential buildings with over 300m² lettable floor area

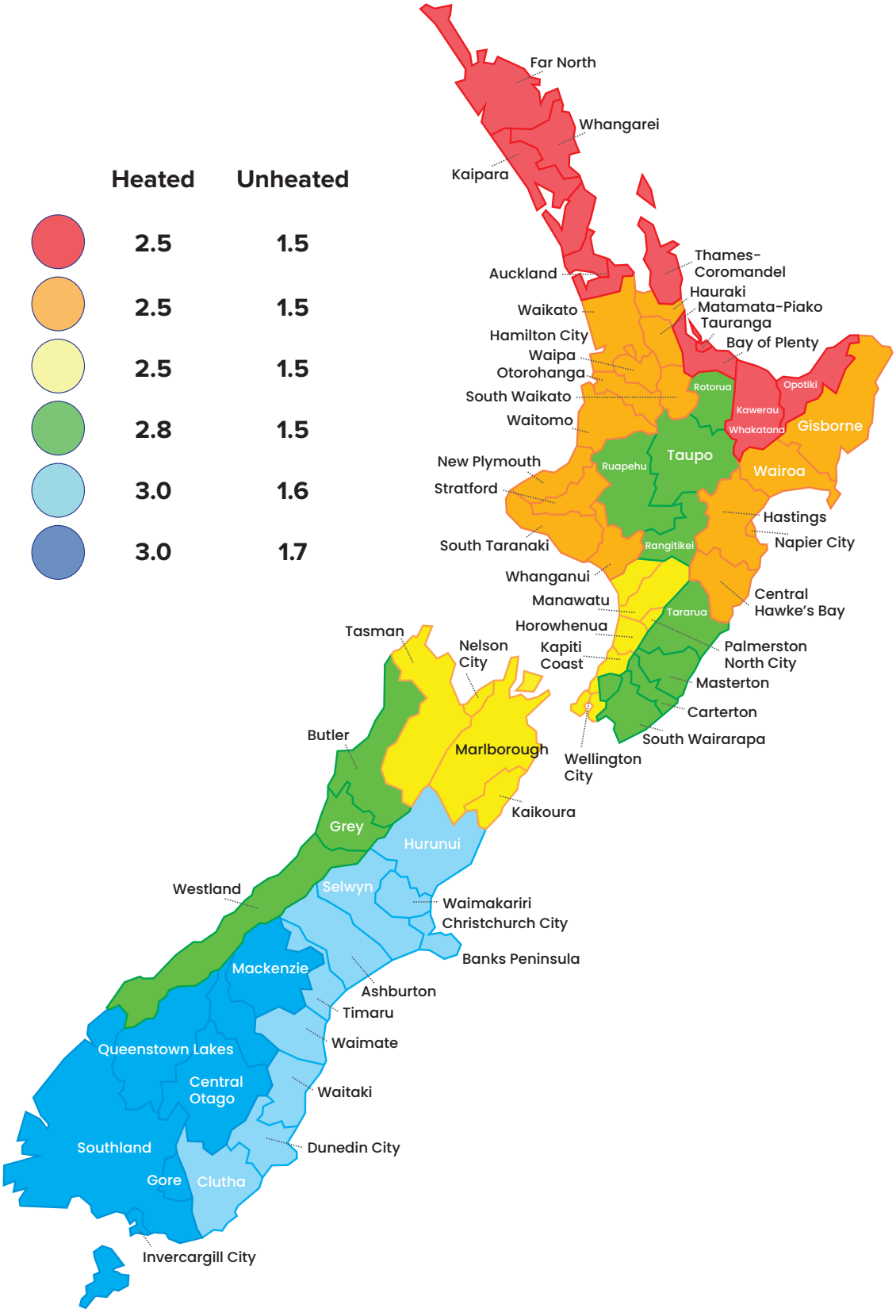
Table 2.1.2.2B: Minimum construction R-values for building elements that do not contain embedded heating systems

Paragraphs 2.1.2.2 b), 2.1.3.11

Construction R-values (m² K/W)(1)						
Building element	**Climate Zone1**	**Climate Zone 2**	**Climate Zone 3**	**Climate Zone 4**	**Climate Zone 5**	**Climate Zone 6**
Roof (2)	R3.5	R4.0	R5.0	R5.4	R6.0	R7.0
Wall	R2.2	R2.4	R2.7	R3.0	R3.0	R3.2
Floor	R2.2	R2.2	R2.2	R2.4	R2.5	R2.6
Windows and doors	R0.33	R0.33	R0.37	R0.37	R0.40	R0.42
Skylights	R0.42	R0.42	R0.46	R0.46	R0.49	R0.51

CLIMATE ZONE MAP

	Heated	Unheated
Climate zone 1	2.5	1.5
Climate zone 2	2.5	1.5
Climate zone 3	2.5	1.5
Climate zone 4	2.8	1.5
Climate zone 5	3.0	1.6
Climate zone 6	3.0	1.7





PRODUCTS

MAXRaft offers three fully insulated foundation products to meet different ground conditions and insulation requirements.

MAXEdge® MAXSlab®

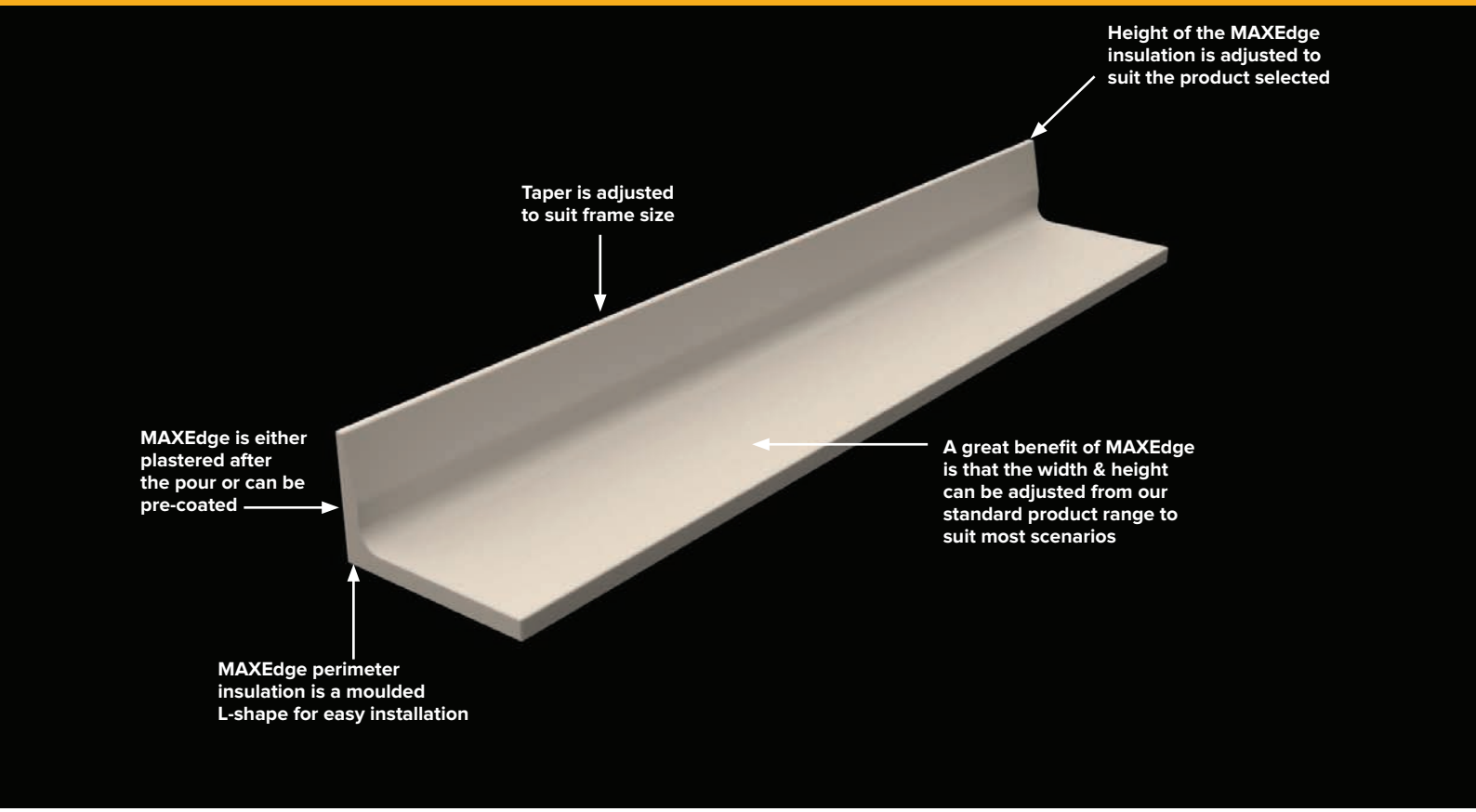
MAX85® MAXRaft® MAXRaft® PLUS+

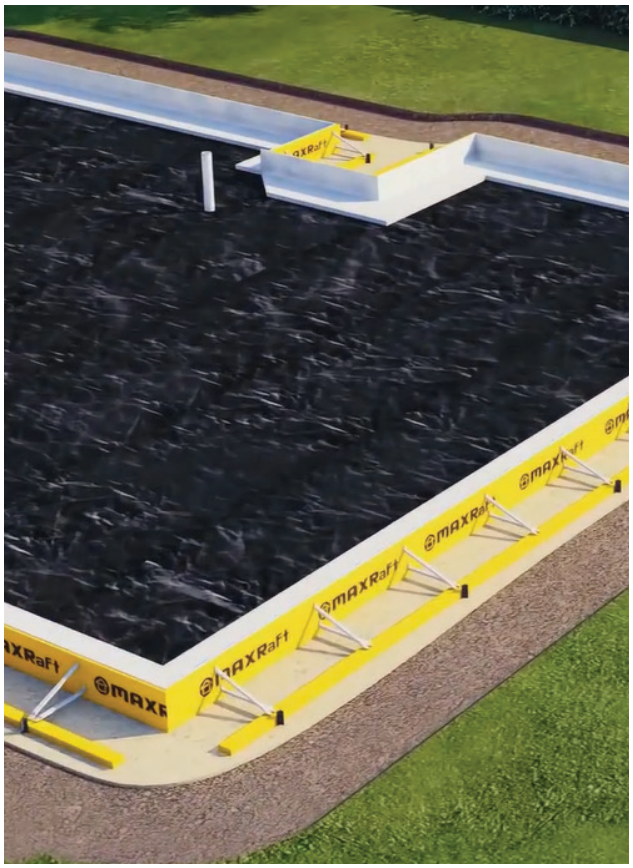
Each product can include:

1. **MAXEdge** L Shape profiles which reduce heat loss from the perimeter.
2. **VH EPS** Load bearing thickenings or ribs
3. **Polystyrene infill or pods** (The grade of EPS differs depending on product)

MAXRaft is BRANZ appraised.

MAXEdge®





PRODUCT INFORMATION

MAXEdge is an innovative and patented L-shaped slab edge insulation that is a vital component of all our products.

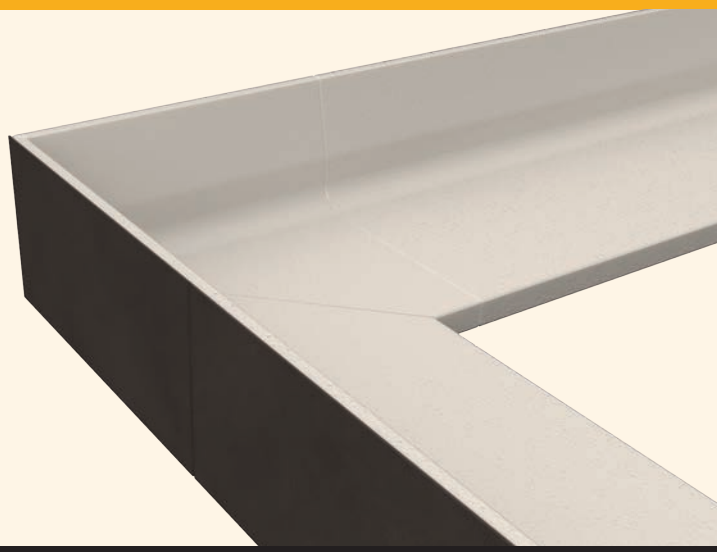
MAXEdge is greater than R1 edge insulation and can be used in conjunction with the H1 AS1 tables for all wall types.

Our MAXEdge profiles are designed to be easily installed inside the formwork and can be adjusted to suit different projects.

By using MAXEdge, you can ensure that your building is equipped with superior insulation that not only provides optimal thermal performance, but also easily surpass the requirements of the New Zealand Building Code.

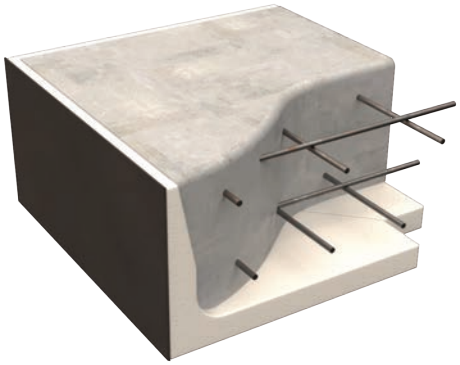
GENERAL INFORMATION

The MAXEdge perimeter insulation requires physical protection and protection from UV rays and waterproofing.



OPTIONS INCLUDE:

OPTION 1

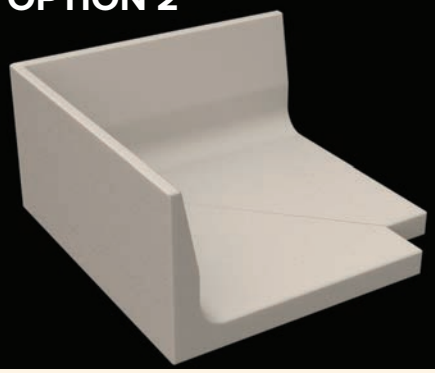


Pre-coated MAXEdge®

MAXEdge insulation arrives to site pre-coated and simply requires painting during the build process.

MAXEdge precoat is both UV Resistant and waterpoof. Although not required, painting is recommended for a more modern finish.

OPTION 2



Plastering clean MAXEdge®

MAXRaft has plastering contacts nationwide or you can engage your chosen plasterer.

For more information see our webite www.maxraft.co.nz/resources/plasterers

MAXEdge® KAPO BOARD

MAXRaft® has an exclusive relationship with Envirosquare and their KAPO Board on MAXEdge insulated foundations. The KAPO Board is appraised for use as a coating option on MAXRaft® for both EPS andXPS.

For more information visit: www.envirosquare.com

MAXSlab®

TC1/ GOOD GROUND





PRODUCT INFORMATION

MAXSlab is designed for TC1/ good ground found in many places in New Zealand.

KEY FEATURES

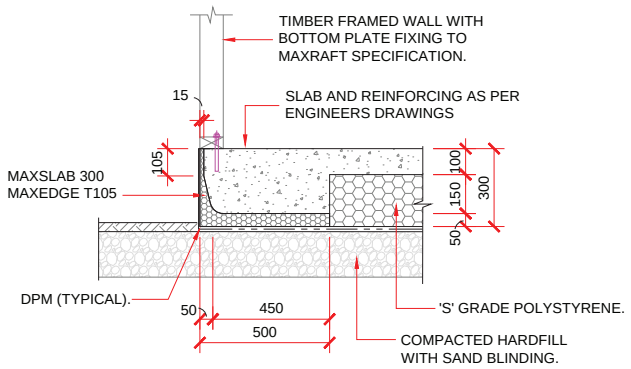
- Superior R-values
- VH EPS MAXEdge & thickening insulation
- Solid sheets of insulation under slab (no ribs)
- Suitable with 90mm/140mm/SIPS
- Suitable with UF Heating
- Panel plan and pre-cut materials
- Minimum waste / Recycled polystyrene material
- Engineered design
- Suitable for sloping sites

MAXSlab®
TC1/ GOOD GROUND

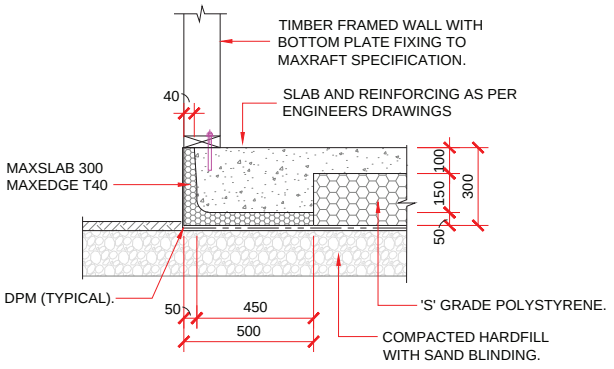
DETAIL

VH EPS MAXEdge, VH Thickenings, S Grade sheets.

90MM FRAME



140MM FRAME



STANDARD HEIGHTS

300MM	350MM	400MM

Bespoke options available

R VALUE TABLE

	AREA / PERIMETER RATIO									
	1.6	1.8	2	2.2	2.4	2.6	2.8	3	3.6	4
MAXSlab 300	2.42	2.64	2.85	3.01	3.17	3.32	3.48	3.64	4.03	4.28
MAXSlab 350	2.96	3.25	3.53	3.69	3.85	4.01	4.17	4.33	4.87	5.23
MAXSlab 400	2.89	3.17	3.45	3.65	3.84	4.04	4.23	4.43	4.92	5.25
MAXSlab 300 Brick* Rebate	2.27	2.48	2.68	2.83	2.99	3.14	3.29	3.44	3.95	4.29

* If brick cladding is to ground, please refer to the MAXSlab or MAXRaft R-Value details shown in above table. (Non-brick)
* alternative MAXEdge 90mm details available with angled bolt fixing.
* R-values are dependant on framing size.

MAX85®





PRODUCT INFORMATION

MAX85 is designed to meet the minimum H1 building code requirements.

Unlike the MAXSlab or MAXRaft products, MAX85 does not have insulation in thickenings and ribs.

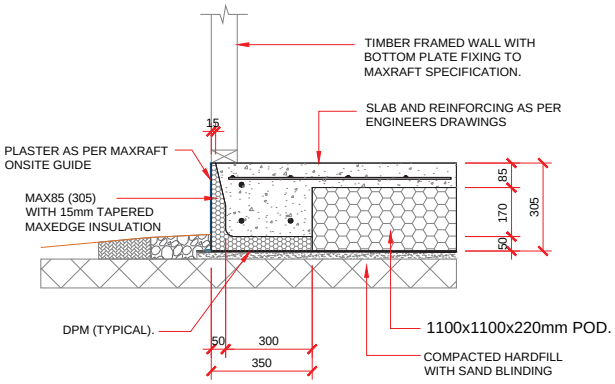
KEY FEATURES

- Includes MAXRaft patent VH EPS MAXEdge
- Suitable for good ground/ soft ground / TC2/ expansive soils/ piles
- Suitable with 90mm/140/SIPS
- Panel plan and pre cut materials
- Engineered design
- 85mm concrete
- Suitable for sloping sites

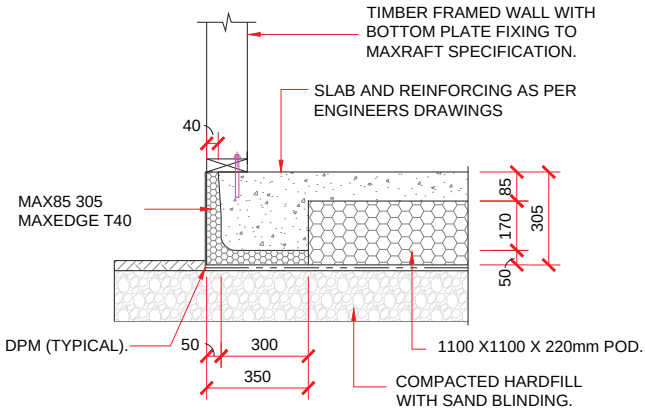
DETAIL

VH EPS MAXEdge with waffle pods

90MM FRAME



140MM FRAME



EXTERNAL FOOTING DETAIL
15mm TAPERED - 50mm BOTTOM
90mm / 140mm FRAMING

305MM	320MM	385MM	400MM

Bespoke options available

R VALUE TABLE

	AREA / PERIMETER RATIO									
	1.6	1.8	2	2.2	2.4	2.6	2.8	3	3.6	4
MAX85 305	1.46	1.54	1.62	1.7	1.77	1.85	1.92	2	2.21	2.36
MAX85 385	1.52	1.62	1.72	1.8	1.88	1.96	2.03	2.11	2.33	2.48
MAX85 305 Brick	1.3	1.39	1.47	1.55	1.62	1.7	1.78	1.85	2.06	2.21
MAX85 385 Brick	1.34	1.43	1.53	1.6	1.68	1.76	1.84	1.92	2.14	2.28

* alternative MAXEdge 90mm details available with angled bolt fixing.
* R-values are dependant on framing size.
* Angled bolt fixings are required to achieve 90mm framing R-Values shown in table. Please contact MAXRaft for R-Values when using a straight bolt fixing.

MAXRaft®

200KPA / TC2 / EXPANSIVE SOILS / PILES





PRODUCT INFORMATION

MAXRaft slabs are typically designed on soft ground, 200KPA / TC2 / Expansive soils / Piles

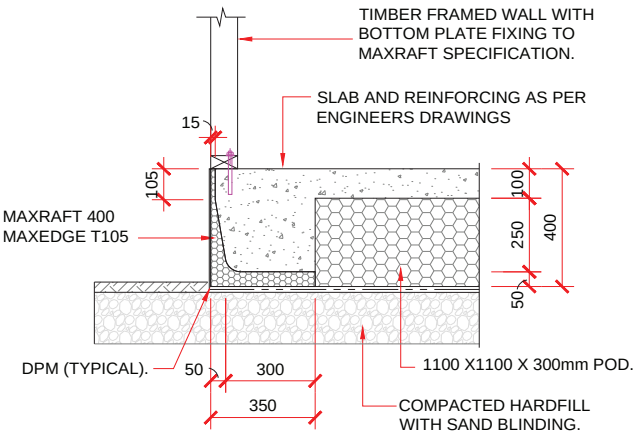
KEY FEATURES

- VH EPS MAXEdge & thickening insulation
- Easily meets the building code
- Suitable with 90mm/140mm/SIPS
- Panel plan and pre-cut materials including-PODS
- Minimum waste / Recycled polystyrene materials Engineered design

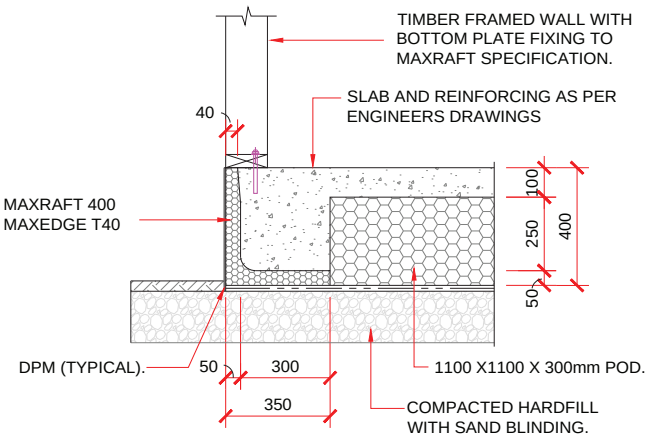
DETAIL

VH EPS MAXEdge, VH EPS in Ribs & Thickenings with waffle pods.

90MM FRAME



140MM FRAME



STANDARD HEIGHTS

320MM	340MM	400MM	420MM

Bespoke options available

R VALUE TABLE

	AREA / PERIMETER RATIO									
	1.6	1.8	2	2.2	2.4	2.6	2.8	3	3.6	4
MAXRaft 320	1.86	1.97	2.07	2.16	2.25	2.33	2.42	2.5	2.74	2.9
MAXRaft 400	1.68	1.81	1.93	2.01	2.1	2.18	2.27	2.35	2.59	2.74
MAXRaft 320 Brick*	1.62	1.73	1.85	1.93	2.02	2.11	2.2	2.29	2.53	2.69
MAXRaft 400 Brick*	1.56	1.68	1.79	1.87	1.96	2.05	2.14	2.23	2.46	2.62

* If brick cladding is to ground, please refer to the MAXSlab or MAXRaft R-Value details shown in above table. (Non-brick)
* alternative MAXEdge 90mm details available with angled bolt fixing.
* R-values are dependant on framing size.

MAXRaft® PLUS+

200KPA / TC2 / EXPANSIVE SOILS / PILES





PRODUCT INFORMATION

MAXRaft Plus+ is designed to achieve better performance than a standard MAXRaft. It utilises solid PODS instead of typical waffle pods to achieve higher R-values. MAXRaft Plus+ is a great option where UF heating is specified on soft ground conditions.

KEY FEATURES

- Solid insulation throughout
- Easily meets the building code
- Suitable with 90mm/140mm/SIPS
- VH EPS MAXEdge & thickening insulation
- Panel plan and pre-cut materials including PODS
- Minimum waste / Recycled polystyrene materials
- S grade solid pods

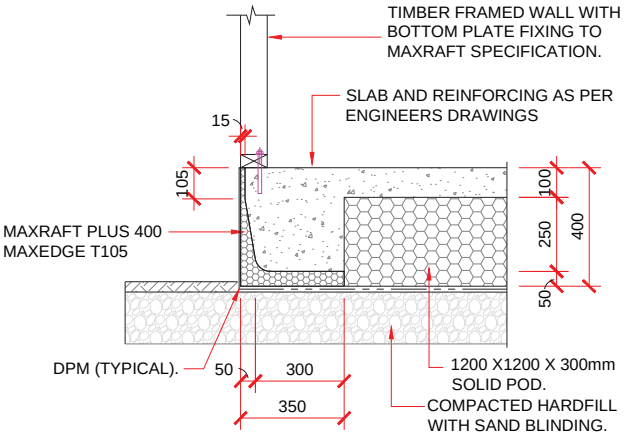
MAXRaft® PLUS+

200KPA / TC2 / EXPANSIVE SOILS / PILES

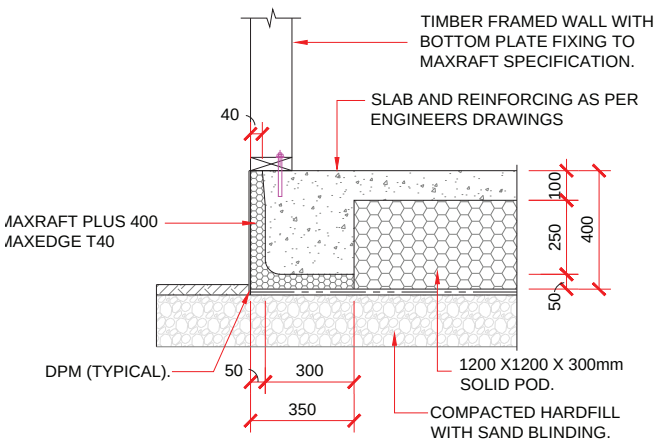
DETAIL

VH EPS MAXEdge, VH EPS in RIbs & Thickenings with Solid Pods.

90MM FRAME



140MM FRAME



STANDARD HEIGHTS

320MM	340MM	400MM	420MM

Bespoke options available

R VALUE TABLE

	AREA / PERIMETER RATIO									
	1.6	1.8	2	2.2	2.4	2.6	2.8	3	3.6	4
MAXRaft Plus+ 320	2.5	2.67	2.84	3.01	3.19	3.36	3.53	3.7	4.03	4.25
MAXRaft Plus+ 400	2.54	2.74	2.94	3.11	3.28	3.45	3.63	3.8	4.15	4.38
MAXRaft Plus+ 320 Brick*	2.18	2.38	2.59	2.71	2.83	2.95	3.07	3.19	3.5	3.71
MAXRaft Plus+ 400 Brick*	2.11	2.29	2.47	2.6	2.73	2.86	2.99	3.12	3.57	3.87

* If brick cladding is to ground, please refer to the MAXSlab or MAXRaft R-Value details shown in above table. (Non-brick)
* alternative MAXEdge 90mm details available with angled bolt fixing.
* R-values are dependant on framing size.
** Higher R-values than shown in the above table can be achieved by adjusting the type of solid pod, please contact MAX-Raft to increase your R-value if required.

MAXRaft®
ENGINEERING

SPECIFYING MAXRAFT

All MAXRaft Fully Insulated Foundations require an engineered design and PS1.

MAXRaft can complete your slab design in house by one of our trusted teams or you can use your preferred engineer.

Visit our website or contact us for a copy of our DWG & PDF Library of our standard details.

Save time and cost in the design process.

Another simple way to specify a MAXRaft product, you can engineer your own MAXRaft slab via the Specifi Platform.

MAXRaft Products are listed on Specifi, an online tool that saves time and enables you to control the timeframe of your slab design!

Specifi Benefits

- Quick turnaround within 72 hours
- Developed by experienced, professional New Zealand engineers
- No additional risk or liability to you when using Specifi
- Self site checks
- Easy to follow software
- Full support via phone or email

SPECIFI™
BUILT BY KIRK ROBERTS CONSULTING

BRANZ Appraised
Appraisal No.1054 [2019]

MAXRaft is Branz Appraised. Please see our website or contact the MAXRaft team for the more information.

UNDERFLOOR HEATING

New H1 requirements by climate zone for embedded UF heating.

Constuction R-Values (M2/K/W)					
ZONE 1	ZONE 2	ZONE 3	ZONE 4	ZONE 5	ZONE 6
2.5	2.5	2.5	2.8	3.0	3.0

MAXRaft products and embedded in-slab heating are a great combination.

Good ground & UF Heating

In most instances MAXSlab will meet the R2.5 to R3 requirement based on climate zone.

Soft soils & UF Heating

MAXRaft insulation is upgraded to MAXRaft Plus+ to meet the R-value requirements when underfloor heating is specified.

	Area / Perimeter Ratio									
	1.6	1.8	2	2.2	2.4	2.6	2.8	3	3.6	4
MAXSlab 300	2.42	2.64	2.85	3.01	3.17	3.32	3.48	3.64	4.03	4.28
MAXSlab 350	2.96	3.25	3.53	3.69	3.85	4.01	4.17	4.33	4.87	5.23
MAXSlab 400	2.89	3.17	3.45	3.65	3.84	4.04	4.23	4.43	4.92	5.25
MAXRaft Plus+ 320	2.5	2.67	2.84	3.01	3.19	3.36	3.53	3.7	4.03	4.25
MAXRaft Plus+ 400	2.54	2.74	2.94	3.11	3.28	3.45	3.63	3.8	4.15	4.38

Notes:

- We can adapt our MAXRaft products if and where required – especially where sites have soft soils and low A/P ratio.
- Underfloor heating pipes can be laid on the mesh or on the polystyrene.
- Where the pipes are installed on top of the mesh, typically the slab thickness and the mesh grade will be increased.





SUSTAINABILITY & RECYCLING

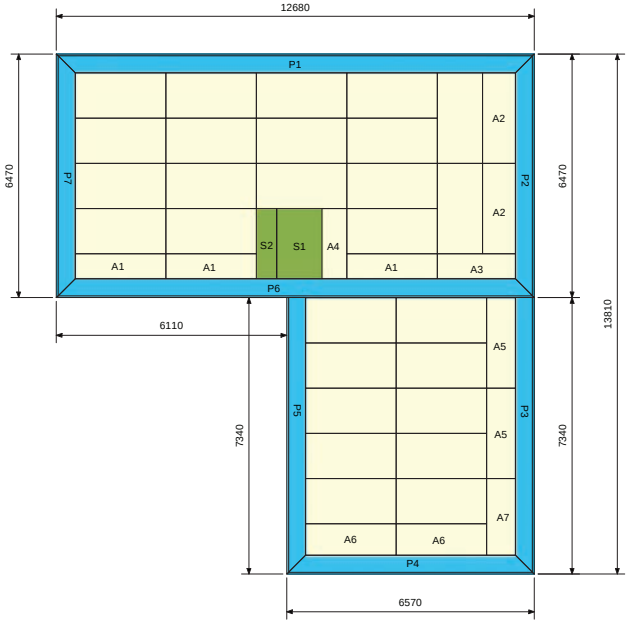
MAXRaft fully insulated foundation products are designed to be energy efficient, cost effective, and sustainably sourced. Our team continues to research new ways and technology to help provide the best foundation solutions, allowing you to live in a home with greater levels of comfort and increased health benefits for you and your family. We believe in building homes above the building standard with industry leading insulation.

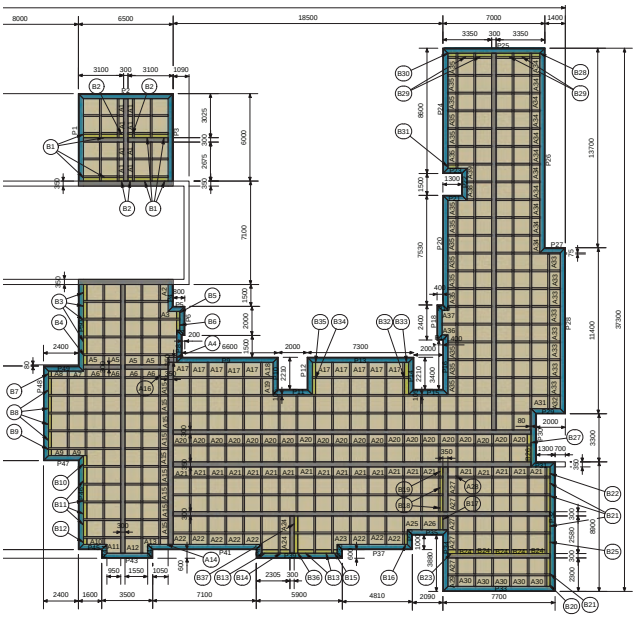
Forward Thinking On Waste

All our designs includes a site specific panel plan prepared in house, it is sent to our manufacturers to pre-cut all the polystyrene materials in the factory. Cutting the materials in the factory means cleaner waste which is easy to contain and recycle. Once on-site the polystyrene materials are installed like a labelled jigsaw puzzle, reducing the need for on-site cutting.

MAXRaft EPS POLYSTYRENE IS 100% RECYCLABLE

All MAXRaft EPS polystyrene components contain approx. 15% recycled material. Once the polystyrene components have been installed on-site, any off-cuts can be returned to the manufacturer to be recycled into new material.





PANEL PLAN EXAMPLES

cut me out

SUMMARY R-VALUE TABLE

		AREA / PERIMETER RATIO									
	Product	1.6	1.8	2	2.2	2.4	2.6	2.8	3	3.6	4
1	MAXSlab 300	2.42	2.64	2.85	3.01	3.17	3.32	3.48	3.64	4.03	4.28
2	MAXSlab 350	2.96	3.25	3.53	3.69	3.85	4.01	4.17	4.33	4.87	5.23
3	MAXSlab 400	2.89	3.17	3.45	3.65	3.84	4.04	4.23	4.43	4.92	5.25
4	MAXSlab 300 Brick Rebate	2.27	2.48	2.68	2.83	2.99	3.14	3.29	3.44	3.95	4.29
5	MAXRaft 320	1.86	1.97	2.07	2.16	2.25	2.33	2.42	2.5	2.74	2.9
6	MAXRaft 400	1.68	1.81	1.93	2.01	2.1	2.18	2.27	2.35	2.59	2.74
7	MAXRaft 320 Brick	1.62	1.73	1.85	1.93	2.02	2.11	2.2	2.29	2.53	2.69
8	MAXRaft 400 Brick	1.56	1.68	1.79	1.87	1.96	2.05	2.14	2.23	2.46	2.62
9	MAX85 305	1.46	1.54	1.62	1.7	1.77	1.85	1.92	2	2.21	2.36
10	MAX85 385	1.52	1.62	1.72	1.8	1.88	1.96	2.03	2.11	2.33	2.48
11	MAX85 305 Brick	1.3	1.39	1.47	1.55	1.62	1.7	1.78	1.85	2.06	2.21
12	MAX85 385 Brick	1.34	1.43	1.53	1.6	1.68	1.76	1.84	1.92	2.14	2.28
13	MAXRaft Plus+ 320 (SG POD)	2.5	2.67	2.84	3.01	3.19	3.36	3.53	3.7	4.03	4.25
14	MAXRaft Plus+ 400 (SG POD)	2.54	2.74	2.94	3.11	3.28	3.45	3.63	3.8	4.15	4.38
15	MAXRaft Plus+ 320 Brick (50/50 POD)	2.18	2.38	2.59	2.71	2.83	2.95	3.07	3.19	3.5	3.71
16	MAXRaft Plus+ 400 Brick (50/50 POD)	2.11	2.29	2.47	2.6	2.73	2.86	2.99	3.12	3.57	3.87

R-values are dependant on framing size.

Product	Suitability
MAXSlab	Good Ground, TC1, 300KPA
MAXRaft 320	200KPA, M Class soils
MAXRaft 400	TC2, H Class Soils
MAX85 305	TC1, 200KPA, M Class soils
MAX85 385	TC2, H Class Soils
MAXRaft Plus+320	200KPA, M Class soils
MAXRaft Plus+400	TC2, H Class Soils

MAXRaft®

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MAXRaft® Installation Manual



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TABLE OF CONTENTS

Section 1	**Installation Guidelines**			
1	**General**	2	**4**	**Protecting the MAXRaft System** 11
			4.1	General 11
2	**Site Requirements**	2	4.2	Beccrete Edge Protection 12
2.1	General	2	4.3	StoMiral Plaster System
3	**Installation Procedure**	2	4.4	Specialized – Tankit Waterproofing 12
3.1	Site Preparation	2		System 12
3.2	Plumbing and Services	2		
3.3	Sand Blinding	3		
3.4	Formwork	3	**5**	**Durability Statement** 13
3.5	Damp Proof Membrane	4		
3.6	MAXRaft installation – Ext. Corners	5	**6**	**Builder's Responsibilities** 13
3.6.1	MAXRaft installation – Int. Corners	5		
3.7	MAXRaft Installation – infill	5		
3.8	Reinforcing Steel	6		**Tools Required** 14
3.9	Reinforcing Mesh	6		
3.9.1	Rebates	7		**Enlarged Pictures** 15 - 31
3.9.2	Door Rebate	7		
3.9.3	Brick Rebate	7		
3.9.4	Shower Rebates	7		
3.10	Door / Window Supports	7		
3.11	In-slab Heating	8		
3.12	Bottom Plate Fixings	8		
3.12.1	Bolt fixings for 90mm			
3.12.2	Bolt fixings for 140mm	8		
3.12.3	Bracing Elements	9		
3.13	Concrete Installation	9		
3.13.1	Placing	9		
3.13.2	Finishing	10		
3.13.3	Curing	10		
3.13.4	Saw cuts	10		
3.14	Removal of Formwork	11		
3.15	Landscaping / Paving	11		

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1 General

This Manual details the installation information required for the MAXRaft® system. All MAXRaft® fully insulated foundations require site-specific engineering and all concrete and reinforcing specified in the engineering must be adhered to when installing the MAXRaft® system. This Manual is to be utilised only by MAXRaft® personnel and authorised third parties.

2 Site Requirements

2.1 General

The sites must be prepared to the standard specified in the MAXRaft® quote and by the engineers.

Where reference is made in the MAXRaft® quote to excavations or otherwise referenced in a Geotechnical report (Geotech), the site must adhere to standards recommended in the Geotech report.

Where fill is used to bring a site up to the required level, or as a replacement for excavated soil, it should be tested to ensure that it meets the ground bearing capacity previously specified by MAXRaft®.

The contractor is to check all dimensions with the architectural drawings and notify MAXRaft® of any discrepancy before construction.

3 Installation Procedure

3.1 Site Preparation

The site should be cut to underside of slab level plus any extra allowance for hard fill and blinding layers.

All vegetation, topsoil and other loose material shall be removed from the building footprint as per distance specified by engineer.

Where fill is required, it shall adhere to the requirements set out in section 2 - Site Requirements.

The cut platform should not be left exposed to dry out for any significant time, particularly where expansive soils have been identified.

Set out the foundation plan on profiles, keeping profiles 800mm from the building line.

3.2 Plumbing and services

Plumbing and services required beneath the slab should be planned and laid to the required location; then brought up at 90 degrees through the subgrade to a height that takes account of the sand blinding, the MAXRaft® insulation and the concrete topping, as per Fig 1. The trenching and placement shall conform to the project architect's consent documentation. Plumbing should be kept a minimum of 50mm from the profile lines where possible.



Fig 1

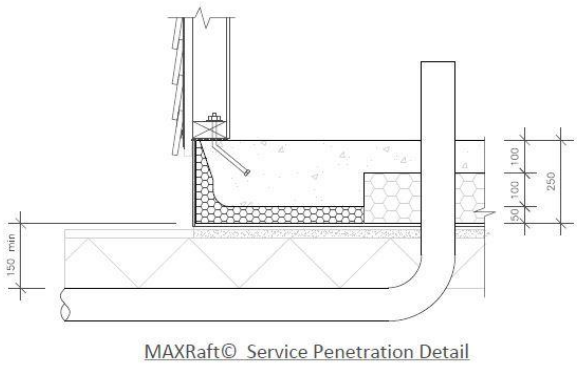


Fig 2 Standard MAXRaft® Penetration

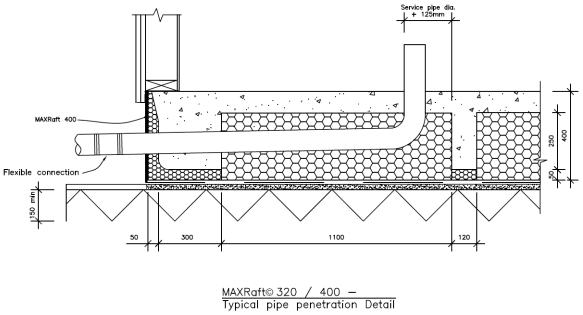
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Material excavated when digging plumbing trenches should be discarded outside the perimeter of the building footprint. The trenches should be refilled with hardfill and topped with compacted sand, screeded to the correct level.

Plumbing/Services brought through the slab should be covered with a 25mm thick polystyrene capping for protection. Where required, pipes can be run through the MAXRaft® insulation by removing polystyrene locally around the piping following installation of the MAXRaft® insulation.

Where MAXRaft® 320 or MAXRaft® 400 is utilised, no one pod may support more than one penetration of greater than 100mm. Where more than one such penetration is required within the confines of a single pod, a 120mm rib shall be inserted to divide the pod into two separate areas.

Fig 3 - MAXRaft® 320 or MAXRaft® 400 Penetration:

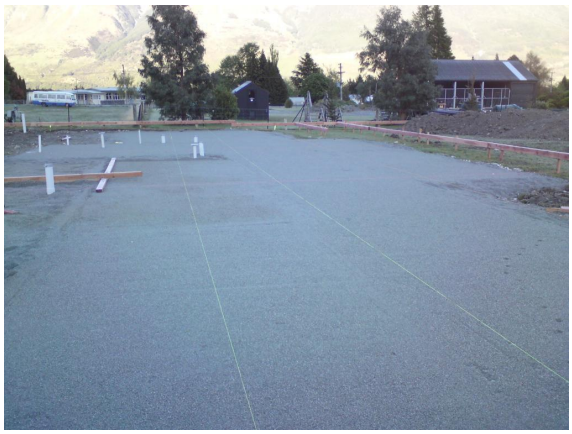


3.3 Sand Blinding

A layer of sand/scalpings 25mm deep consisting of compacted fines shall be laid over the building platform, and extending at least 500mm beyond the perimeter of the foundation slab. This blinding must be compacted and levelled to +/- 3mm of the desired level, as per Fig 4.

If the building platform is over clay, ensure the clay surface has not been softened by building activity.

Fig 4



If the clay has been softened, remove the softened material and replace compacted screed. If the depth of the softened clay is over 50mm beneath the desired base of the MAXRaft®, fill shall be placed in accordance with Clause 7.5.3 NZS3604:2011.

The sand is required to ensure a level platform is provided for the MAXRaft® system and that the system remains level and stable throughout the installation process and to provide a smooth surface to receive the damp proof membrane (DPM).

If blinding is done before plumbing, additional blinding material should be left on site to infill plumbing excavations.

3.4 Formwork

MAXRaft® recommends the use of LVL's or shutters as formwork at up to 1000mm centres. Although the MAXRaft edge requires less bracing than a traditional waffle slab, LVL's or Shutters will ensure a strong and clean finish and make the process of installing rebates easier.

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Fig 5 Example Boxing Setup

The formwork may also be set to the height of the slab and concrete placed with a laser to ensure the appropriate finish.



Fig 6 Example Boxing with shutters

3.5 Damp Proof Membrane (DPM)

A continuous layer of 0.25mm damp proof membrane consisting of polythene sheeting in accordance with NZS3604:2011 shall be used under the MAXRaft®. The DPM should be placed on top of the sand blinding layer over the foundation area plus an additional 100mm extending past the foundation line and cut in a straight line at the end of the 100mm extension. See Fig 7.



Fig 7

The joints should lap at least 150mm and be sealed with pressure sensitive tape.

All penetrations through the DPM by services/plumbing shall be sealed with similar tape.

The DPM may either extend beyond the formwork or may be stapled to the inside of the formwork. If stapling, ensure that there is enough material to allow for a 90 degree angle at the base to allow the MAXRaft® insulation to sit up against the formwork, Fig 8. If using staples be mindful of tears. Damage to the DPM will require repair.



Fig 8

It is imperative that the Polythene DPM is protected and kept straight and clean during construction as the exterior coating system will be applied down the face of the finished MAXRaft® and onto the Polythene DPM.

3.6 External Corners

External corners are pre-made to suit the slab. These should be installed first, followed by the straight lengths of perimeter profile. Only straight lengths require cutting onsite. Ensure to use expanding foam in any gaps between the edge profile prior to the concrete pour.

See figs, 9 & 10

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Fig 9 & 10 above

3.6.1 Internal Corners

When joining internal corners cut the top of the edge profile and butt the polystyrene together. As per fig 11 below.



Fig 11

3.7 MAXRaft Infill Installation

The MAXSlab 250mm for good ground will be delivered with a panel plan and goes together like a jigsaw puzzle. Each polystyrene sheet will be labelled and should be placed as designated in the panel plan provided.

MAXRaft 320/400 pod designs may require some cutting of pods and VH strips onsite, please ensure all waste is placed in the bags provided to be recycled. To install the polystyrene please follow the layout provided in the engineer's drawings.

If a schist veneer is specified, a 100mm diameter hole should be cut around the protruding steel. This will allow for the concrete to be poured around it to ensure a good connection. Any polythene beneath this hole should be cut away. As per Fig 12.



Fig 12

Cut any service holes that may be required 20mm larger than the size of the penetration using either a gibsaw, holesaw, sabre saw or a handsaw. All polystyrene cutting should be done away from the building footprint to ensure no polystyrene beads float up during concrete placement (if required vacuum up beads pre-pour). Once the penetration has been inserted through the hole, this area must be filled with Expanding Foam to ensure a seal is created.

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Fig 13

Once the steel has been laid in line with the directions below, joins should be sealed by placing a line of Expanding Foam between any gaps, Fig 14.



Fig 14

3.8 Reinforcing Steel

Reinforcing steel, whether in the perimeter footings, internal thickenings or in ribs (if using MAXRaft® 320 or MAXRaft® 400), shall be laid in accordance with the specifications as per the engineering plans. All laps and stirrups must comply with the relevant specifications.

The steel reinforcing can come in pre-tied lengths before the MAXRaft® arrives. This allows you to place them in the footings once the MAXRaft® system is in place. Chair up all reinforcing.The concrete cover for reinforcing steel will be specified in the engineering documents.

Where steel fibres have been specified, install reinforcing steel as specified in the engineering documents and keep a copy of the concrete delivery slip to record the steel fibre quantities within.

3.9 Reinforcing Mesh

Mesh as specified in the engineering





documents shall be placed over the MAXRaft® insulation and supported on chairs as per fig 15. The chairs should be of sufficient number to ensure that the mesh does not sag excessively between support points. The mesh should be lapped as per mesh specification and tied at all laps.

Fig 15

If a PS4 is required for the building consent, the reinforcement requires inspection by a suitably qualified engineer to ensure it has been placed satisfactorily. This shall be done prior to pouring the concrete. If a PS4 is not required, the local authority shall inspect the reinforcement prior to the concrete pour.

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3.9.1 Rebates

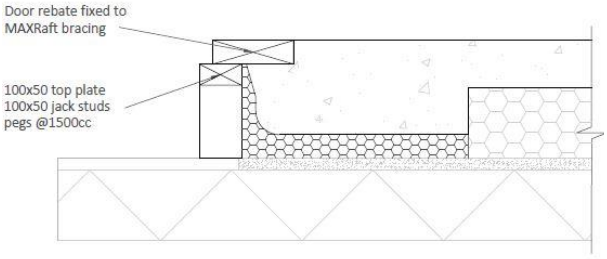
Timber rebates shall be inserted where necessary as dictated by the architect's plans. Any gaps between the perimeter mouldings and the rebates should be filled with expanding foam.

All rebates to be H3 timber.

3.9.2 Door Rebates

Timber rebates are fixed to the perimeter

100 x 50mm brace as per Fig 16.



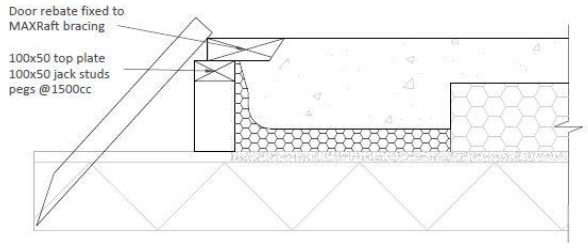
MAXRaft© Door Rebate

Fig 16

3.9.3 Brick Rebates

Timber rebates are fixed to the perimeter 100 x 50mm brace as per Fig 17.

The dimensions of the brick rebate will be specified in the MAXRaft® engineering document.



MAXRaft© 90mm Brick Veneer

Fig 17

3.9.4 Shower Rebates

Box any shower rebates with 150 x 50mm formwork. The concrete is to be poured separately.

The shower rebate may occasionally be specified in the engineering documents. Where it is not specified, the MAXRaft® insulation is to be cut locally to ensure the concrete topping remains consistent with the rest of the floor.

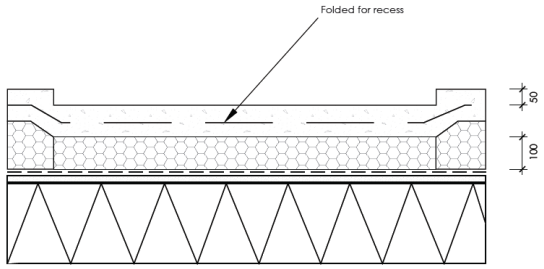
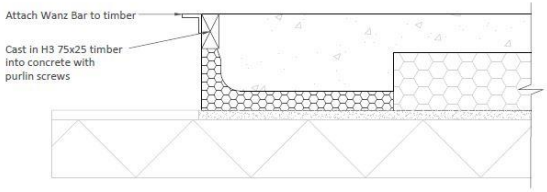


Fig 18

3.10 Door/Window Supports

H3 Timber can be cast into the MAXRaft® with Purlin screws, a WANZ bar can be fixed to this for exterior joinery as shown below in Fig 19.

The cast in timber shall be placed below the desired rebate. Cut down the MAXRaft® mouldings below the level of the rebate to create room for the cast in timber. Foam up any gaps that appear between the timber and the mouldings once the timber is secure.



MAXRaft© Wanz Bar Fixing

Fig 19

Alternatively, if larger architectural doors are being used which require larger extrusions, a cast in galvanised angle can be used as shown in Fig 20.

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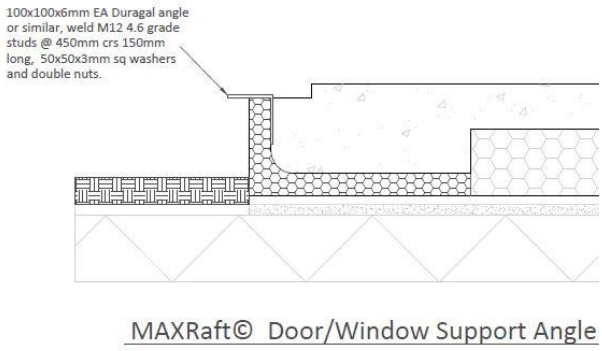


Fig 20.

3.11 In-slab heating

Your heating contractor will install their pipes or cables. Depending on the heating system and the concrete cover, it may be possible to staple the heating system directly onto the MAXRaft® insulation as per Fig 21. If the heating system is laid on top of the mesh a 120mm slab may be required.

If the pipes are being stapled directly to the insulation, the heating system should be put in place prior to laying the mesh reinforcement, but after laying the perimeter reinforcement.

Where the heating system is being stapled directly onto the MAXRaft® insulation, a topping concrete thickness of at least 100mm will be required.



Fig 21

3.12 Bottom Plate Fixings

There are several options for the bottom plate fixings, depending on the width of the timber wall framing.

Bottom plate fixings and bracing hold down requirements may also be specified in the MAXRaft® engineering documents.

3.12.1 Bolt options for 90mm framing

1) M12 cast-in bolts with 50 x 50 x 3mm sq washers as per clause 6.11.9 of NZS3604
2) Simpson Strong-Tie TITEN HD THD10160MG screw anchors or similar approved at 600mm centres, 25mm from inside face of framing.
3) Simpson Strong-Tie AT-HP Blue anchoring adhesive with M12 4.6 grade stud or similar approved at 100mm embedment at 600mm centres

3.12.2 Screw in Bolt for 140mm

1) Simpson Strong-Tie TITEN HD THD10160MG screw anchors or similar approved at 900mm centres, 25mm from inside face of framing.
2) Simpson Strong-Tie AT-HP Blue anchoring adhesive with M12 4.6 grade stud or similar approved at 100mm embedment at 900mm centres

Table 1

Bottom Plate Fixings		
	90mm Framing	140mm framing
Cast-in bolts	✓	✓
Screw-in bolts	✓	✓
Epcon C6 Chemset Anchors	✓	✓

Table 1 – applies to houses designed in line with NZS3604 only.

All fixings to be used in line with manufacturers recommendations.

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3.12.3 – Bracing Elements

Any additional 15kN fixing required for 90mm bracing element hold downs to be Simpson Strong Tie M10 Screw Anchors (or similar) or Ramset Epcon C6 Chemical Anchors with 25mm edge distance to internal face of framing.

3.13 Concrete Installation

Concrete placing should be carried out by experienced contractors, strictly in accordance with NZS3109:1997, Clause 7.

Concrete strength and depth will be specified in the engineering documents.

Ensure reinforcement has been inspected by either a qualified engineer and/or council prior to pouring concrete.

3.13.1 Placing

The concrete shall be poured and placed in such a manner as to ensure that the MAXRaft® insulation does not move during the process.

Ideally, concrete should be placed through the centre of the foundation prior to pouring and placing the perimeter footings, internal thickenings or ribs to prevent flotation or movement during placing. The concrete should not be directed at the upstand of the perimeter insulation as the formwork is not designed to withstand direct impact and may break under pressure.

The concrete shall be placed in such a manner as to minimise segregation.

The concrete shall be compacted by vibration around all steel and against all rebates and perimeter footings.

3.13.2 Finishing

Immediately after placing and compaction has been completed the concrete should be screeded with the assistance of a level. Ensure the top surface is finished within tolerance using a laser level. Do not use the top of the MAXRaft® as a base point for levelling the concrete.

Clean any concrete off the polythene and the MAXRaft® system.

3.13.3 Curing

Where the possibility of adverse weather conditions could lead to early drying of the top surface, the contractor should consider delaying the pour, or alternatively, take appropriate actions to ensure plastic cracking does not form on the surface of the slab.

Proper curing methods are recommended as follows:

- Ponding of water (Fig 25)
- Continuous sprinkling of the slab
- Placing wet sacking over the slab



Fig 23

If a large change in temperature is expected within 24 hours of pouring, then ponding or continuous sprinkling is recommended to mitigate adverse effects in the slab.

Where a polished concrete floor is specified, we recommend ponding the slab soon after placing for 3 days (or as long as possible).

When ponding, lay a 10mm high strip of foam around the top of the perimeter to keep the water in place.

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3.13.4 Saw Cuts

Where saw cuts are provided as specified in NZS 3604, floor finish, the location of load bearing walls and underfloor heating should be taken into account. Saw cuts should be cut into the slab within 24 hours after pouring once the slab is sufficiently hard.

Saw cuts should be approximately 1/3rd of the concrete topping thickness, with a minimum 25mm deep cut for concrete 85mm thick. For large floors, formed control joints may be required.

Saw cuts shall be placed where specified in the architect's plans.

If the slab has been ponded, it should be re-ponded after saw cuts have been completed.

3.14 Removal of Formwork

The formwork must not be removed within 12 hours of finishing the slab. No loads are to be placed on either the slab or the MAXRaft® insulation before the concrete has cured sufficiently over 4 days.

Formwork should be removed with care so as not to damage the MAXRaft® exterior or polythene under layer. Once the boxing is stripped the poly should be checked for any non-conformities (concrete spillage etc.) and cleaned down straight away before it sets to leave a clean MAXRaft outside face of the slab.

3.15 Landscaping / Paving

Landscaping/paving shall not take place until the exterior of the MAXRaft® perimeter has been protected with the relevant coating application.

Where possible a 60mm drainage strip between the MAXRaft and path should be laid, Fig 26.



Fig 24

If concrete paths are to be laid, drainage should be as per E2 NZBC e.g. a slot drain or similar. Fig 27



Fig 25

The minimum levels for paved, concrete and landscaped surfaces are set out in NZBC E2 and should be adhered to.

Allowance shall also be made to ensure that large trees and their associated roots do not impact on the stability of the MAXRaft®.

4 Protecting the MAXRaft® System

4.1 General

The MAXRaft® system exterior requires protection from physical damage, UV rays and water absorption.

MAXRaft® should be protected by the use of a coating that protects the insulation and is suitable for use in the subgrade.

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Fully tanking of the system is not required. But if preferred a bead of silicone at the junction of the MAXRaft® and DPM will suffice.

Coating products must be applied in line with the relevant manufacturer's specifications and is recommended to be completed within 30 days of the pour.

For ease of application it is recommended that the exterior coating is applied to the MAXRaft edge prior to the external cladding being installed.

There are a number of protection systems available, some of which are listed below. These systems meet the relevant requirements for subgrade protection.

- Beccrete;
- Plaster in conjunction with plaster-able weathertight flashing tape (Exterior Insulation and Finish Systems Tape);
- StoMiral Plaster System;
- Specialized – Tankit Penetration Waterproofing System.

The MAXRaft website is regularly updated with further systems as they become available (http://www.maxraft.co.nz/protecting-maxraft/)

4.2 Beccrete Edge Protection;

Beccrete on MAXRaft has been specifically engineered for MAXRaft EPS & XPS Edge. The system comprises of a butyl tape to seal the polystyrene-polythene junction, then a waterproofing slurry coat is applied to the polystyrene edge over the tape. Specialised Beccrete products along with selected sands and pigments are added then mixed to make the first stage of Beccrete. This is then applied at 2-3mm thick with Alkalai resistant fibreglass mesh embedded into the surface to create the second stage. The final stage is a 2mm application before curing.

This system is installed by approved Beccrete applicators.

4.3 StoMiral Plaster System;

The StoMiral Plaster System should be installed by a Sto Contractor in line with the MAXRaft Insulated Foundation Construction – StoMiral Plaster System over MAXRaft Foundations guidelines.

4.4 Specialized – Tankit Penetration Waterproofing System

The Specialized Tankit waterproofing membrane is a one component polymer modified cementitious material which is mixed with clean potable water and used in conjunction with fiberglass reinforcing material to create a high build membrane. It is formulated to be applied over a variety of properly prepared surfaces. Application as per the Tankit Waterproofing Specification.

5 Durability

Where MAXRaft® is correctly specified, installed, protected and maintained in line with this guide and the Technical Manual, it will meet the NZBC 1992 B2 Clause requirement for at least 50 years life expectancy.

The MAXRaft® Durability Statement can be provided upon request.

A signed quality assurance form from MAXRaft® must be provided to ensure that the polystyrene has been supplied in line with the PS1 and is covered by the Durability statement.

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6 Builder's Responsibilities

It is the builder's responsibility to ensure that all the above procedures are followed when installing a MAXRaft® foundation.

The builder is also responsible for ensuring that the house dimensions are correct prior to the construction of any framing.

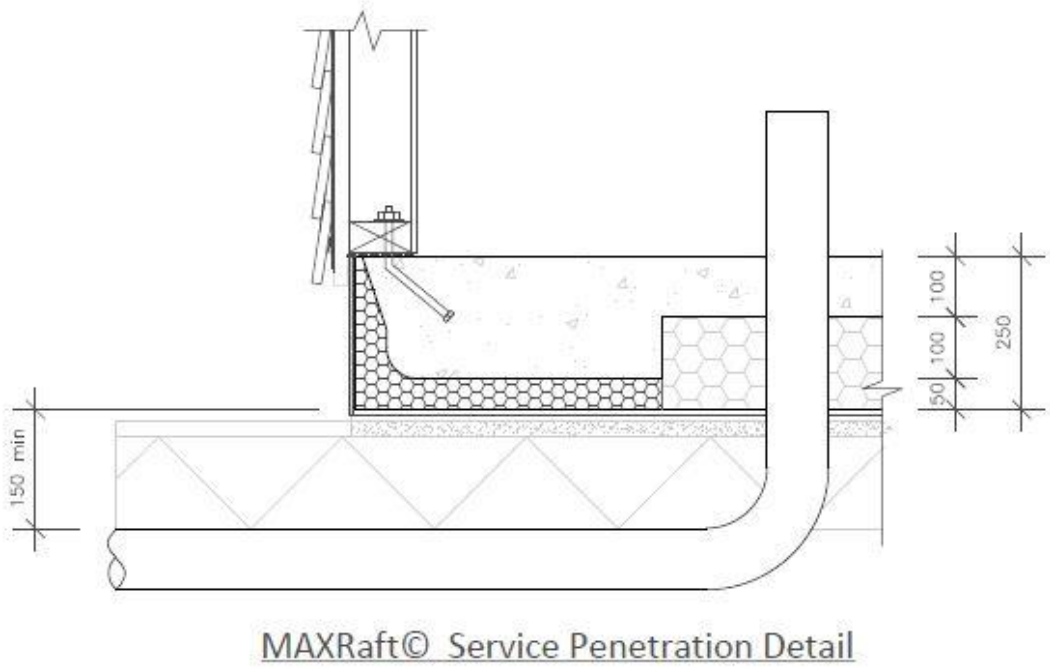
Tools Required

- Profiles / stringlines – to ensure building is correctly sited.
- Laser level – to ensure profiles and substrate are at correct level.
- Sledgehammer – to ensure bracing is stable.
- Screws or nails – for bracing and supports.
- Most up to date plans sent to MAXRaft® – to ensure cuts are to correct size and can be placed correctly.
- Handsaw – to cut out any penetrations.
- Gibsaw – for any additional onsite cuts.
- Skillsaw – to mitre corners
- 45° protractor
- Polythene & Tape – to ensure DPM, lapped as per S.2.3.5 above.
- 100 x 50 MAXRaft® formwork – to ensure support for MAXRaft® as concrete is being poured.
- Reinforcement bent & tied – to allow for easy positioning where reinforcing is required as per engineering.
- Cans of Sika Boom-G expanding foam – to fill around penetrations and gaps, and glue mitred corners and joins together.
- Site set up as per onsite guide.

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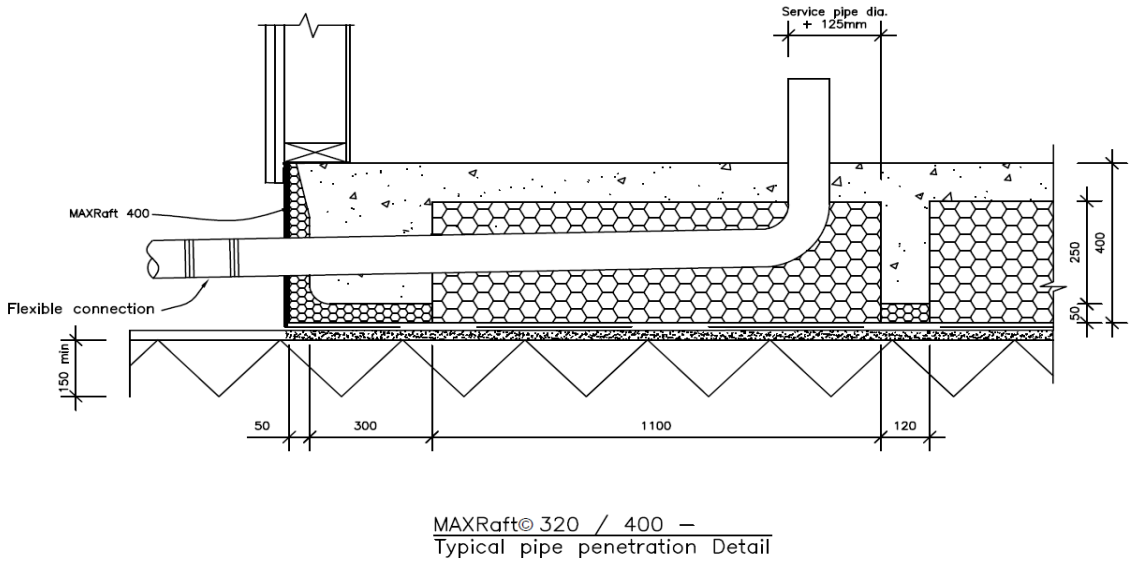
Fig 1



MAXRaft© Service Penetration Detail

Fig 2

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MAXRaft© 320 / 400 –
Typical pipe penetration Detail

Fig 3

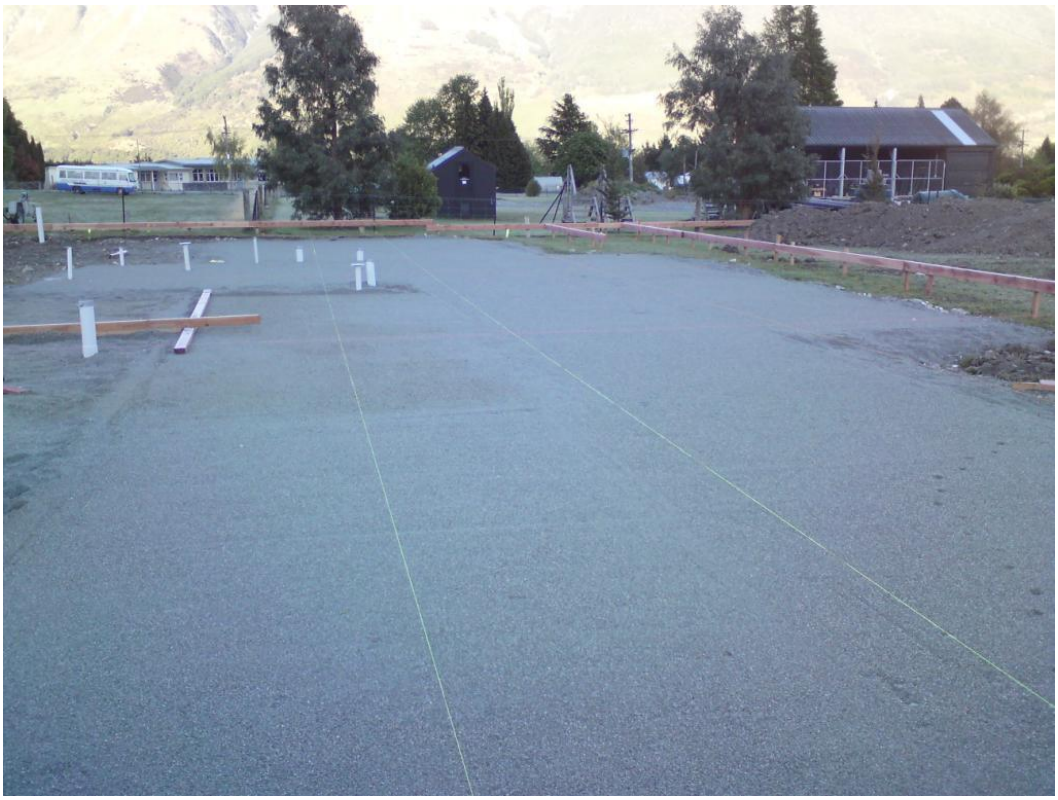


Fig 4

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Fig 5



Fig 6

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Fig 7



Fig 8

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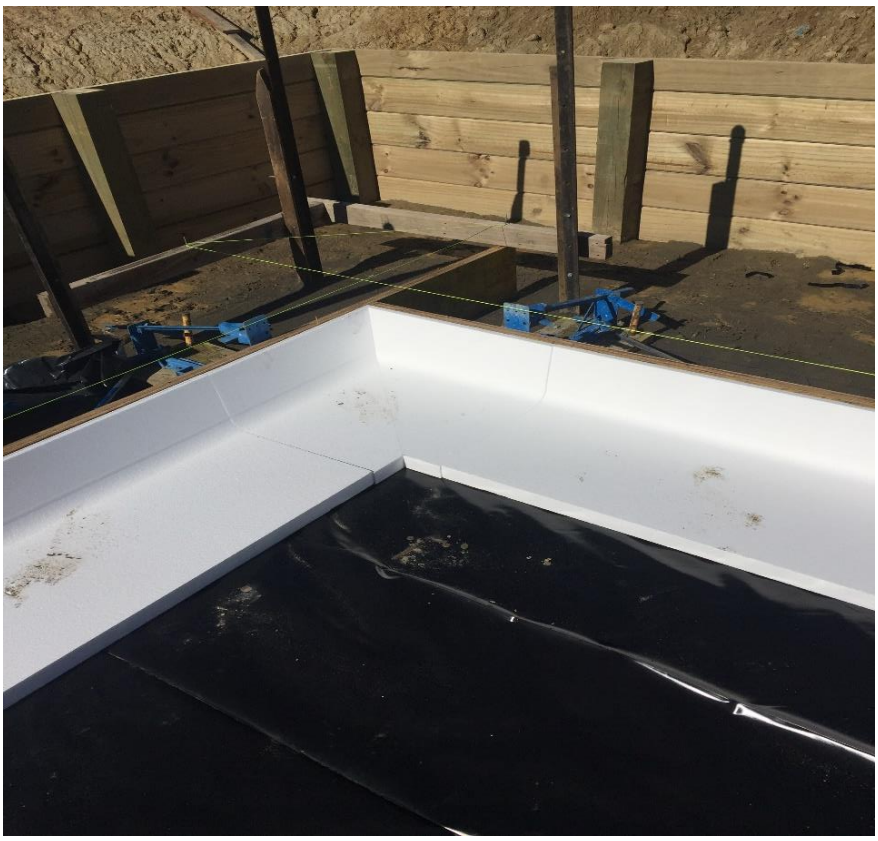


Fig 9

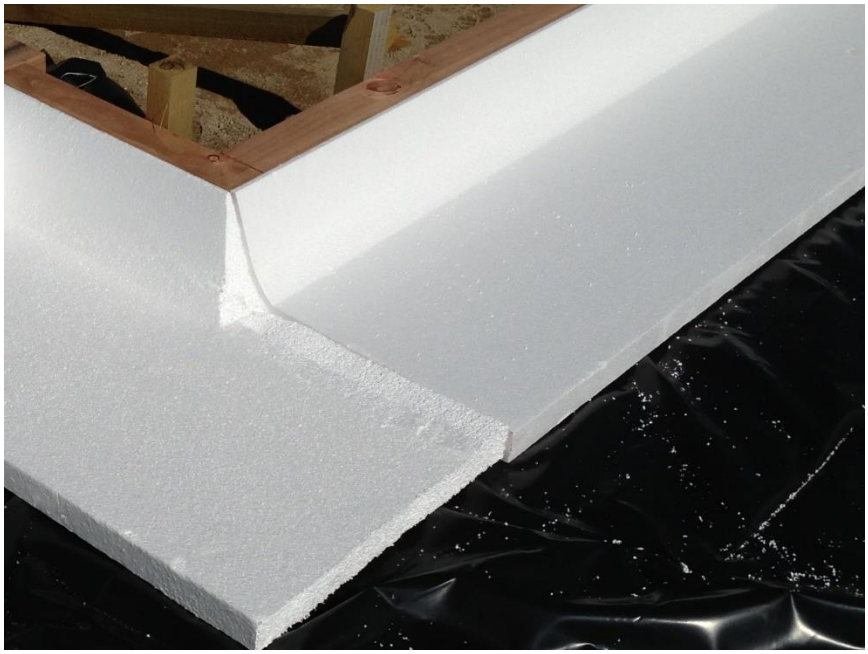


Fig 10

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Fig 11



Fig 12

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Fig 13



Fig 14

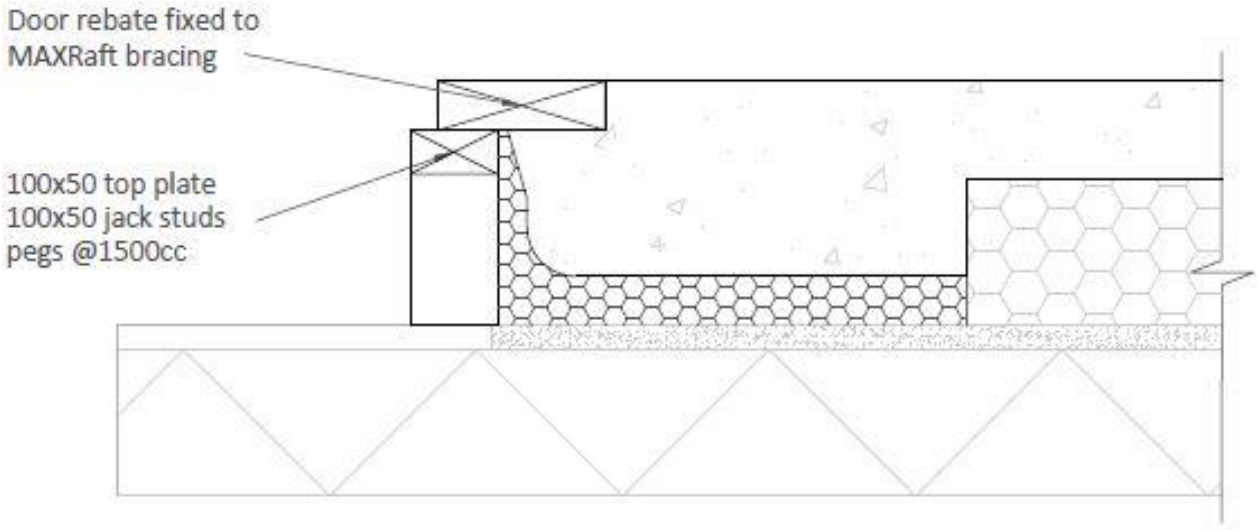
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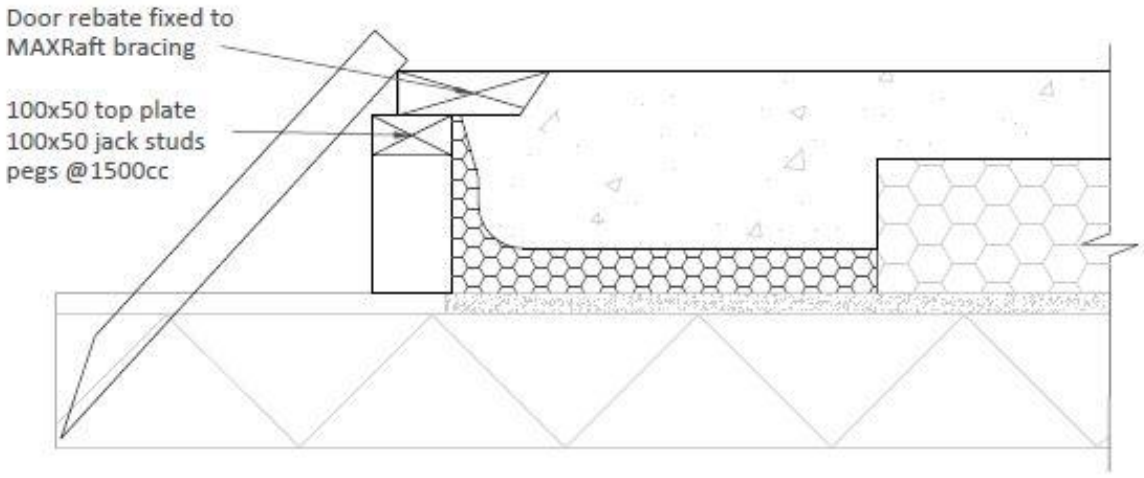
Fig 15

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MAXRaft© Door Rebate

Fig 16



MAXRaft© 90mm Brick Veneer

Fig 17

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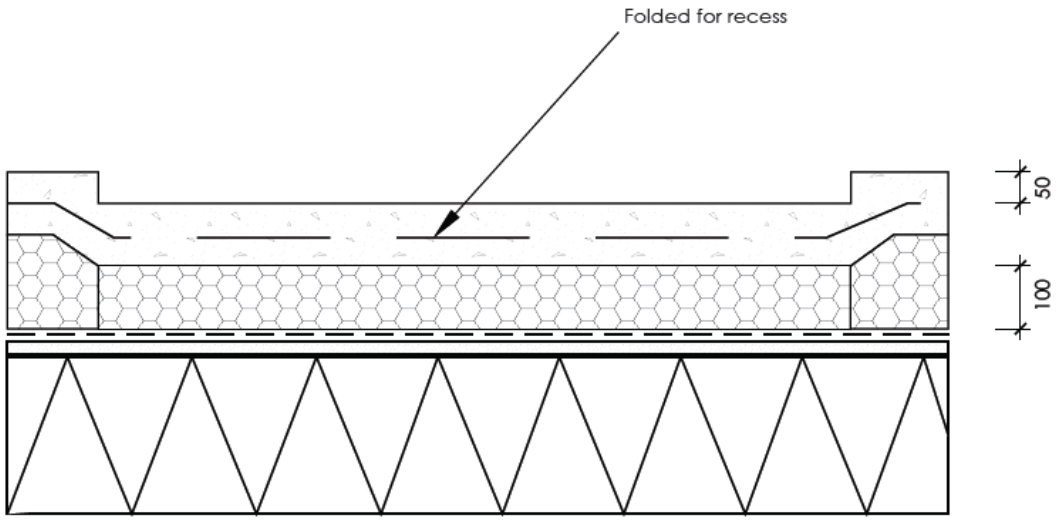


Fig 18

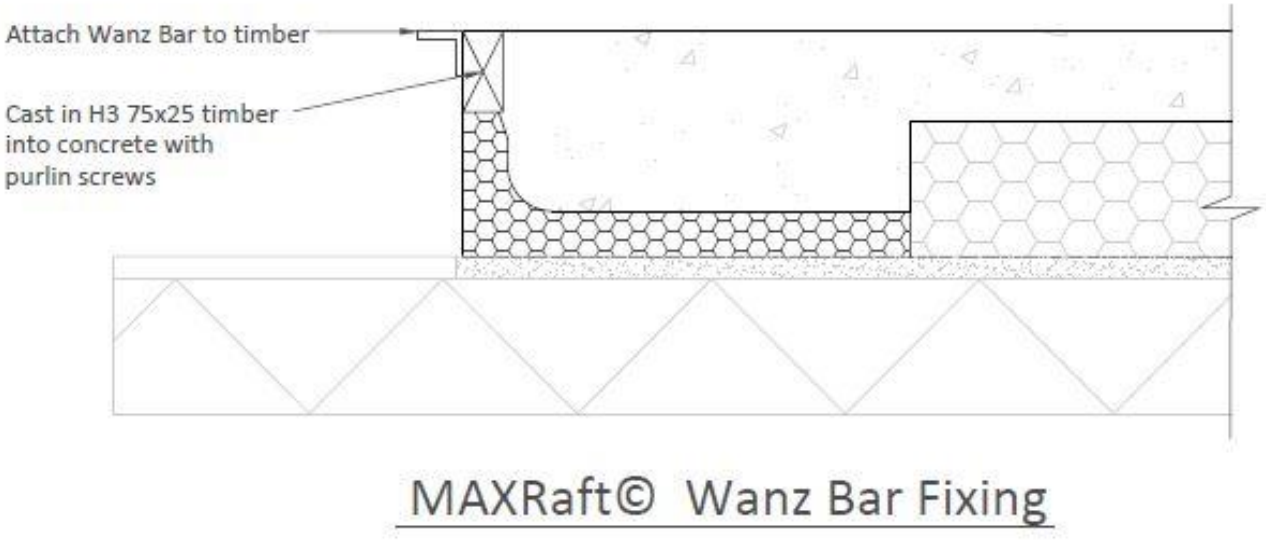


Fig 19

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Fig 20



Fig 21

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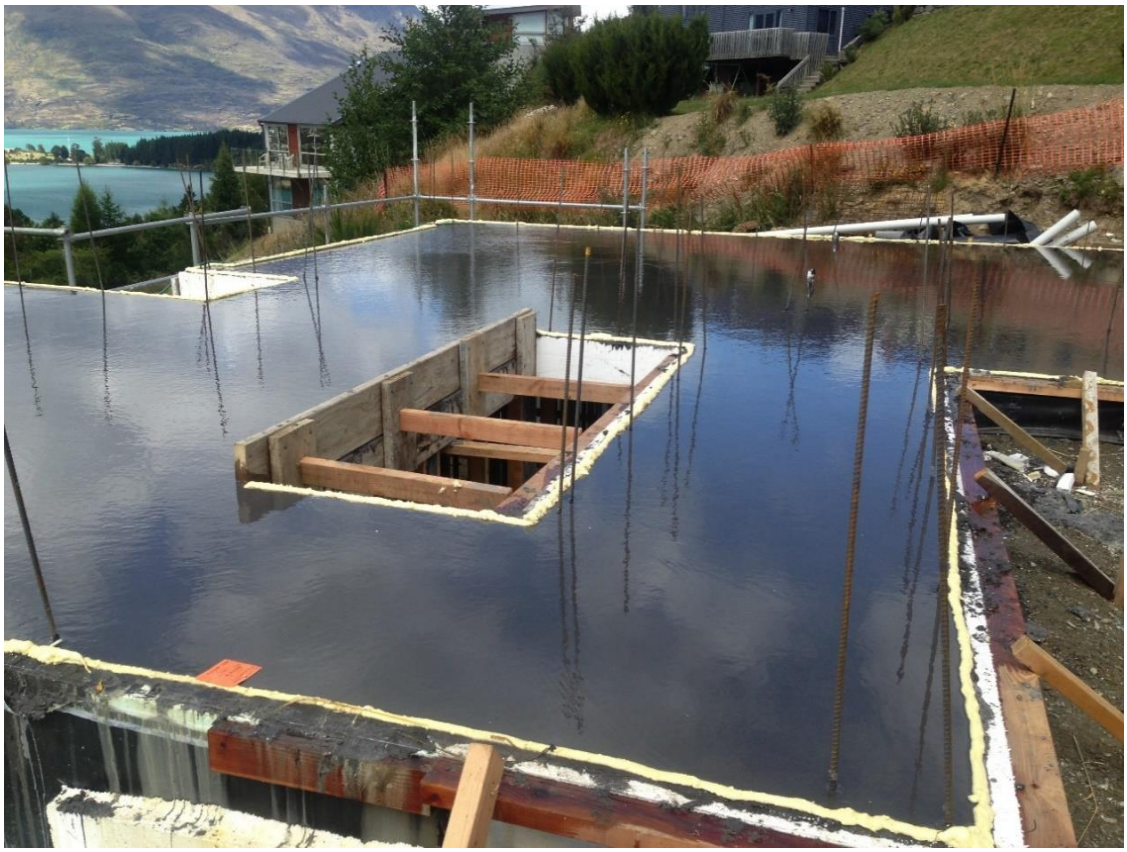


Fig 23



Fig 24

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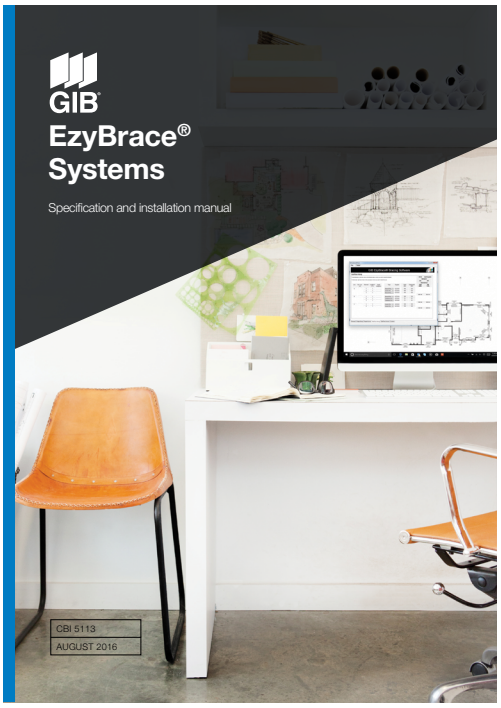


Fig 25

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BRANZ Appraised
Appraisal No. 928 [2021]

GIB EZYBRACE® SYSTEMS



Appraisal No. 928 (2021)

This Appraisal replaces BRANZ Appraisal No. 928 [2016]

BRANZ Appraisals

Technical Assessments of products for building and construction.

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branz.co.nz

Product

1.1 GIB EzyBrace® Systems are a range of wall and ceiling bracing systems based on the use of GIB® Standard, GIB Braceline® and other GIB® plasterboards. GIB EzyBrace® Systems are used to resist earthquake and wind loads on timber-framed buildings designed and constructed in accordance with NZS 3604 and the GIBFix® Framing System. The GIB EzyBrace® Bracing Software provides an electronic means of calculating bracing demand and resistance.

Scope

2.1 GIB EzyBrace® Systems and the GIB EzyBrace® Bracing Software have been appraised for the design and use of interior wall and ceiling bracing systems in buildings within the scope limitations of NZS 3604.

Building Regulations

New Zealand Building Code (NZBC)

3.1 **In the opinion of BRANZ, GIB EzyBrace® Systems, if designed, used, installed and maintained in accordance with the statements and conditions of this Appraisal, will meet the following provisions of the NZBC:**

Clause B1 STRUCTURE: Performance B1.3.1, B1.3.2 and B1.3.4. GIB EzyBrace® Systems meet the requirements for loads arising from self-weight, earthquake, wind and impact [i.e. B1.3.3 (a), (f), (h) and (j)]. See Paragraphs 8.1-8.10.

Clause B2 DURABILITY: Performance B2.3.1 (a) not less than 50 years. GIB EzyBrace® Systems meet this requirement. See Paragraphs 9.1-9.4.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. GIB EzyBrace® Systems meet this requirement.

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

Technical Specification

4.1 The GIB® plasterboards and accessories used with the GIB EzyBrace® Systems, and supplied or specified by Winstone Wallboards Ltd are as follows:

GIB® plasterboards

- **GIB® Standard** - GIB® Standard plasterboard is a paper-bound, fibreglass reinforced gypsum-plaster core sheet lining material. GIB® Standard plasterboard is available in 10 mm and 13 mm thicknesses and a sheet width of 1,200 mm and 1,350 mm (GIB® Wideline). The sheets have a taper on the two long sheet edges. The 10 mm thick sheets are also available with a square edge. Sheets are available in various lengths from 2,400 mm to 6,000 mm. The nominal sheet weight is 6.5 kg/m² for 10 mm thick sheets and 8.5 kg/m² for 13 mm thick sheets. GIB® Standard plasterboard face paper is a light buff colour.
- **GIB Braceline®** - GIB Braceline® is a high-density fibreglass reinforced, paper-bound gypsum-plaster core sheet lining material. GIB Braceline® is available in 10 mm and 13 mm thicknesses. The sheets have a taper on the two long sheet edges. GIB Braceline® has a sheet width of 1,200 mm and 1,350 mm, and is available in lengths of 2,400 mm, 2,700 mm, 3,000 mm, 3,600 mm and 4,800 mm. The nominal sheet weight is 9 kg/m² for 10 mm thick sheets and 12.5 kg/m² for 13 mm thick sheets. GIB Braceline® face paper is light blue in colour.
- **Alternative GIB® plasterboards** - in certain situations, as specified in the Technical Literature, substitution is permitted with GIB Aqualine®, GIB Fyreline®, GIB Toughline® and GIB Ultraline®.

Components and Accessories

- **GIB® Accessories and GIB® Jointing Compounds** - as specified in the GIB® Site Guide Technical Literature.
- Fasteners
  - **GIB Grabber® High Thread Screws for fixing directly to timber** – 32 mm x 6 g.
  - **GIB Nail** – 30 x 2.8 mm.
  - **GIB Grabber® screws for fixing to light gauge steel battens** – 32 mm x 6 g.
- Adhesive and Sealants
  - **GIBFix® One** – an off-white acrylic adhesive supplied in 375 ml cartridges and 600 ml sausages.
  - **GIBFix® All-Bond** – a green solvent-based adhesive supplied in 375 ml cartridges and 600 ml sausages.
- GIBFix® Framing Components
  - **GIBFix® Angle** – 45 x 45 x 0.55 mm galvanised steel angle with a knurled surface. Supplied in lengths of 2.4 m and 2.7 m.
  - **GIB Grabber® Dual Thread Screws for fixing to timber through GIBFix® Angle** – 32 mm x 7 g needle-point screw with coarse thread lower section and fine thread upper section.
- Fasteners, Anchors and Connections
  - **GIB® HandiBrac®** – a one-piece, 2 mm thick, galvanised steel angle bracket approximately 95 mm high, 65 mm long and 54 mm wide. The bracket is supplied with five Type 17 screws, 14 g x 35 mm.
  - **BOWMAC® screw bolt** – M10 x 140 mm screw anchor, with a blue painted hex head.
  - **Coach screws** – 12 mm x 150 mm and 50 x 50 x 3 mm washer, hot-dip galvanised for fixing to timber floors.
  - **Cast-in bolts** – M12 x 150 mm minimum and 50 x 50 x 3 mm washers for fixing to concrete floors.
  - **Shot-fired fasteners** – minimum 75 mm x 3.8 mm with 16 mm discs for fixing GS1-N, GS2-N and GS2-NOM internal line bracing elements to concrete slabs.
  - **Galvanised or stainless steel strap** – 25 x 0.9 mm top and bottom plate connections.
  - **Strap fixings** – 30 x 2.5 mm hot-dip galvanised or stainless steel flat head nails. *(Note: For corrosion protection requirements, refer to NZS 3604, Section 4.)*

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

- **Ceiling Diaphragms** - ceiling diaphragms are constructed using timber ceiling battens, or GIB® Rondo® or similar metal ceiling batten systems.
- Plywood
  - **Plywood** – minimum of 7 mm thick complying with AS/NZS 2269 D-D Structural Grade.
  - **Plywood fixings** – 50 x 2.5 mm hot-dip galvanised or stainless steel annular-grooved, flathead nails.

Handling and Storage

5.1 The best results are achieved when GIB® plasterboards are treated as a finishing material and protected from damage. Sheets must be stacked flat and kept dry at all times. For limits on stack heights see the GIB® Site Guide. Sheets must be carried on edge and not dragged.

5.2 All accessories must be kept dry.

Technical Literature

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

Design Information

General

7.1 NZS 3604 provides methods to distribute the bracing elements in walls to resist forces. The use of ceiling diaphragms is defined in the Technical Literature.

7.2 GIB EzyBrace® Systems are for use in dry, internal situations only.

7.3 GIB EzyBrace® Systems must not be exposed to temperatures of 52°C or greater for prolonged periods. Refer to appliance and fitting manufacturers for installation details.

GIB EzyBrace® Bracing Software

7.4 The GIB EzyBrace® Bracing Software contains design procedures and an electronic calculation method for bracing demand calculated in accordance with NZS 3604, Section 5. Floor loadings can be selected in accordance with either NZS 3604, Bracing Demand Tables 5.5–5.10 for 2 kPa floor loads or less, or Tables 14.1–14.3 for 3 kPa floor loads.

7.5 The bracing demand calculations contained in the GIB EzyBrace® Bracing Software are based on first principles engineering and calculate wind and earthquake demand, based on the building parameters entered. Resulting bracing demand calculations are project specific and can differ from values derived using NZS 3604 wind and earthquake demand tables. The GIB EzyBrace® Bracing Software has been assessed as part of this Appraisal.

7.6 The bracing ratings for GIB EzyBrace® Systems are embedded in the GIB EzyBrace® Bracing Software.

GIBFix® Framing System

7.7 The GIBFix® Framing System utilises GIBFix® Angles fixed at internal corners and at wall/ceiling junctions to reduce the potential for fastener 'popping' and joint cracking due to timber framing movement. The GIBFix® Framing System also offers an alternative arrangement of studs at corners and at intersecting walls to improve insulation and to reduce thermal bridging compared to traditional wall framing layouts. Refer to the Technical Literature for full details.

7.8 Where walls intersect, noggings are required at maximum 900 mm centres to enable fixing of the end stud of the intersecting wall to the main wall framing.

7.9 The GIBFix® Framing System permits the use of a single panel hold-down [e.g. GIB® HandiBrac®] at wall corners and T-intersections for both the across and along bracing directions.

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

Framing

7.10 GIB EzyBrace® Systems can be installed using conventional timber framing layouts or by using the layouts provided in the GIBFix® Framing System. The bracing ratings embedded in the GIB EzyBrace® Bracing Software are equally applicable to both framing options.

7.11 Timber framing grade, spacing and construction must comply with NZS 3604. Timber treatment must comply with NZBC Acceptable Solution B2/AS1.

7.12 Winstone Wallboards Ltd recommends the use of kiln-dried stress-graded framing timber. The minimum actual framing dimensions are 90 mm x 45 mm for external walls and 75 mm x 45 mm for internal walls.

7.13 Joints in the top plates of bracing panels must be tied together with 3 kN and 6 kN top plate connectors using 25 mm x 0.9 mm hot-dip galvanised mild steel strap, three nails each side of joint for 3 kN and six nails each side of joint for 6 kN.

Bracing System GS2-NOM

7.14 Most GIB EzyBrace® Systems require additional fasteners at the corners to achieve the published bracing ratings. The GS2-NOM system only requires fixings at 300 mm centres around the sheet perimeter.

7.15 Where internal doors penetrate a GS2-NOM bracing element and recessed door jambs are used, the sheets may be adhesive fixed around the door opening with GIBFix® All-Bond, instead of screw fixing. This is designed to reduce fastener 'popping' around internal doors when using grooved door frames. Screw fixing should be used where door frames are to be finished with architraves and the architrave will cover the screws. The adhesive fix option around door openings must not be used with any other GIB EzyBrace® Systems.

Alternative GIB® plasterboards

7.16 GIB Ezybrace® Systems have been designed and tested using only the products specified. Occasionally additional properties may be required to be provided by a different GIB® plasterboard product. Table 1 provides acceptable alternative options.

Table 1: Permitted Alternatives in GIB EzyBrace® Systems

Specified	Permitted alternative GIB® plasterboard products								
GIB® plasterboard	GIB® Standard	GIB Ultraline®	GIB Braceline/ Noiseline®	GIB Aqualine®	GIB Toughline®	GIB Fyreline®			
						10 mm	13 mm	16 mm	19 mm
GIB® Standard	N/A	✓	✓	✓	✓	✓ *Note 1*	✓ *Notes 1 and 3*		
GIB Braceline®	X	X	N/A	✓ *Note 2*	✓	X	✓ *Notes 1, 2 and 3*		

- ***Note 1:*** *The fastener type and length and must be as required for the relevant Fire Resistance Rating (FRR) system but the fixing pattern must be as required for bracing elements.*
- ***Note 2:*** *The bracing element must be 900 mm or longer. Fasteners must be at maximum 100 mm centres to the perimeter of the bracing element. The bracing corner fastening pattern applies to all four corners of the element.*
- ***Note 3:*** *Specify traditional wall framing layout where a FRR is required. See Paragraph 11.4.*

BOWMAC Screw Bolts

7.17 When BOWMAC Screw Bolts are used as fixings for external walls with concrete masonry header block foundations, the minimum grout/concrete strength must be as specified in NZS 3604. BOWMAC Screw Bolts may be used in Corrosion Zones B and C as defined in NZS 3604. BOWMAC Screw Bolts may only be used in NZS 3604 Corrosion Zone D where the minimum concrete cover to the bolt is 60 mm. This cannot be achieved with standard 90 mm wide timber framing. An alternative option in this scenario is to use 140 mm wide framing.

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

Structure

Bracing

8.1 The bracing unit (BU) ratings are embedded in the GIB EzyBrace® Bracing Software and vary with the wall length.

8.2 The Technical Literature provides comprehensive construction and panel hold-down details. These include bottom plate fixings using anchor screws and cast-in bolts (concrete), coach screws (timber), GIB® HandiBrac® or nailed stud-to-plate straps.

8.3 Bracing units derived from the BRANZ P21 test method are based on a wall height of 2.4 m. The GIB EzyBrace® Bracing Software calculates bracing ratings for higher wall heights by multiplying the appropriate bracing rating by 2.4 m and dividing by the actual wall height in metres. For walls less than 2.4 m in height, the GIB EzyBrace® Bracing Software calculates bracing ratings as if they were 2.4 m high.

8.4 NZS 3604 limits wall bracing elements to a maximum of 120 BU/m for timber-framed floors and 150 BU/m for concrete floors.

Ceiling Diaphragms

8.5 GIB® ceiling diaphragms are used to space bracing lines further apart than 6 m. The basic shape of a ceiling diaphragm must be square or rectangular and the length must not exceed twice the width.

8.6 For ceiling diaphragms not steeper than 15° and not exceeding 7.5 m in length, any GIB® plasterboard may be used provided the perimeter fixing are at 150 mm centres.

8.7 For ceiling diaphragms not steeper than 45° and not exceeding 7.5 m in length, and for diaphragms not steeper than 25° and not exceeding 12 m in length, any GIB® plasterboard may be used provided the perimeter fixings are at 100 mm centres.

Openings in Bracing Elements

8.8 Small openings of 90 x 90 mm or less may be placed anywhere except within 90 mm of the edge of the bracing element.

Shower Areas

8.9 GIB EzyBrace® Systems must not be located in shower cubicles or behind baths and the like. GIB EzyBrace® Systems may be used in water-splash areas provided they are protected as required by NZBC Clause E3 Internal Moisture. Refer to BRANZ Appraisal No. 427 GIB® Wet Area Systems.

Impact Resistance

8.10 GIB® plasterboards provide adequate resistance to soft body impact, based upon history of use in domestic and light commercial applications.

Durability

9.1 GIB EzyBrace® Systems, including linings and their fixings, have a serviceable life of at least 50 years. The ability of the systems to remain durable is dependent on them remaining dry in service, and being maintained in accordance with this Appraisal.

Maintenance

9.2 The building must be maintained weatherproof and GIB® plasterboards must be protected from external and internal moisture in accordance with NZBC Clauses E2 and E3.

9.3 Holes resulting from damage to the lining, up to 100 x 100 mm square, will have no significant effect on the performance of the bracing panel. Such holes may be repaired by patching, stopping and finishing as appropriate. Independent expert advice must be sought to assess the effect and repair of larger areas of damage.

9.4 Bracing elements require no ongoing maintenance, apart from decoration and the repair of any damage.

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

Prevention of Fire Occurring

10.1 Separation or protection must be provided to the GIB EzyBrace® Systems from heat sources such as fireplaces, heating appliances and chimneys. Part 7 of NZBC Verification Method C/VM1 and NZBC Acceptable Solution C/AS1, and NZBC Acceptable Solution C/AS2 provide methods for separation and protection of combustible materials from heat sources.

Fire Affecting Areas Beyond the Fire Source

11.1 For internal surface finish properties and fire resistance ratings, refer to BRANZ Appraisal No. 289 GIB® Fire Rated Systems.

Internal Moisture

12.1 GIB® plasterboard must be used in dry internal situations, and must not be used where likely to be exposed to liquid water, or where extended exposure to humidity above 90% RH is expected, e.g., such as may be expected in sauna rooms, commercial kitchens and the like.

Installation Information

Installation Skill Level Requirement

13.1 Installation of GIB EzyBrace® Systems must be completed by, or under the supervision of a Licensed Building Practitioner with the relevant Licence Class, in accordance with the Technical Literature and this Appraisal.

General

14.1 GIB EzyBrace® Systems must be installed in accordance with the Technical Literature. For inspection, reference must be made to the Technical Literature.

Framing

14.2 To achieve an acceptable decorative finish, the GIB® Site Guide specifies that walls must not be lined unless the moisture content of timber framing is less than 18%. Winstone Wallboards Ltd recommends a moisture content of 12% or less where buildings are to be air conditioned, centrally heated or have heat pumps installed.

14.3 Where the GIBFix® Framing System is used, GIBFix® Angles are tacked to the framing with flat head clouts prior to installation of the GIB® plasterboard.

Cutting

14.4 GIB® plasterboard is easily cut by scoring the face paper with a sharp short-bladed trimming knife, and then snapping the plasterboard away from the cut face and cutting the back paper or by sawing. Use of a metal straightedge facilitates clean straight cuts. Cut edges can be tidied up by using a knife. Paper dags should be removed.

Hold-downs

14.5 GIB EzyBrace® Systems which require hold-downs must either have a GIB® HandiBrac® fitted to each end of the bracing element or alternatively a metal stud-to-plate strap and hold-down anchor may be used. Refer to the Technical Literature for full installation details. Where a metal stud-to-plate strap is used, the hold-down anchor must be placed no more than 80 mm from the end of the bracing element.

14.6 Where the GIBFix® Framing System is used, a single hold-down located at a wall intersection may be used to provide the hold-down in both the across and along bracing directions.

Plasterboard Sheet Fixing

14.7 Corner fixings must be 50 mm away from the sheet corner. Fixings must be no closer than 12 mm from the paper-bound sheet edge, and no closer than 18 mm from a cut edge, and driven at right angles to the sheet until the head is seated in a slight dimple just below the surface of the paper liner. Fixings must not be over-driven.

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

14.8 Wall bracing plasterboards (except for those used with the GS2-NOM system) are fixed at 150 mm centres around the perimeter framing of the bracing element *(Note: There is a variation for GIB Aqualine® and GIB Fyreline®, see Table 1)*. At the corners of the wall bracing elements, a special fastening pattern is required with fasteners spaced at 50 mm, 100 mm, 150 mm, 225 mm and 300 mm from the corner and thereafter at 150 mm centres. Fixing to other framing is either mechanical or by using GIBFix® adhesives.

14.9 When installing GS2-NOM bracing elements, the GIB® plasterboard is fixed to framing around the bracing element perimeter and at sheet joints with fasteners at maximum 300 mm centres. Where recessed door jambs are used on internal door frames, the GIB® plasterboard may be fixed to the framing around the door opening with GIBFix® All-Bond, see Paragraph 7.15.

14.10 Where GIB Aqualine® or GIB Fyreline® substitutes for GIB Braceline®, bracing elements must be longer than 900 mm and the bracing element perimeter fasteners must be spaced at 100 mm centres and the corner pattern described in Paragraph 14.8 used.

14.11 Full sheets must be used wherever possible.

Fire Resistance Rated Bracing Elements

14.12 Where a bracing element is also used as a fire-rated element, the method of fixing (including the length of the fixing specified) for the fire-rated element must be used, but the perimeter fixings of the bracing element must be at 150 mm centres and fixings at corners of the bracing element must be fixed as described in Paragraph 14.8. In two-layer systems, the inner layer must be used for bracing.

Plywood Fixing

14.13 Plywood is nail fixed at 150 mm centres around the perimeter of each sheet and at 300 mm centres to intermediate framing.

Ceiling Diaphragms

14.14 All GIB EzyBrace® System ceiling diaphragms require fixings around the perimeter at 100 mm or 150 mm centres, depending on the ceiling pitch and length. See Paragraphs 8.4-8.6 and refer to the Technical Literature.

14.15 The perimeter of the ceiling diaphragm is fixed to GIBFix® Angles, GIB® Rondo® perimeter channels, or alternatively, to an additional ex 150 x 40 mm timber plate fixed to the top plate.

Jointing and Finishing

14.16 All bracing element joints must be reinforced with GIB® tape and finished in accordance with the GIB® Site Guide.

Health and Safety

15.1 Dust resulting from the sanding of stopping and finishing compounds may be a respiratory irritant, and the use of a suitable facemask is recommended.

Basis of Appraisal

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

Tests

16.1 Bracing tests were carried out by Winstone Wallboards Ltd in accordance with BRANZ Technical Paper P21 to determine the performance of GIB EzyBrace® Systems when the building is subjected to lateral wind or earthquake loading. Nail and screw slip tests were carried out by BRANZ and Winstone Wallboards Ltd. Winstone Wallboards Ltd's test facilities, procedures and results have been reviewed by BRANZ and found to be satisfactory.

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

Other Investigations

17.1 The GIB EzyBrace® Bracing Software has been assessed by BRANZ and found to be satisfactory.

17.2 The GIB EzyBrace® Systems and GIB® Site Guide Technical Literature have been examined by BRANZ and found to be satisfactory.

17.3 Site inspections were carried out by BRANZ to assess the practicability of the installation of the systems, and to view completed installations.

17.4 An assessment was made of the durability of the systems by BRANZ technical experts and found to be satisfactory.

17.5 The properties of Winstone Wallboards Ltd GIB® plasterboards have been assessed for the following properties: MOR, MOE, paper tensile strength, paper shear strength, nail pull resistance, Hunter hardness, inspection for fungal spores, and hard and soft body impact tests.

Quality

18.1 Winstone Wallboards Ltd's manufacturing process and details of the quality and composition of the materials, have been examined by BRANZ and found to be satisfactory.

18.2 The quality management systems of Winstone Wallboards Ltd have been assessed and registered by TELARC as meeting the requirements of ISO 9001, Registration No. 581.

18.3 Winstone Wallboards Ltd is responsible for the quality of the product supplied.

18.4 The quality of the application and finish on-site is the responsibility of the installation and stopping contractors.

18.5 Designers are responsible for the design of buildings.

18.6 Building owners are responsible for the maintenance in accordance with the instructions of Winstone Wallboards Ltd.

Sources of Information

- AS/NZS 2269.0:2012 Plywood - Structural - Specifications.
- AS/NZS 2588:2018 Gypsum plasterboard.
- BRANZ Technical Paper P21:2010 A wall bracing test and evaluation procedure.
- NZS 3604:2011 Timber-framed buildings.
- Ministry of Business, Innovation and Employment Record of amendments - Acceptable Solutions, Verification Methods and handbooks.
- The Building Regulations 1992.

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

BRANZ

In the opinion of BRANZ, GIB EzyBrace® Systems are fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided they are used, designed, installed and maintained as set out in this Appraisal.

The Appraisal is issued only to Winstone Wallboards Ltd, and is valid until further notice, subject to the Conditions of Appraisal.

Conditions of Appraisal

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

For BRANZ

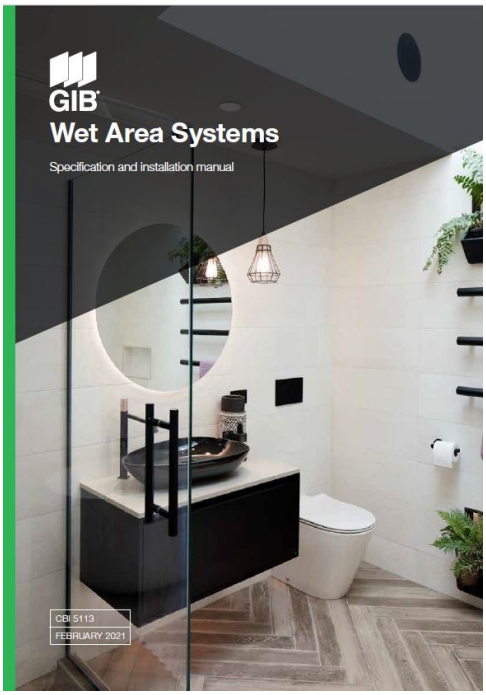
Chelydra Percy
Chief Executive

Date of Issue:
01 December 2021

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

BRANZ Appraised
Appraisal No. 427 [2021]

GIB® WET AREA SYSTEMS



Appraisal No. 427 (2021)

This Appraisal replaces BRANZ Appraisal No. 427 (2007)

BRANZ Appraisals

Technical Assessments of products for building and construction.

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Product

1.1 GIB® Wet Area Systems are for the interior lining of timber and steel-framed walls and ceilings in wet areas such as bathrooms, laundries, kitchens and toilets where a water-resistant lining material is desirable.

Scope

2.1 GIB® Wet Area Systems have been appraised for use as a wet area wall and ceiling lining in buildings within the following scope:

- on timber-framed walls and ceilings within the scope limitations on NZS 3604; or,
- on steel-framed walls and ceilings within the scope limitations of NASH Standard Part 2, or,
- on timber and light gauge steel-framed walls and ceilings subject to specific design.

Building Regulations

New Zealand Building Code (NZBC)

3.1 **In the opinion of BRANZ, GIB® Wet Area Systems, if designed, used, installed and maintained in accordance with the statements and conditions of this Appraisal, will meet or contribute to meeting the following provisions of the NZBC:**

Clause B1 STRUCTURE: Performance B1.3.1, B1.3.2 and B1.3.4. GIB® Wet Area Systems meet the requirements for loads arising from self-weight and impact [i.e. B1.3.3 (a) and (j)]. See Paragraphs 8.1-8.3.

Clause B2 DURABILITY: Performance B2.3.1 (b) 15 years and B2.3.1 (c) 5 years. GIB® Wet Area Systems meet these requirements. See Paragraphs 9.1-9.5.

Clause E3 INTERNAL MOISTURE: Performance E3.3.4 and E3.3.5. GIB® Wet Area Systems meet these requirements. See Paragraphs 12.1-12.3.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. GIB® Wet Area Systems meet this requirement.

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

Technical Specification

4.1 The GIB® plasterboards and accessories used in GIB® Wet Area Systems, and supplied by Winstone Wallboards Ltd are as follows:

GIB® Plasterboards

- **GIB Aqualine®** is a paper-bound, modified water-resistant gypsum-plaster core sheet lining material. It is available in 10 and 13 mm sheet thicknesses. Sheets are available in various edge profiles and lengths from 2,400 mm to 4,800 mm. Refer to Table 1. The nominal sheet weights are 8 kg/m² and 11 kg/m² for 10 mm and 13 mm thick sheets respectively. GIB Aqualine® face paper is green in colour.
- **GIB Toughline® Aqua** is a paper-bound, modified water-resistant gypsum-plaster core sheet lining material. It is available in a sheet thickness of 13 mm. Sheets are available in various edge profiles and lengths from 2,400 mm to 3,000 mm. Refer to Table 1. The nominal sheet weight is 11.4 kg/m². GIB Toughline® Aqua face paper is mauve in colour.
- **GIB Weatherline®** is an exterior-grade, glass-fibre fleece-wrapped modified-gypsum core sheet material. The product is available in 10 mm and 13 mm thicknesses and a board width of 1,200 mm. Standard sheet lengths are 2,450, 2,700 and 3,000 mm. Custom sheet lengths are also available. The nominal sheet weights are 9 kg/m² and 11.5 kg/m² for 10 mm and 13 mm thick sheets respectively.

Table 1: GIB® Wet Area Plasterboard Available Sheet Sizes

Plasterboard Type	Sheet Thickness (mm)	Sheet Edge Profile	Sheet Width (mm)	Sheet Length (mm)					
				2,400	2,450	2,700	3,000	3,600	4,800
GIB Aqualine®	10	TE/TE	1,200	✓		✓	✓	✓	
		TE/SE	1,200	✓					✓
		TE/SE	1,350	✓				✓	
	13	TE/TE	1,200	✓		✓	✓	✓	
GIB Toughline® Aqua	13	TE/TE	1,200	✓		✓	✓		
GIB Weatherline®	10	SE/SE	1,200		✓	✓	✓		
	13	SE/SE	1,200			✓	✓		

TE = Tapered Edge SE = Square Edge

Fastenings

- GIB® Grabber® High Thread Drywall screws for fixing to timber: 6 g x 25 mm and 32 mm.
- GIB® Grabber® Self Tapping Drywall screws for fixing to light gauge steel: 6 g x 25 mm and 32 mm.

Adhesive and Sealants

- GIBFix® One (Acrylic).
- GIBFix® All-Bond (Solvent).

GIB® Accessories

- Corner Support Angle - GIBFix® Angle or GIB® Rondo® NZ18. Minimum 32 x 32 x 0.55 mm galvanised metal angle.

GIB® Jointing Compounds

- As specified in the GIB® Wet Area Systems and GIB® Site Guide Technical Literature.

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

4.2 System components and accessories for the GIB® Wet Area Systems, which are supplied by the building contractor are:

Waterproofing

- A waterproofing system complying with AS/NZS 4858.

Finishes

- Finishes such as tiling, flexible sheet vinyl, paints and wallpapers have not been assessed and are outside the scope of this Appraisal.

Handling and Storage

5.1 The best results are achieved when GIB® plasterboards are treated as a finishing material and protected from damage. Sheets must be stacked flat and kept dry at all times. For limits on stack heights see the GIB® Site Guide. Sheets must be carried on edge and not dragged.

5.2 All accessories must be kept dry.

Technical Literature

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

Design Information

General

7.1 GIB® Wet Area Systems provide a water-resistant lining as a base for finishing systems in wet areas such as bathrooms, toilets, laundries and kitchens. The typical finishes are ceramic tiles and flexible sheet vinyl to walls, and paint and wallpaper to walls and ceilings. [*Note: GIB Weatherline® is a suitable substrate for ceramic tiles and sheet vinyl. For paint or wallpaper finishes use GIB Aqualine® or GIB Toughline® Aqua.]*

7.2 GIB® Wet Area Systems must not be used in the following situations:

- For bracing applications in shower areas or adjacent baths [See Paragraphs 7.4 and 8.2].
- In areas of high humidity [above 90% RH] or continually wet areas such as group showers, steam rooms, or swimming pools.
- Installed over a vapour barrier.
- Applied directly to masonry, concrete or solid plaster.
- Applied over other sheet lining materials.
- Used externally of the building envelope.
- Exposed to temperatures of 52°C or greater for prolonged periods. [Refer to appliance and fitting manufacturers for installation details.]

7.3 GIB Aqualine® may be substituted for some other GIB® plasterboard products in specific GIB® Bracing Systems, GIB® Fire Rated Systems and GIB® Noise Control Systems. Refer to the relevant systems technical literature for details.

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

Wet Areas

7.4 Wet areas are spaces where sanitary fixtures and sanitary appliances are located such as bathrooms, toilets, laundries and kitchens. There are two general categories of wet areas as follows:

- Water Splash – These are areas subject to intermittent splashing of water such as around baths, vanities, tubs and sinks.
- Shower Areas – These are areas subject to frequent and heavy water splash such as enclosed showers, unenclosed shower zones and showers over baths.

7.5 Both the above wet area categories must be finished with surfaces and joints that are impervious and easily cleaned. In addition, shower areas must be waterproofed. This can be achieved using proprietary rigid shower lining systems, flexible vinyl shower wall finishes, or tiling. Tiled shower areas must include a wet area waterproofing membrane system under the tiles.

Intertenancy Walls – Wet Areas

7.6 Intertenancy construction that incorporates fire resistance and noise control must be protected from water splash. In shower areas, GIB® Wet Area plasterboards must not be substituted for other GIB® plasterboards but must be an extra lining layer. Refer to the Technical Literature.

Tiling

7.7 GIB® Wet Area Systems are suitable as a substrate for tiling up to the following weights:

- 10 mm GIB Aqualine® and GIB Weatherline® - up to 26 kg/m^2.
- 13 mm GIB Aqualine®, GIB Toughline® Aqua and GIB Weatherline® - up to 40 kg/m^2.

[Note: Most ceramic and porcelain wall tiles weigh less than 20 kg/m^2. For further information on tiling consult the BRANZ Good Practice Guide – Tiling.]

Framing

7.8 Supporting framing must comprise one of the following, subject to the minimum sizes, dwang centres and all other frame requirements of GIB® Wet Area Systems Technical Literature:

- Timber framing must be designed and constructed in accordance with NZS 3604, or to a specific design using NZS 3603 and AS/NZS 1170. Refer to Paragraph 15.2 regarding recommended moisture content of timber framing.
- Steel framing must be designed and constructed in accordance with NASH Standard Part 2, or to a specific design in accordance with AS/NZS 1170.

Structure

Bracing

8.1 GIB Aqualine®, GIB Toughline® Aqua and GIB Weatherline®can be used in GIB EzyBrace® Systems. Refer to BRANZ Appraisals Nos. 928 [2016] and 1048 [2019].

8.2 GIB Wet Area Systems must not be used for bracing in shower areas or behind baths.

Impact Resistance

8.3 GIB® plasterboards provide adequate resistance to soft body impact, based upon experience of use in domestic and light commercial applications. GIB Toughline® Aqua is recommended by Winstone Wallboards Ltd where higher impact resistance is desired.

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

Durability

Serviceable Life

9.1 GIB® Wet Area Systems have a serviceable life of at least 15 years as a fully protected shower or water splash lining. As a general wall and ceiling lining, GIB® Wet Area Systems will have a serviceable life in excess of 50 years. The ability of GIB® plasterboards to remain durable is dependent on being protected and remaining dry in service, and being maintained in accordance with this Appraisal.

Maintenance

9.2 The building must be maintained weathertight and all lining systems protected from internal and external moisture.

9.3 Finishes to water splash and shower areas, including tiles, grout, waterproof membranes, sealants and flexible sheet vinyl must be checked to ensure the integrity of the system is maintained. They must be repaired or replaced if necessary. When repairing or replacing finishes, the GIB® plasterboard substrate must be checked for defects and repaired or replaced, as required.

9.4 For flexible sheet vinyl, particular attention must be paid to joints, especially at corners. Checks should be made to ensure the vinyl has not been punctured. Where damage has occurred, repairs must be made immediately.

9.5 Impact damage to GIB® plasterboard, resulting in small holes and cracks, may be patched, stopped and finished. For larger areas of damage, expert advice on repair must be sought from Winstone Wallboards Ltd.

Prevention of Fire Occurring

10.1 Separation or protection must be provided to the GIB® Wet Area Systems from heat sources such as fireplaces, heating appliances, flues and chimneys. Part 7 of NZBC Acceptable Solutions C/AS1 and C/AS2, and NZBC Verification Method C/VM1 provide methods for separation and protection of combustible materials from heat sources.

Fire Affecting Areas Beyond the Fire Source

Control of Internal Fire and Smoke Spread

11.1 The gypsum plasterboard used in GIB® Wet Area Systems without an applied paint or wallpaper finish has been tested in accordance with ISO 5660 and achieved a Material Group Number of 1-S.

11.2 The gypsum plasterboard used in GIB® Wet Area Systems with an untested applied finish of a waterborne or solvent borne paint coating ≤ 0.4mm thick achieves a Material Group Number of G2-S in accordance with Table A1 of NZBC Verification Method C/VM2.

11.3 A lower Material Group Number may be achieved when used with a tested finishing system. The Material Group Number for the complete lining system must be obtained from the supplier of the finish product or system.

Fire Resistance Ratings (FRRs)

11.4 GIB® Wet Area plasterboards, when used as part of GIB® Fire Rated Systems, can be used to provide FRRs as determined by NZBC Acceptable Solutions C/AS1 and C/AS2 and NZBC Verification Method C/VM2. Refer to BRANZ Appraisal No. 289 (2018) and relevant technical literature.

Internal Moisture

12.1 When installed in accordance with this Appraisal, GIB® Wet Area Systems will provide wall surfaces adjacent to sanitary fixtures and sanitary appliances that are impervious and easily cleaned.

12.2 The construction methods in the Technical Literature meet with the internal moisture requirements of the NZBC Acceptable Solution E3/AS1.

12.3 To minimise internal condensation, adequate levels of ventilation and thermal resistance must be provided to all spaces where moisture may be generated.

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

Airborne and Impact Sound

13.1 GIB® Wet Area plasterboards, when used as part of GIB® Noise Control systems, can be used to provide acoustic ratings as required by NZBC Acceptable Solution G6/AS1. Refer to BRANZ Appraisal No. 394 [2017] and relevant technical literature.

Installation Information

Installation Skill Level Requirement

14.1 Installation of GIB® Wet Area Systems must be completed by, or under the supervision of, a Licensed Building Practitioner with the relevant Licence Class, in accordance with the Technical Literature and this Appraisal.

General

15.1 GIB® Wet Area Systems must be installed in accordance with the Technical Literature. For inspection, reference must be made to the Technical Literature.

Framing

15.2 To achieve an acceptable decorative finish, the walls must not be lined unless the moisture content of timber framing is less than 18%. Winstone Wallboards Ltd recommend a moisture content of 8–12% where buildings are to be air conditioned or centrally heated.

Cutting

15.3 GIB® Wet Area plasterboards are easily cut by scoring the face paper with a sharp short-bladed trimming knife, and then snapping the plasterboard away from the cut face and cutting the back paper or by sawing. Use of a metal straightedge facilitates clean straight cuts. Cut edges can be tidied up by using a knife. Paper dags should be removed.

Fixing Sheets

Non-Tiled Areas

16.1 GIB® Wet Area plasterboards may be installed vertically or horizontally. Sheets are fixed with GIB® Grabber® screws at 300 mm centres around the perimeter of the sheet, and with GIBFix® adhesive on all intermediate studs and dwangs. Adhesive must not be used under fasteners. A 5-10 mm gap must be left between the floor and the bottom of the sheet.

Tiled Areas

16.2 Control joints must be provided at maximum 4 m centres.

16.3 Internal corners in shower areas must be reinforced with a minimum 32 x 32 x 0.55 mm galvanised metal angle (i.e. GIBFix® Angle or GIB® Rondo® NZ18) prior to lining the walls.

16.4 GIB® Wet Area plasterboards may be installed vertically or horizontally. Sheets are fixed with GIB® Grabber® screws at 150 mm centres to the perimeter of wall and to all intermediate studs. Adhesive must not be used in place of screws.

Ceilings

16.5 Supports of timber or steel battens or ceiling joists must be 450 mm centres for 10 mm GIB Aqualine®, or 600 mm centres for 13 mm GIB Aqualine® or GIB Toughline® Aqua.

16.6 GIB Aqualine® and GIB Toughline® Aqua sheets must be fixed with GIB® Grabber® screws at 600 mm centres around the perimeter of the ceiling and at 200 mm centre along supports. Alternatively, sheets are screw fixed at 600 mm centres along the supports and GIBFix® adhesive placed at 200 mm centres between the screws.

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

Penetrations and Sealants

17.1 All cut-outs for pipe penetrations must be made neatly using a hole saw. Cut-outs should be made approximately 12 mm diameter greater than the pipe.

17.2 A bead of sealant must be placed to the full thickness of the plasterboard sheet around all pipe penetrations, at bath rims and preformed shower bases and where an impervious junction is required at the floor/wall line.

17.3 In tiled areas, a bead of sealant 6 mm wide must also be placed to the full thickness of the tiles where the above situation occurs. The sealant manufacturer's technical literature must be followed for installation.

Jointing and Finishing

18.1 Jointing must be carried out in accordance with GIB® Site Guide Technical Literature.

18.2 Tiled shower areas must incorporate a waterproofing membrane over GIB® Wet Area Systems. Waterproofing membranes are outside the scope of this Appraisal and must otherwise be specified and approved.

Health and Safety

19.1 Dust resulting from the sanding of stopping and finishing compounds may be a respiratory irritant, and the use of a suitable facemask is recommended.

Basis of Appraisal

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

Tests

20.1 Winstone Wallboards Ltd GIB® plasterboards have been assessed for the following properties: MOR, MOE, paper tensile strength, paper shear strength, nail pull resistance, edge hardness, water resistance, hard and soft body impact tests and humidified deflection.

20.2 Cone calorimeter tests to ISO 5660 have been carried out by BRANZ.

Other Investigations

21.1 An assessment was made of the durability of the systems by BRANZ technical experts and found to be satisfactory.

21.2 Site inspections were carried out by BRANZ to assess the practicability of the installation of the systems, and to view completed installations.

21.3 The GIB® Wet Area Systems and GIB® Site Guide Technical Literature have been examined by BRANZ and found to be satisfactory.

Quality

22.1 Winstone Wallboards Ltd's manufacturing process and details of the quality and composition of the materials, have been examined by BRANZ and found to be satisfactory.

22.2 The quality management systems of Winstone Wallboards Ltd have been assessed and registered by TELARC as meeting the requirements of ISO 9001: 2015, Registration No. 581.

22.3 Winstone Wallboards Ltd is responsible for the quality of the product supplied.

22.4 The quality of the application and finish on site is the responsibility of the installation, stopping and finishing contractors.

22.5 Designers are responsible for the design of buildings.

22.6 Building owners are responsible for the maintenance in accordance with the instructions of Winstone Wallboards Ltd.

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

Sources of Information

- AS/NZS 1170: 2002 Structural design actions - General principles.
- AS/NZS 2588: 2018 Gypsum plasterboard.
- BRANZ Good Practice Guide: Tiling (3rd edition), April 2015.
- ISO 5660-1:2002 Reaction-to-fire tests - Heat release, smoke production and mass loss rate - Part 1: Heat release rate (cone calorimeter method).
- NZS 3603: 1993 Timber Structures Standard.
- NZS 3604: 2011 Timber-framed buildings.
- Ministry of Business, Innovation and Employment Record of Amendments - Acceptable Solutions, Verification Methods and handbooks.
- The Building Regulations 1992.

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

BRANZ

In the opinion of BRANZ, GIB® Wet Area Systems are fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided they are used, designed, installed and maintained as set out in this Appraisal.

The Appraisal is issued only to Winstone Wallboards Ltd, and is valid until further notice, subject to the Conditions of Appraisal.

Conditions of Appraisal

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

For BRANZ

Chelydra Percy
Chief Executive

Date of Issue:
15 February 2021

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



Rondo® Metal Batten Systems

Specification and Installation Manual

CBI 5113

SEPTEMBER 2024

NATIONAL SUPPORT

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GIB® HELPLINE

0800 100 442

GIB® RONDO® METAL BATTEN SYSTEMS PROVIDE A STABLE SUBSTRATE FOR PLASTERBOARD CEILING LININGS.

Regular users of metal batten systems consistently have fewer call-backs for movement related ceiling defects such as peaking or cracked joints and popped fasteners.

GIB® Rondo® Metal Batten systems offer framing options to enable the construction of resilient and high performing, smooth surfaces. They form an essential part in many GIB® Fire Rated and GIB Noise Control® Systems and allow for the installation of services in the created cavity.

Some of the wall and ceiling systems are suitable to use as an integral part of airtight and thermal designs for 'high performance' homes.

WHY USE GIB® RONDO® METAL BATTEN SYSTEMS

- Consistent performance
  - Less influence from moisture or environmental factors than timber. Unlike timber battens which can vary in grade, species and with temperature and humidity
- Lighter weight
  - Lower transport costs and easier to handle on site
- Require less storage space
  - Storage space is often at a premium on building sites and a house-lot of GIB® Rondo® componentry will occupy substantially less space on site than timber battens
- Easy to achieve a flat, stable substrate
  - This results in a trouble-free ceiling and reduces the risk of costly call-backs
- Noise Control
  - Clip fix systems can noticeably improve inter-storey noise control
- Technical back up, our well established and highly rated technical team are available to quickly and efficiently handle any enquiries, call us on **0800 100 442** or email **helpline@gib.co.nz**

WHAT'S NEW OR CHANGED IN THIS BOOK?

- Introduction of GIB® Rondo® Metal Batten ceiling and wall systems for easier specification and installation using system specification ID codes
- System selectors for
  - Direct fix systems
  - Clip fix systems
  - Fully suspended systems
- Suspended ceiling specification and installation
- Full component list with parts dimensioned and SKU numbers
- Updated fastener requirements
- Links to installation videos on the GIB® Website

CONTENTS

1. General Design and Installation 6-8
Scope of use 6
GIB Noise Control® and GIB® Fire Rated systems 6
GIB Ezybrace® systems 6
Compliance and standards 6
Electricity 6
Ceiling loads 6
Bottom chord restraint and lateral support of top plates 6
Raking and coved ceilings and skillion roofs 6
Wall loads 6
Tiling walls on batten systems 6
Back-blocking 6
Control joints 7
Health and safety 7
Use only the current specification 7
GIB® warranty statement and substitution 7
Sustainability 7
Handling and storage 8
Installation 8
Batten spacing and span 8
Drop height 8

2. GIB® Rondo® Metal Batten Selector 10

3. Direct Fix (DF) and Clip Fix (CF) Ceiling Specification and Installation 11
Specification example 11
Introduction 11
Installation 11
Jointing battens 11
Perimeter fixing 11

4. GIB® Rondo® 310 Direct Fix (DF) - GR310-DF Ceiling Specification and Installation 12
GIB® Rondo® 310 Direct Fix (DF) system 12
Fasteners 12
Perimeter 12
Installation 12
Perimeter options 12
Preferred option 12

5. GIB® Rondo® 310 Clip Fix (CF) - GR310-CF Ceiling Specification and Installation 13
GIB® Rondo® 310 Clip Fix (CF) system 13
Fastening the short and long clip 13
Fastening the GIB Quiet Clip® 13
Perimeter 13
Installation 13
GIB® Rondo® 310 Clip Fix (CF) system example 13

6. GIB® Rondo® 308 Clip Fix (CF) - GR308-CF Ceiling Specification and Installation 14
GIB® Rondo® 308 Clip Fix (CF) system 14
STWC Acoustic Clip 14
Betagrip Clip 14
A239 Clip 14
Fastening the short and long clip 14
Perimeter 14
Installation 14
GIB® Rondo® 308 Clip Fix (CF) system example 14

7. GIB® Rondo® 129 Clip Fix (CF) - GR129-CF Ceiling Specification and Installation 15
GIB® Rondo® 129 Clip Fix (CF) system 15
STWC Acoustic Clip 15
Betagrip Clip 15
A239 Clip 15
Fastening the short and long clip 15
Perimeter 15
Installation 15
GIB® Rondo® 129 Clip Fix (CF) system example 15

8. Suspended Ceiling (SC) Specification and Installation 16-19
Suspended ceiling metal batten (SC) on rod 16
Ceiling accessories 17
Suspended ceilings 18
Supporting framing and batten layout 18
Jointing battens 18
Jointing top cross rail 18
Perimeter fixing 18
Fasteners 18
Installation 18
Specific engineering design 19
Raking ceilings 19

9. Fixing to Walls 20-21
Batten fixing to walls 20
Linings 20
Perimeter 20
GIB® Rondo® 310 set out and direct fixing (DF) 20
Jointing 20
Installation 20
Batten set out and clip fixing (CF) 20
Fasteners 20
Fixing to masonry 21

10. Construction Details 22-24
Control joint details 22
Raking Ceilings and Skillion Roofs 23
GIB® Rondo® clip fix (CF) system 24



SCOPE OF USE

The GIB® Rondo® Metal Batten systems covered in this literature are suitable for applications within the following scope of use:

- For buildings designed and constructed in accordance with NZS3604:2011 Timber Framed Buildings or NASH Standard for Residential and Low-Rise Steel Framing
- A maximum ceiling area of 144m^2, not exceeding 12 metres in any direction
- For use in dry internal environments
- Supporting a single layer 10mm or 13mm GIB® plasterboard ceiling lining

GIB NOISE CONTROL® AND GIB® FIRE RATED SYSTEMS

Fire rated and noise control systems have specific requirements to ensure their performance. Please refer to the relevant GIB® literature* for details about the use and installation of those GIB® systems especially regarding requirements for multiple layers of GIB® plasterboard and perimeter detailing.

*GIB® Fire Rated Systems and GIB Noise Control® Systems manual

GIB EZYBRACE® SYSTEMS

Specific design is required to use GIB® Rondo® Metal Battens in a GIB EzyBrace® wall bracing element.

GIB® plasterboard ceiling diaphragms are stiff and strong horizontal elements that transfer loads to walls on bracing lines. Full details can be found in the GIB® EzyBrace® System specification and installation manual or the GIB® Site Guide.

COMPLIANCE AND STANDARDS

When used within the scope of application and the details in this literature, compliance is achieved with the following NZBC Clauses:

- B1 Structure
- B2 Durability
- F2 Hazardous Building Material

Relevant standards:

- AS/NZS 1170 Structural design actions
- AS/NZS 4600:2018 Cold-formed steel structures
- NZS 3404 Parts 1 and 2:1997 Steel structures standard
- AS 1397:2021 Continuous hot-dip metallic coated steel sheet
- AS 3566:2002 Self drilling screws
- AS/NZS 2589:2017 Gypsum linings

ELECTRICITY

Earthing is not required when electrical fixtures such as light fittings are installed between metal battens or fixed to timber blocking between battens.

Do not run electrical cabling inside metal battens.

For any other scenarios, consult an electrical contractor for any earthing requirements that may need to be incorporated.

CEILING LOADS

To limit sag, loads on GIB® plasterboard ceilings must not exceed an insulation weight of 4.2kg/m^2, and a fixture weight of 1kg or more unless they are independently supported. The placement of ceiling fixtures such as light fittings are to be limited to one fixture per m^2 unless independently supported.

BOTTOM CHORD RESTRAINT AND LATERAL SUPPORT OF TOP PLATES

Directly fixed GIB® Rondo® Metal Battens will provide bottom chord restraint for roof trusses and lateral support for top plates for buildings compliant with NZS 3604:2011 or NASH Standard for Residential and Low-Rise Steel Framing. Clip or full suspended systems provide minimal or no restraint or lateral support.

RAKING AND COVED CEILINGS AND SKILLION ROOFS

Due to the higher and fluctuating air moisture content, temperatures, and low air movement that can occur in raking ceilings, it is strongly recommended that clip fixed GIB® Rondo® Metal Batten systems are used. Unlike the various species and grades of timber battens which are variously affected by temperature and humidity, the performance of GIB® Rondo® Metal Battens is consistent throughout New Zealand.

Roof space ventilation, ceiling control joints or perimeter relief, and back-blocking will help reduce the risk of cracking in large expansive plasterboard ceilings.

Specific Engineering Design (SED) is required when designing raking suspended ceilings. See the Suspended Ceiling section in this manual for further details (p.16-19).

WALL LOADS

Metal battens on walls are not suitable for mounting heavy items such as shelving, cupboards, or vanity units.

TILING WALLS ON BATTEN SYSTEMS

To support tiles, reduce batten spacing to 450mm centres maximum and batten spans to 800mm centres maximum. Use 13mm GIB Aqualine® when tiling on metal battens.

BACK-BLOCKING

Back-blocking is the practice of laminating an offcut of plasterboard to the back of a joint using GIB-Cove® Bond. The back-blocking process is described in detail in the GIB® Site Guide.

Back-blocking is required as outlined below:

- Timber battens
  - When there are 3 or more tapered edge joints in a ceiling area
- Metal battens
  - When there are 6 or more tapered edge joints in a ceiling area
- To achieve a Level 5 Finish (all joints)

When using clip fixed metal battens or suspended ceiling, back-blocking tapered edge joints is not required when a Level 4 Finish is specified.

We strongly recommend back-blocking in the following situations:

- Sheet end joints not formed over battens
- All sheet joints in garages
- All sheet joints in ceiling application for superior performance

CONTROL JOINTS

Control joints are recommended to provide relief from stresses associated with changes in temperature, humidity, and the performance of junctions between dissimilar construction materials. Control joints must be positioned at maximum 12.0m centres in either direction. For general requirements refer to the GIB® Site Guide or for more significant structural movements consult the building designer.

Control joints in the GIB® Rondo® Metal Batten system can be achieved as shown in the details section of this manual (p.22).

Refer to the GIB® Fire Rated and GIB Noise Control® Systems literature for control joints in those systems.

HEALTH AND SAFETY

Use appropriate PPE such as eye protection and gloves. PPE must be used when handling or cutting GIB® Rondo® Metal Batten system components. Avoid breathing the dust while cleaning metal battens, and avoid any sharp edges when cutting.

USE ONLY THE CURRENT SPECIFICATION

This publication may be superseded by a new publication. Winstone Wallboards accepts no liability for reliance upon publications that have been superseded.

Before using this publication check whether this is the current publication; simply call the GIB® Helpline on 0800 100 442 or visit gib.co.nz

GIB® WARRANTY STATEMENT AND SUBSTITUTION

Product and System Warranty

The Winstone Wallboards warranty covers GIB® products and/or systems for a minimum of 10 years from the date of purchase. Winstone Wallboards warrants that GIB® products will be free from defects caused by factory workmanship or materials and, subject to compliance with the conditions in the Winstone Wallboards warranty statement, that the product or system will perform to the extent set out in relevant Winstone Wallboards published literature current at the time of installation. Nothing in this document shall exclude or modify any legal rights a customer may have under the Consumer Guarantees Act or otherwise which cannot be excluded or modified at law.

We are 100% Behind our Products and Systems

If any of our products or systems fail to perform as claimed or an issue associated with any GIB® product or system does occur, Winstone Wallboards will work with the relevant parties to help resolve the issue.

System and Product Components

A system is a group of related product components that interact to perform a task. Ensure the full GIB® building system, including the appropriate GIB® branded products, are specified and installed. This will ensure performance is not compromised and that any failure that is attributable to GIB® products and/or systems will be supported. Winstone Wallboards will not support system performance where substitute products are used.

SUSTAINABILITY

- Winstone Wallboards Ltd is committed to protecting the environment. Environmental planning is integrated into all our business activities:
  - Our operations strive to exceed all environmental regulatory requirements at all times
  - Protection of the environment is a day-to-day responsibility that we must all accept
  - We allocate management time and resources to address relevant environmental issues and continuously improve our activities in that area
  - We will achieve our standards through positive action, employee involvement and constant communication with our neighbours, local authorities and customers
- Recycled steel content in Rondo® product is maximised, without being detrimental to the quality of the product
- The Rondo® EPD provides the Life Cycle Assessment (LCA) data

Rondo® is constantly reviewing its processes to minimise Rondo® Australia and New Zealand's consumption of energy from fossil fuels and reducing waste to landfill. Rondo® is constantly reviewing advancements in technology that could be introduced to benefit Rondo® by reducing annual energy consumption and the waste sent to landfill annually. Rondo® also recognises its responsibility in making a genuine commitment to the environment, aiming to achieve and maintain a high standard of environmental care within all areas of its operations.

GIB® sustainability

Rondo® sustainability

HANDLING AND STORAGE

- Metal components must be protected from the weather prior to installation and stored dry and flat on suitable dunnage
- Do not make service holes in metal battens or accessory components
- Metal battens can be cut using tin snips, a hacksaw or grinder disk. Wear appropriate PPE and take care when using a grinder not to damage the surface of the battens.
- Follow normal safe practices to protect yourself and others

INSTALLATION

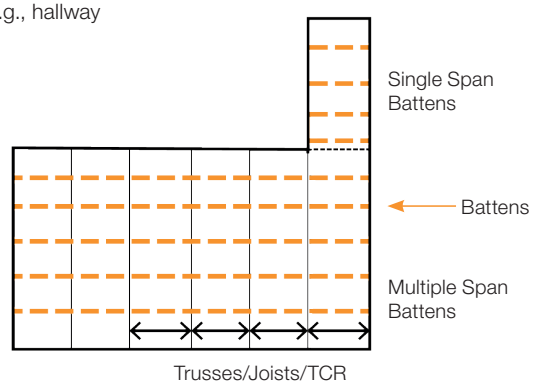
- Install GIB® Rondo® Metal Batten system after the roof is on. This is important with heavyweight roofs to reduce any unevenness and stress in the ceiling plane as the roof settles. Truss bottom chords usually have a pre-camber which changes under the roof load and will also affect the 'flatness' of the finished ceiling and create stress points especially near wall framing
- Do not line the ceiling until the moisture content of the timber framing supporting the battens is less than 18%. It is recommended that a moisture content of 8-12% is achieved if the building is to be air-conditioned and/or centrally heated
- To minimise the risk of plasterboard surface defects, ensure all ceiling battens run in the same direction. Consider control joints at a change in direction

Scan to view GIB® installation videos

BATTEN SPACING AND SPAN

Batten spacing must not exceed 450mm for 10mm GIB® plasterboard and 600mm for 13mm GIB® plasterboard. The batten span between direct fixing points or clips must not exceed 1200mm for multi-spans or 900mm for a single span.

- A multiple span batten is continuous across more than 2 supports
- A single span batten spans between 2 supports only e.g., hallway



DROP HEIGHT

For ceiling applications, the following drop heights can be achieved depending on batten type, Direct Fix (DF), Clip Fix (CF) and Suspended Ceiling (SC). The drop height is measured from the underside of the floor framing or slab to the top of the plasterboard ceiling lining.

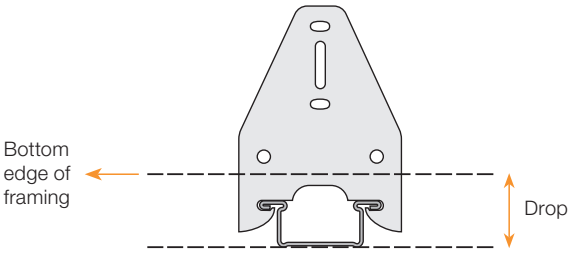


Table 1

Batten	Fixing	Type	Drop Range (mm)	Page
GIB® Rondo® 310	Direct Fix	N/A	35	12
	Clip Fix	311D Clip	40-65	13
		313 Long Clip	40-165	
		A311 GIB® Quiet Clip	40-65	
Rondo® 308	Clip Fix	226 Clip	20-45	14
		394 Long Clip	20-145	
		STWC Acoustic Clip	30-40	
		Betagrip Clip	35 / 40	
		A239 Clip 100mm Bolt	55-130	
		A239 Clip 180mm Bolt	55-210	
	Suspended Ceiling	Grid	150-1000	18
		Grid + STSU Clip	165-1000	
Rondo® 129	Clip Fix	226 Clip	30-55	15
		394 Long Clip	30-155	
		STWC Acoustic Clip	40-50	
		Betagrip Clip	30-50	
		A239 Clip 100mm Bolt	70-140	
		A239 Clip 180mm Bolt	70-220	
	Suspended Ceiling	Grid	165-1000	18
		Grid + STSU Clip	180-1000	

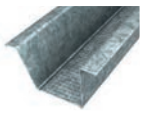


GIB® Rondo® Metal Batten Selector - Direct Fix (DF) and Clip Fix (CF) Options

GIB® RONDO® 310 SYSTEM
DF AND CF

310 BATTEN
12639 3.6m
12640 4.8m
12641 6.0m

35mm (h) x 40mm (face)



311D CLIP
12711

92mm (h) x 90mm (w)
Adjustment range 2-30mm



313 LONG CLIP
14907

190mm (h) x 90mm (w)
Adjustment range 2-130mm



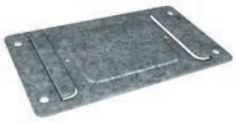
A311 GIB QUIET CLIP®
14209

92mm (h) x 90mm (w)
Adjustment range 2-30mm



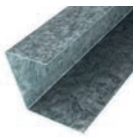
312 JOINTER
12643

55mm (l) x 21mm (w)



340 PERIMETER CHANNEL
12642 3.0m

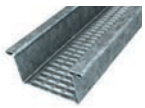
35mm (h) x 24mm x 36mm
(uneven leg)



GIB® RONDO® 308 SYSTEM
CF ONLY

308 BATTEN
14918 3.6m
14919 4.8m
14920 6.0m

16mm (h) x 38mm (face)



394 LONG CLIP
14909

190mm (h) x 66mm (w)
Adjustment range 2-130mm



STWC ACOUSTIC CLIP
14984

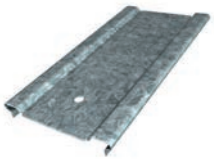
Resilient mount. Direct fix to wall or ceiling. Adjustment up to 5mm possible.

Also referred to as ST001.



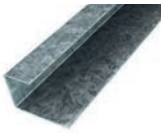
138 JOINTER
14924

91mm (l) x 51mm (w)



142 PERIMETER CHANNEL
14937

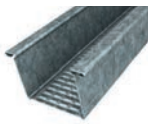
16mm (h) x 13mm x 28mm
(uneven leg)



GIB® RONDO® 129 SYSTEM
CF ONLY

129 BATTEN
14915 3.6m
14916 4.8m
14917 6.0m

28mm (h) x 38mm (face)



226 CLIP
14903

90mm (h) x 66mm (w)
Adjustment range 2-30mm



A239 CLIP
14911

100mm Rod & Clip

A239 CLIP
14913

180mm Rod & Clip



For direct fixing to concrete walls or ceilings.

Accepts 129 or 308 Batten.

BETAGRIP CLIP
14914

For direct fixing to concrete walls or ceilings. Approx. before 25mm adjustment for height in 5mm increments.

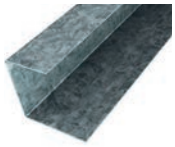
Accepts 129 batten in all slots and 308 batten in upper 2 slots.

Previously known as BETAFIX CLIP.



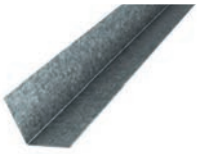
140 PERIMETER CHANNEL
14936

28mm (h) x 20mm x 30mm
(uneven leg)



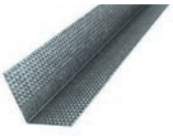
NZ18 PERIMETER ANGLE
12645 3.0m
Can also be used for internal corners in tiled shower situations (see GIB® Site Guide).

32mm (h) x 32mm (w)



GIBFIX® ANGLE
15662 2.4m
15663 2.7m

45mm (h) x 45mm (w)



*NZ18 & GIBFix® angle are compatible with all ceiling battens types.

Scan to view GIB® Rondo® range

SPECIFICATION EXAMPLE

Fixing
Direct Fix (DF)
Clip Fix (CF)

GIB® Rondo®



Clip Options

Batten	Clip
310	311D
	313LC
	A311
308/129	226
	394LC
	STWC
	BGC
	A239100
	A239180

Batten
310
308
129

INTRODUCTION

This section describes Direct Fix (DF) and Clip Fix (CF) ceiling applications. Select an appropriate system based on your specific project requirements, framing alignment, and the required ceiling drop height. Batten options are the GIB® Rondo® 310 Batten with a depth of 35mm, the Rondo® 308 Batten with a depth of 16mm, and the Rondo® 129 Batten with a depth of 28mm.

GIB® Rondo® 310 System

- Only the GIB® Rondo® 310 Batten can be direct fixed
- For clip fixing to framing, the 311D and 313 Long Clip are used with the GIB® Rondo® 310 Batten
- To reduce noise attenuation between floor levels the GIB Quiet Clip® can be used with the GIB® Rondo® 310 Batten

GIB® Rondo® 308/129 System

- The Rondo® 308 and 129 Battens require clip fixing
- For clip fixing to framing, the 226 and 394 Long Clip are used with Rondo® 308 and 129 Batten
- To reduce noise attenuation between floor levels the STWC Acoustic Clip can be used with the Rondo® 308 or 129 Batten
- The Betagrip Clip and A239 Clips are used with Rondo® 308 or 129 Battens

Specification Reference

A specification reference can be assigned by combining the batten type, fixing method, and clip type as follows:

GR308/129 Systems	GR310 Systems
GR308 or GR129-CF-226	GR310-DF
GR308 or GR129-CF-394LC	GR310-CF-311D
GR308 or GR129-CF-STWC	GR310-CF-313LC
GR308 or GR129-CF-BGC	GR310-CF-A311
GR308 or GR129-CF-A239100	
GR308 or GR129-CF-A239180	

INSTALLATION

The supporting framing must be straight and true, and comply with relevant NZBC requirements and associated Standards (see General Design and Installation).

Batten spacing must not exceed 450mm for 10mm GIB® plasterboard and 600mm for 13mm GIB® plasterboard. The batten span between direct fixing points or clips must not exceed 1200mm for multi-spans or 900mm for a single span.

Ensure all battens run in the same direction to minimise the risk of defects such as plasterboard joint cracking. Consider control joints to provide any stress relief at a change of direction.

JOINTING BATTENS

When direct fixing using GIB® Rondo® 310 Battens, batten joints can be made over a supporting framing member. When batten joints fall between framing or when clip fixing is used, the GIB® Rondo® 310 Battens can be joined using the 312 Jointer. Do not run batten joints in a line but stagger them between adjacent battens.

The Rondo® 308 and 129 Battens can be joined using the 138 Jointer. Stagger joints between adjacent battens.

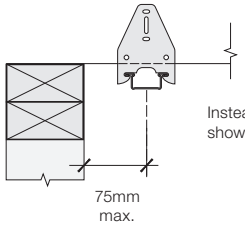
PERIMETER FIXING

There are several options to fix the ceiling perimeter.

When direct fixing using GIB® Rondo® 310 Battens. The ceiling perimeter can be fixed to a nominally 140 x 35mm oversize top plate. The batten dimensions match the nominal top plate thickness. When clip fixing, or with a conventional plate arrangement, use the 340 Perimeter channel or a NZ18 or GIBFix® Angle.

When clip fixing Rondo® 308 or 129 Battens, the ceiling perimeter is fixed to a 142 or 140 Perimeter channel respectively, or a NZ18 or GIBFix® Angle.

When a batten runs parallel and 75mm or less from a perimeter wall, a perimeter channel or angle is not required unless the wall-to-ceiling joint is square stopped, or when dictated by fire or structural requirements. Raking or skillion roofs may have specific perimeter requirements for folded metal angles.

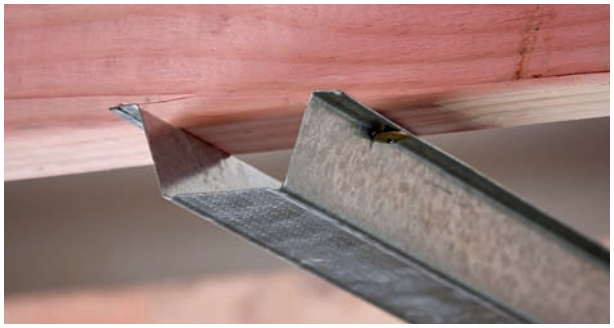


Instead of a metal angle a batten can be positioned as shown (not suitable for fire-rated applications)

GIB® RONDO® 310 DIRECT FIX (DF) SYSTEM

This fixing method applies to the GIB® Rondo® 310 Metal Batten only. For specification purposes the following string can be used.

GR310-DF



FASTENERS

Fix directly by fastening with pairs of 32mm x 8g GIB® Grabber® Wafer Head or 32mm x 7g GIB® Grabber® Dual Thread Screws.

- Alternatively, pairs of min. 45mm x 2.8mm flat or 'D' head nails can be used
- For fixing to steel framing a drill tip screw is recommended
- Perimeter channel fixed to wall framing with 32mm x 8g GIB® Grabber® Wafer Head Screws or 32mm x 7g GIB® Grabber® Dual Thread Screws at 600mm centres maximum for a standard ceiling, 300mm maximum centres behind square stopping or in ceiling diaphragms. There must be a nog or dwang behind the wall or ceiling perimeter metal channel or angle
- To fix the batten to perimeter channel or angle use 13mm x 7g GIB® Grabber® Pancake Head Drill Tip Screw or 3mm diameter steel rivets

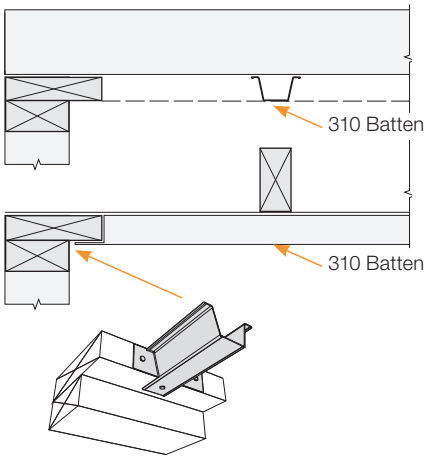
PERIMETER

GIB® Rondo® NZ18 angle, 340 Perimeter channel, GIBFix® Angle or a traditional 140mm oversize top plate. Note that ceiling diaphragms, and raking or skillion ceilings and roofs have specific perimeter requirements, some using folded metal angles.

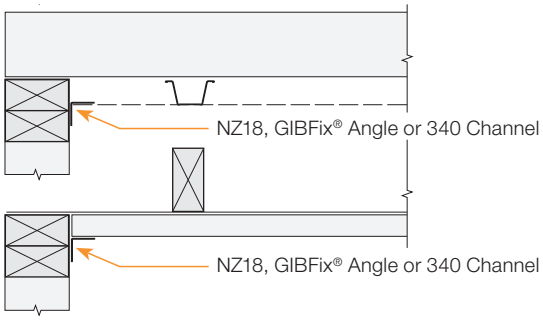
INSTALLATION

1. Establish ceiling height
2. Fix any perimeter channels or angles at required level
3. Set out batten centres
4. Cut the battens 10mm short to leave a 5mm gap at each end
5. Set the battens in the correct position and fasten to the framing taking care not to distort the batten

PERIMETER OPTIONS



PREFERRED OPTION



GIB® RONDO® 310 CLIP FIX (CF) SYSTEM

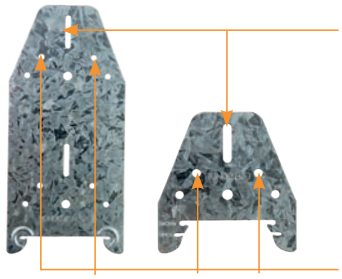
This fixing method applies to the GIB® Rondo® 310 Metal Batten and matching clip options selected, depending on the desired drop height or acoustic requirements.

Clips available for use with the GIB® Rondo® 310 Batten are the 311D Clip, the 313 Long Clip, and the A311 GIB Quiet Clip®.

For specification purposes coding can be used, quoting the batten type followed by CF and the clip type.

GR310-CF-311D
GR310-CF-313LC
GR310-CF-A311

FASTENING THE SHORT AND LONG CLIP

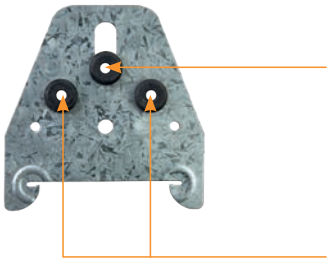


Insert one 32mm x 8g GIB® Wafer Head Screw into the vertical slot firmly but not quite home. Adjust levels as required and then drive completely home

Insert 2 further fasteners to complete the connection

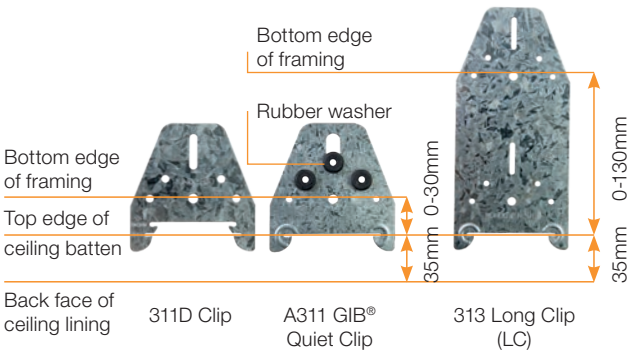
FASTENING THE A311 GIB QUIET CLIP®

Insert the first screw into the middle rubber grommet, tighten enough to hold the A311 GIB® Quiet Clip® in place, adjust the clip to the correct position insert the remaining two screws and tighten. Do not overtighten the screws to the point where the grommet is crushed. The screws should be tightened enough to allow the flexibility to remain in the connection.



Insert one 32mm x 8g GIB® Wafer Head Screw into the vertical slot firmly but not quite home. Adjust levels as required and then drive completely home

Insert 2 further fasteners to complete the connection



PERIMETER

GIB® Rondo® NZ18 Angle, 340 Perimeter Channel, GIBFix® Angle or a traditional 140mm oversize top plate. Note that ceiling diaphragms, and raking or skillion ceilings and roofs have specific perimeter requirements, some using folded metal.

Perimeter channel fixed to wall framing with 32mm x 8g GIB® Grabber® Wafer Head Screws or 32mm x 7g GIB® Grabber® Dual Thread Screws at 600mm centres maximum for a standard ceiling, 300mm maximum centres behind square stopping or in ceiling diaphragms. There must be a nog or dwang behind the wall or ceiling perimeter metal channel or angle.

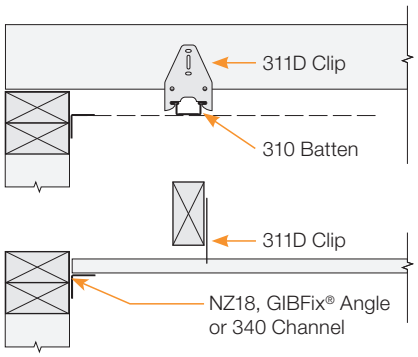
To fix the batten to perimeter channel or angle, use 13mm x 7g GIB® Grabber® Pancake Head Drill Tip Screw or 3mm diameter steel rivets.

INSTALLATION

1. Establish a datum line for the ceiling
2. Fix any perimeter channels or angles at the level required
3. Place a string line on the datum line at right angles to the battens, under the truss or joist closest to the centre of the room
4. Install clips at the required centres based on the batten span using the string line to establish the correct position
5. Alternatively use a laser level to provide the datum level and guide the clip installation heights
6. Cut the batten to the required length using tin snips, a hacksaw or grinder disk. Cut the battens 10mm short to leave a 5mm gap at each end
7. Insert the batten into the channel at each end and fit into the clips
8. Install remainder of clips ensuring that the batten is straight and flat

GIB® RONDO® 310 CLIP FIX (CF) SYSTEM EXAMPLE

Recommended Best Practice Details



GIB® RONDO® 308 CLIP FIX (CF) SYSTEM

This fixing method applies to the Rondo® 308 Metal Batten and matching clip options, selected depending on the desired drop height or acoustic requirements.

Clips available for use with the Rondo® 308 Batten are the 226 Clip, the 394 Long Clip, the STWC Acoustic Clip, the Betagrip Clip, and the 100mm or 180mm A239 Clip.

For specification purposes coding can be used, quoting the batten type followed by CF and the clip type.

GR308-CF-226	GR308-CF-BGC
GR308-CF-394LC	GR308-CF-A239100
GR308-CF-STWC	GR308-CF-A239180

STWC ACOUSTIC CLIP

Fix the STWC Acoustic Clip to the framing using a 63mm x 8g GIB® Grabber® Self Tapping Screw.



BETAGRIP CLIP

Fix the Betagrip Clip to timber or steel framing using two 32mm x 7g GIB® Grabber® Dual Thread Screws in the outer holes. Use a min. 50mm long 6mm Hex Head Screw bolt in the centre hole only for fixing to concrete.

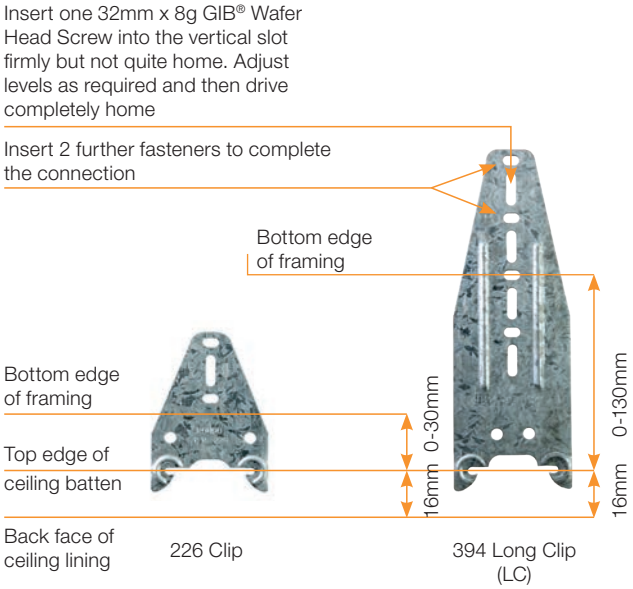


A239 CLIP

Fix the A239 Clip to concrete floor using the supplied CT06 anchor screw bolt in a 6mm diameter hole drilled to allow a 40mm screw embedment.



FASTENING THE SHORT AND LONG CLIP



PERIMETER

GIB® Rondo® NZ18 Angle, 142 Perimeter Channel, GIBFix® Angle or a traditional 140mm oversize top plate. Note that ceiling diaphragms, and raking or skillion ceilings and roofs have specific perimeter requirements, some using folded metal angles.

Perimeter channel fixed to wall framing with 32mm x 8g GIB® Grabber® Wafer Head Screws or 32mm x 7g GIB® Grabber® Dual Thread Screws at 600mm centres maximum for a standard ceiling, 300mm maximum centres behind square stopping or in ceiling diaphragms. There must be a nog or dwang behind the wall or ceiling perimeter metal channel or angle.

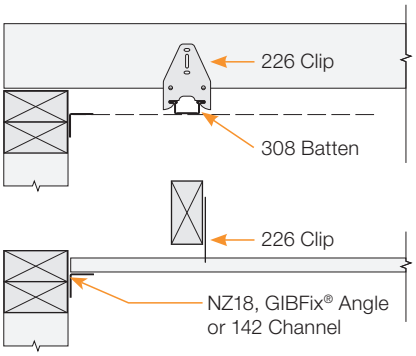
To fix the batten to perimeter channel or angle, use 13mm x 7g GIB® Grabber® Pancake Head Drill Tip Screw or 3mm diameter steel rivets.

INSTALLATION

1. Establish a datum line for the ceiling
2. Fix any perimeter channels or angles
3. Place a string line on the datum line at right angles to the battens, under the truss or joist closest to the centre of the room
4. Install clips or brackets at the required centres based on the batten span using the string line to establish the correct position
5. Alternatively use a laser level to provide the datum level and guide the clip installation heights
6. Cut the batten to the required length using tin snips, a hacksaw or grinder disk
7. Insert the batten into the channel at each end and fit into the clips or brackets
8. Install remainder of clips or brackets ensuring that the batten is straight and flat

GIB® RONDO® 308 CLIP FIX (CF) SYSTEM EXAMPLE

Recommended Best Practice Details



GIB® RONDO® 129 CLIP FIX (CF) SYSTEM

This fixing method applies to the Rondo® 129 Metal Batten and matching clip options, selected depending on the desired drop height or acoustic requirements.

Clips available for use with the Rondo® 129 Batten are the 226 Clip, the 394 Long Clip, the STWC Acoustic Clip, the Betagrip Clip, and the 100 or 180mm A239 Clip.

For specification purposes coding can be used, quoting the batten type followed by CF and the clip type.

GR129-CF-226	GR129-CF-BGC
GR129-CF-394LC	GR129-CF-A239100
GR129-CF-STWC	GR129-CF-A239180

STWC ACOUSTIC CLIP

Fix the STWC Acoustic Clip to the framing using a 63mm x 8g GIB® Grabber® Self Tapping Screw.



BETAGRIP CLIP

Fix the Betagrip Clip to timber or steel framing using two 32mm x 7g GIB® Grabber® Dual Thread Screws in the outer holes. Use a min. 50mm long 6mm Hex Head Screw bolt in the centre hole only for fixing to concrete.

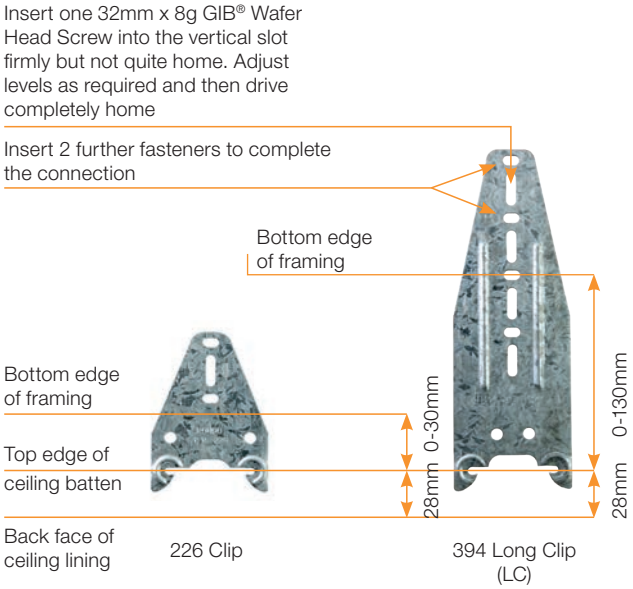


A239 CLIP

Fix the A239 Clip to concrete floor using the supplied CT06 anchor screw bolt in a 6mm diameter hole drilled to allow a 40mm screw embedment.



FASTENING THE SHORT AND LONG CLIP



PERIMETER

GIB® Rondo® NZ18 Angle, 140 Perimeter Channel, GIBFix® Angle or a traditional 140mm oversize top plate. Note that ceiling diaphragms, and raking or skillion ceilings and roofs have specific perimeter requirements, some using folded metal angles.

Perimeter channel fixed to wall framing with 32mm x 8g GIB® Grabber® Wafer Head Screws or 32mm x 7g GIB® Grabber® Dual Thread Screws at 600mm centres maximum for a standard ceiling, 300mm maximum centres behind square stopping or in ceiling diaphragms. There must be a nog or dwang behind the wall or ceiling perimeter metal channel or angle.

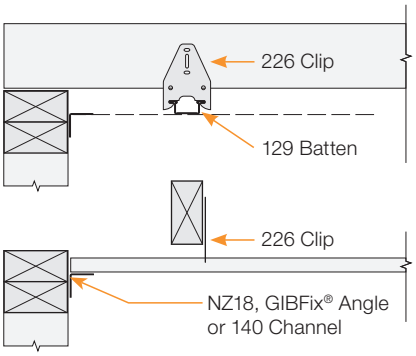
To fix batten to perimeter channel or angle use 13mm x 7g GIB® Grabber® Pancake Head Drill Tip Screw or 3mm diameter steel rivets.

INSTALLATION

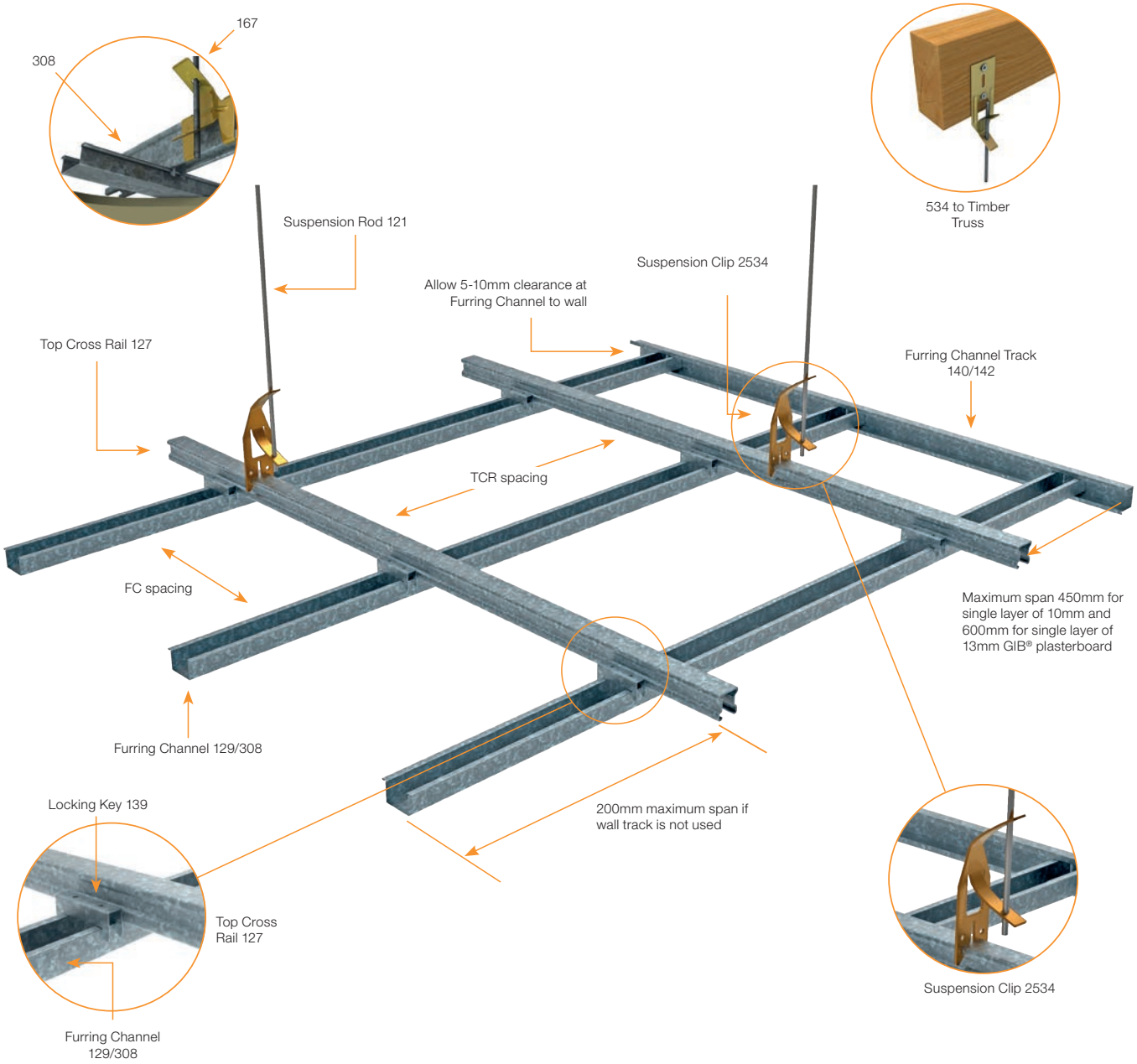
1. Establish a datum line for the ceiling
2. Fix any perimeter channels or angles
3. Place a string line on the datum line at right angles to the battens, under the truss or joist closest to the centre of the room
4. Install clips or brackets at the required centres based on the batten span using the string line to establish the correct position
5. Alternatively use a laser level to provide the datum level and guide the clip installation heights
6. Cut the batten to the required length using tin snips, a hacksaw or grinder disk
7. Insert the batten into the channel at each end and fit into the clips or brackets
8. Install remainder of clips or brackets ensuring that the batten is straight and flat

GIB® RONDO® 129 CLIP FIX (CF) SYSTEM EXAMPLE

Recommended Best Practice Details



Suspended ceiling metal battens (SC) on rod **Fully suspended (150–1000mm drop)**



CEILING ACCESSORIES (COMPATIBLE WITH THE 308 & 129 BATTENS)

547 CLIP

14935

Fix vertically.

5mm galv. rod (121) is fitted by squeezing the two lugs of the 547 clip. Easily adjustable for height.



STSU CLIP

14983

Ceiling resilient mount.

Fits 127 or 128 TCR.

Accepts either 129 or 308 Battens.



534 CLIP

14934

Fix horizontally.

5mm galv. rod (121) is fitted by squeezing the two lugs of the 534 clip. Easily adjustable for height.



167 CLIP

14929

Side mount clip - low profile alternative for 2534 clip.

Connects 127 TCR to 5mm rod.

Provides height adjustment.

Only suitable for single layer systems.



121 ROD

14931 3.6m

5mm galv. rod for use with 547, 534, 2534, 8167 clips.



2534 CLIP

14930

Friction fitted to 121 rod.

Connects to TCR 127 & 128



127 TCR – 25mm

14921 3.6m
14922 4.8m

25mm (h) x 21mm (w)

Top Cross Rail. (TCR)
Also called strongback, works with 2534 clip.



128 TCR – 38mm

14923 4.8m

Top Cross Rail (TCR). Also called a strongback. Works with 2534 clip.

38mm (h) x 21mm (w)



139 CLIP

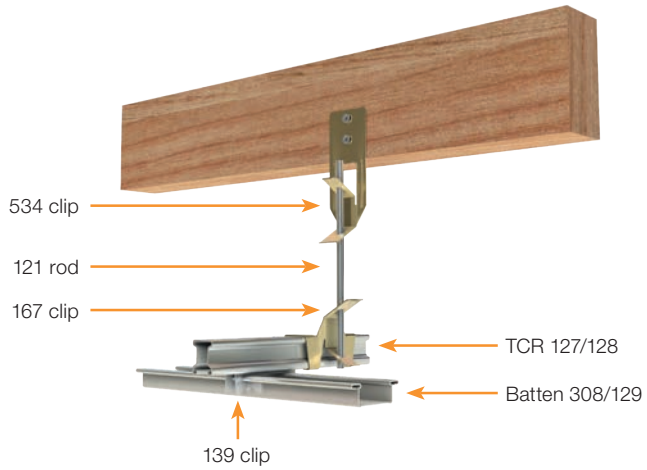
14925

Clicks into TCR at spacings to suit the ceiling lining, i.e. 450mm for 10mm plasterboard and 600mm for 13mm plasterboard.

Connects to 308 or 129 batten.



EXAMPLE



SUSPENDED CEILINGS

This section describes suspended ceiling (SC) applications. Select an appropriate system based on your specific project requirements, framing alignment, and the required ceiling drop height. Batten options, also referred to as furring channels, are the Rondo® 308 and 129 Battens.

The Rondo® 308 or 129 Batten is clipped to a top cross rail (TCR) using 139 Clips. The 127 or 128 TCR is connected via 2524 Clips or 167 Side Mounted Clips to 5mm galvanised suspension 121 Rods. Rods are fixed to the supporting structure using 547 Clips for mounting to a horizontal surface, or 534 Clips for side mounting to a vertical face.

The suspended ceiling option permits a drop from 150 to 1000mm.

A specification reference can be assigned for the selected system by combining the batten type, and fixing method. For example:

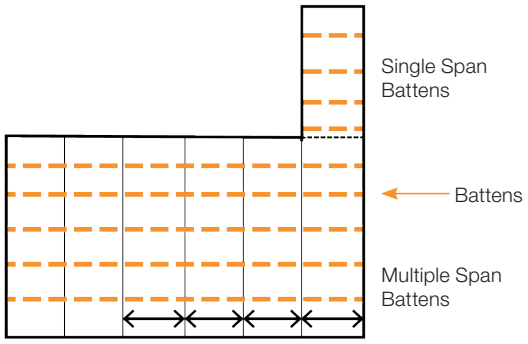
GR308-SC
GR129-SC

SUPPORTING FRAMING AND BATTEN LAYOUT

The supporting framing must be straight and true, and comply with relevant NZBC requirements and associated Standards (see General Design and Installation).

Batten spacing must not exceed 450mm for 10mm GIB® plasterboard and 600mm for 13mm GIB® plasterboard.

Ensure all battens run in the same direction to minimise the risk of defects such as plasterboard joint cracking. Consider control joints to provide any stress relief at a change of direction.



JOINTING BATTENS

The Rondo® 308 and 129 Battens can be joined using the 138 Jointer. Do not run batten joints in a line but stagger them between adjacent battens.

JOINTING TOP CROSS RAIL

To join TCRs, use a 200mm long piece of the 127 TCR and clip it over the top of the rail (see Control Joint Details p.22).

PERIMETER FIXING

The Rondo® 308 and 129 Battens can be terminated at the ceiling perimeter into a 142 or 140 Perimeter Channel respectively or can be fixed to a NZ18 or GIBFix® Angle.

When a batten runs parallel, and 75mm or less from a perimeter wall, a perimeter channel or angle is not required unless the wall-to-ceiling joint is square stopped, or when dictated by fire or structural requirements.

FASTENERS

1. 534 Top mount fixed to timber framing by fastening with min. 12g x 38mm Hex Head Screw. For fixing to concrete, use min. 50mm long 6mm Hex Head Screw bolt.
2. 547 Top mount fixed to underside of the timber with min. 12g x 38mm Hex Head Screw. For fixing to concrete, use min. 50mm long 6mm Hex Head Screw bolt.
3. Perimeter Channel to wall framing with 32mm x 8g GIB® Grabber® Wafer Head Screws 600mm centres maximum for a standard ceiling, 300mm maximum centres behind square stopping.

INSTALLATION

1. Establish a datum line for the ceiling
2. Fix the perimeter channels or angles. There must be a nog/dwang behind the channel or angle
3. Cut the suspension rod (121) to length using a hacksaw
4. Attach top mount clip (534) to one end of the rod and TCR clip (167) to the other end
5. Fix the rod assembly to floor or roof structure above to support the TCR along its length at maximum 1200mm centres and space the TCRs at 1200mm centres maximum to form a 1200mm grid. The first hanger to be a maximum of 400mm from the wall perimeter channel
6. Adjust all hangers to correct drop using a string line or laser
7. Attach TCR (127) to suspension clips (TCR clip 167)
8. Click the 139 locking key batten clips into the TCR at 600mm centres
9. Cut the battens to length using tin snips, a hacksaw or grinder disk
10. Insert the batten into the channel at each end and fit into the batten clips. Stagger any batten joints and use the 138 batten jointer. Ensure the battens are straight and flat

SPECIFIC ENGINEERING DESIGN

The suspended ceiling systems in this technical literature can be specified without the need for Specific Engineering Design (SED), provided they are intended for installation within the following scope of use:

- Buildings designed and constructed in accordance with NZS3604:2011 Timber Framed Buildings or NASH Standard for Residential and Low-Rise Steel Framing
- A maximum ceiling area of 144 m^2, not exceeding 12 metres in any direction
- Supporting a single layer of 10mm or 13mm GIB® plasterboard ceiling lining
- Suspension drop not exceeding 1000 mm measured from the supporting structure above to the back of the ceiling lining
- GIB® plasterboard installed to the suspension grid in accordance with the current GIB® Site Guide
- The ceiling is level, with no height variations along the ceiling plane

This scope assumes buildings of limited height and a ceiling perimeter which is fixed to bounding walls by means of plasterboard fixings to the perimeter channel or angle, and a coved or square stopped junction detail between the ceiling and wall linings.

For application outside this scope, Specific Engineering Design SED is required. Options include full fixing of plasterboard ceiling linings to perimeter walls capable of transferring the associated seismic forces, designing the grid suspension system to transfer these forces to structural walls, or bracing the suspension system so that forces are directly transferred to the floor above.

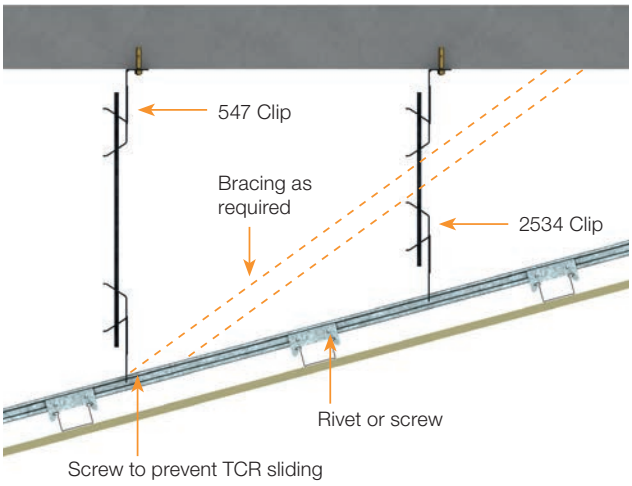
AS/NZS 2785:2020 Suspended Ceilings - Design and Installation provides one way of designing the suspended ceiling systems. When using this Standard care must be taken not to confuse the performance of a plasterboard lined ceiling with a two-way grid system which accommodates proprietary ceiling tiles.

When other areas of performance are required, such as fire-resistance or noise-control, the design must carefully consider compliance with all relevant NZBC clauses.

RAKING CEILINGS

Specific Engineering Design (SED) is recommended when designing raking suspended ceilings. Due to the slope of the ceiling, lateral forces will develop. If these forces are not directly transferred to the perimeter walls by the ceiling linings, they will be imposed on the grid and hangers in which case a separate bracing system is required.

Raking or skillion roofs may also have specific perimeter requirements for folded metal angles (see Raking Ceilings p.23).



BATTEN FIXING TO WALLS

This section describes batten fixing to walls. Only the GIB® Rondo® 310 Batten can be direct fixed. The GIB® Rondo® 310 Batten as well as the Rondo® 308 and 129 Battens can be clip fixed. Note that the Rondo® 308 and 129 Battens use a different clip design.

- Do not fix metal battens direct to masonry walls
- Metal batten to wall fixing is not suitable for wall bracing elements without specific design
- Refer to GIB® Fire Rated Systems and GIB Noise Control® Systems for use in those applications
- Specific thermal design is required when installing metal battens over an internal vapour control membrane as part of an air tightness design
- Battens must be spaced no further than 600mm apart and be supported at 1200mm maximum

LININGS

When linings and battens run in the same direction with longitudinal sheet joints formed over battens, there is no need for nogs/dwangs between the battens unless to support sheet end butt joints.

When linings run perpendicular to the battens, there is no need for nogs/dwangs behind the tapered sheet joints.

Sheet end or cut edge joints must be supported by framing.

PERIMETER

Use an NZ18 or GIBFix® Angle behind wall-to-ceiling and wall-to-wall joints and fix to battens either side using 13mm x 7g GIB® Grabber® Pancake Head Drill Tip Screws.

GIB® RONDO® 310 SET OUT AND DIRECT FIXING (DF)

Install battens perpendicular to studs or nogs/dwangs and fix at no more than 1200mm centres with pairs of 32mm x 8g GIB® Grabber® Wafer Head Screws through each flange.

When fixing horizontally, place the lowest batten about 10mm from the floor and the highest to allow for wall/ceiling junction construction and finishing.

JOINTING

Batten end joints can be formed over framing or use the 312 Jointer anywhere between supports. Stagger joints between adjacent battens.

INSTALLATION

- Cut battens 10mm short leaving a 5mm gap at each end
- Set out batten centres not exceeding 600mm
- Pack where necessary to provide a flat substrate and fasten taking care not to distort the batten
- Form internal and external corners using the NZ18 or GIBFix® Angle

BATTEN SET OUT AND CLIP FIXING (CF)

The GIB® Rondo® 310 and Rondo® 308 and 129 Battens can all be clip fixed to walls. Note that the Rondo® 308 and 129 Battens use a different clip design, but otherwise separation achieved with the standard and long clips are the same.

The A311 GIB Quiet Clip® can only be used with the GIB® Rondo® 310 Batten and the STWC Acoustic Clip only accepts Rondo® 308 and 129 Battens.

For standard clip fixing to walls, simply use the ceiling specification turned 90 degrees, except that batten spacing for walls can be 600mm for both 10mm and 13mm GIB® plasterboard linings.

Alternatively, the A239 Clip and threaded rod, the STWC Acoustic Clip, or Betagrip Clip can be used with the Rondo® 308 and 129 Battens for face fixing to flat surfaces, including concrete masonry.

Place clips at no more than 1200mm centres along the battens. Space battens at no more than 600mm. When fixing battens horizontally, set out to locate the lowest batten 10mm from the floor and the highest to allow for wall/ceiling junction construction and finishing.

JOINTING

Rondo® 308 and 129 Batten joints are formed using the 138 Jointer anywhere between supports. Stagger joints between adjacent battens.

INSTALLATION

- Cut battens 10mm short leaving a 5mm gap at each end
- Set out batten centres not exceeding 600mm
- Using a laser or string lines, install the clips at the required centres, creating a level surface
- Fit the battens into the clips
- Form internal and external corners using the NZ18 or GIBFix® Angle

FASTENERS

- Betagrip Clip - 38mm x 8g GIB® Grabber® Wafer Head Screws to timber or 6.0mm diameter screw bolt with minimum 50mm embedment for masonry
- STWC Acoustic Clip - 63mm x 8g GIB® Grabber® Self Tapping Drywall Screws to framing
- A239 Threaded Rod (100 or 180mm) and Clip - supplied 6.5mm masonry anchor

STWC Acoustic Clip



Betagrip Clip



A239 Clip and Threaded Rod



FIXING TO MASONRY

If installation is required to concrete or masonry, it is recommended that GIB® Rondo® 308 battens are clipped to GIB® Rondo® A239 clips as shown. A239 clips should be spaced at 1200mm centres (maximum) vertically and 600mm centres (maximum) horizontally

Anchor Bolt



Polystyrene



A239 Clip



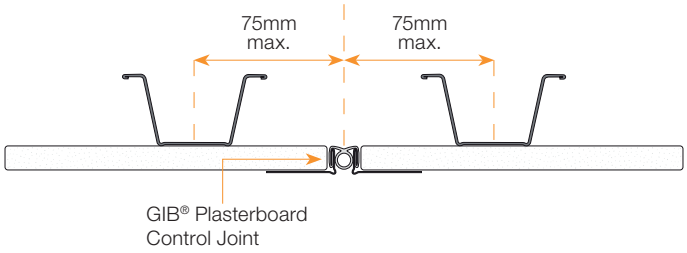
308 Batten

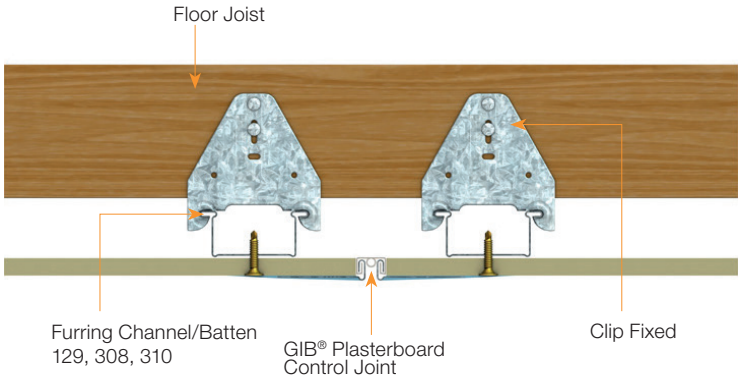


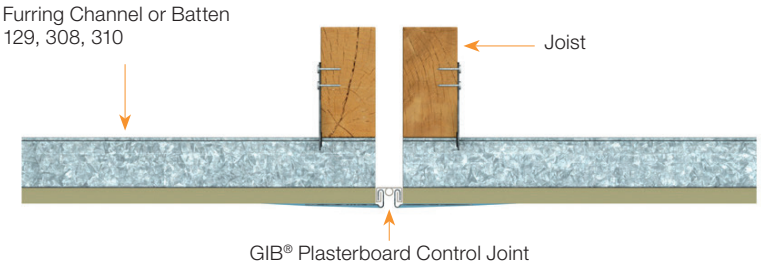
GIB® Plasterboard Overlay



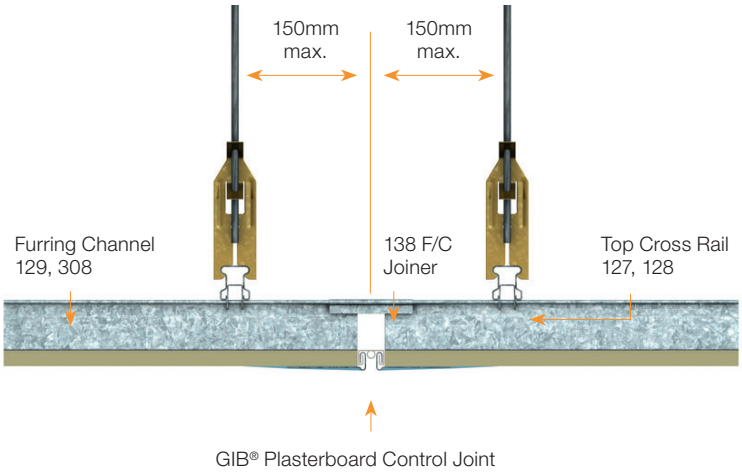
CONTROL JOINT: DIRECT AND CLIP FIXED







CONTROL JOINT: SUSPENDED CEILING



RAKING CEILINGS AND SKILLION ROOFS

Due to the higher temperatures and low air movement that can occur in raking ceilings it is strongly recommended that clip fixed GIB® Rondo® metal battens are used (these are considered to be ceiling suspension systems).

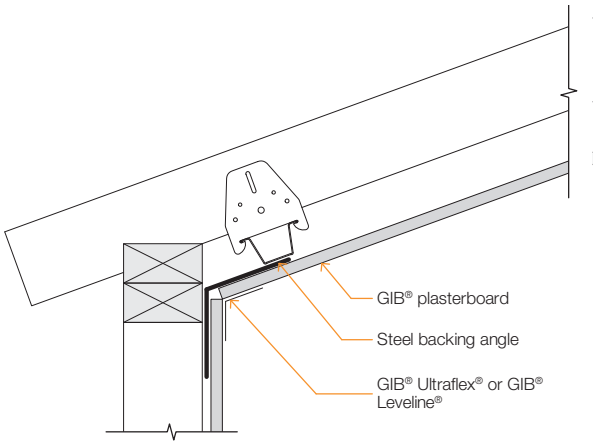
Because of the heat that can be generated in roof spaces, timber battens can be subjected to conditions that contribute to joint failure and popped fasteners.

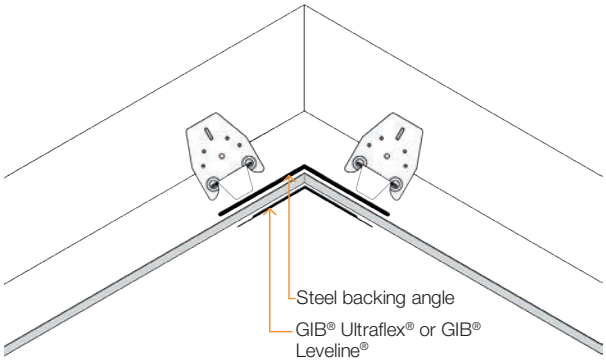
The use of control joints or perimeter relief will help reduce the risk of cracking in large, expansive ceilings.

These may not be suitable for use in Fire Rated Systems or Noise Control Systems.

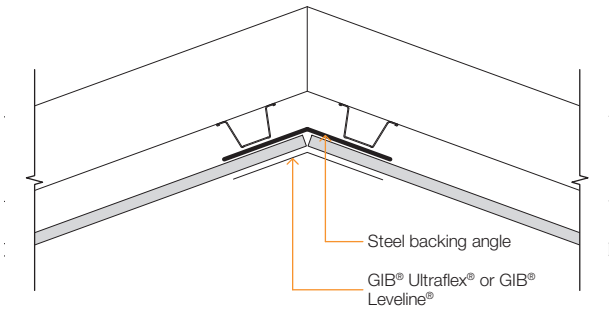
Back-blocking of all ceiling joints is highly recommended as it can reduce the likelihood of cracking.

FIXED — STEEL BACKING ANGLE



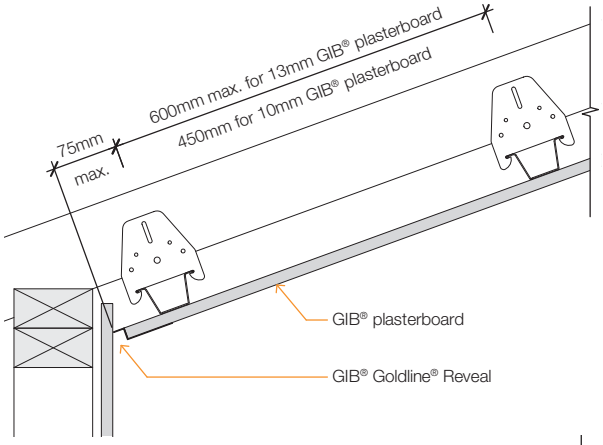


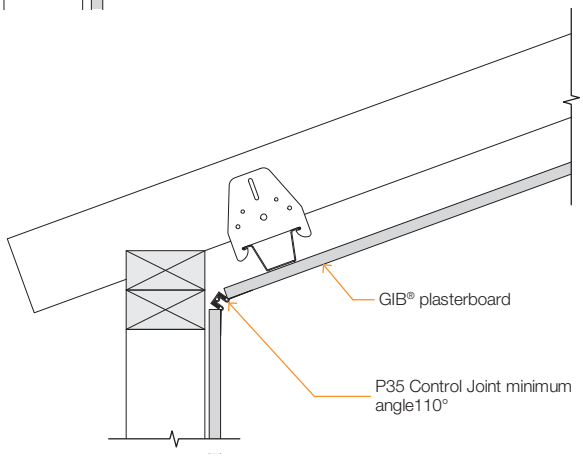
NOTE: It is recommended that a flexible perimeter relief be used where there is a high risk of movement.

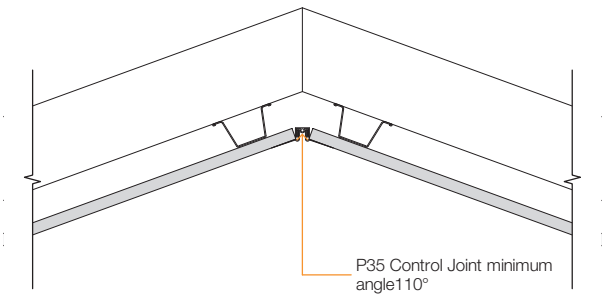


NOTE: It is recommended that a flexible perimeter relief be used where there is a high risk of movement.

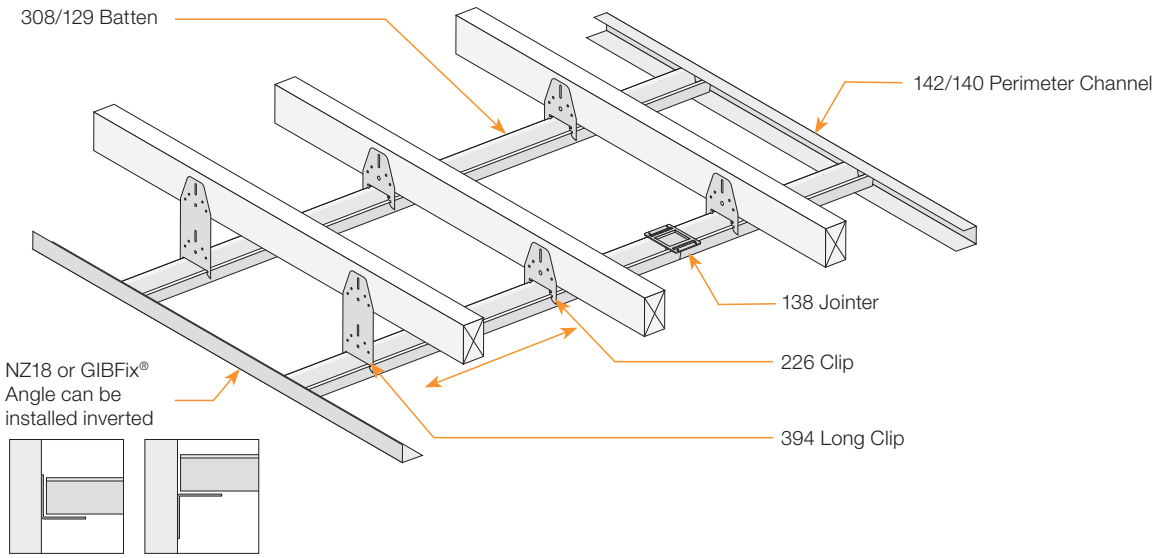
FLEXIBLE — PERIMETER RELIEF



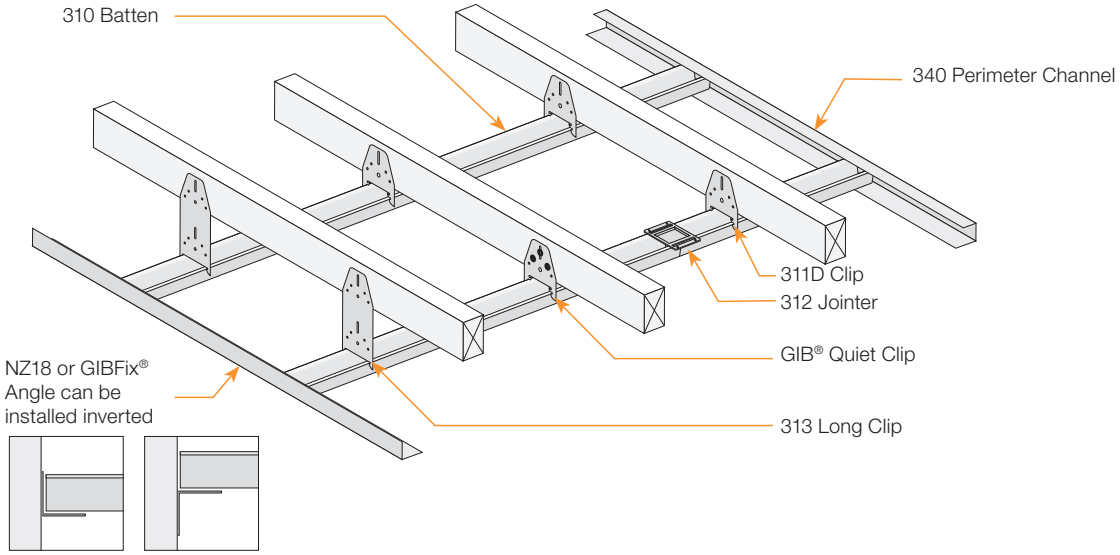




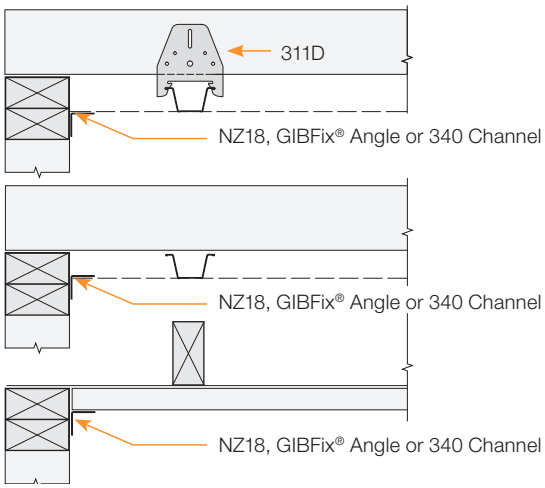
GIB® RONDO® 308/129 SYSTEM



GIB® RONDO® 310 SYSTEM



Recommended Best Practice Details



Notes

Notes

GIB® Rondo® Metal Batten Systems, September 2024

LIMITATIONS

Winstone Wallboards Ltd accepts no liability if the GIB® Rondo® Metal Batten systems and junction details are not installed in strict accordance with instructions contained within this publication.

USE ONLY THE CURRENT SPECIFICATION

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SUBSTITUTION

GIB® Rondo® Metal Batten systems have been specifically designed and tested to achieve the stated performance levels. To maintain the GIB® product and system warranty, all system components detailed in this publication must be used when specifying and installing GIB® Rondo® Metal Batten systems.

TRADEMARKS

The names GIB®, GIB Fyreline®, GIB Ultraline®, GIB Toughline®, GIB Braceline® GIB Noiseline®, GIB Aqualine®, GIB Weatherline®, GIB Tradeset®, GIB Plus 4®, GIB-Cove®, GIB Lite Blue®, GIBFix®, GIB® Quiet Stud®, GIB Rail®, GIB Barrierline®, GIB X-Block®, GIB Fire Soundseal®, GIB Clip®, the colour mauve for GIB Toughline®, the colour blue for GIB Braceline® GIB Noiseline®, the colour pink for GIB Fyreline®, the colour green for GIB Aqualine®, the colour purple for GIB Weatherline® and the shield device are registered trademarks of Fletcher Building Holdings Limited.

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