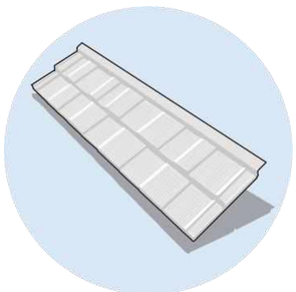
Gerard Oberon

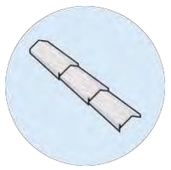
The depth and dimension of Oberon make it most responsive to changes in light. It is often seen on substantial homes alongside dressed stone and natural timbers.





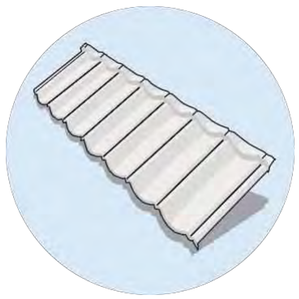
Pitch – min./max.	20-90°
Overall length	1310 mm
Length of cover	1230 mm
Width of cover	320 mm
Upstand	20 mm
Roof cover/panel	0.39 m^2
Panels/m^2	2.54
Weight/panel Textured	2.8 kg
Weight/panel Smooth	NA
Weight/m^2 Textured	7.1 kg
Weight/m^2 Smooth	NA

Gerard Oberon is compatible with **Angle** trim.



Gerard Heritage

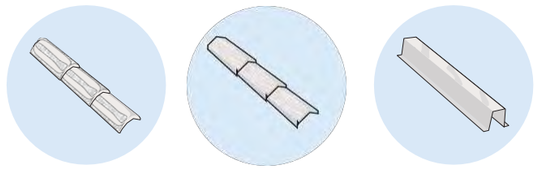
The scalloped shapes of this profile bring a look that's similar to heavyweight tiles. The advantages of pressed steel mean this profile is often chosen as a substitute.





Pitch – min./max.	12-90°
Overall length	1330 mm
Length of cover	1257 mm
Width of cover	369 mm
Upstand	28 mm
Roof cover/panel	0.46 m^2
Panels/m^2	2.2
Weight/panel Textured	2.9 kg
Weight/panel Smooth	2.1 kg
Weight/m^2 Textured	6.4 kg
Weight/m^2 Smooth	4.7 kg

Gerard Heritage is compatible with all three Gerard trims – **Barrel, Angle** and **Box**.

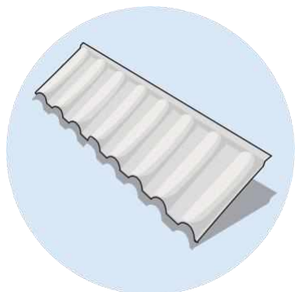


Dimensions and weights given are nominal.

Products and specifications

Gerard Milano

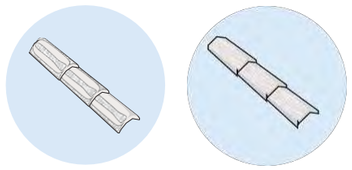
With balanced arches and flats found in traditional design, Gerard Milano is a timeless profile that creates clean, elegant and classical looking roofs.





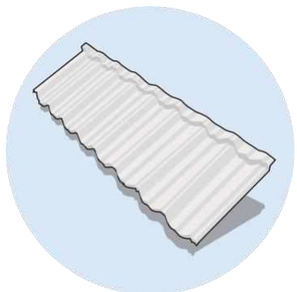
Pitch – min./max.	12-90°
Overall length	1330 mm
Length of cover	1215 mm
Width of cover	368 mm
Upstand	24 mm
Roof cover/panel	0.45 m^2
Panels/m^2	2.2
Weight/panel Textured	2.9 kg
Weight/panel Smooth	NA
Weight/m^2 Textured	6.4 kg
Weight/m^2 Smooth	NA

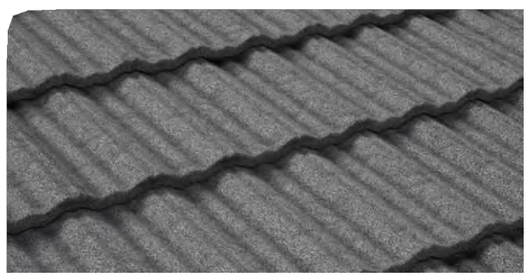
Gerard Milano is compatible with **Barrel** and **Angle** trims.



Gerard Classic

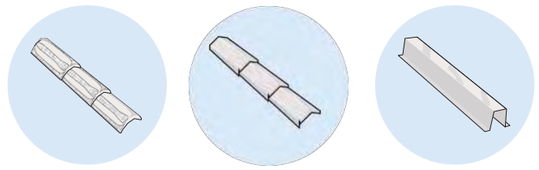
Gerard Classic is a geometric profile with shapes and angles that accentuate light and shadow to emphasise its corrugations and create a look of strength and definition.





Pitch – min /max.	12-90°
Overall length	1320 mm
Length of cover	1257 mm
Width of cover	369 mm
Upstand	28 mm
Roof cover/panel	0.46 m^2
Panels/m^2	2.2
Weight/panel Textured	2.9 kg
Weight/panel Smooth	2.1 kg
Weight/m^2 Textured	6.4 kg
Weight/m^2 Smooth	4.7 kg

Gerard Classic is compatible with all three Gerard trims – **Barrel, Angle** and **Box**.



Dimensions and weights given are nominal.

1.1.2. Trims

Gerard Roof trims

Trim is an essential roofing element, for performance as well as appearance; roof trims create a weatherproof seal at roof junctions and are an important part of the integrity of the roofing system.

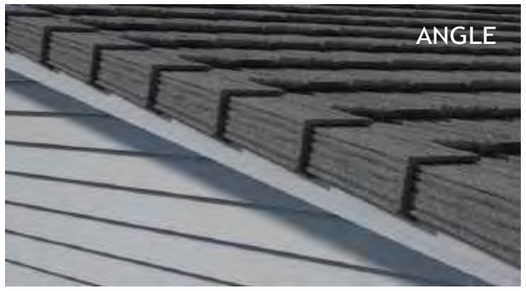
There are three types of roof trim – Angle, Barrel and Box. Each roof profile is compatible with one or more of these as shown in the chart on the right.

Gerard's roof trim component system is designed to be fully integrated. The finish of Gerard trims can be chosen to exactly match the finish of a Gerard roof or chosen in a contrasting colour to create a specific effect.

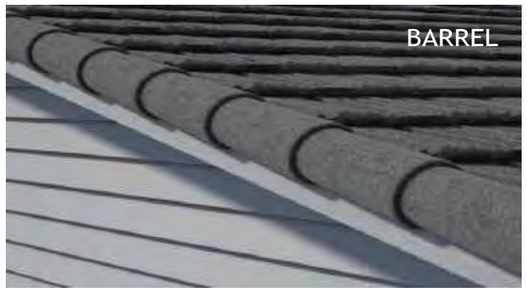
	Angle trim	Barrel trim	Box trim
Stratos	✓	✓	✓
Senator	✓		
Rockport	✓		
Alpine	✓		
Oberon	✓		
Heritage	✓	✓	✓
Milano	✓	✓	
Classic	✓	✓	✓

Gerard Roof Profiles With Corresponding Trims

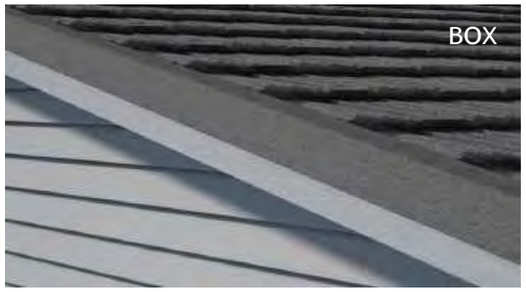












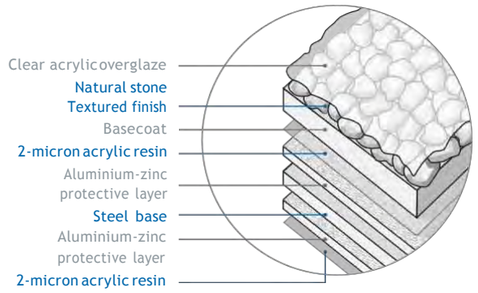
1.2 Finishes

Choice of surface finishes

Some Gerard roof profiles allow you to choose either a textured or Smooth finish on the surface of your roof.
Both have their merits and both come in a range of contemporary colours. The decision is usually influenced most by the architectural style of the home and the intended colour scheme.

1.2.1 Textured finishes

Naturally coloured mineral fragments, or ceramic coated stone fragments, fused to aluminium-zinc steel in layers of acrylic resin and over-glaze.



Textured finish advantages:

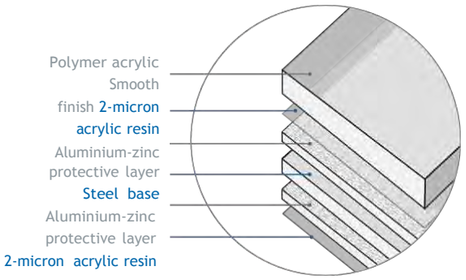
- Additional protection from the elements
- Natural stone colours are almost entirely fade-free
- Gerard textured finishes have longer warranty

A textured stone finish is inclined to look a little more substantial yet visually softer than a Smooth finish.



1.2.2 Smooth finishes

45-micron thick topcoat of ultra-tough polymer acrylic applied after the shape has been pressed into the aluminium-zinc steel (preventing surface micro-cracks).



Smooth finish advantages:

- Less expensive than a textured finish
- Smooth surface with clearer detail
- Just like ordinary coloured steel but much more durable

Smooth finishes tend to produce a smoother, crisper look accentuating patterns and details more.



1.2.3 Custom finishes to order

Custom finishes can be created for special projects by request.

A Gerard Smooth finish can be made to match any colour sample. We also have the ability to develop a custom textured finish – for example, we could work with stone that's native to your location.

To find out more contact Gerard Roofs on 0800 100 244.

1.3 Colours & finishes

1.3.1 Textured finish colours



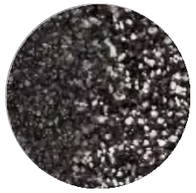
Midnight

Black / Ebony



Charcoal

Black / Ebony



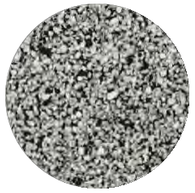
Eclipse

Black / Ebony



Onyx

Greyfriars / Greyfriars



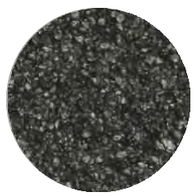
Ashwood

Sandstone Grey / Sandstone Grey



Rainforest

Karaka / Karaka



Greenstone

Karaka or River Gum / Karaka



Ravine

Karaka / Karaka



Teak

Lignite / Lignite



Pepper

Ironsand / Ironsand



Terracotta

Scoria / Scoria

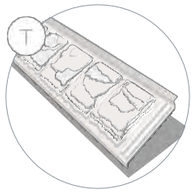


Cedar

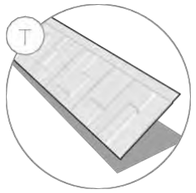
Lignite or Scoria / Lignite

1.3.2 Types of finish by roof profile

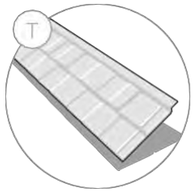
Textured finishes and colours are available for all Gerard roof profiles.



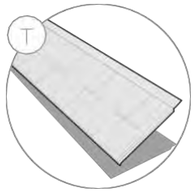
Gerard Alpine



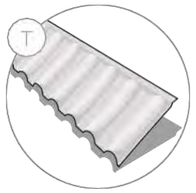
Gerard Rockport



Gerard Oberon



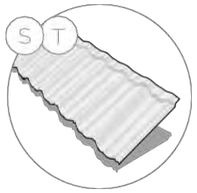
Gerard Senator



Gerard Milano

The name below each colour swatch title is the Colorcote® / Colorsteel® equivalent.
These are useful for matching accessories like fascia or aluminium joinery
as the names are often referred to as a colour standard.

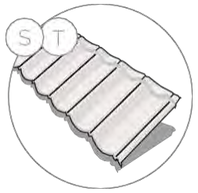
Smooth finishes and colours are available for the three Gerard profiles shown below.



Gerard Classic



Gerard Stratos



Gerard Heritage

1.3.3 Smooth finish colours



Obsidian

Black / Ebony



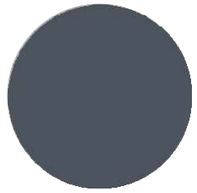
Graphite

Ironsand / Ironsand



Castle Grey

Windsor Grey / Windsor Grey



Ocean Blue

New Denim Blue / New Denim Blue



Smoke Grey

Greyfriars / Greyfriars



Pearl Grey

Sandstone Grey / Sandstone Grey



Chalk

Cloud / Pacific Cloud



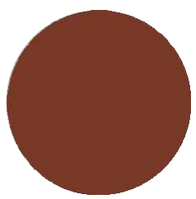
Dark Green

Karaka / Karaka



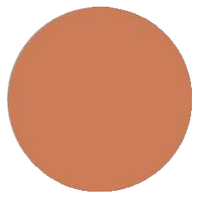
Mint Green

Mist Green / Mist Green



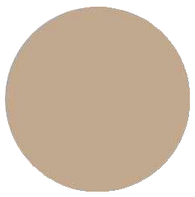
Russet

Scoria / Scoria



Marseille Clay

Terracotta / Terracotta



Morocco

Beige / *No equivalent*

The name below each colour swatch title is the Colorcote® / Colorsteel®equivalent.
These are useful for matching accessories like fascia or aluminium joinery
as the names are often referred to as a colour standard.

1.4 Product warranty

Gerard's warranty addresses homeowners' two main concerns:

1. That the roof remains weatherproof
2. That the coating remains sound

Complicated rules simplified

Warranties are complex but we've narrowed the variables affecting Gerard Roofs' warranty cover down to two questions:

Is the building sited in a corrosive environment?

Does the roof have a Smooth or a textured finish?

On the right is a chart showing the terms of the warranty according to the circumstances of the individual building.

In each situation the warranty is pro-rata with cover diminishing over time.

There are two warranty environment zones: Standard and Corrosive. Warranty cover is longer in the standard environment zone.

A Corrosive Environment is defined as anywhere within 750m of breaking surf.

Gerard Roofs' warranty applies to all Gerard manufactured products, even if installed in extreme corrosive conditions.

Installation is assured

Be reassured that Gerard roofs are only installed by Gerard Certified Roofers.

Each GCR is responsible under law to make good any problems in the unlikely event they arise.

Visit www.gerardroofs.co.nz to download a sample of the full warranty document.

The chart shows the duration of both aspects of roof cover, according to the type of texture and the corrosiveness of the environment.

		
Weatherproofing		
Weatherproofing cover with textured finish roof	50 years pro-rata	25 years pro-rata
Weatherproofing cover with Smooth finish roof	50 years pro-rata	15 years pro-rata
Surface coating		
Textured Coating cover	20 years pro-rata	10 years pro-rata
Smooth Coating cover	15 years pro-rata	5 years pro-rata

1.5 Environmental responsibility

A Gerard pressed steel roof is an environmentally responsible choice.

Pressed steel roofing generates minimal manufacturing, construction site and demolition waste.

A pressed steel roof is lighter than its concrete or clay equivalent, which means transportation is more energy-efficient. It requires less framing support, which also saves resources. Steel is endlessly recyclable too.

Gerard Roofs is conscious of its environmental footprint and was New Zealand's first roofing manufacturer to be awarded ISO 14001 environmental accreditation.

TELARC REGISTERED™
Environment ISO 14001

1.6 CAD details available

CAD details for commonly encountered roof details in a number of common formats can be found at www.gerardroofs.co.nz/designtech

At the time of publication these details cover:

- Eaves
- Gables
- Ridges
- Roof-to-wall (transverse)
- Hips
- Roof-to-wall (parallel)
- Valleys

Gerard Roofs' CAD library is an expanding online resource that will be added to periodically as new details become available.
Check www.gerardroofs.co.nz/designtech to see the latest available versions.

Specific details for unusual or challenging areas can be requested by contacting Gerard Roofs on 0800 100 244.

1.7 Handling and storage

Gerard panels and accessories must be transported and handled with care to avoid damaging the pre-finished surfaces.

Long term storage of panels and accessories must be under dry, ventilated cover. For short term storage on site, panels and accessories must be stored flat off the ground, no more than two pallets high.

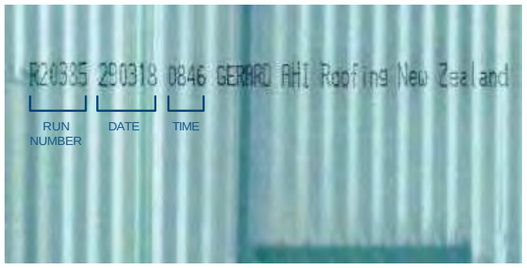
Handling and storage of all materials supplied by Gerard Roofs, whether on or off site, is under the control of the Gerard Certified Roofer.

Other materials must be handled and stored in accordance with the relevant manufacturer's instructions.

1.8 Product identification

Gerard Roofs print a run number, date and time of production on the reverse side of each panel. Pallets have pallet cards that show the run number, date of production and colour code markings; this allows identification of batch colours.

The steel supplier also prints a code which allows identification of the parent coil.



Reverse side of the panel.



2.0 Design considerations

This section contains general information you need to keep in mind when designing buildings with Gerard Roofs. The numbered sections (2.1; 2.2; etc.) correspond to the equivalent parts of the Gerard Roofs website specification area (www.gerardroofs.co.nz/designtech). Any details and diagrams can be downloaded from there.

2.1 Scope

This specification covers the supply and fixing of:

- Materials
- General information
- Limitations of use
- Service of life
- Workmanship - pre-roofing requirements
- Timber battens.
- Roofing underlay
- Valleys
- Gerard Roofs - pressed metal tiles/panels
- Trim, standard, barrel and angle
- Wall flashings
- Fixings/fasteners
- Incompatible materials
- Extra high wind zone variations
- Solar panels

2.2 Building code

The following standard specifications should be adhered to in both materials and workmanship.

NZS 2295	Roofing underlays
NZS 4217	Standard for pressed metal tile roofs
NZS 3604:2011	Code of practice for light timber framed buildings, not requiring specific design
AS/NZS 4680	Hot-dip galvanized (zinc) coatings on fabricated ferrous articles - galvanising of nails
E2/AS1	New Zealand Building Code clause E2 External moisture
AS1397:2011	AS 1397-2011 continuous hot-dip metallic coated steel sheet and strip - coatings of zinc and zinc alloyed with aluminium and magnesium.
AS/NZS 1530	pt. 3:1999. Fire standard

NZ Building Code sections B1,B2,E2, G12

2.3 Serviceable life

Durability (B2)

Without recoating, the Gerard Roofs products will meet the provisions of NZBC B2.3(C) for 15 years, when used and maintained.

Structure (B1)

When installed according to the manufacturers recommendations the Gerard Roofs products will allow provisions of NZBC B1.3.1, B1.3.2 and B1.3.4 to be met for the relevant provisions of B1.3.3.

External moisture (E2)

When correctly used and installed, the Gerard products meet the requirements of the NZ Building Code E2/AS1

Live loads

During installation and subsequent construction process or maintenance, walking load must be positioned to the front of the panel where the panel is supported by a batten.

Wind zones

On new roofs when fixed to battens sized and installed according to NZS 3604:2011 Gerard Roofs systems are suitable for use in all NZS 3604:2011 building wind zones up to and including extra high.

Spread of fire (C3)

The coating of the roof is <1mm thickness and applied directly to a non-combustible substrate. There was no spread of flames when tested to AS/NZ 1530.pt3.

Water supplies (G12)

Rainwater collected from the Gerard Roofs systems will meet the provisions of NZBC G12.3.1, providing the surface coating is maintained as directed.

It is recommended that a potable water collection system is not installed until 3 good rainfalls have washed the new roof surface free of building debris and surface coating surfactants.

Snow

The Gerard Roofs products are suitable for use where buildings are designed for a 1kPa snow loading.

2.4 Other information sources

NZ MRM Code of Practice.

2.5 Alternatives

No alternatives or substitutions permitted.

2.6 Materials

2.6.1 Panels and accessory materials

The roofing panels and accessories are made by Gerard Roofs.

The base material is aluminium-zinc coated steel - 0.39 mm, AZ150 of AS1397:2011.

Panels are finished in either a granulated textured or Smooth paint finish.

Submissions

An actual product sample should be sighted to confirm colour choice before material orders are placed/accepted.

2.6.2 Installation materials

1. Roofing underlay shall be either a bitumen impregnated Kraft or synthetic underlay. Kraft underlays are covered by NZS2295 while synthetic roofing underlays are approved by Acceptable Solution documentation from the suppliers.
2. Battens of rough sawn radiata pine type timber meeting suitable dimensions (table 02, page 22) with H1.2 protection.
3. Ridge, hip, gable and wall flashings shall be supplied as standard products from Gerard Roofs.
4. Valleys may be used as supplied pre-finished in 2.4 metre lengths by Gerard Roofs or made to order out of pre-painted 0.55 mm G300 AZ150 aluminium-zinc coated steel in a matching colour from a sheet metal fabricator. If made to order, valleys should have similar dimensions to those supplied by Gerard Roofs.
5. Valleys must be painted to the same colour as the roof panel if not pre-finished.
6. Hip end caps to be installed where necessary to stop ingress of moisture or bird-life.
7. All nails in panels should be 50 mm galvanised and coated to meet AS/NZS 4680 specification (Zn 390 g/m^2). Galvanised nails are used for ridge hip caps 30 mm, all other trim or flashings 50 mm.

2.7 General information

Profile	Minimum pitch
Stratos	15°
Senator	15°
Rockport	15°
Alpine	15°
Oberon	20°
Heritage	12°
Milano	12°
Classic	12°

Minimum Roof Pitches For Gerard Roof Profiles

For full specifications - refer to individual panel profile data (pages 6-9) dimensions, coverage, weights etc.

2.7.1. Dissimilar metals/materials

When two different metals are in contact and moisture is present, one metal is relatively protected while the other suffers accelerated corrosion. A similar effect often occurs with water flowing over different metals.

This form of corrosion is commonly found:

- Where water is discharged from copper or brass systems over a galvanised or aluminium-zinc coated steel roof.
- Where unpainted lead flashings are applied directly to aluminium-zinc coated steel products.
- Where fasteners are incompatible with the roofing material.
- Any electrical contact between dissimilar metals should be avoided, e.g. wet leaves making contact between copper gutters and aluminium-zinc coated steel roof panels.

Note: Special consideration should be given when replacing existing roofs as some roof claddings use unsuitable materials for flashing such as lead.

2.8 Limitations on use

2.8.1. Corrosive environments

The Gerard system must not be used in high alkaline environments (such as intensive animal shelters or other buildings with high ammonia concentrations); contact with fresh concrete or plaster must be avoided. The roofing must not be used in contact with permanently damp materials, nor on or near industrial buildings in which corrosive processes occur, nor over swimming pools.

Directing water-flow to minimise potential corrosion

More active metals → **More noble metals**

Zinc › Aluminium-Zinc Coated Steel › Aluminium › Steel › Lead › Copper › Stainless Steel

This chart lists commonly used metals in a 'Galvanic Series'. If any two of these metals are in damp contact or a run-off situation, the metal further to the left will sacrifice itself to protect the metal further to the right. Therefore the simple rule to remember is that you can run water from left to right, but not from right to left. For example zinc to copper is alright, but copper to zinc is not. Specific advice should be sought from Gerard Roofs regarding use of dissimilar metals.



3.0 Substrate & installation overview

Information for the design and specification of the sub-structure of a Gerard roof; rafters, battens, underlays and fixings are covered in detail. The numbered points (3.1; 3.2; etc.) correspond to the equivalent parts of the Gerard Roofs website specification area (www.gerardroofs.co.nz/designtech). Any details and diagrams can be downloaded from there.

3.1 Preparation of structure

3.1.1 Rafters and valley boards

Rafters and valley boards are to be correctly installed by the builder before roofing can start.

Refer to Gerard Roofs Technical Note - Builder Check List, on the Gerard Roofs website.

Where an exact number of complete panel courses is not possible, the top row of panels should be trimmed to fit and then bent up beneath the ridge flashing.

3.2 Battens

Select batten size to suit rafter or truss spacing. Battens are to be treated to H1.2 and graded on site.

Truss spacing (mm)	Batten size (mm)	Situation
900	40 x 50	Standard
1200	50 x 50	Occasional
1500	50 x 65 on edge	Unusual
1800	50 x 75 on edge	Unusual

Table 02 Batten/Spacing

3.2.1 Batten setout

Stratos, Heritage, Classic, Milano, Rockport and Alpine profiles

A row of battens fixed directly behind the fascia with the second batten 330mm up the truss. Subsequent battens are spaced at 370mm (or as specified for profile and coating finish). The final, top row of panels is 365mm or less, depending on whether the top row needs cutting due to rafter length.

Senator

A row of battens fixed directly behind the fascia with the second batten 330mm up the truss. Subsequent battens are spaced at 368mm. A centre support batten (40x50 mm) positioned 185 mm behind the front face of the panel batten is installed and held in place with a single batten nail. Panels are not fastened to this support batten. The final top row of panels should be 365mm or less, depending on whether the top row needs cutting due to rafter length.

NB. The second batten up from the facia is left out to allow the roofing underlay to maintain an angle above horizontal.

Oberon

A row of battens fixed directly behind the facia with the second batten 280 mm up the truss. Subsequent battens are spaced at 160mm. The final top row of panels is 155mm or less, depending on whether the top row needs cutting due to rafter length. Panels are not fastened to intermediate support battens.

NB. The second batten up from the facia is left out to allow the roofing underlay to maintain an angle above horizontal.

Eaves panels at gutter fascia

Panels should extend into the gutter by 40mm. This may vary slightly depending on the rafter length and roof pitch.

Roof profile	Batten spacing	
	Textured	*Smooth*
Stratos	370mm	371mm
Senator*	368mm	
Rockport	368mm	
Alpine	368mm	
Oberonˆ	320mm	
Heritage	369mm	370mm
Milano	368mm	
Classic	369mm	370mm

Table 03 Batten Set-Out

**Centre batten 185 mm, second batten from eave not installed*
ˆCentre batten 160 mm, second batten from eave not installed

3.2.2 Batten/rafter fastening

Gerard Roofs require that all 40 x 50 mm battens fastened to rafters at 900 mm centres are to be fastened with 2 x 90 mm gun nails in all wind zones up to and including the very high wind zone.

In extra high wind zones a screw fastener must be used for all batten rafter junctions.

This meets or exceeds the requirements of NZS3604:2011

Wind zone	900 rafter 50x40 mm	1200 rafter 50x50 mm
Low 32m/s	S	S
Medium 37m/s	S	S
High 44m/s	S	T
Very high 50m/s	S	T
Extra high 55m/s	T	T
SED +55m/s*	Contact GR	Contact GR

Table 04 Fasteners for Panel Battens -Wind Zones – NZS3604.

S = 2 x 90 mm x 3.15 mm nails (0.8kN)
T = 80 mm x 10g screw (2.4kN)

**In SED Specific design situations refer to Gerard Roofs Technical Notes on installation in SED wind areas.*

3.3 Roofing underlay

Must comply with standard NZS 2295 - Pliable and Permeable Building Underlays. Roofing underlay is installed under the battens but over the bottom batten.

Roofing underlay should be installed horizontally with a minimum overlap of 75 mm.

All vertical laps to be taken past rafters and lap by a minimum of 150 mm.

The Roofing underlay is self-supporting up to 1200 mm and does not need mesh.

3.4 Valleys

Valley trays should be made from 0.55 mm AZ150 coated steel. Typically the steel will be pre-painted. Install valleys in a weatherproof workmanlike manner. Do not fix through valleys. Where more than one valley length is used in one run, have an overlap of at least 150mm. Tag valleys at the top edge of the valley join to eliminate valley creep.

3.5 Solar brackets

Gerard Roofs have proprietary solar brackets which can be installed at the time of roofing or later. These brackets do not require holes to be cut into the surface of the panels offering complete weather security.

Refer to Gerard Roofs for more information.

3.6 Panel installation

Care must be taken when handling, cutting, bending and installing to avoid damage to the surface. In particular, the paint finish must be kept clean.

Use rubber soled work shoes during installation and protective/synthetic padding on bending equipment.

Where work is still to be carried out on upper storey dormer windows or walls, panels can be left off to avoid damage or fallout from paint or plaster coatings. Alternatively, a plank embedded into 3 sand bags along its length can be used on top of the panel, with the sand bags placed over the support batten near the nose of the panel.

Where work is progressing above installed panels, dust sheets must be used held down with sand bags.

3.6 Panel installation continued

Heritage, Classic and Milano

Heritage, Classic and Milano can be installed to a minimum of 12° and may be laid left to right or right to left. All laps to be the same way on each plane.

Stratos

Stratos can be installed to a minimum of 15° and may be laid left to right or right to left. The laps must be laid facing away from prevailing winds or line of vision. All laps should be the same way on each plane. Courses must be staggered in a random pattern to avoid patterning as you progress up a hip, or gable.

Senator, Alpine and Rockport

Senator, Alpine and Rockport can be installed to a minimum of 15°. These profiles may only be laid in a single direction, as follows:

- Senator and Alpine – left to right only
- Rockport – right to left only

Courses of all three should be laid in a random pattern, with staggered start points.

Senator should be installed with an intermediate batten at 185mm to support roof traffic.

Oberon

Oberon can be installed at a minimum of 20° and should be laid right to left. Reference can be made to the individual profile fixing pattern pages at the back of this specification manual. Courses must be staggered in a random pattern for Oberon, to avoid patterning as you progress up a hip or gable.

Eaves

At eaves, the front rows of panels are fixed to the battens alongside the fascia by driving nails through the top face into the eave batten. These nails are positioned at points of low water run off. Eaves nails for Smooth finish have a synthetic washer installed under the nail head, eaves nails on textured finishes are sealed with the touch up kit basecoat and chip.

Nailing panels

Successive rows of panels are fixed by driving 50mm nails through the centre of the panel nose into the face of the battens. These nails are spaced as shown/ described in the individual profile fixing pattern pages at the back of this specification manual.

Only Gerard Roofs approved nails should be used in the installation of panels and accessories.

Valleys

Panels are cut at the same angle as the valley, at appropriate points, and bent down into the valley; they must not touch the valley tray. At the ridge, panels are cut and bent up under ridge accessories.

Ridge, Hip, Gable and Wall flashings

Only factory produced flashings and trim as supplied by Gerard Roofs may be installed. Panels are turned up by a minimum of 40 mm and covered by Gerard Roofs accessories to the prescribed coverage. Special flashings can be formed and coated to order.

Wall roof lower junctions

Gerard roofs have proprietary PVC stop end flashings that direct roof/wall run off water into the rain water gutter system.

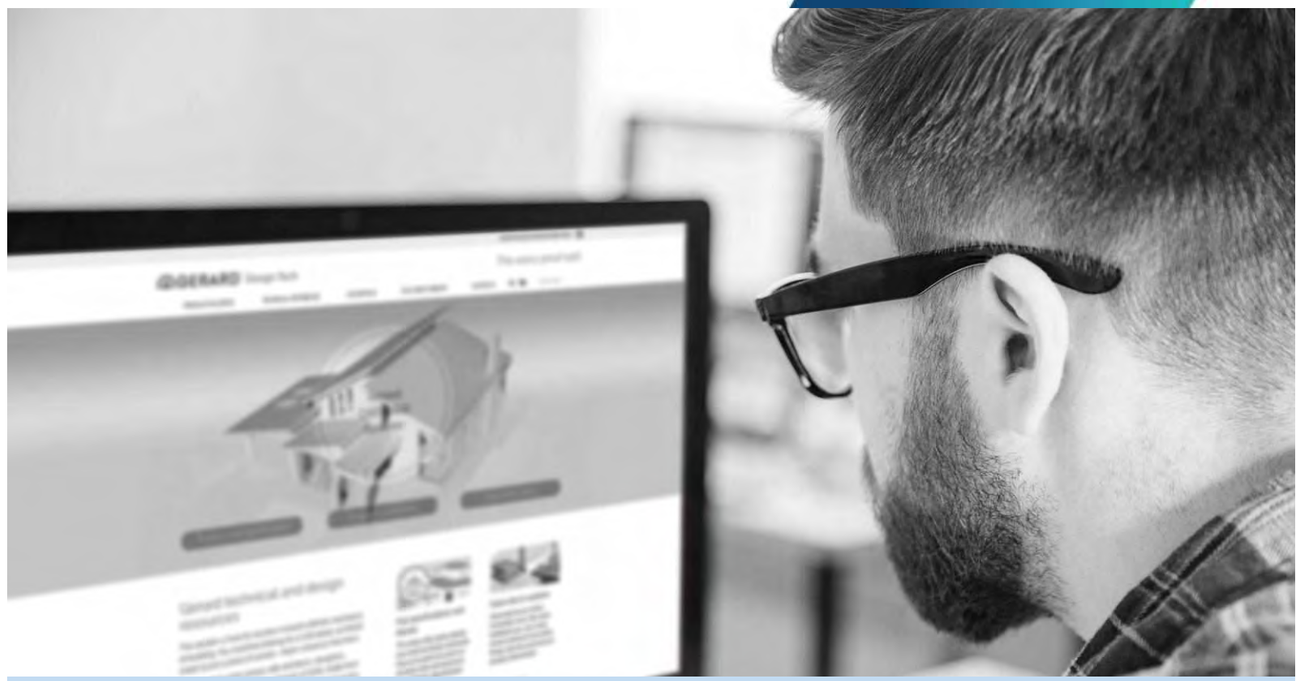
Membrane areas

If flat membrane areas such as Butynol overlap onto product surfaces, these can be painted with the touch up kit or base coated and granite textured.

Weather sealing

Proprietary or custom made rubber or metal flashings require neutral-cure silicone or MS sealants acceptable to Gerard Roofs to be used for weather-sealing services penetrating the roof. Sealant shall be applied between the flashing and panel surface and mechanical fasteners (rivets, Tek screws) installed to permanently fix the flashing in place.

GERARD
Roofing Designed to Endure



4.0 Standard roof details

This section contains the common junction details and information you need to design and specify buildings with Gerard Roofs. The numbered sections (4.1; 4.2; etc.) correspond to the equivalent parts of the Gerard Roofs website specification area (www.gerardroofs.co.nz/designtech). Any details and diagrams can be downloaded from there.

4.1 Batten spacing – Eave

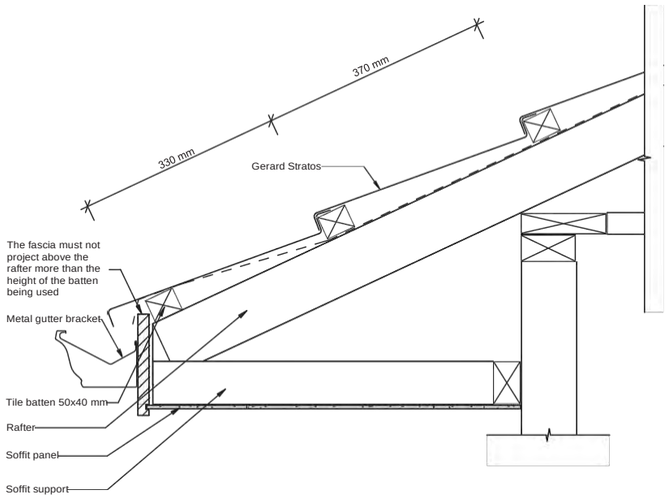


Fig 001 - Gerard Eave

4.2 Ridge installation

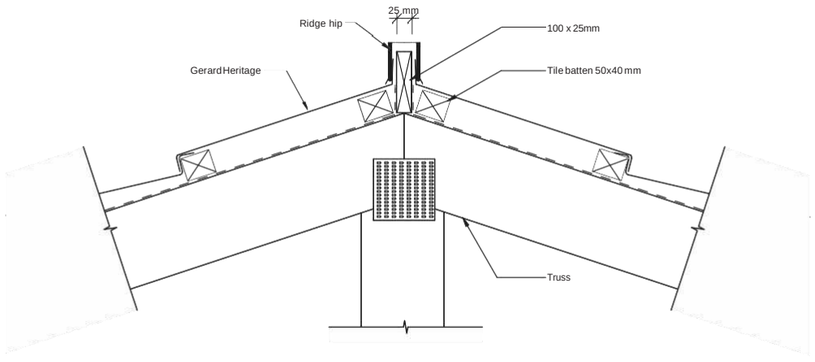


Fig 002 - Gerard Box Trim Ridge Board/Batten - Truss

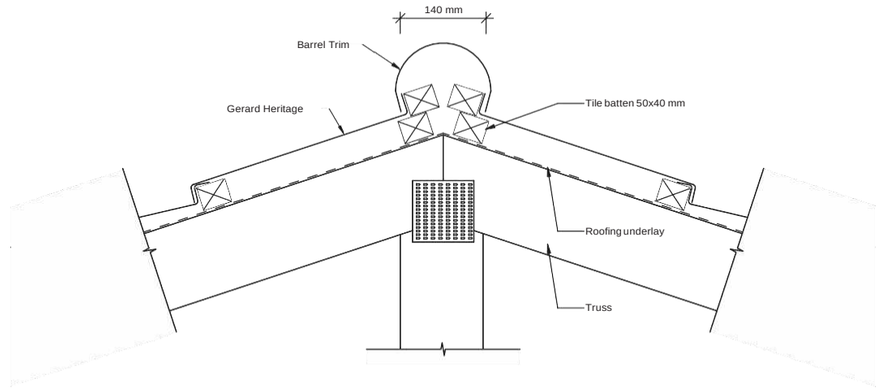


Fig 003 - Gerard Barrel Trim Ridge Board/Batten - Truss

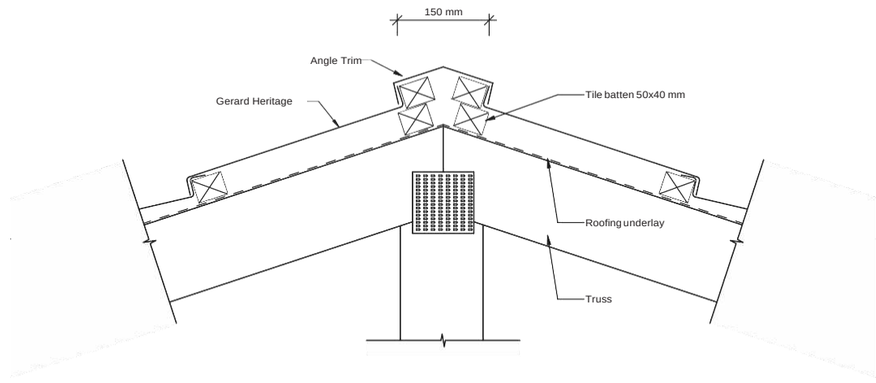


Fig 004 - Gerard Angle Trim Ridge Board/Batten - Truss

4.3 Valleys

Gerard Roofs provide valley trays in two widths, a 160mm Combination Valley and a 250mm E2 Wide Valley for use where required by specification.

Valleys must be supported by valley boards; these should be installed with nogging where necessary.

The nogging should have at least 25 mm clearance beyond where the valley sits so battens have sufficient support and nailing width.

Panels above valleys should be turned down to within 5 mm of the valley tray but must not touch the tray.

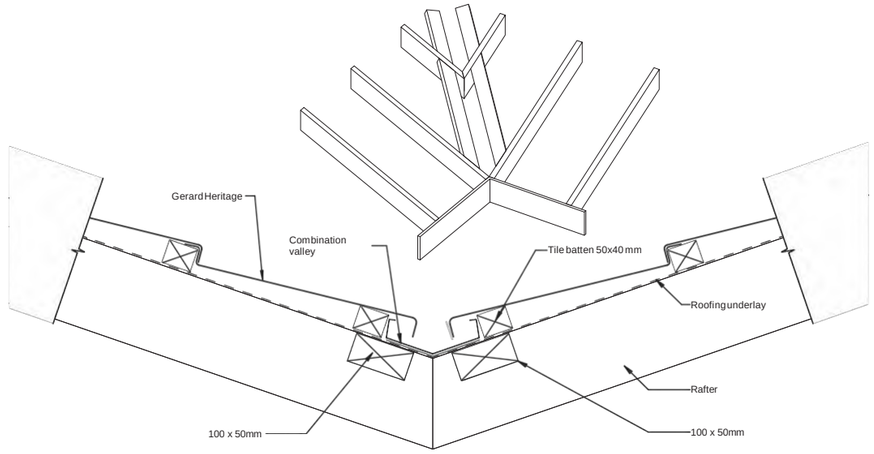


Fig 005 - Gerard Combination Valley

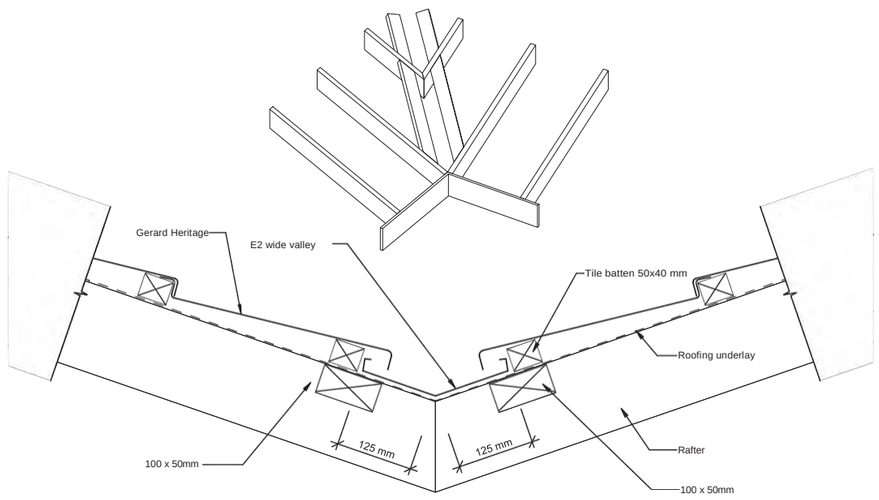


Fig 006 - Gerard E2 Wide Valley

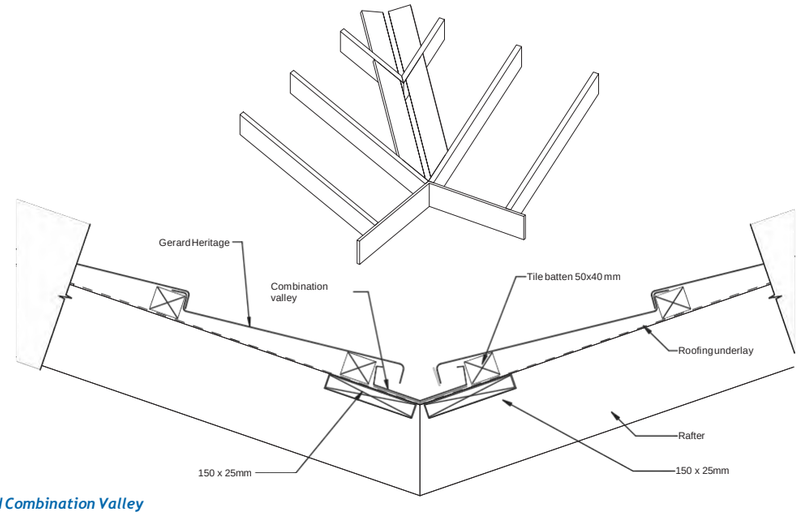


Fig 007 - Gerard Combination Valley

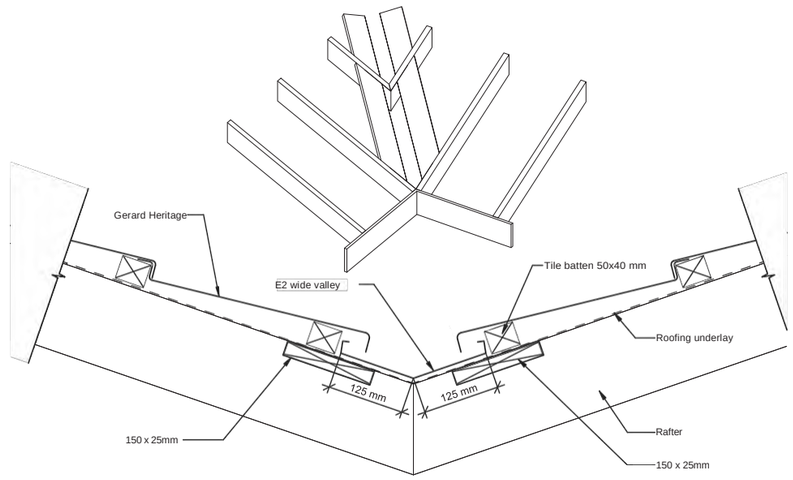


Fig 008 - Gerard Valley - E2 Wide Valley

4.4 Hips

4.4.1 Installation of roof trim on hip junction with wooden battens

Roof panels that butt up to hip battens should be turned up by 40 mm; roof trims must cover battens and overlap panels below by a minimum of 35 mm.

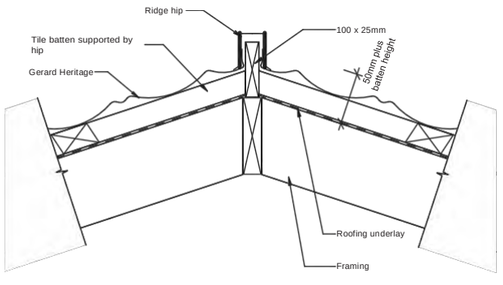


Fig 009 - Gerard Heritage Hip - Box Trim

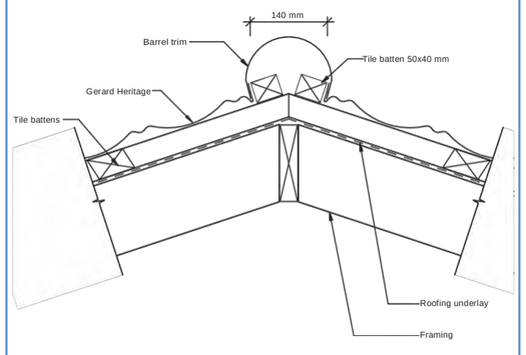


Fig 010 - Gerard Heritage Hip - Barrel Trim

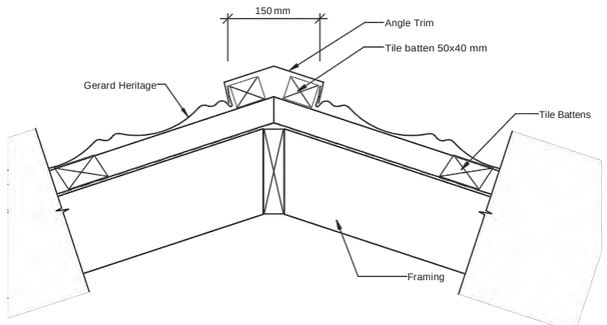


Fig 011 - Gerard Heritage Hip - Angle Trim

4.5 Barge/Gable ends

4.5.1 Installation of roof trim over a wooden fascia with batten

Roof panels that butt up to edge battens should be turned up by 40 mm; roof trims must cover battens and overlap panels below by a minimum of 25 mm.

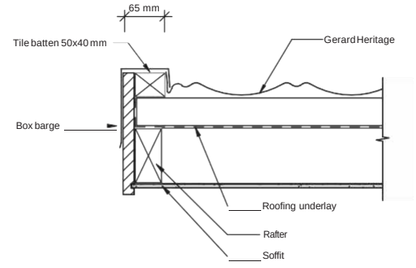


Fig 012 - Gerard Heritage Gable End - Box Barge

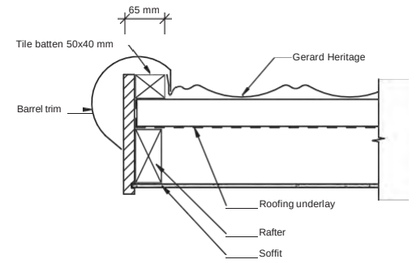


Fig 013 - Gerard Heritage Gable End - Barrel Trim

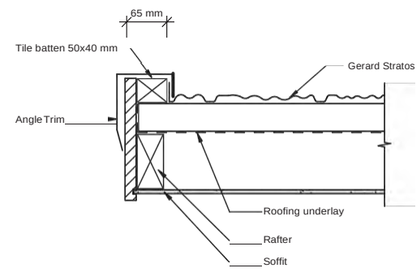


Fig 014 - Gerard Stratos Gable End - Angle Trim

4.5.2 Installation of roof trim over a metal fascia with and without batten

Roof panels that butt up to edge battens should be turned up by 40 mm; roof trims must cover battens and overlap panels below by a minimum of 25 mm.

Roof trims should be riveted to the metal facia.

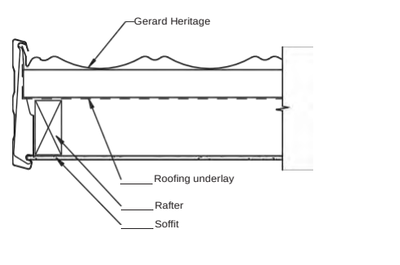


Fig 015 - Gerard Heritage Fascia - Box Trim

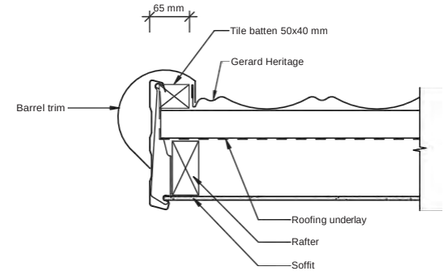


Fig 016 - Gerard Heritage Fascia - Barrel Trim

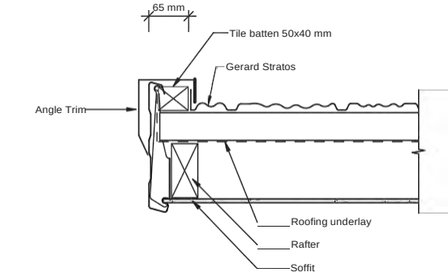


Fig 017 - Gerard Stratos Fascia - Angle Trim

4.6 Wall flashings

There are several types of wall flashings that may be used with various thicknesses of wall claddings.

Gerard Roofs manufacture most of these without hooks or hems which then requires 100 mm coverage of the section hidden behind the wall cladding.

4.6.1 Side flashings

Side flashings are general purpose flashings suitable for use with most wall claddings.

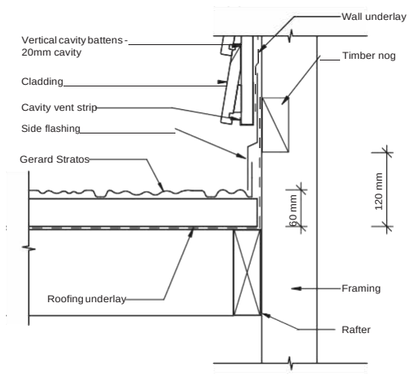


Fig 018 - Gerard Stratos Wall Parallel - Side Flashing

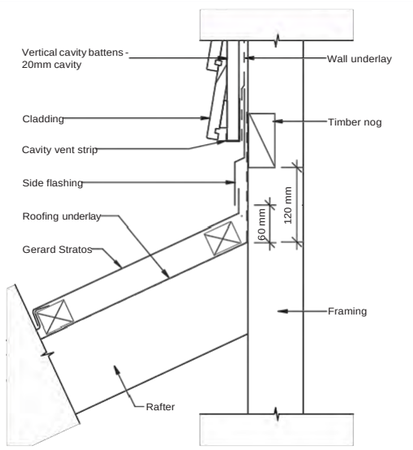


Fig 019 - Gerard Wall Transverse - Side Flashing

4.6.2 Step - Pitch flashings

Pitch flashings are a special system for thicker wall claddings like brick veneer. The transverse wall flashing is folded to closely match the roof pitch allowing the corner junctions to mitre neatly.

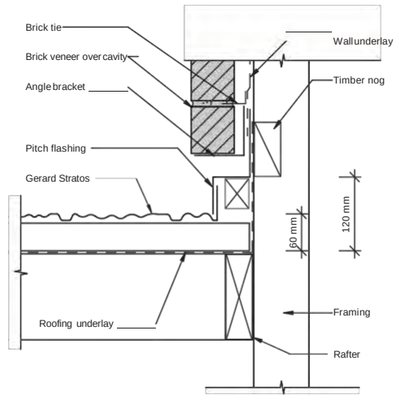


Fig 020 - Gerard Stratos Wall Parallel - Pitch Flashing

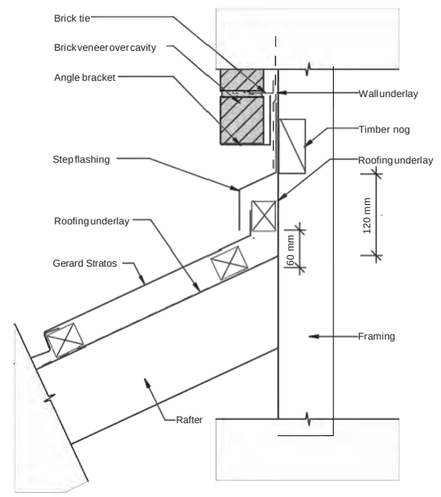


Fig 021 - Gerard Wall Transverse - Step Flashing

4.6.3 Soft edge apron flashings

Soft edge apron flashings are general purpose flashings suitable for most wall claddings. The soft edged aluminium is moulded down to meet the surface of the panel.

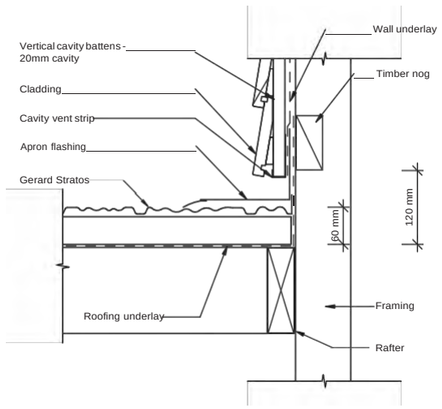


Fig 022 - Gerard Stratos Wall Parallel - Apron Flashing

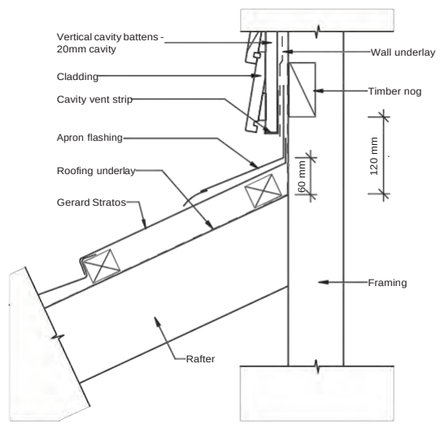


Fig 023 - Gerard Transverse - Apron Flashing

4.7 Wall Stop Ends

Gerard Roofs proprietary PVC Stop Ends direct water away from the roof and wall and into the rain water collection gutters. There are left and right versions.

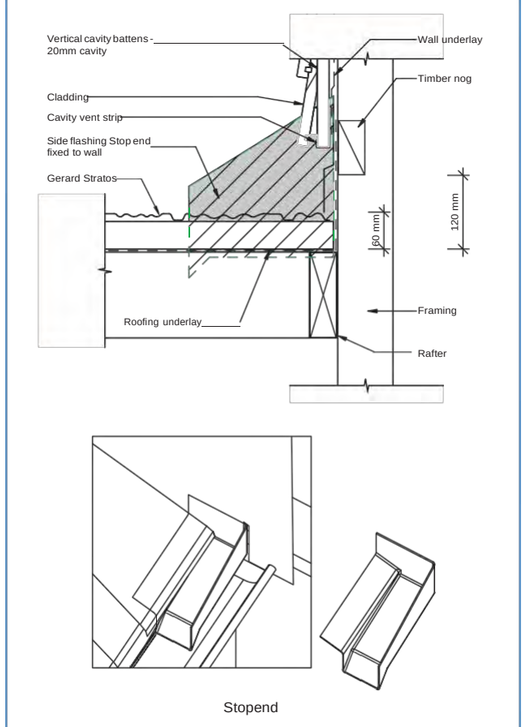


Fig 024 - Gerard Wall Parallel - Stop End Wall

4.8 Change in pitch

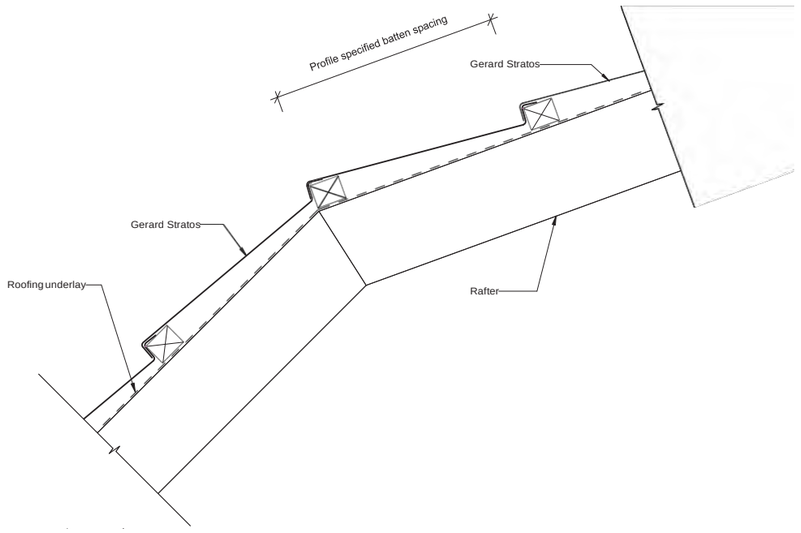


Fig 025 - Gerard Change in Pitch - Low Pitch to High Pitch
A batten is located at the point where the roof line changes pitch. If an exact number of courses of full panels is not practical a panel may be bent to suit.

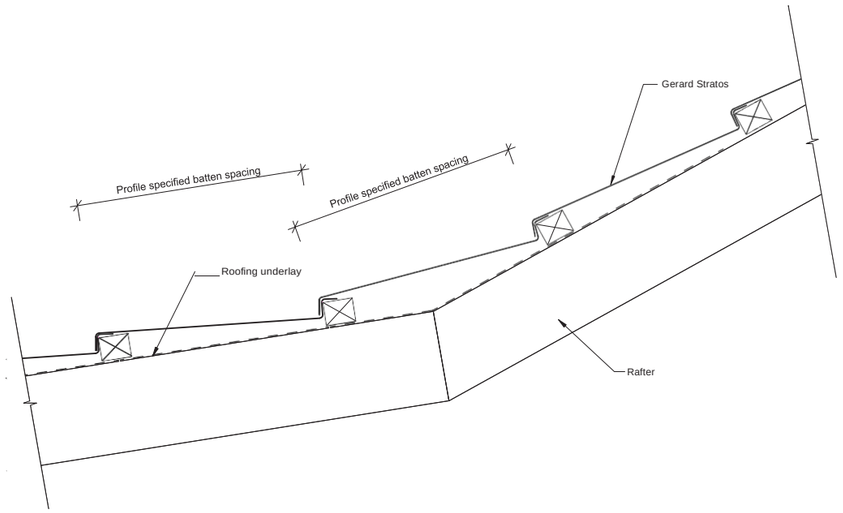


Fig 026 - Gerard Change in Pitch
A batten is located at the point where the roof line changes pitch. If an exact number of courses of full panels is not practical a panel may be bent to suit.

4.9 Penetrations

4.9.1 Pipes

Pipe penetrations should be flashed using an EPDM flexible sleeve/boot or similar, such as Aquaseal. The edge of the EPDM flexible sleeve/boot should be fixed at 45° to horizontal.

4.9.2 Chimneys

Chimneys require specific flashings depending on the type and width of the chimney.

Cylindrical chimneys may be flashed with a large EPDM rubber sleeve similar to pipe flashings.

Rectangular chimneys require a back flashing. For chimneys up to 600 mm wide this may be made of flat sheet supplied by Gerard Roofs, AZ150 pre-painted steel, aluminium, or a supported butyl membrane.

Chimneys exceeding 600mm in width

For chimneys and other penetrations wider than 600mm an internal gutter should be used to create a fall to the edges of the penetration.

This requires a cricket flashing or slope to direct water to the edges using a supported butyl membrane.

Where the chimney is situated at the eave an internal gutter should be installed around the side to allow water to exit into the eave's rainwater system.

Angled internal gutters should be formed using butyl rubber or other inert material such as aluminium. These should be installed by suitably qualified Licensed Building Practitioners (LBPs).

4.9.3 Roof windows

Refer to specific roof window supplier's installation instructions. Typically this will involve cutting and bending panels up to the perimeter of the roof window in a manner that supports installation of the proprietary flashings supplied by the roof window manufacturer.

4.9.4 Solar panels

Refer to specific solar panel supplier's installation instructions. Note that these should allow for fastening directly to the rafters and not to the roof panel battens. Penetrations of the support must be appropriately flashed to ensure weather security, e.g. an EPDM flexible sleeve/boot.

4.10 Extra high wind zone installation

Refer to *Table 04 Fasteners for Panel Battens - Wind Zones - NZS3604.* (Page 23)

Gerard Roofs fixing patterns do not change for extra high wind zones.

Gerard Roofs can provide a wall flashing that retains the panel turn up and offers greater wind-blown rain protection. This is an extended side flashing that has a soft edge to contour the panel surface and a hem at the top section that is mandatory for roofs in extra high wind zones.

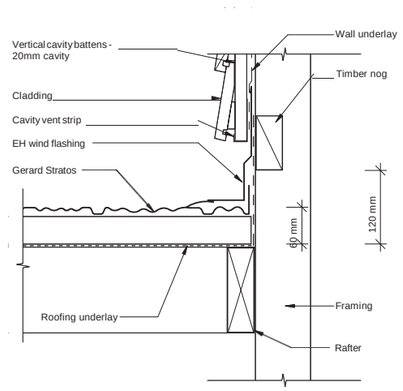


Fig 027 - Gerard Stratos Parallel - EH Wind Wall Flashing

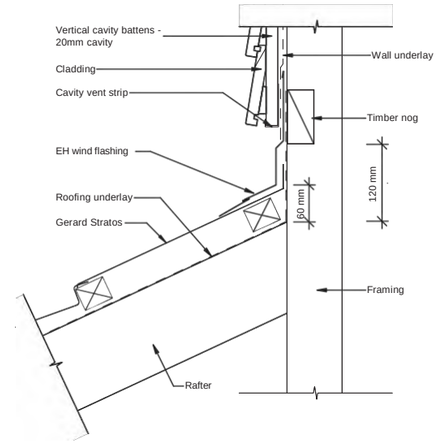


Fig 028 - Gerard Wall Transverse - EH Wind Wall Flashing



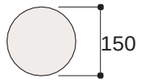
5.0 Components & fixing patterns

This section contains useful installation information for very detailed specification. You'll find a complete list of Gerard Roofs componentry and specific layout and fixing instructions for each of the eight Gerard Roof profiles. The information contained in this section is also contained in individual product profile sheets available for download at www.gerardroofs.co.nz/designtech

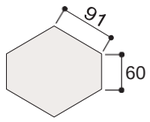
5.1 Gerard Roofs components

To accompany their eight roof profile panels – Stratos, Senator, Rockport, Alpine, Oberon, Milano, Heritage and Classic – Gerard Roofs produces a full range of accessories.

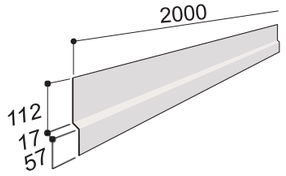
All components are produced in the same way, from the same steel and, where appropriate, coated to match the roof profile panels themselves using the same materials and techniques to ensure complete synergy for performance and aesthetics.



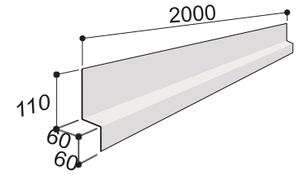
Barrel Trim End



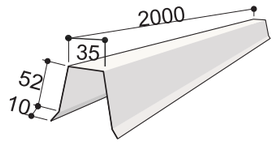
Angle Trim End



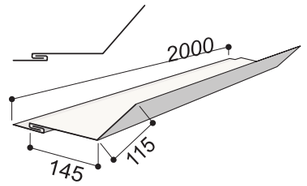
Side Flashing



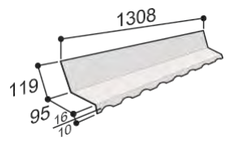
Pitch Flashing



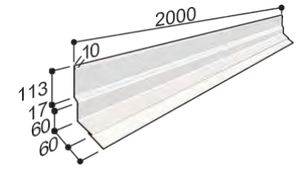
Box Trim



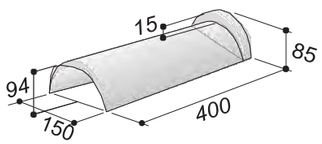
Apron Flashing



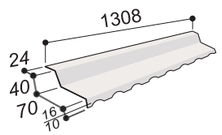
Milano Wall Flashing



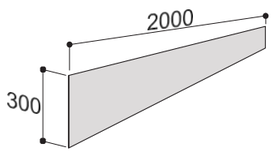
EH Wind Wall Flashing



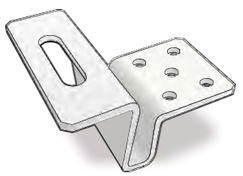
Barrel Trim



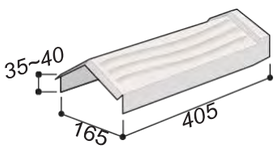
Milano Ridge Flashing



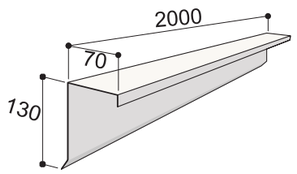
Flat Sheet 300 (Also 400 and 490)



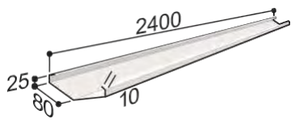
Solar Brackets



Angle Trim



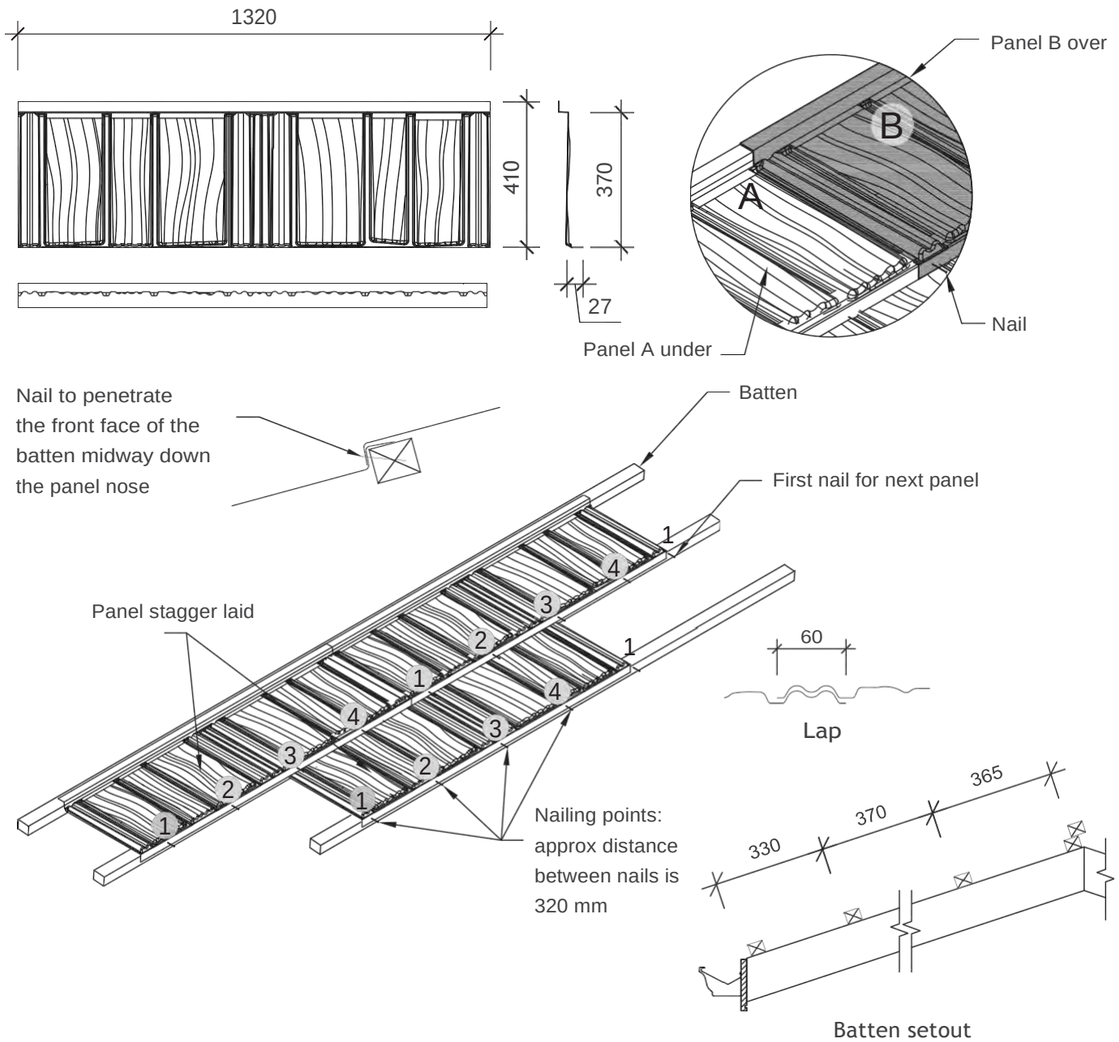
Box Barge



Combination Valley

5.2 Gerard Stratos installation

Panel installation instructions & nailing positions



Fixing

- The nose of each panel is held down at 5 points.
- This comprises 4 nails as per the diagrams plus the nailed overlapping panel.

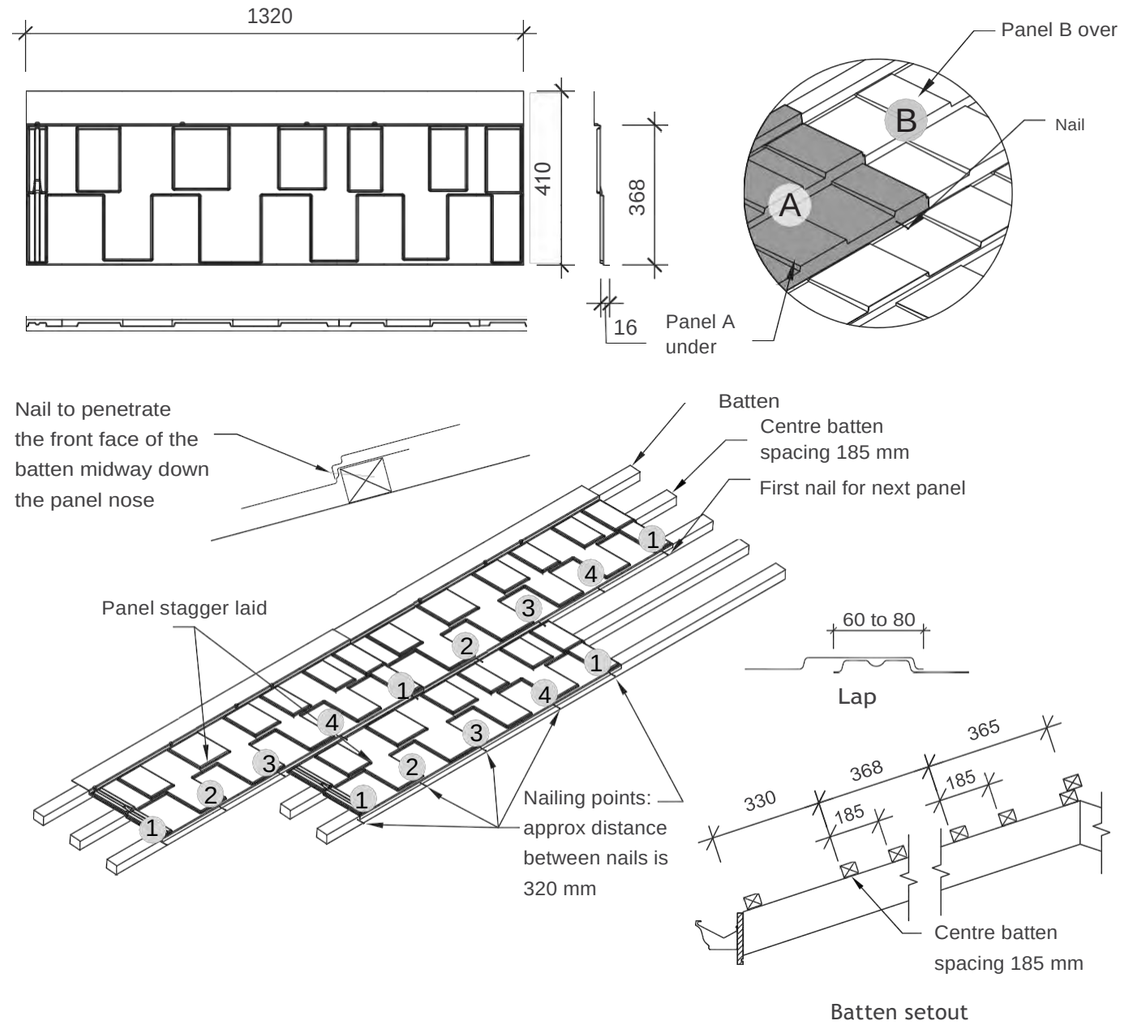
Fastening Panels in Cyclone Areas

- Where a building has been designed outside the scope of NZS 3604. Gerard panels (tiles) on buildings with a wind load design of above 3.8 kPa should be fastened at approx 160 mm spacing (each module).

Dimensions and weights given are nominal.

5.3 Gerard Senator installation

Panel installation instructions & nailing positions



Fixing

- The nose of each panel is held down at 5 points.
- This comprises 4 nails as per the diagrams plus the nailed overlapping panel.

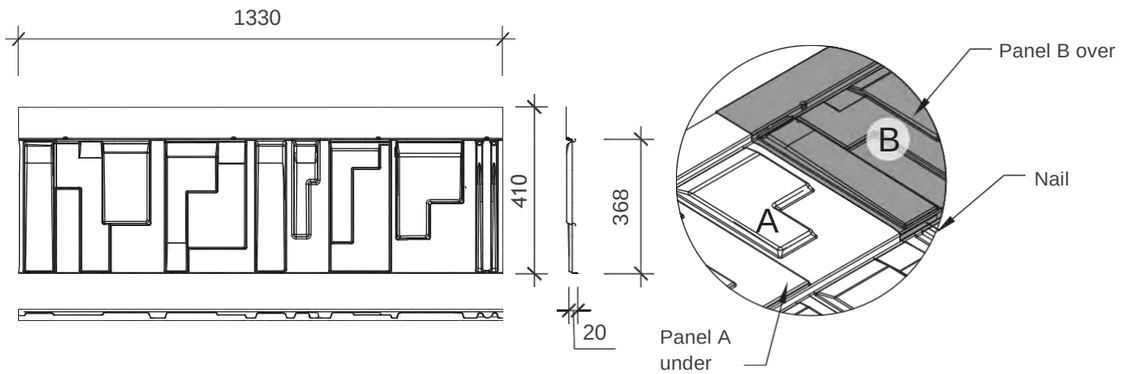
Fastening Panels in Cyclone Areas

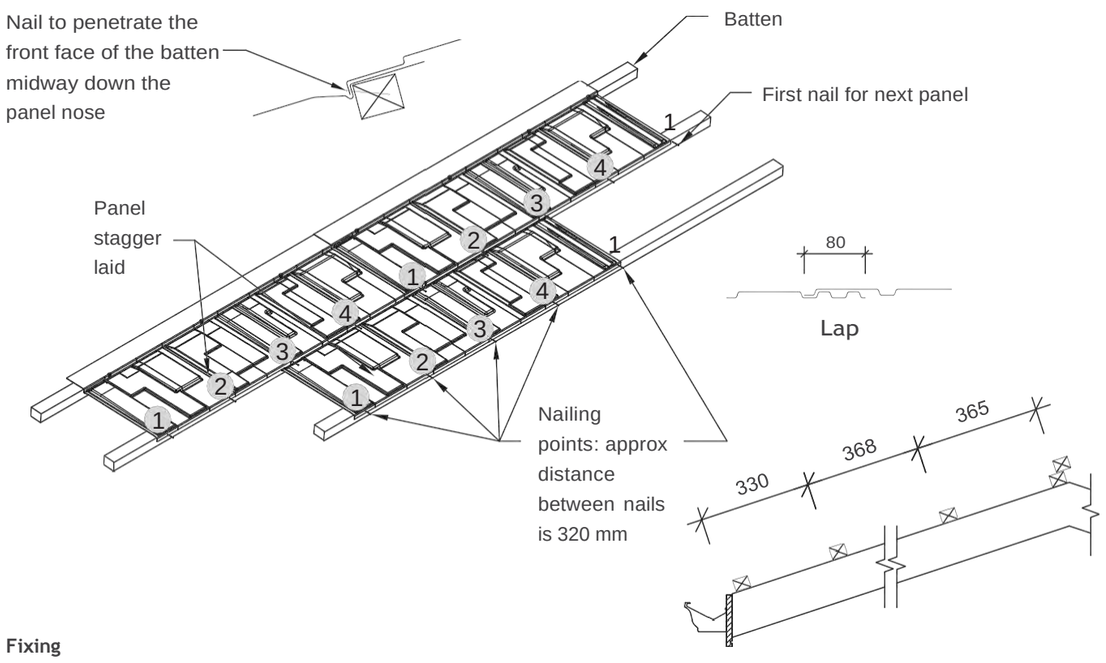
- Where a building has been designed outside the scope of NZS 3604. Gerard panels (tiles) on buildings with a wind load design of above 3.8 kPa should be fastened at approx 160 mm spacing (each module).

Dimensions and weights given are nominal.

5.4 Gerard Rockport installation

Panel installation instructions & nailing positions





Fixing

- The nose of each panel is held down at 5 points.
- This comprises 4 nails as per the diagrams plus the nailed overlapping panel.

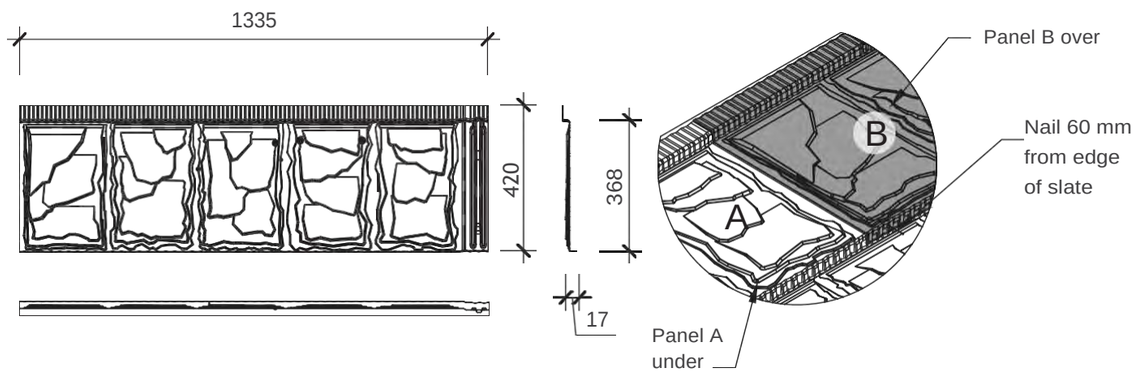
Fastening Panels in Cyclone Areas

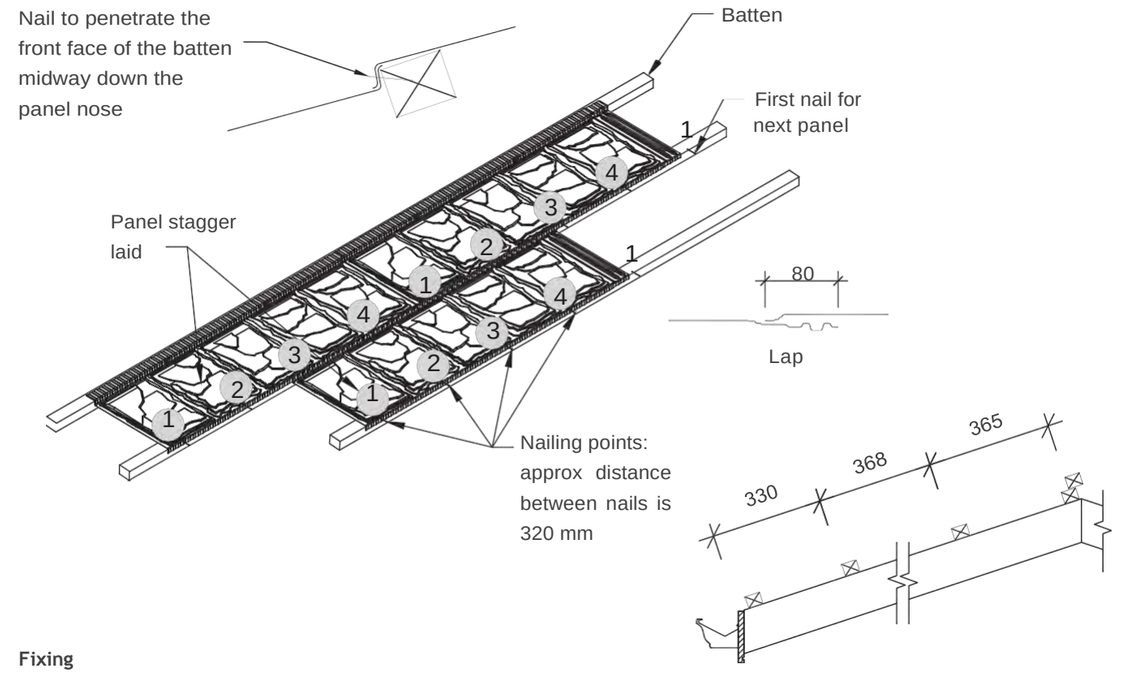
- Where a building has been designed outside the scope of NZS 3604. Gerard panels (tiles) on buildings with a wind load design of above 3.8 kPa should be fastened at approx 160 mm spacing (each module).

Dimensions and weights given are nominal.

5.5 Gerard Alpine installation

Panel installation instructions & nailing positions





Fixing

- The nose of each panel is held down at 5 points.
- This comprises 4 nails as per the diagrams plus the nailed overlapping panel.

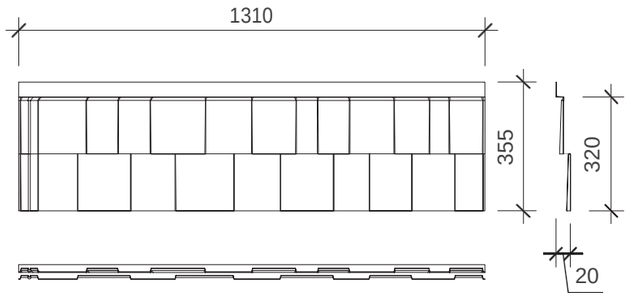
Fastening Panels in Cyclone Areas

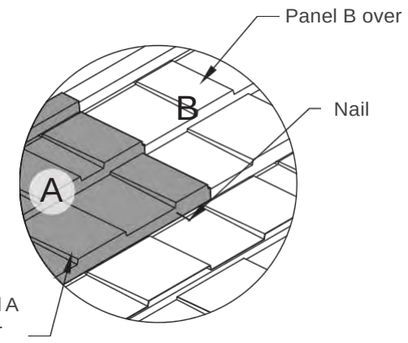
- Where a building has been designed outside the scope of NZS 3604. Gerard panels (tiles) on buildings with a wind load design of above 3.8 kPa should be fastened at approx 160 mm spacing (each module).

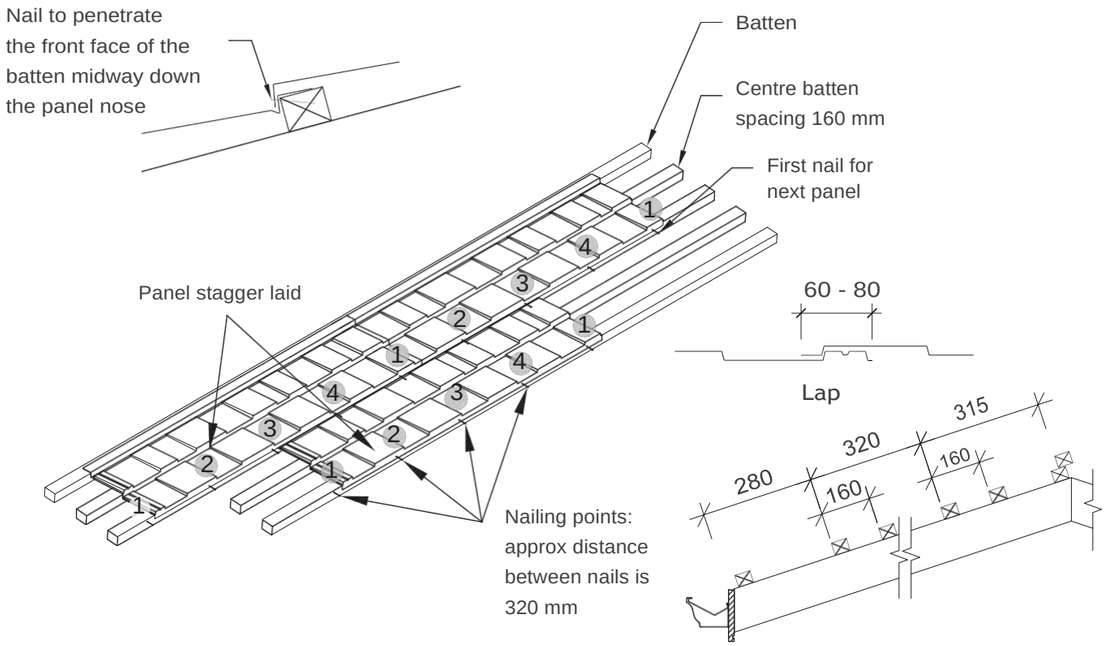
Dimensions and weights given are nominal.

5.6 Gerard Oberon installation

Panel installation instructions & nailing positions







Batten setout

Fixing

- The nose of each panel is held down at 5 points.
- This comprises 4 nails as per the diagrams plus the nailed overlapping panel.

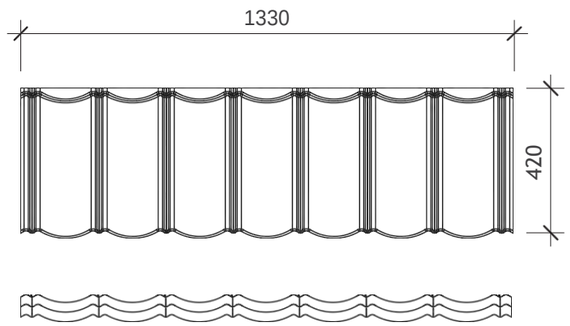
Fastening Panels in Cyclone Areas

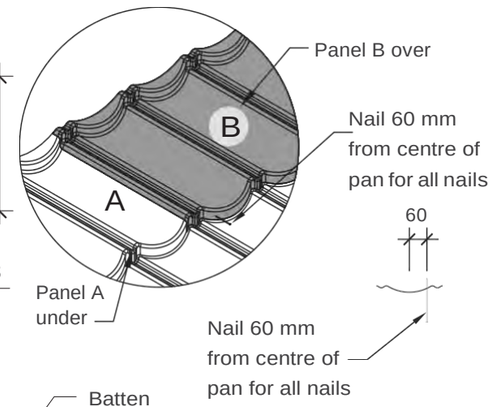
- Where a building has been designed outside the scope of NZS 3604. Gerard panels (tiles) on buildings with a wind load design of above 3.8 kPa should be fastened at approx 160 mm spacing (each module).

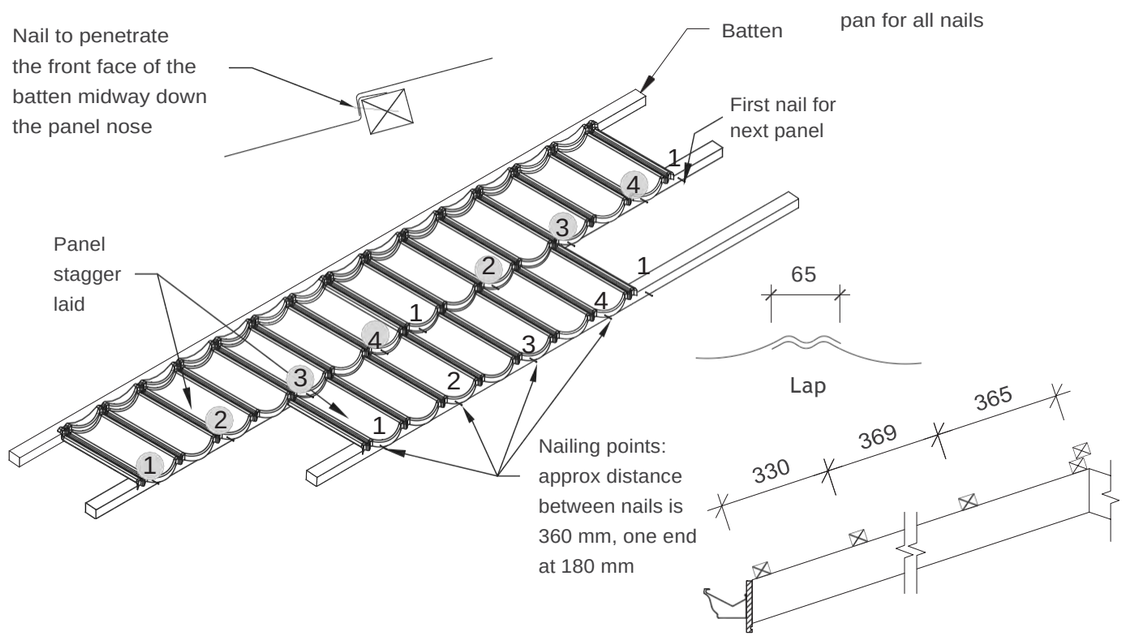
Dimensions and weights given are nominal.

5.7 Gerard Heritage installation

Panel installation instructions & nailing positions







Batten setout

Fixing

- The nose of each panel is held down at 5 points.
- This comprises 4 nails as per the diagrams plus the nailed overlapping panel.

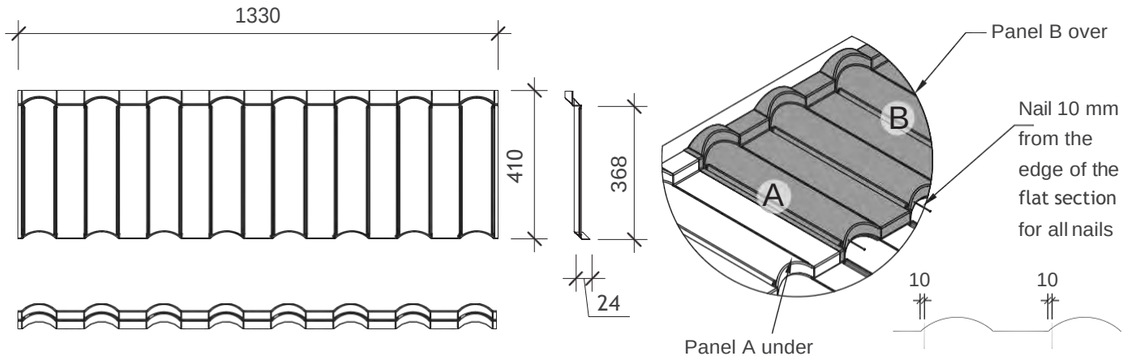
Fastening Panels in Cyclone Areas

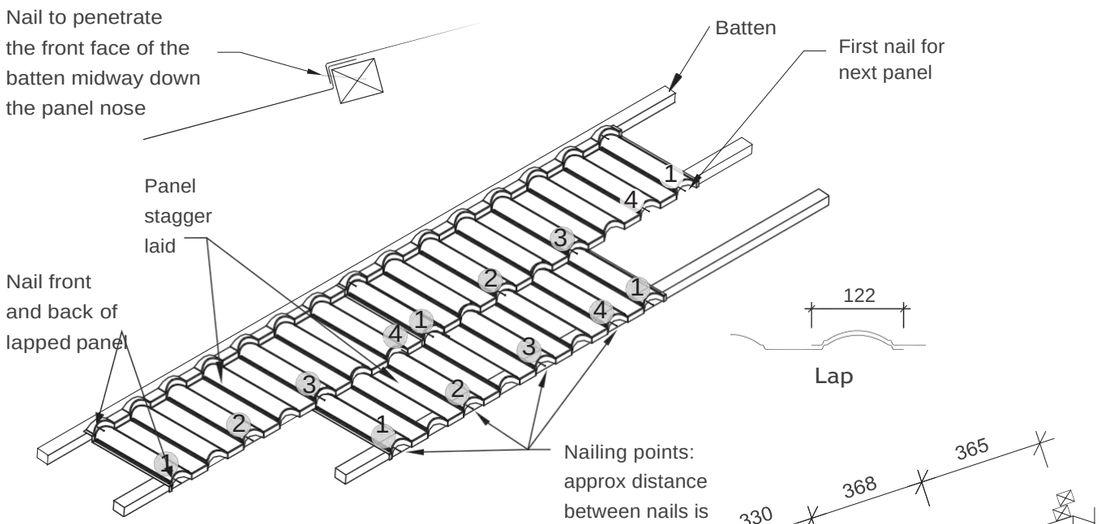
- Where a building has been designed outside the scope of NZS 3604. Gerard panels (tiles) on buildings with a wind load design of above 3.8 kPa should be fastened at approx 160 mm spacing (each module).

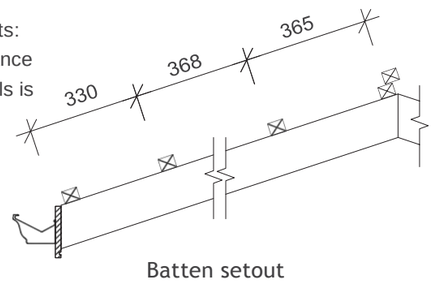
Dimensions and weights given are nominal.

5.8 Gerard Milano installation

Panel installation instructions & nailing positions







Batten setout

Fixing

- The nose of each panel is held down at 5 points.
- This comprises 4 nails as per the diagrams plus the nailed overlapping panel.
- Nail front and back of lapped panel.

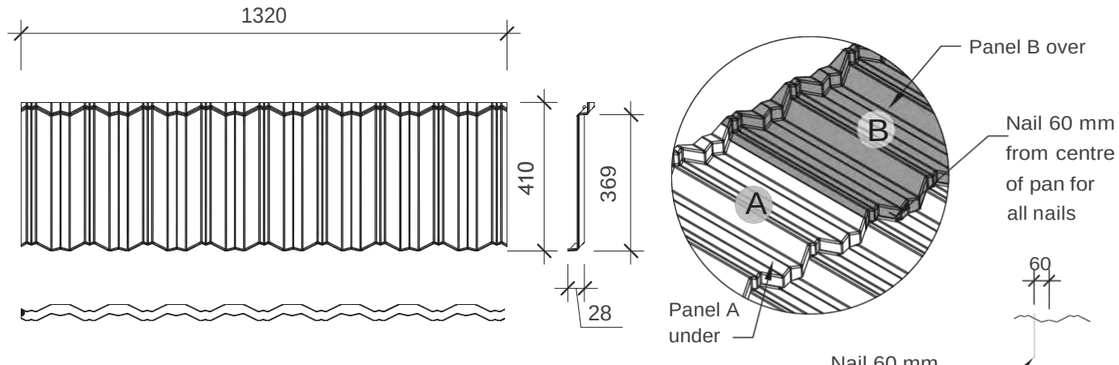
Fastening Panels in Cyclone Areas

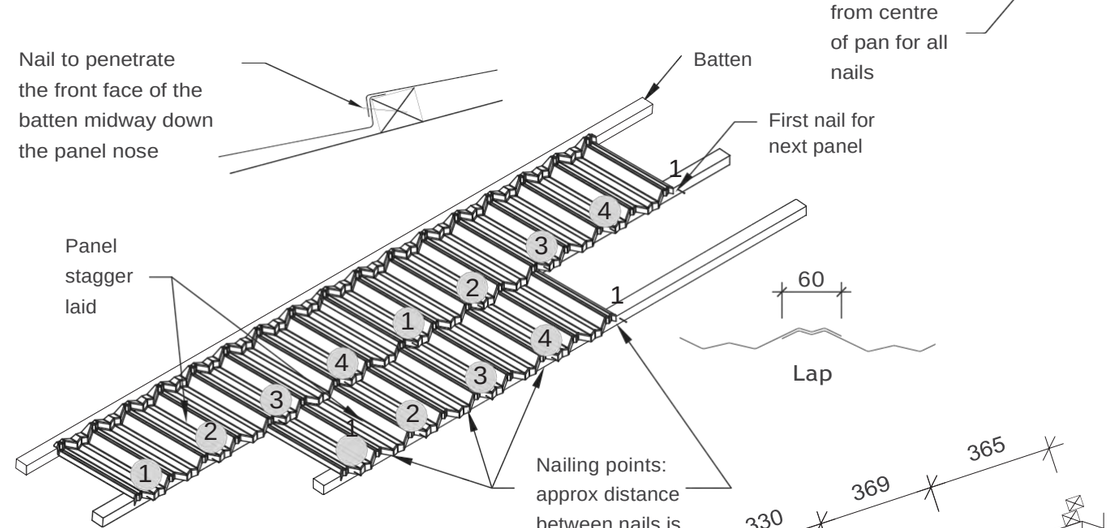
- Where a building has been designed outside the scope of NZS 3604. Gerard panels (tiles) on buildings with a wind load design of above 3.8 kPa should be fastened at approx 160 mm spacing (each module).

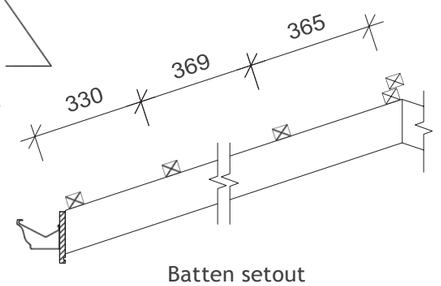
Dimensions and weights given are nominal.

5.9 Gerard Classic installation

Panel installation instructions & nailing positions







Batten setout

Fixing

- The nose of each panel is held down at 5 points.
- This comprises 4 nails as per the diagrams plus the nailed overlapping panel.

Fastening Panels in Cyclone Areas

- Where a building has been designed outside the scope of NZS 3604. Gerard panels (tiles) on buildings with a wind load design of above 3.8 kPa should be fastened at approx 160 mm spacing (each module).

Dimensions and weights given are nominal.

Important information about this material

The Gerard Roofing System

RoofTG Pacific Ltd accepts no liability if the Gerard roofing system is not used in accordance with instructions contained in this publication.

Use only the current specification

This publication may be superseded by a newer publication. RoofTG Pacific Ltd accepts no liability for reliance upon publications that have been superseded. Before using this manual check whether this is the current version; simply call the Gerard Roofs Helpline on 0800 100 244 or visit www.gerardroofs.co.nz

Substitution

RoofTG Pacific Ltd accepts no liability if the systems are not installed in accordance with instructions contained in this and other Gerard Roofs technical literature. Substitution of specified or recommended components with alternative brands can compromise performance dramatically. The Gerard roofing system is not generic and must be installed as specified including the use of Gerard branded components.

Trade marks

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PO Box 18071
Glen Innes
Auckland 1743

Freephone: 0800 100 244

www.gerardroofs.co.nz

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Product Technical Statement

GERARD
Roofing Designed to Endure

PO Box 18071, Glen Innes
Auckland 1743, New Zealand
Freephone 0800 100 244
www.gerardroofs.co.nz

Gerard Roofs Pressed Steel Tiles

Statement of Building Code Compliance

This system if designed, used, installed and maintained in accordance with the supporting technical information and additional conditions and limitations will meet the following provisions of the New Zealand Building Code:

- B1 Structure
- B2 Durability
- E1 Surface Water
- E2 External Moisture

Evidence Base to Support Compliance

This system has the following evidence to support the above solution type declaration:

- Independent technical opinion
- In-house technical opinion
- Independent testing
- In-house testing
- Industry-based scheme
- Historical proof of performance

B1, B2, E1 & E2 reference NZ Metal Roofing & Wall Cladding Manufacturers Code of Practice. Section 10 relates to Pressed Metal Roofing Tiles.

Compliance with NZS4217 Pressed Metal Tile Roofs

Aluminium-zinc coated steel complies with AS1397, not NZS3441 as prescribed in NZS4217. We are also comfortable that we meet the requirements of B2 based on the In-service History Evaluation allowed under B2/VM1. At two severe marine testing sites we have roofs which are in good condition after 23 and 36 years respectively. Evaluations continue on other roofs which are in excess of 30 years.

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Scope of Use

Buildings that comply with NZS3604 with a minimum roof pitch which is profile dependent of between 12 and 20 degrees.

Environmental Conditions

This system is code-compliant for the following environmental conditions:

- Wind Zone - Specific Design
- Corrosion Zone - Sea Spray Extreme
- Seismic Zone - High

Specific design can allow higher wind speeds - batten rafter connections are the limitation.

Installation Conditions

This system is code-compliant on the condition that it has been installed by:

- Licensed Applicator / Installer

Additional Conditions & Limitations

A warranty for the system is supplied with 50 year pro-rated duration.

Material Compatibility with Modern Roofing Materials

If alterations are made to the home after the installation of the roof, such as fitting of chimneys, extensions, installation of skylights, etc., it is important to ensure that the materials that are used are compatible with the roofing material. Gerard Roofs' steel tiles are manufactured from 55% aluminium-zinc coated steel and then post coated with a protective and decorative coating system.

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Dissimilar Metal Corrosion

When two different metals are in contact and moisture is present, one metal is relatively protected while the other suffers accelerated corrosion. A similar effect commonly occurs with water flowing over dissimilar metals. This form of corrosion is commonly found where:

- Water is discharged from copper or brass systems over a galvanised or 55% aluminium-zinc coated steel roof
- Unpainted lead flashings are applied directly to 55% aluminium-zinc coated steel products, or
- Where fasteners are incompatible with the roofing material

Any electrical contact between dissimilar metals should be avoided.

Consenting Instructions

Where Gerard Roof Tiles are specified on plans these must be installed by a trained installer. Substitution is not allowed.

Critical Maintenance

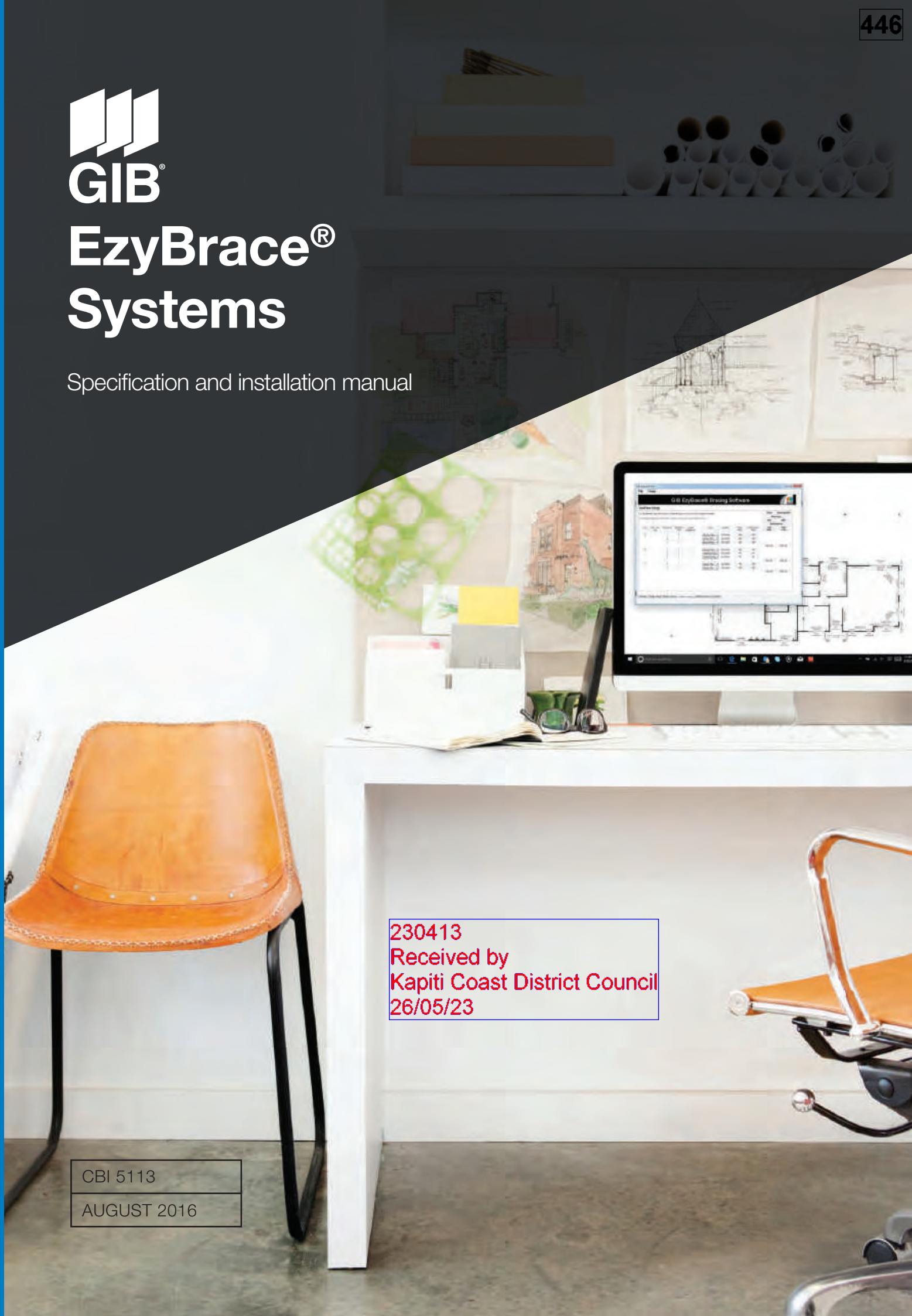
As detailed in our warranty: "It is best to chemically clean the roof before growths are seen as a preventative maintenance measure. Spores may be present on the roof for up to two years before any visible organic growths are noticed. Treating the roof will not only kill the organic growths, but also the spores that lead to them. We suggest treating the roof every three to five years, however if you see growth occurring treat the roof more frequently."

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GIB®

EzyBrace® Systems

Specification and installation manual



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Kapiti Coast District Council
26/05/23

CBI 5113
AUGUST 2016



NATIONAL SUPPORT

VISIT: Winstone Wallboards Limited
37 Felix Street, Penrose,
Auckland 1061, New Zealand

POST: PO Box 12 256, Penrose 1642,
Auckland, New Zealand

PHONE: +64 9 633 0100

FAX: +64 9 633 0101
Free Fax: 0800 229 222

EMAIL: info@gib.co.nz

WEB: gib.co.nz

GIB® HELPLINE

0800 100 442

Based on learnings derived from the 2011 Canterbury earthquakes GIB EzyBrace® Systems have been updated to offer improved design flexibility and further simplification of the bracing design and build process.

NEW GIB EZYBRACE® 2016 DESIGN SOFTWARE

- Improved user interface with simplified bracing design process.
- Increased functionality including exterior line check function, easy insert/deletion of bracing elements and built in software help function.
- Includes the new GIB® Bracing element GS2- NOM
- Allows the GIBFix® Framing System to be used in GIB EzyBrace® designs.

NEW GIB® BRACING ELEMENT GS2-NOM

- Allows internal walls lined with GIB® plasterboard on both sides and fastened off as per the standard fixing requirements of the current GIB® Site Guide to contribute to bracing resistance.
- Potentially reduces the amount of fasteners[1]
- Encourages more even bracing distribution throughout the building.

[1] Actual savings dependent on building and bracing design

UPDATE TO OPENINGS IN BRACING ELEMENTS AND CEILING DIAPHRAGMS

- Large hole specification updated to use a more conservative methodology.
- Guidance included for fireplace flues and range hoods.

NEW — GIBFIX® FRAMING SYSTEM

- Reduced potential for fastener pop and joint cracking as a result of timber frame movement.
- Reduced potential for on-site call backs.
- Improved thermal performance.
- Reinforced plasterboard junctions.

BRANZ Appraised
Appraisal No.928 [2016]

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GIB EzyBrace® Systems — August 2016

Winstone Wallboards Ltd accepts no liability if GIB EzyBrace® Systems are not designed and installed in strict accordance with instructions contained in this publication.

USE ONLY THE CURRENT SPECIFICATION

This publication may be superseded by a new publication at any time. Winstone Wallboards accepts no liability for reliance upon publications that have been superseded. Check for the current publication at gib.co.nz/library before using this publication. If you are unsure whether this is the current publication, call the GIB® Helpline on 0800 100 442.

GIB EzyBrace® 2011 software and specification literature remains valid until futher notice.

PATENTS

GIBFix® Framing System and GIB EzyBrace® Systems, including componentry and design method, have patents pending (NZ Patent Number 596691, NZ Patent 709159 pending) and design and other IP rights reserved.

Beware of substitution

The performance of GIB® Systems are very sensitive to design detailing and construction practices. All GIB® Systems have been developed specifically for New Zealand conditions and independently tested or assessed to ensure the required level of performance. It is important to use only GIB® branded components where specified and to closely follow the specified design details and construction practices, to be confident that the required level of performance and quality is achieved on site.

For further information call our GIB® Helpline on 0800 100 442.

GIB EzyBrace® Systems have been designed and tested using only the products specified. When additional GIB® plasterboard properties are required the table below provides acceptable alternative options.

	Acceptable alternative GIB® plasterboards								
Specified GIB® plasterboard	GIB® Standard	GIB Ultraline®	GIB Braceline/ Noiseline®	GIB Aqualine®	GIB Toughline®	GIB Fyreline®			
						10mm	13mm	16mm	19mm
GIB® Standard		OK	OK	OK	OK	Note 1 and 3			
GIB Braceline®	X	X		Note 2	OK	X	Notes 1, 2 and 3		

Note 1 *The fastener type and length must be as required for the relevant FRR system using the perimeter fixing pattern illustrated for the relevant bracing specification.*

Note 2 *The element must be 900mm or longer. Decrease perimeter fastener centres to 100mm. The bracing corner fastening pattern, as illustrated for the relevant specification applies to all four corners of the element. Panel hold-down fixings are required.*

Note 3 *Specify traditional wall framing layout (see figure 1) where a Fire Resistance Rating (FRR) is required.*

Scope of use

This document is a guide to wall bracing of light timber frame (LTF) buildings constructed in accordance with NZS3604:2011 Timber Framed Buildings and presents a simple and efficient method for calculating and incorporating bracing resistance. This information draws on recent experiences from seismic activity in New Zealand and seeks to minimise earthquake damage to plasterboard linings in LTF buildings.

This document outlines the main principles of bracing design and construction using GIB® plasterboard products and systems. Further detailed information can be found in the GIB® Bracing Supplement by visiting gib.co.nz/library. This 'live' on-line document is updated continuously in response to market feedback and Winstone Wallboards' development initiatives.

Finish quality — framing and substrates

Home owners are increasingly demanding a high quality of interior finish. Finish quality is heavily influenced by the substrate to which linings are fixed. Detailed information on 'Levels of Finish' is given in AS/NZS 2589 and the latest version of the GIB® Site Guide.

New GIBFix® Framing System

With increased NZ Building Code requirements and growing customer demand for thermal efficiency and high quality interior finishes, traditional framing practices present problems such as multiple framing members at wall intersections creating thermal 'bridges' and cavities where insulation cannot be installed effectively.

Figure 1 shows a traditional wall framing layout. Figure 2 shows the alternative GIBFix® Framing System layout.

Multiple timber framing members also take longer to dry resulting in an increased risk of fastener pops and blemishes resulting from timber frame movement.

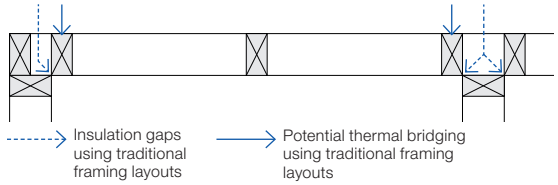
The GIBFix® Framing System offers better thermal efficiencies and minimises potential joint imperfections resulting from interior linings being fixed to multiple timber framing members.

The GIBFix® Framing System can be used in conjunction with GIB EzyBrace® Systems.

Bracing resistance is not affected by the GIBFix® Framing System if the use of this alternative timber framing layout is preferred. Refer to the GIBFix® Framing System literature for more information.

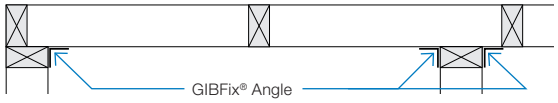
Bracing ratings apply whether fixing is directly into timber or into the metal components, provided correct construction details, fastener types and centres are applied.

FIGURE 1: TRADITIONAL WALL FRAMING LAYOUT



GFS004

FIGURE 2: GIBFIX® FRAMING SYSTEM (ALTERNATIVE LAYOUT)



GFS005

NEW GS2-NOM Bracing Element

The new GS2-NOM bracing element allows most homes to be braced with a single lining type and less fixings so that a high quality finish is maintained throughout.

GS2-NOM permits the contribution of 'nominally fixed' internal walls. Higher performance elements are commonly specified on external walls and where limited wall area is available or adjacent to significant openings.

Winstone Wallboards recommends the use of the GIBFix® Framing System in conjunction with GS2-NOM elements. Key benefits of this approach include:

- Reduced potential for fastener pop and joint cracking of plasterboard linings.
- Enhanced thermal performance.
- Allows internal walls lined with GIB® plasterboard on both sides and fastened off as per the standard fixing requirements of the current GIB® Site Guide to contribute bracing resistance.
- Potentially reduces the amount of fasteners[1].
- Encourages more even bracing distribution throughout the building.

1. Actual savings dependent on building and bracing design.

Compliance with the NZ Building Code

NZBC CLAUSE B1 — STRUCTURE

The design and material specification for steel and timber framing used in conjunction with this literature must be in accordance with the performance requirements of NZBC Clause B1. GIB EzyBrace® Systems comply with the requirements of NZS 3604:2011, when designed and installed in accordance with this publication and relevant technical literature. NZS 3604:2011 is an acceptable solution to NZBC Clause B1.

NZBC CLAUSE B2 — DURABILITY

Under normal conditions of dry internal use GIB EzyBrace® Systems have a service life in excess of 50 years and satisfy the requirements of NZBC Clause B2. When in conditions of dry internal use, the components specified in this literature satisfy the requirements of NZBC Clause B2.

GIB® EzyBrace® Systems must not be specified in areas where 15 year durability applies and where linings are subject to direct water pressure, e.g. shower cubicle or shower over bath situations.

NZBC CLAUSE F2 — HAZARDOUS BUILDING MATERIALS

Under normal conditions of use, during handling, installation or serviceable life, the products detailed in GIB EzyBrace® Systems do not constitute a health hazard and meet the provisions of the NZBC Clause F2.

NZBC CLAUSE H1 — ENERGY EFFICIENCY

Buildings must be constructed to achieve an adequate degree of energy efficiency and the building envelope must provide adequate thermal resistance. The required thermal resistance (R-value) of timber framed external walls depends on climate zone but is commonly in the range from R 1.9 to R 2.0.

CAD design details

Where applicable drawings related to GIB EzyBrace® Systems have been produced for CAD design. These are identified by a unique number in the bottom corner of each detail box. CAD design details can be found at gib.co.nz/library.

Appraisal

GIB EzyBrace® Systems 2016 have been appraised by the Building Research Association of New Zealand (BRANZ), Appraisal No. 928 (2016) GIB EzyBrace® Systems, 2016.

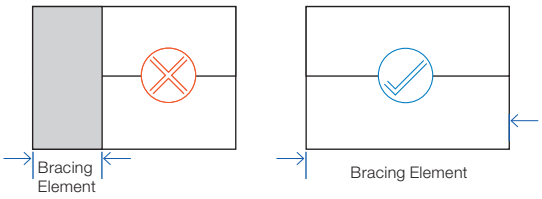
It is of prime importance to comply with the details of design, construction and workmanship in this document.

Bracing resistance

WALL BRACING LAYOUT

When designing the bracing layout, carefully consider the final finished appearance and utilise full wall lengths where possible, avoiding unnecessary fastenings in the centre of a clear wall. Using the available wall length provides additional bracing and achieves improved aesthetics.

FIGURE 3: WALL BRACING LAYOUT



BRACING DISTRIBUTION

Distribute bracing by drawing a grid pattern of bracing lines along and across the building. Bracing lines must coincide as much as possible with the wall bracing elements. Pairs of elements may be counted on a single line provided they are no more than 2 metres apart and parallel. See figure 4.

Locate bracing evenly throughout the building and as close as practical to corners of external walls.

Space bracing lines no more than:

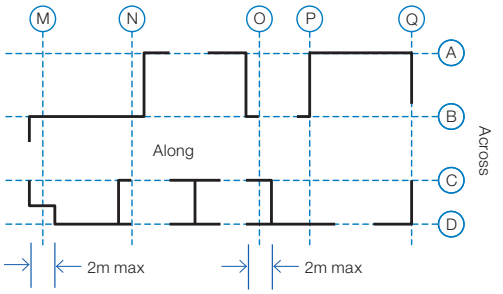
- 6 metres for standard construction with any GIB® plasterboard ceiling, or
- 7.5 metres where dragon ties in accordance with NZS3604:2011 have been installed, or
- 12 metres with a GIB® plasterboard ceiling diaphragm.

The construction of ceiling diaphragms is described in detail on p.18–20.

NZS3604:2011 requires that no bracing line shall have a capacity less than the greater of:

- 100 Bracing Units (BUs), or
- 15 x the external wall length (BUs) for bracing lines coinciding with external walls, or
- 50% of the total demand (D) divided by the number of lines (n) in the direction being considered (BUs).

FIGURE 4: BRACING GRID LAYOUT



The NZS3604 ‘rules’ are merely minimum guidelines and compliance with them does not in itself ensure even distribution. The designer is responsible for checking distribution. Poor distribution can cause torsional effects and localised or more significant damage in an earthquake event.

GIB EZYBRACE® SYSTEMS

The GIB EzyBrace® Specification Numbering System (and sub-components thereof) is protected by copyright and makes specification and identification of GIB EzyBrace® Systems transparent.

- 'GS' stands for GIB® Standard.
- 'BL' for GIB Braceline®.
- 'P' for plywood.
- '1' and '2' for linings one or both sides.
- ‘N’ stands for 'no specific panel hold-down fixings'.
- 'H' stands for 'specific panel hold-down fixing' required.
- 'NOM' stands for 'nominal plasterboard fixing'. This refers to the standard fixing method used to install plasterboard as shown in the current GIB® Site Guide.

Where specific hold-down fixings are specified, refer to p.15-16. GIB HandiBrac® is fully contained within the framing cavity and does not interfere with lining installation and quality of finish.

Where no specific hold-down fixings are required, the minimum NZS3604:2011 bottom plate fixings apply.

Full bracing element construction details are provided in this technical literature.

Further general design and construction information can also be found in our GIB® Bracing Supplement by visiting gib.co.nz/library.

Specifying GIB EzyBrace® elements (minimum wall length 400mm)

Inside lining external walls.	Nominate available lengths of wall as GS1-N elements. Use BL1-H if higher ratings are required. If the other side of the frame is lined with plywood consider GSP-H or BLP-H elements or use alternative proprietary bracing systems.
Internal walls (only one side available for bracing).	Nominate available lengths of wall as GS1-N elements. Use BL1-H if higher ratings are required.
Internal walls (both sides available for bracing).	Nominate available length of wall as GS2-NOM elements. Change to GS1-N if higher ratings are required. Change to GS2-N if higher ratings are required. Change to BLG-H for even higher ratings. Consider GSP-H or BLP-H if the opposite side is lined with plywood.

Bracing demand

GIB EZYBRACE® CALCULATOR

The GIB EzyBrace® calculator is a software tool to determine the wind and earthquake bracing demand and to design the bracing resistance for light timber-framed buildings constructed in accordance with NZS 3604:2011.

The updated GIB EzyBrace® calculator combines an up-to-date user-friendly interface with the latest knowledge relating to the performance of GIB® plasterboard in light timber-framed structures when subjected to high winds or earthquakes. The calculator can be down-loaded free of charge by visiting gib.co.nz/ezybrace and can be installed on either Microsoft® or Apple® Mac environments.

DEMAND

Wind and Earthquake 'Demand' calculates the forces a structure must be able to resist during its 'design life'. The GIB EzyBrace® calculator's Demand sheet determines the number of Bracing Units required depending on building location, building dimensions and materials used. The Demand sheet closely follows the familiar format of our Excel based GIB EzyBrace® calculator, and includes additional features such as a pop-up help facility explaining required input.

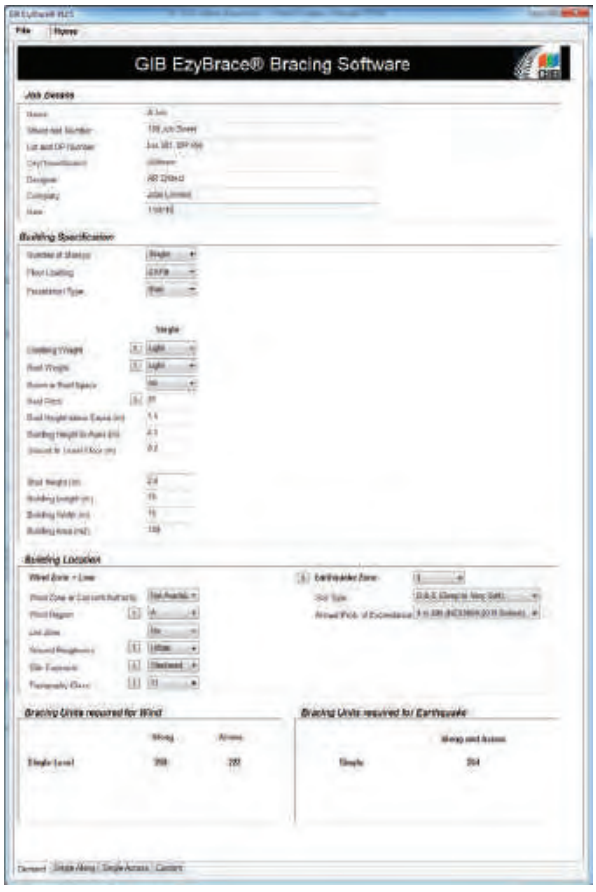
Bracing resistance sheets ('tabs') are added depending on the building specification entered. For example, subfloor bracing resistance tabs only show when a 'subfloor' foundation type has been selected.

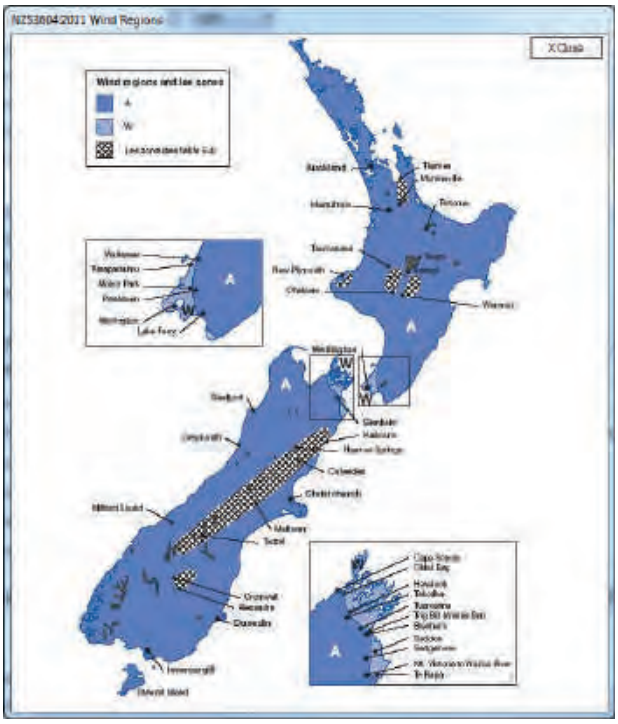
The Demand sheet gives the designer the option to select a longer earthquake return period which represents a higher earthquake design force. The default for buildings constructed in accordance with NZS3604:2011 is an earthquake that has a 10% chance of being exceeded within the assumed 50 year 'design life' of a light timber framed residential structure, a 'return period' of 500 years.

Many commercial and public buildings are designed for the more stringent requirement of a 10% probability of exceedance in a 100 or 250 year life expectancy.

A screen shot of the GIB EzyBrace® 2016 Demand Sheet and Help Facility is shown in figure 5.

FIGURE 5: GIB EZYBRACE® 2016 — DEMAND CALCULATION SHEET AND 'POP UP' HELP FACILITY





Download GIB EzyBrace® 2016 design software from gib.co.nz/ezybrace

Software functionality

Innovations adopted in the GIB EzyBrace® 2016 bracing 'resistance' calculation sheets include the ability to easily add and delete lines and elements during calculations.

The software compares bracing resistance achieved with demand and for wall bracing lines incorporating external walls, the external wall length can now be entered to check minimum bracing units required on that line. The NZS 3604:2011 rules and associated software output are not the only check. Designers must additionally check the building layout to ensure adequate bracing distribution.

Figures 6 and 7 show screen shots of the Wall and Subfloor Resistance Sheets respectively.

FIGURE 6: GIB EZYBRACE® 2016 — WALL BRACING RESISTANCE CALCULATION SHEET

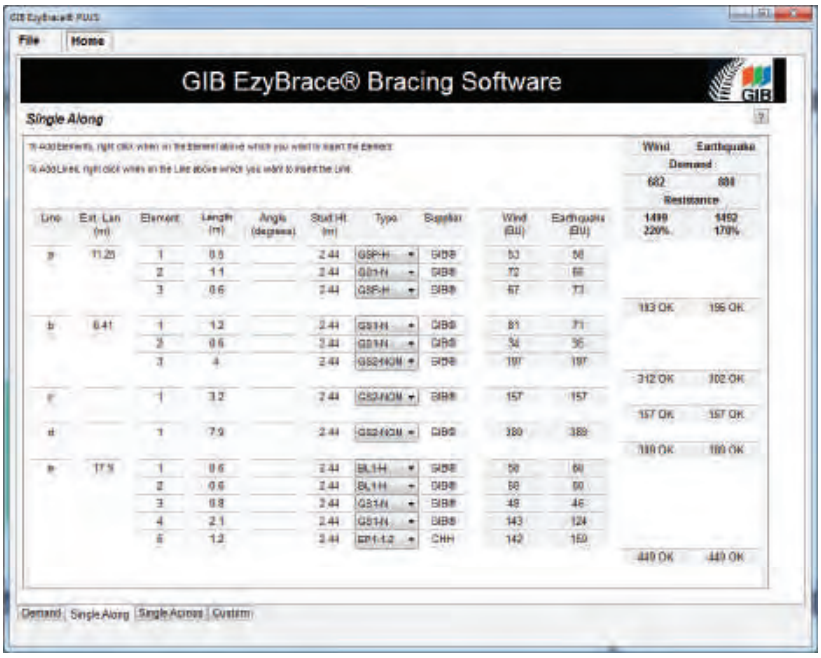
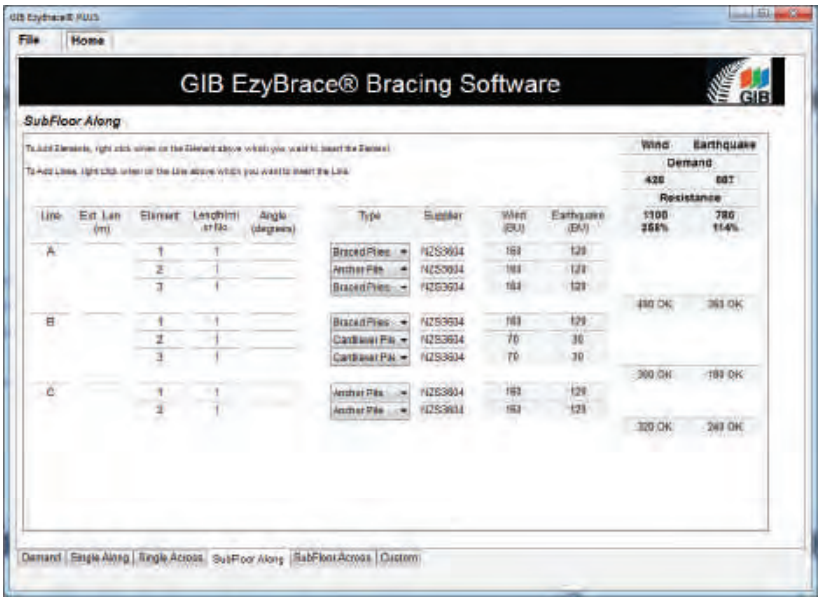


FIGURE 7: GIB EZYBRACE® 2016 — SUBFLOOR BRACING RESISTANCE CALCULATION SHEET

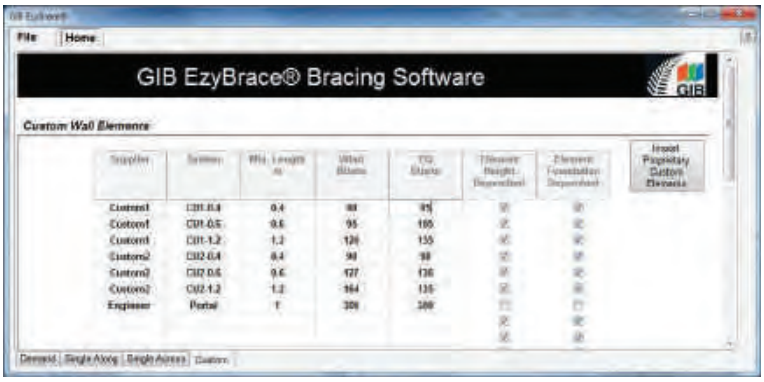


Download GIB EzyBrace® 2016 design software from gib.co.nz/ezybrace

Software functionality

Custom elements can be entered by accessing the 'custom' tab as shown in figure 8.

FIGURE 8: GIB EZYBRACE® 2016 — CUSTOM ELEMENTS SHEET



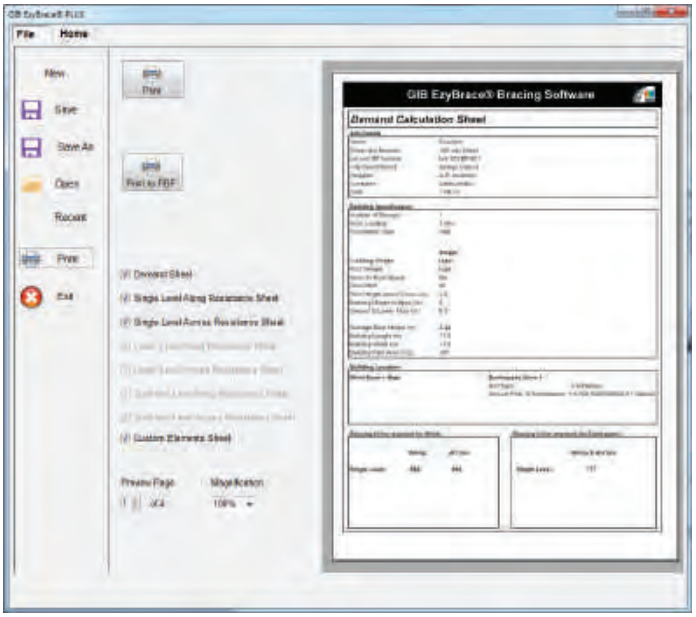
Note: Values and systems shown in Custom Elements Sheets are for illustrative purposes only.

Help can be accessed by pressing the ? symbol which displays a window with further information.

The GIB EzyBrace® 2016 software has a number of options that can be accessed via the File tab at the top left hand corner of the window. The options include: New, Save, Save As, Open, Recent and Print.

- The New option closes any opened job ready for the input of a new job.
- The Save option saves the currently opened job to the same filename and the Save As option saves the job to a new filename.
- The Open option prompts for the name of an existing job.
- The Recent option displays a list of the ten latest jobs and allows for the selection of one of these jobs to be opened.
- The Print option displays the print screen. In this screen, a print preview is displayed. The print preview can be copied to the clipboard by clicking the right-hand mouse button. Also on the print screen is the option to choose which pages are to be printed and the option to print the output to a portable data format, PDF, file.
- The Print Screen View is shown in figure 9.

FIGURE 9: GIB EZYBRACE® 2016 — PRINT SCREEN VIEW



Download GIB EzyBrace® 2016 design software from gib.co.nz/ezybrace

GIB® plasterboard linings

When fixing part sheets of GIB® plasterboard, a minimum sheet width of 300mm applies for bracing elements. Horizontal fixing is recommended. If fixing vertically, full height sheets shall be used where possible. Where sheet end butt joints are unavoidable they must be formed over nogs or over the studs and fastened at 200mm centres. Alternatively, and preferably, sheet end butt joints may be back-blocked.

When a GIB® Bracing element has been designated for a section of wall, BU ratings cannot be increased by incorporating additional proprietary bracing elements within that same section of wall.

LIMITATIONS

- GIB® plasterboard must be stacked flat and protected from the weather.
- GIB® plasterboard must be handled as a finishing material.
- GIB® plasterboard in use must not be exposed to liquid water or be installed in situations where extended exposure to humidities above 90% RH can reasonably be expected.
- GIB EzyBrace® Systems must not be used in showers or behind baths.
- It is highly recommended not to install GIB® plasterboard in any situation where external claddings are not in place or the property is not adequately protected from the elements.
- If GIB® plasterboard is installed under these conditions, the risk of surface defects such as joint peaking or cracking is greatly increased.

GIB EzyBrace® Systems in water-splash areas

When GIB® plasterboard is installed in locations likely to be frequently exposed to liquid water it must have an impervious finish. Examples are adhesive fixed acrylic shower linings or ceramic tiles over an approved waterproof membrane over GIB Aqualine®. The NZBC requires 15 years durability in these situations. Bracing elements are required to have a durability of 50 years. Bracing elements are not to be located in shower cubicles or behind baths because of durability requirements, the likelihood of renovation, and practical issues associated with fixing bracing elements to perimeter framing members. Otherwise GIB EzyBrace® Systems can be used in water-splash areas as defined by NZBC Clause E3, provided these are maintained impervious for the life of the building.

For futher design details refer to the current GIB Aqualine® Wet Area Systems literature.

Renovation

When relining walls during the process of renovation, ensure that bracing elements are reinstated (check the building plans).

Openings in bracing elements

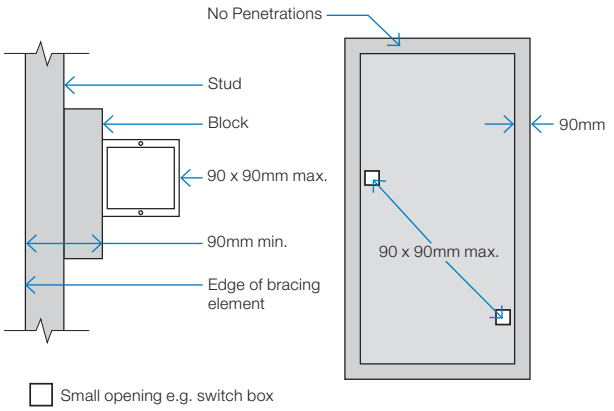
SMALL OPENINGS

Small openings (e.g. power outlets) of 90 x 90mm or less may be placed no closer than 90mm to the edge of the braced element. A block may need to be provided alongside the perimeter stud as shown below.

LARGE OPENINGS

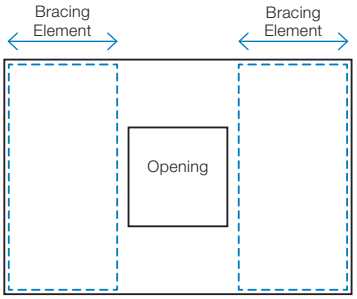
Openings above 90 x 90mm such as switch boards, recessed cabinets and TV's etc. should be placed outside of the bracing element or locate bracing on the other side of the wall framing.

FIGURE 10: SMALL OPENINGS IN BRACING ELEMENTS



GEB001

FIGURE 11: LARGE OPENINGS AND BRACING ELEMENTS



Timber framing

General framing requirements such as grade, spacings and installation shall comply with the provisions of NZS 3604:2011. To achieve the published bracing performance the minimum actual framing dimensions are 90 x 45mm for external walls and 70 x 45mm for internal walls.

As a minimum the use of Kiln Dried Stress Graded timber for all wall, roof and mid-floor framing members is recommended.

GIBFix® Framing System (alternative layout)

Practices recommended as part of the GIBFix® Framing System aim to increase timber framing efficiencies, reduce reliance on unnecessary framing at wall junctions and minimise surface imperfections that commonly arise from constructing plasterboard junctions over multiple timber members. GIBFix® Angles fixed to a single timber framing member are introduced to tie together plasterboard junctions, improving seismic resilience and decrease the risk of future defects due to timber movement. The GIBFix® Framing System can be used in conjunction with the GIB EzyBrace® System.

Note: GIBFix® Angles and 32mm x 7g GIB® Grabber® Dual Thread Screws may also be used in traditional wall framing layouts and in GIB EzyBrace® Systems.

When the GIBFix® Framing System is used a minimum of 2 equally spaced nogs for walls between 2.4m and 3m in height are required at corners and wall junctions.

When used in GIB EzyBrace® systems GIBFix® Angles must run from top to bottom on all applicable studs. If 2 GIBFix® Angles are required on a stud they must be overlapped by a minimum of 300mm with 2/32mm 7g GIB® Grabber® Dual Thread Screws penetrating through both GIBFix® Angles.

For full specification details refer to GIBFix® Framing System literature available at gib.co.nz/gibfix.

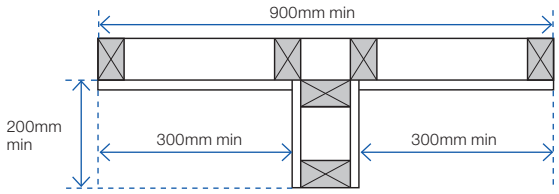
Guidelines for intersection walls

GIB® Bracing Elements may have intersecting walls with a minimum length of 200mm. Fasteners are required around the perimeter of the bracing element. Vertical joints at T-junctions shall be fixed and jointed as specified for intermediate sheet joints. The bracing element length must be no less than 900mm.

Where a Wall Bracing Element is interrupted by a T-junction the element is deemed to be continuous for the whole length (900mm minimum in the example illustrated).

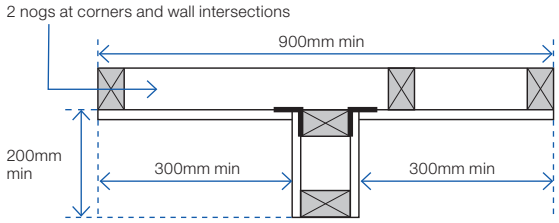
When fixing part sheets of GIB® plasterboard to the side of a T-junction, a minimum width of 300mm applies for bracing elements. See figures 12 and 13.

FIGURE 12: WALL INTERSECTION (TRADITIONAL WALL FRAMING)



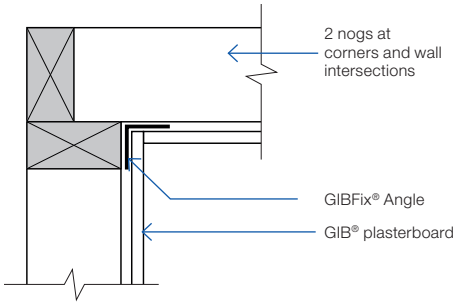
GEB002

FIGURE 13: WALL INTERSECTION (GIBFIX® FRAMING SYSTEM)



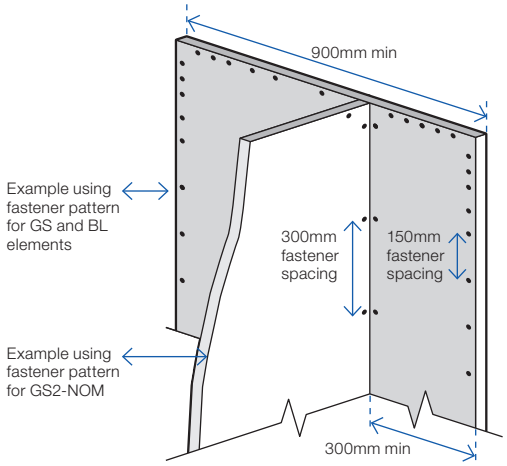
GEB003

FIGURE 14: CORNER INTERSECTION (GIBFIX® FRAMING SYSTEM)



GFS001

FIGURE 15: WALL INTERSECTION FASTENER PLACEMENT



Junction

Min 32mm x 6g GIB® Grabber® High Thread or 32mm x 7g GIB® Grabber® Dual Thread Screws @ 300mm ctrs each side.

Top plate connections

For top plate connections refer to NZS3604:2011 section 8.7.3.

Parapets and gable end walls

Bracing elements must be fixed from top plate to bottom plate. Fixing to a row of nogs is not acceptable unless either:

A continuous member such as an ex 90 x 45mm ribbon plate is fixed across the studs just above a row of nogs at the ceiling line, as shown in figure 16.

or

GIBFix® Angle as shown in figure 17. The angle is fixed to a row of nogs with 30 x 2.5mm galv flat head nails or 32mm x 7g GIB® Grabber® Dual Thread Screws at 300mm centres.

Bottom plate fixing

TIMBER FLOOR

For elements with an 'N' specification use 2/100 x 3.75mm hand or 3/90 x 3.15mm power-driven nails at 600mm centres.

In addition, for elements with an 'H' specification, use GIB HandiBrac® panel hold-down fixings at each end of the bracing element, see p.16.

CONCRETE FLOOR — EXTERNAL WALL BRACING ELEMENTS

For bracing elements with an 'N' specification fix external wall plates in accordance with NZS 3604:2011.

Use GIB HandiBrac® panel hold-down fixings at each end of bracing elements with an 'H' specification and minimum intermediate fixings as required by NZS 3604:2011.

CONCRETE FLOOR — INTERNAL WALL BRACING ELEMENTS

For bracing elements with an 'N' specification fix plates in accordance with NZS 3604:2011 or use 75 x 3.8mm shot-fired fasteners with 16mm discs spaced at 150 and 300mm from end-studs and 600mm centres thereafter.

For bracing elements with an 'H' specification use GIB HandiBrac® panel hold-down fixings at each end of the element and minimum intermediate fixings as required by NZS 3604:2011.

FIGURE 16: PARAPETS AND GABLE ENDS WITH RIBBON PLATE

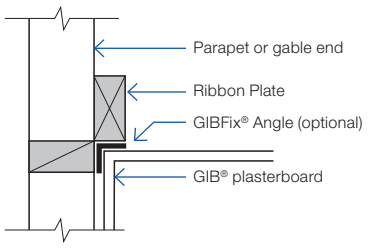
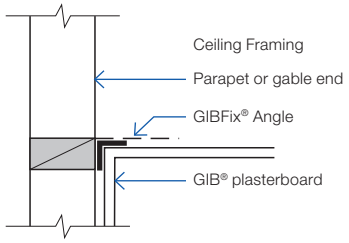


FIGURE 17: PARAPETS AND GABLE ENDS WITH GIBFIX® ANGLE



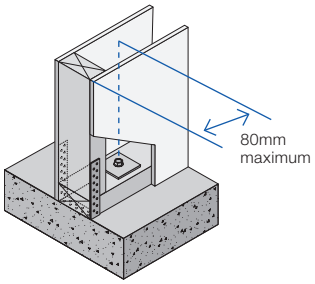
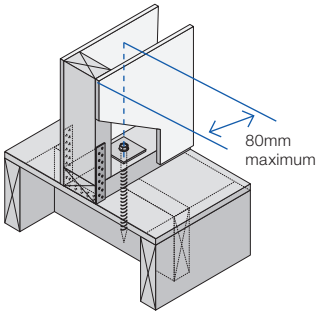
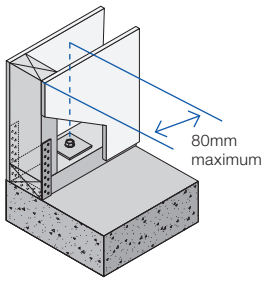
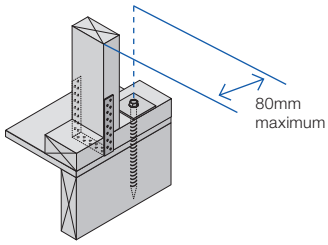
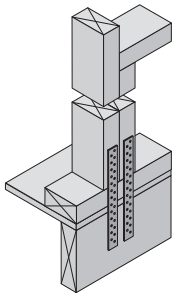
GFS003

BOTTOM PLATE FIXINGS FOR GIB® BRACING ELEMENTS

Brace type	Concrete slabs		Timber floors
	External wall	Internal wall	External and Internal walls
GS1-N	As per NZS 3604:2011. No specific additional fastening required.	As per NZS 3604:2011. Alternatively use 75 x 3.8mm shot-fired fasteners with 16mm discs, 150mm and 300mm from each end of the bracing element and at 600mm thereafter.	Pairs of 100 x 3.75mm flat head hand driven nails or 3/90 x 3.15mm power driven nails at 600mm centres in accordance with NZS 3604:2011.
GS2-N	Not applicable.		
GS2-NOM			
GSP-H BL1-H BLP-H	Intermediate fastenings to comply with NZS 3604:2011 In addition: GIB HandiBrac® fixings or metal wrap-around strap fixings and bolt as illustrated on p.15 and 16.		Pairs of 100 x 3.75mm flat head hand driven nails or 3/90 x 3.15mm power driven nails at 600mm centres in accordance with NZS 3604:2011. In addition: GIB HandiBrac® fixings or metal wrap-around strap fixings and bolt as illustrated on p.15 and 16.
BLG-H	Not applicable	As for GSP-H, BL1-H, BLP-H on concrete slab as illustrated on p.15 and 16.	

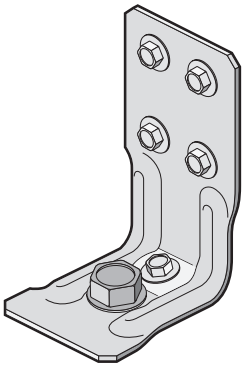
Bracing strap installation

Care needs to be taken with the installation of the bracing strap. It should be checked in to be flush with the face of the stud providing a flat substrate for the plasterboard and positioned in such a way that the corner fastenings of the bracing element are not affected by it. Keeping the strap to the edge of the end stud as shown will allow the corner fastenings to be installed without having to penetrate the bracing strap.

Concrete floor	Timber floor
400 x 25 x 0.9mm galvanised strap to pass under the plate and up the other side of the stud. Six 30 x 2.5mm flat head galvanised nails to each side of the stud. Three 30 x 2.5mm flat head galvanised nails to each side of the plate. Hold down bolt with 50 x 50 x 3mm washer to be fitted within 80mm of the end of the element.	
Internal wall	
 GEB004	 GEB005
External wall	
 GEB006	 GEB007
Note: Where applicable drawings have been produced for CAD design. These are identified by a unique number in the bottom corner of each detail box that can be found at gib.co.nz/library.	2/300 x 25 x 0.9mm galvanised straps with six 30 x 2.5mm flat head galvanised nails to each stud and into the floor joist and three nails to the plate. Block to nog fixed with 3/100 x 3.75mm nails to stud.
	 GEB008

Hold-down fastener requirements	
Concrete floor	Timber floor
A mechanical fastening with a minimum characteristic uplift capacity of 15kN fitted with a 50 x 50 x 3mm square washer within 80mm of the ends of the bracing element.	12 x 150mm galvanised coach screw fitted with a 50 x 50 x 3mm square washer within 80mm of the ends of the bracing element

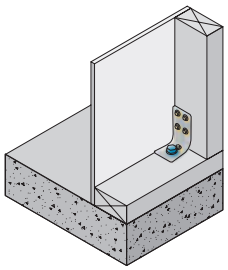
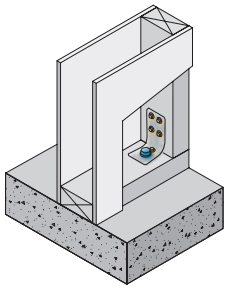
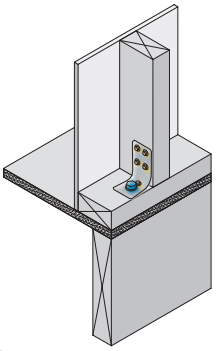
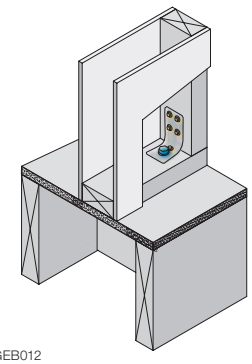
GIB HandiBrac® installation



Developed in conjunction with MiTek™, the GIB HandiBrac® has been designed and tested by Winstone Wallboards for use in GIB EzyBrace® elements that require hold-downs. The GIB HandiBrac® is a substitute for bottom plate hold-down straps.

- Quick and easy to fit.
- May be fitted at any stage before lining.
- Framing face is clear to allow flush lining.
- Easily inspected.

The GIB HandiBrac® with BOWMAC® blue head screw bolt is suitable for timber and concrete floors constructed in accordance with NZS 3604:2011.

Concrete floor		**Timber floor**	
External walls	Internal walls	External walls	Internal walls
 GEB009	 GEB010	 GEB011	 GEB012
Position GIB HandiBrac® as close as practicable to the internal edge of the bottom plate.	Position GIB HandiBrac® at the stud/plate junction and at mid-width of plate.	Position GIB HandiBrac® flush with the outside stud face, as close as practicable to the centre of the boundary joist.	Position GIB HandiBrac® in the centre of floor joist or full depth solid block.
Hold-down fastener requirements			
A mechanical fastening with a minimum characteristic uplift capacity of 15kN or use supplied BT10/140 screwbolt in GIB HandiBrac® pack.		12 x 150mm galvanised coach screw or use supplied BT10/140 screwbolt in GIB HandiBrac® pack.	

GIB HandiBrac® placement with GIBFix® Framing System for concrete floors

Figure 18 shows the preferred positioning of the GIB HandiBrac® panel hold-down brackets within the GIBFix® Framing System layout and where they are required by bracing systems with an 'H' in the specification code.

Note that, in corners and at wall junctions, a single GIB HandiBrac® can serve 'H' type bracing elements in both directions, but additional intermediate concrete anchors may need to be installed to meet the minimum requirements of NZS 3604:2011 for bottom plate fixing.

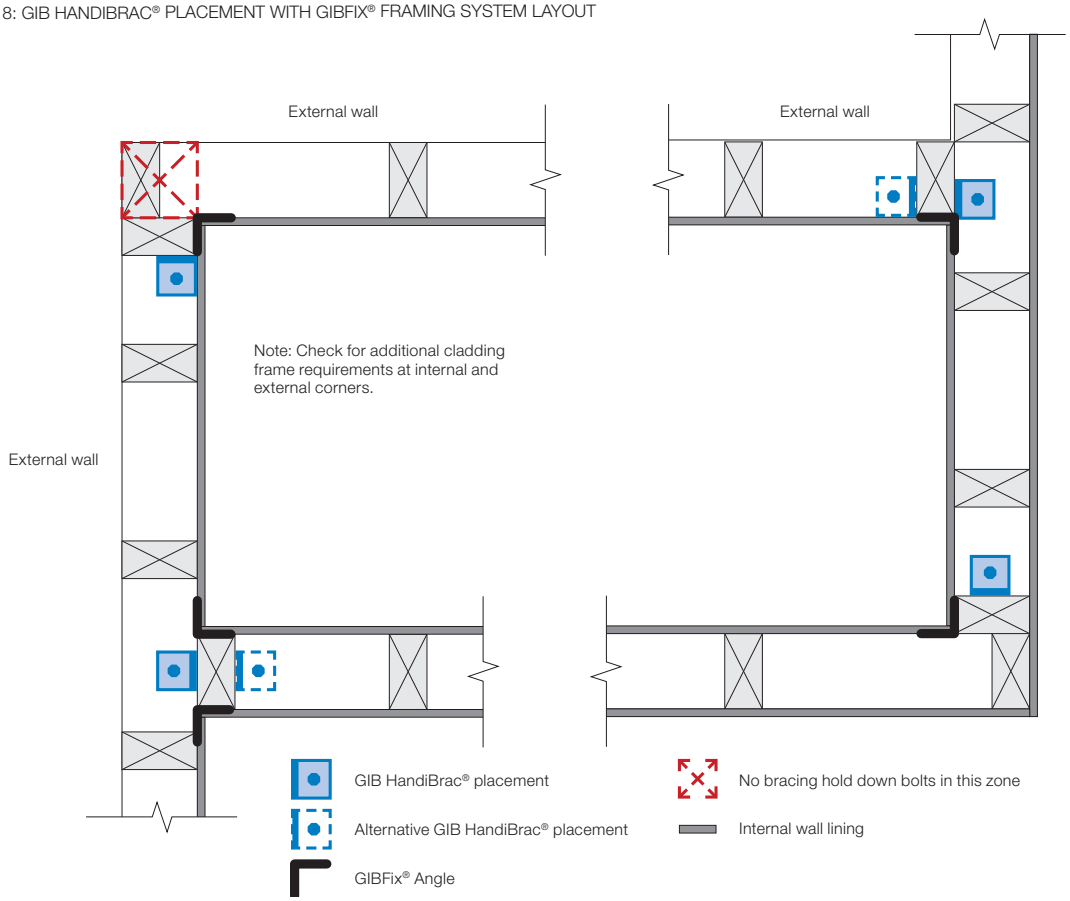
The GIB HandiBrac® is fixed to the stud which has the GIBFix® Angle.

For bracing elements with sheet material both sides of the wall connect corner studs using 8/90mm gun nails as shown in figure 19.

TIMBER FLOORS

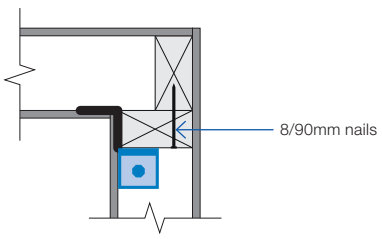
For timber floors bolt fixing in to solid joist or block is required, as shown on p 15.

FIGURE 18: GIB HANDIBRAC® PLACEMENT WITH GIBFIX® FRAMING SYSTEM LAYOUT



GEB013

FIGURE 19: STUD CONNECTION FOR 'H' TYPE BRACING ELEMENTS WITH SHEET MATERIAL BOTH SIDES



GEB014

Ceiling diaphragms

GIB® plasterboard ceiling diaphragms are stiff and strong horizontal elements which effectively transfer loads to bracing walls. They themselves do not have a bracing unit rating but are used when bracing lines exceed 6m separation. The basic shape of a ceiling diaphragm is square or rectangular. Protrusions are permitted but cut-outs are not. The length of a ceiling diaphragm shall not exceed twice its width. Dimensions are measured between supporting bracing lines. Supporting bracing lines shall have a bracing capacity no less than the greater of 100 bracing units or 15 bracing units per metre of diaphragm dimension, measured at right angles to the line being considered, see figure 21.

Limitations for GIB® plasterboard ceiling diaphragms

Ceiling diaphragms may be constructed using any GIB® plasterboard provided perimeter fixing is at;

150mm centres for: Diaphragms up to 7.5m in length, no steeper than 15°.

100mm centres for: Diaphragms up to 7.5m in length, no steeper than 45°. Diaphragms up to 12m in length, no steeper than 25°.

Diaphragms outside these parameters must be specifically designed.

General fixing requirements for GIB® Ceiling Diaphragms:

- Linings must be installed over the entire area of the diaphragm.
- Fastening must be no less than 12mm from sheet edges and not less than 18mm from sheet ends.
- Sheets must be supported by framing members (e.g., ceiling battens) spaced at no more than 500mm centres for 10mm GIB® plasterboard and at no more than 600mm centres for 13mm GIB® plasterboard.
- Sheets within the diaphragm area may be fastened and finished conventionally in accordance with the publication entitled, “GIB® Site Guide”. All joints shall be GIB® Joint Tape reinforced and stopped. It is recommended that sheet butt joints are formed off framing and back-blocked (see “GIB® Site Guide”).
- Use full width sheets where possible. At least 900mm wide sheets with a length not less than 1800mm shall be used. Sheets less than 900mm wide but no less than 600mm may be used provided all joints with adjacent sheets are back-blocked (see “GIB® Site Guide” and figure 22).
- Fasteners are placed at the specified centres around the ceiling diaphragm with the corners fastened using the GIB EzyBrace® fastener pattern.

FIGURE 20: PROTRUSIONS AND CUTOUTS

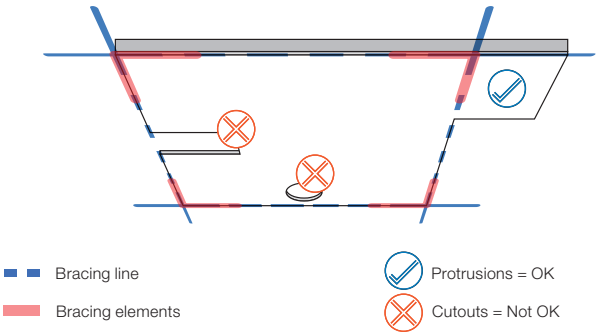


FIGURE 21: DIAPHRAGM BRACING LINING SPACINGS

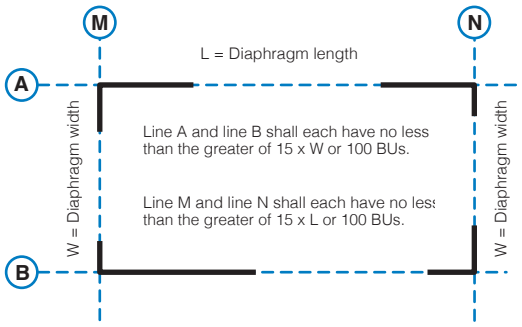
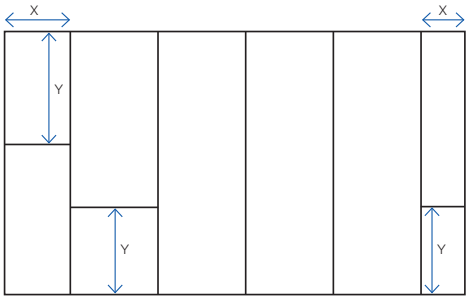


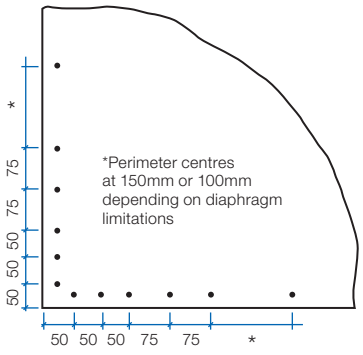
FIGURE 22: GIB® CEILING DIAPHRAGM SHEET WIDTHS AND LENGTHS



X = 900mm min or 600–900mm min provided all adjacent joints are back-blocked.

Y = 1800mm min sheet lengths at ends of ceiling diaphragms.

FIGURE 23: GIB EZYBRACE® FASTENER PATTERN



Unless stated all fastener spacings are maximums.

GEB015

Ceiling battens in ceiling diaphragms

Ceiling diaphragms may be constructed using steel or timber ceiling battens.

Battens shall be spaced at a maximum of:
- 500mm for 10mm GIB® plasterboard.
- 600mm for 13mm GIB® plasterboard.

Timber battens shall be fixed in accordance with the requirements of NZS 3604:2011.

Metal battens shall be GIB® Rondo® battens with two external flanges of 8mm to allow direct screw fixing to roof framing.

GIB® Rondo® metal battens shall be fixed with 2/32mm x 8g GIB® Grabber® Wafer Head Self Tapping screws to supporting framing.

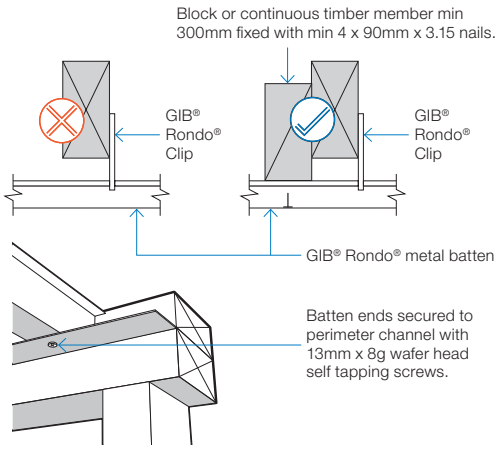
GIB® Rondo® metal battens must be fixed directly to the roof framing. If a clip system has been used, a timber block (min 300mm) or a continuous timber member can be fixed alongside the bottom chord to permit a direct connection to the batten, see figure 26.

For GIB® Rondo® metal battens, a GIB® Rondo® metal channel or metal angle is required at the perimeter of the diaphragm. The perimeter channel shall be fastened to the top plate with 32mm x 8g GIB® Grabber® Wafer Head Self Tapping screws or 32mm x 7g GIB® Grabber® Dual Thread screw at 300mm centres maximum.

Linings are fastened to metal using 25mm x 6g GIB® Grabber® Self Tapping screws and to timber framing using 32mm x 6g GIB® Grabber® High Thread screws. Alternatively 32mm x 7g GIB® Grabber® Dual Thread screws can be used in both cases. Fastener centres are specified on p.18.

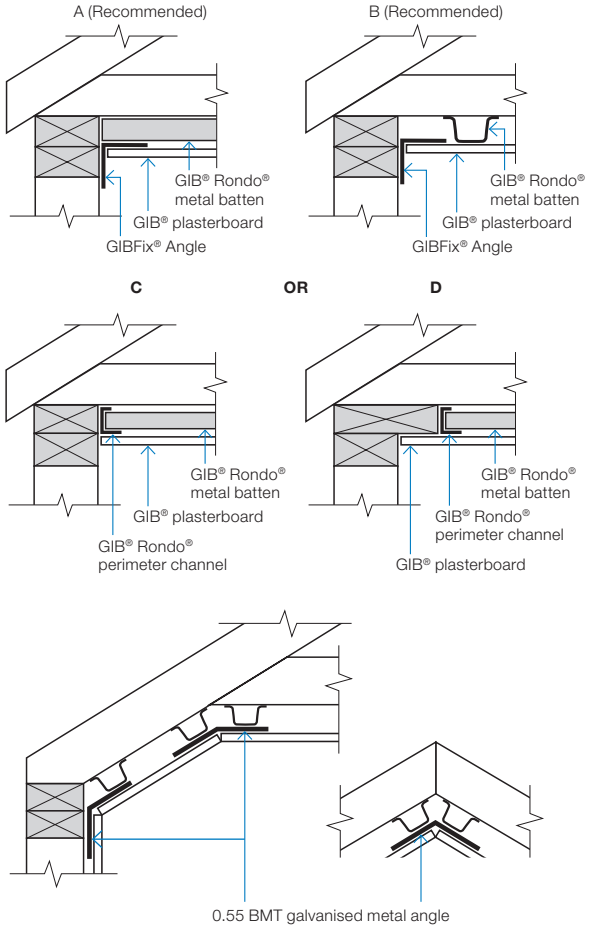
Coved ceiling diaphragms can be achieved by using nominally 32 x 32 x 0.55mm proprietary galvanised metal angles ("back-flashing") at the changes in direction. These angles shall be:
- Fastened at 300mm on each edge to metal battens using 32mm x 8g GIB® Grabber® Wafer Head Self Tapping screws or 32mm x 7g GIB® Grabber® Dual Thread screws.
- Fastened to timber framing using 32mm x 7g GIB® Grabber® Dual Thread screws when linings are installed.

FIGURE 26: GIB® RONDO® METAL CEILING BATTEN INSTALLATION



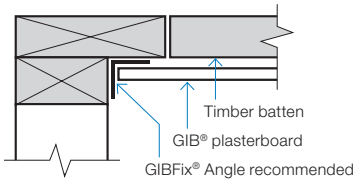
GEB016

FIGURE 27: GIB® RONDO® METAL CEILING BATTENS WITH CORNER ANGLES



GEB017

FIGURE 28: TIMBER CEILING BATTENS*



GEB018

Openings in ceiling diaphragms

SMALL OPENINGS

Small opening (e.g. down lights) of 90 x 90mm or less may be placed no closer than 90mm to the edge of the ceiling diaphragm.

LARGE OPENINGS

Openings are allowed withing the middle third of the diaphragms length and width. Fixing of sheet material to opening trimmers shall be at 150mm centres. Neither opening dimension shall exceed a third of the diaphragm width. Larger openings or openings in other locations require specific engineering design.

Where fireplace flue or range hood openings are required in a ceiling diaphragm use a galvansed metal backing plate as shown in figure 25, with a maximum hole diameter of 350mm.

Figure 25 can also be used for range hood openings in walls.

For information on openings in ceiling diaphragms contact the GIB® Helpline on 0800 100 442.

FIGURE 24: LARGE OPENINGS IN CEILING DIAPHRAGMS

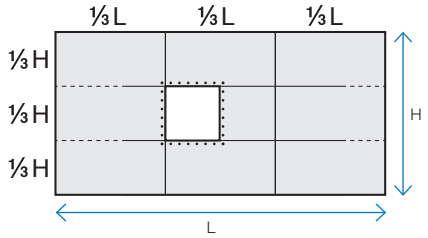
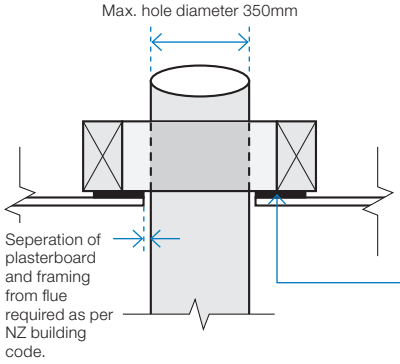
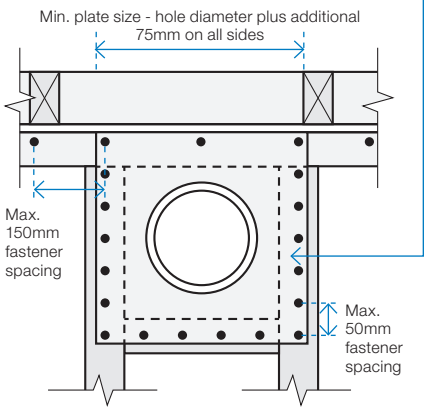


FIGURE 25: FIREPLACE FLUES AND RANGE HOOD OPENINGS

Section view



Plan view



Steel plate
0.55 BMT Galvanised sheet Max. opening 350mm diameter. Installed prior to GIB® plasterboard.

Framing
90 x 45mm framing trimmed to provide extra fixing.

GIB® plasterboard ceiling
Installed over the steel plate and into framing using a minimum of 32mm x 6g GIB® Grabber High Thread or 32mm x 7g GIB® Grabber Dual Thread screws at 50mm max centre spacing.

Plasterboard ceiling not shown in plan view

Length of GIB EzyBrace® elements ('N' Type)

The length of GIB EzyBrace® elements with an 'N' extension (requiring standard NZS3604:2011 plate connections) can be taken as the full frame length measured from the outside of the end-stud to the opening face as illustrated in figures 29-32.

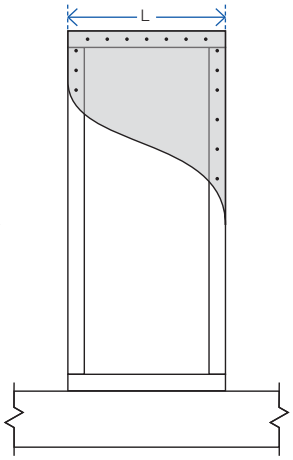
'N' type GIB EzyBrace® elements are identified by GIB® specification numbers GS1-N, GS2-N and GS2-NOM

The dimension 'L' shall not be less than 400mm.

Perimeter bracing fixing for linings of both 'H' and 'N' type elements is along the top and bottom plates, end stud, and doubling stud immediately adjacent to the opening.

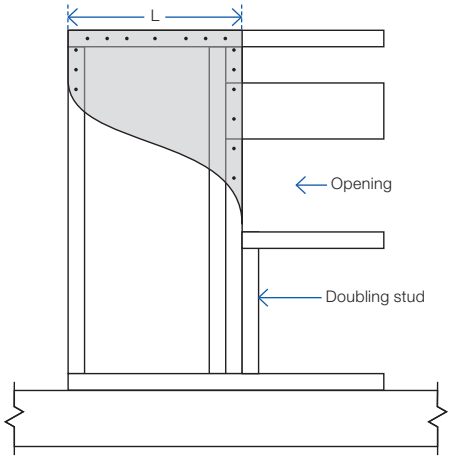
Fastener spacings and diagram scales shown in Figures 29–32 are indicative only. Refer to p.23–30 for construction details.

FIGURE 29: GS BRACING ELEMENTS (OPTION A)



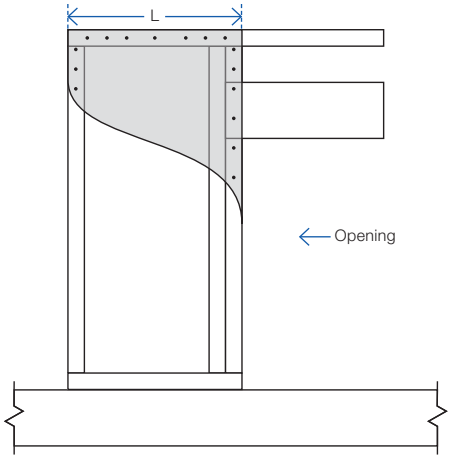
GS1-N, GS2-N elements
'L' indicates the length of the bracing element

FIGURE 30: GS BRACING ELEMENTS (OPTION B)



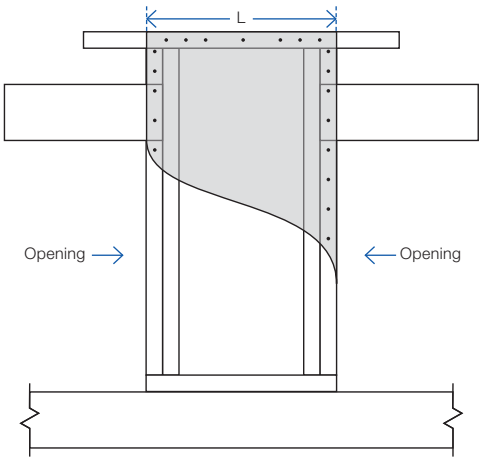
GS1-N, GS2-N elements
'L' indicates the length of the bracing element

FIGURE 31: GS BRACING ELEMENTS (OPTION C)



GS1-N, GS2-N elements
'L' indicates the length of the bracing element

FIGURE 32: GS BRACING ELEMENTS (OPTION D)



GS1-N, GS2-N elements
'L' indicates the length of the bracing element

Length of GIB EzyBrace® elements ('H' Type)

GIB EzyBrace® elements with an 'H' extension (requiring special panel hold-down fixings) can be used when the dimension 'L' as illustrated in figures 33–36 is 400mm or more.

'H' type GIB EzyBrace® elements are identified by GIB® specification numbers GSP-H, BL1-H, BLG-H and BLP-H.

The length of an 'H' type element is not only determined by the sheet material, but also by the placement of the hold-down fixings.

Hold-down fixings cannot be placed closer together than what is shown for the standard panel in figure 33.

Hold-down fixings can be placed under windows provided sill trimming studs beneath the opening are connected to the bracing element using 8/90mm gun nails, as illustrated in figure 34.

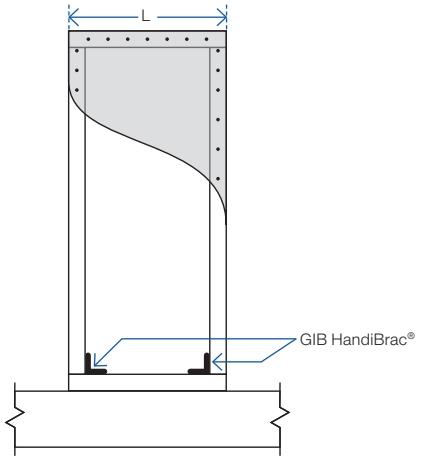
Spike doubling stud to trimming stud using a minimum of 2/90mm gun nails at 600mm centres. Lintel straps (where required for wind uplift) should be checked in and be located away from the bracing element fasteners.

Perimeter bracing fixing for linings of both 'H' and 'N' type elements is along the top and bottom plates, end stud, and doubling stud immediately adjacent to the opening as indicated in figures 34-36.

When using bracing straps, installed in accordance with p.17, fix the strap to the same framing member as shown for the GIB Handibrac® below, and install the adjacent anchor bolt in the same position as the GIB HandiBrac® bolt.

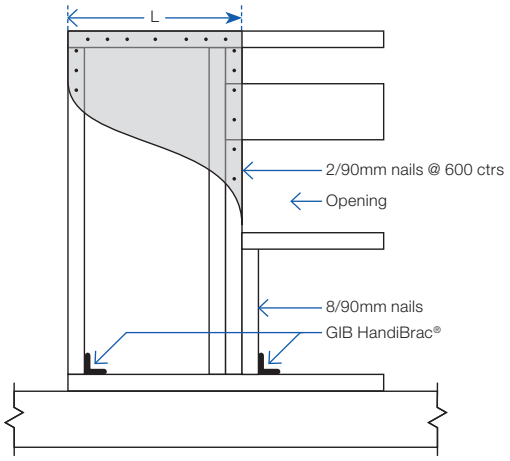
Fastener spacings and diagram scales shown in figures 33–36 are indicative only. Refer to p.23–30 for construction details.

FIGURE 33: BL BRACING ELEMENTS (OPTION A)



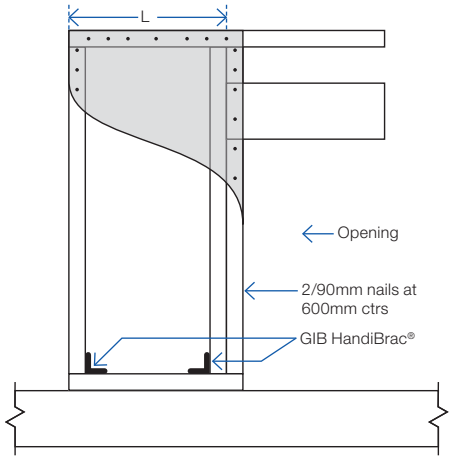
'H' type elements with specific hold downs
'L' indicates the length of the bracing element

FIGURE 34: BL BRACING ELEMENTS (OPTION B)



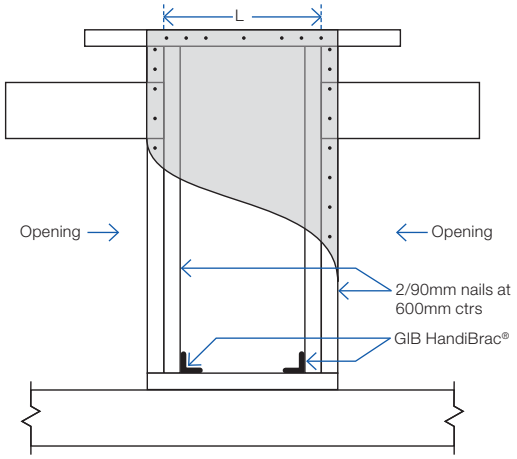
'H' type elements with specific hold downs
'L' indicates the length of the bracing element

FIGURE 35: BL BRACING ELEMENTS (OPTION C)



'H' type elements with specific hold downs
'L' indicates the length of the bracing element

FIGURE 36: BL BRACING ELEMENTS (OPTION D)



'H' type elements with specific hold downs
'L' indicates the length of the bracing element

GIB EzyBrace® Systems specification GS1-N

Specification code	Minimum length (m)	Lining requirement
GS1-N	0.4	Any 10mm or 13mm GIB® Standard plasterboard to one side only

WALL FRAMING

Wall framing to comply with;

- NZBC B1 — Structure B1/AS1 Clause 3 Timber (NZS 3604:2011).
- NZBC B2 — Durability B2/AS1 Clause 3.2 Timber (NZS 3602).

Framing dimensions and height as determined by NZS 3604:2011 stud and top plate tables for load bearing and non-bearing walls. The use of kiln dried stress graded timber is recommended.

BOTTOM PLATE FIXING

Timber floor

Pairs of hand driven 100 x 3.75mm nails at 600mm centres; or three power driven 90 x 3.15mm nails at 600mm centres.

Concrete floor

Internal Wall Bracing Lines: In accordance with the requirements of NZS 3604:2011 for internal wall plate fixing or 75 x 3.8mm shot fired fasteners with 16mm discs spaced at 150mm and 300mm from end studs and 600mm centres thereafter.

External Wall Bracing Lines: In accordance with the requirements of NZS 3604:2011 for external wall bottom plate fixing.

WALL LINING

- Any 10mm or 13mm GIB® plasterboard lining.
- Sheets can be fixed vertically or horizontally.
- Sheet joints shall be touch fitted.
- Use full length sheets where possible.

PERMITTED ALTERNATIVES

For permitted GIB® plasterboard alternatives refer to p. 5 in GIB EzyBrace® Systems literature.

FASTENING THE LINING

Fasteners

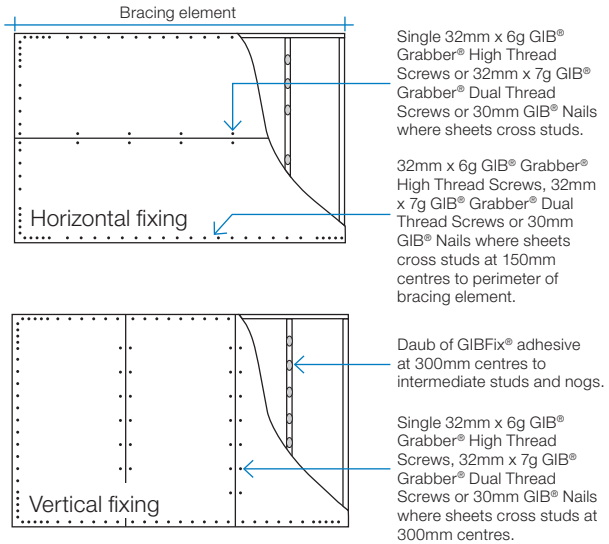
32mm x 6g GIB® Grabber® High Thread Screws, 32mm x 7g GIB® Grabber® Dual Thread Screws or 30mm GIB® Nails. If using the GIBFix® Angle use only 32mm x 7g GIB® Grabber® Dual Thread Screws.

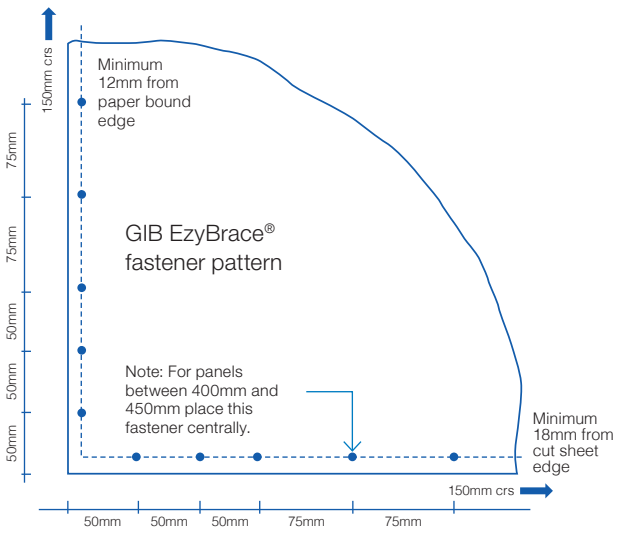
Fastener centres

50,100,150, 225, 300mm maximum from each corner and 150mm thereafter around the perimeter of the bracing element. For vertically fixed sheets place fasteners at 300mm maximum centres to intermediate sheet joints. For horizontally fixed sheets place single fasteners to the sheet edge where it crosses the stud. Use daubs of GIBFix® adhesive at 300mm maximum centres to intermediate studs. Place fasteners no closer than 12mm from paper bound sheet edges and 18mm from any sheet end or cut edge.

JOINTING

Joint strength is important in delivering bracing system performance. All fastener heads stopped and all sheet joints GIB® Joint Tape reinforced and stopped in accordance with the GIB® Site Guide.





Unless stated all fastener spacings are maximums.

In order for GIB® systems to perform as tested, all components must be installed exactly as prescribed. Substituting components produces an entirely different system and may seriously compromise performance. Follow the specifications. This specification sheet is issued in conjunction with the publication GIB EzyBrace® Systems

GIB EzyBrace® Systems specification GS2-NOM

Specification code	Minimum length (m)	Lining requirement
GS2-NOM	0.4	Any 10mm or 13mm GIB® Standard plasterboard fixed to each side of the wall framing

WALL FRAMING

Wall framing to comply with;

- NZBC B1 — Structure B1/AS1 Clause 3 Timber (NZS 3604:2011).
- NZBC B2 — Durability B2/AS1 Clause 3.2 Timber (NZS 3602).

Framing dimensions and height as determined by NZS 3604:2011 stud and top plate tables for load bearing and non-bearing walls. The use of kiln dried stress graded timber is recommended.

BOTTOM PLATE FIXING

Timber floor

Pairs of hand driven 100mm x 3.75mm nails at 600mm centres; or three power driven 90mm x 3.15mm nails at 600mm centres.

Concrete floor

Internal Wall Bracing Lines: In accordance with the requirements of NZS 3604:2011 for internal wall plate fixing or 75mm x 3.8mm shot fired fasteners with 16mm discs spaced at 150mm and 300mm from end studs and then 600mm centres thereafter.

WALL LINING

- A layer of 10mm or 13mm GIB® plasterboard to each side of the wall.
- Sheets can be fixed vertically or horizontally.
- Sheet joints shall be touch fitted.
- Use full length sheets where possible.

PERMITTED ALTERNATIVES

For permitted GIB® plasterboard alternatives refer to p. 5 in GIB EzyBrace® Systems literature.

FASTENING THE LINING

Fasteners

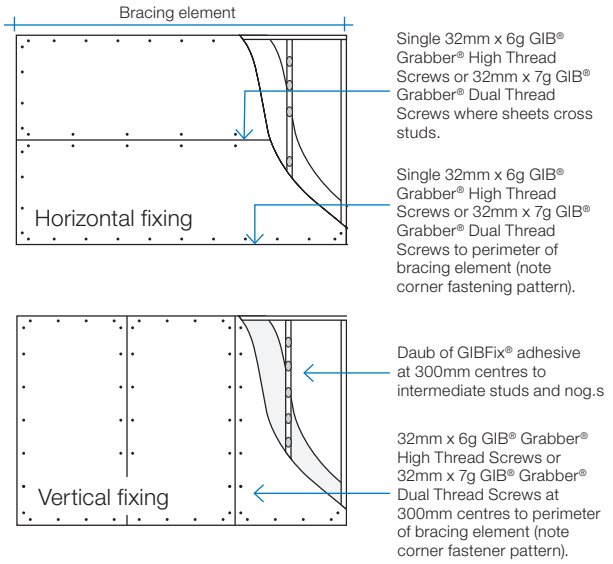
32mm x 6g GIB® Grabber® High Thread Screws or 32mm x 7g GIB® Grabber® Dual Thread Screws. If using the GIBFix® Angle use 32mm x 7g GIB® Grabber® Dual Thread Screws.

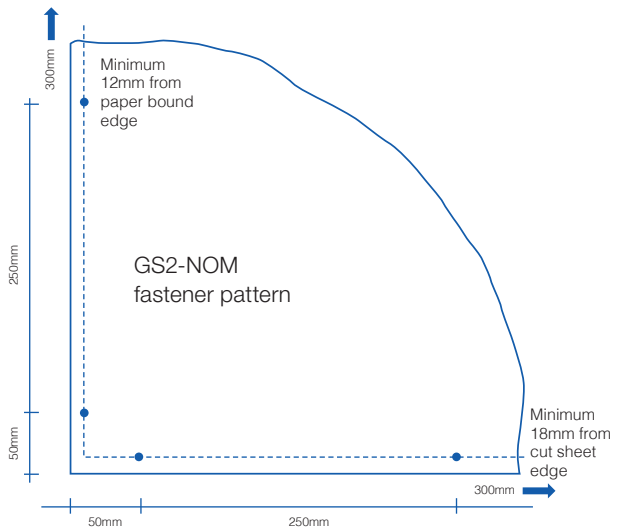
Fastener centres

50, 300mm from each corner and 300mm maximum thereafter around the perimeter of the bracing element. For horizontally fixed sheets place single fasteners to the sheet edge where it crosses the stud. Use daubs of GIBFix® adhesive at 300mm maximum centres to intermediate studs. Place fasteners no closer than 12mm from paper bound sheet edges and 18mm from any sheet end or cut edge.

JOINTING

Joint strength is important in delivering bracing system performance. All fastener heads stopped and all sheet joints GIB® Joint Tape reinforced and stopped in accordance with the GIB® Site Guide.





Unless stated all fastener spacings are maximums.

In order for GIB® systems to perform as tested, all components must be installed exactly as prescribed. Substituting components produces an entirely different system and may seriously compromise performance. Follow the specifications. This specification sheet is issued in conjunction with the publication GIB EzyBrace® Systems

GS2-NOM ADHESIVE FIXING OPTION AT DOOR JAMBS

As an alternative to using screw fixings, a continuous 6-10mm bead of solvent based GIBFix® All-Bond can be applied along the full height studs immediately adjacent to an internal door opening and at the door lintel or head trimmer. The lining is then bedded into the adhesive and installed into the rebated jamb, as shown in figure 38.

This solvent based adhesive option may only be used with GS2-NOM specification and is designed to reduce popping of fasteners around door openings on internal walls.

FIGURE 37: SCREW FIX FOR OPENINGS

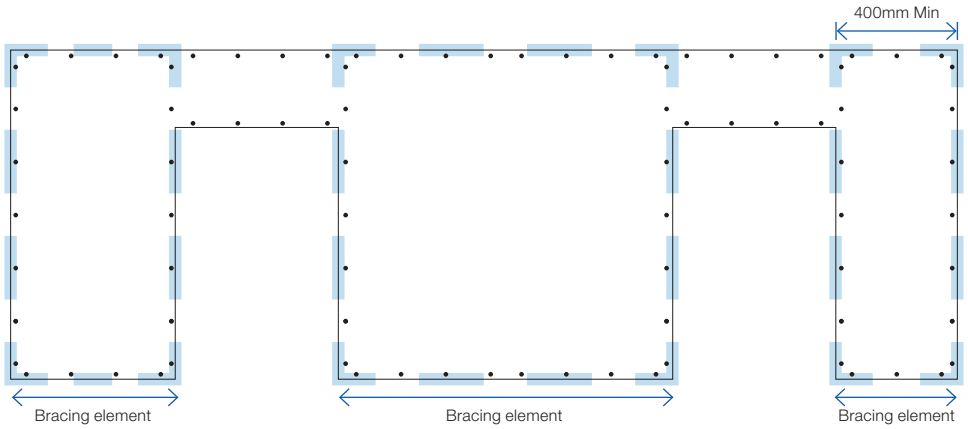
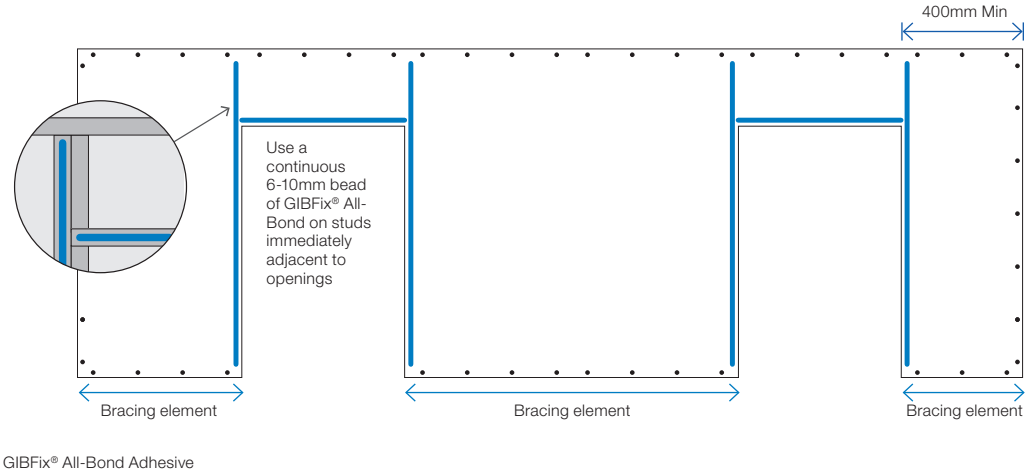
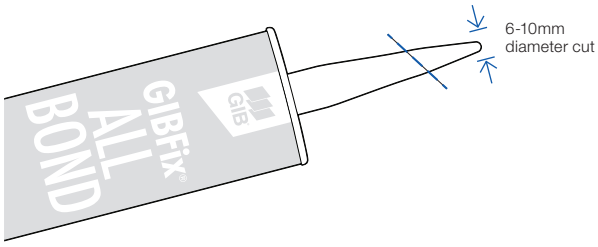


FIGURE 38: SCREW AND ADHESIVE FIX FOR OPENINGS



ADHESIVE NOZZLE APERTURE



GIB EzyBrace® Systems specification GS2-N

Specification code	Minimum length (m)	Lining requirement
GS2-N	0.4	Any 10mm or 13mm GIB® Standard plasterboard fixed to each side of the wall framing

WALL FRAMING

Wall framing to comply with;

- NZBC B1 — Structure B1/AS1 Clause 3 Timber (NZS 3604:2011).
- NZBC B2 — Durability B2/AS1 Clause 3.2 Timber (NZS 3602).

Framing dimensions and height as determined by NZS 3604:2011 stud and top plate tables for load bearing and non-bearing walls. The use of kiln dried stress graded timber is recommended.

BOTTOM PLATE FIXING

Timber Floor

Pairs of hand driven 100 x 3.75mm nails at 600mm centres; or three power driven 90 x 3.15mm nails at 600mm centres.

Concrete floor

Internal Wall Bracing Lines: In accordance with the requirements of NZS 3604:2011 for internal wall plate fixing or 75 x 3.8mm shot fired fasteners with 16mm discs spaced at 150mm and 300mm from end studs and then 600mm centres thereafter.

WALL LINING

- A layer of 10mm or 13mm GIB® plasterboard to each side of the wall.
- Sheets can be fixed vertically or horizontally.
- Sheet joints shall be touch fitted.
- Use full length sheets where possible.

PERMITTED ALTERNATIVES

For permitted GIB® plasterboard alternatives refer to p. 5 in GIB EzyBrace® Systems literature.

FASTENING THE LINING

Fasteners

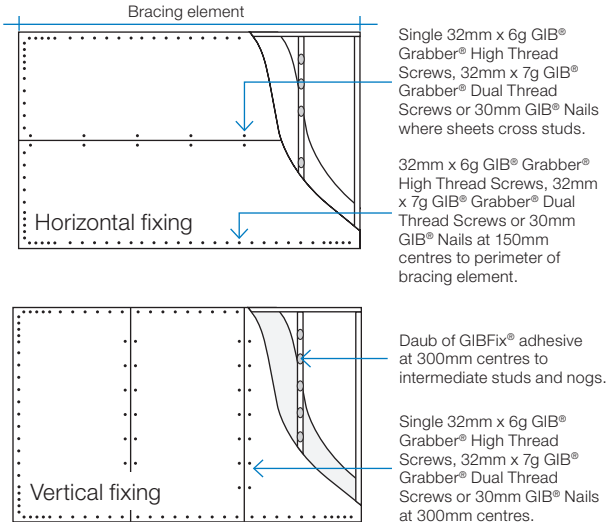
32mm x 6g GIB® Grabber® High Thread Screws,32mm x 7g GIB® Grabber® Dual Thread Screws or 30mm GIB® Nails. If using the GIBFix® Angle use only 32mm x 7g GIB® Grabber® Dual Thread Screws.

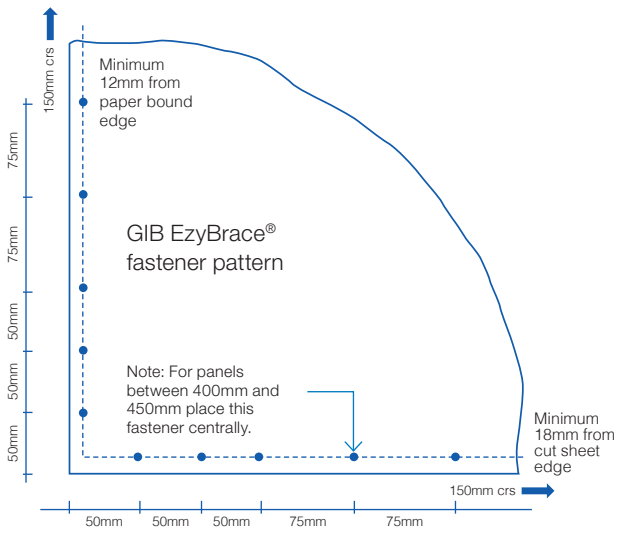
Fastener centres

50,100,150, 225, 300mm maximum from each corner and 150mm thereafter around the perimeter of the bracing element. For vertically fixed sheets place fasteners at 300mm maximum centres to intermediate sheet joints. For horizontally fixed sheets place single fasteners to the sheet edge where it crosses the stud. Use daubs of GIBFix® adhesive at 300mm maximum centres to intermediate studs. Place fasteners no closer than 12mm from paper bound sheet edges and 18mm from any sheet end or cut edge.

JOINTING

Joint strength is important in delivering bracing system performance. All fastener heads stopped and all sheet joints GIB® Joint Tape reinforced and stopped in accordance with the GIB® Site Guide.





Unless stated all fastener spacings are maximums.

In order for GIB® systems to perform as tested, all components must be installed exactly as prescribed. Substituting components produces an entirely different system and may seriously compromise performance. Follow the specifications. This specification sheet is issued in conjunction with the publication GIB EzyBrace® Systems

GIB EzyBrace® Systems specification GSP-H

Specification Code	Minimum length (m)	Lining requirement	Other requirements
GSP-H	0.4	Any 10mm or 13mm GIB® plasterboard lining to one side of framing and minimum 7mm structural plywood manufactured to AS/NZ 2269.0 :2012 to the other side	Hold downs

WALL FRAMING

Wall framing to comply with;

- NZBC B1 — Structure B1/AS1 Clause 3 Timber (NZS 3604:2011).
- NZBC B2 — Durability B2/AS1 Clause 3.2 Timber (NZS 3602).

Framing dimensions and height as determined by NZS 3604:2011 stud and top plate tables for load bearing and non-bearing walls. The use of kiln dried stress graded timber is recommended.

BOTTOM PLATE FIXING

Timber floor

Use panel hold downs at each end of the bracing element. The GIB HandiBrac® is recommended. See details in GIB EzyBrace® Systems or GIB® Site Guide.

Pairs of hand driven 100 x 3.75mm nails at 600mm centres; or Three power driven 90 x 3.15mm nails at 600mm centres.

Concrete floor

Use panel hold downs at each end of the bracing element. The GIB HandiBrac® is recommended. See details in GIB EzyBrace® Systems or GIB® Site Guide. Within the length of the bracing element bottom plates are to be fixed in accordance with the requirements of NZS 3604:2011.

WALL LINING

- A layer of 10mm or 13mm GIB® plasterboard to one side of the wall plus minimum 7mm structural plywood manufactured to AS/NZ 2269.0 :2012 to the other side.
- Sheets can be fixed vertically or horizontally, with edges supported.
- Sheet joints shall be touch fitted.
- Use full length sheets where possible.

PERMITTED ALTERNATIVES

For permitted GIB® plasterboard alternatives refer to p. 5 in GIB EzyBrace® Systems literature.

FASTENING THE LINING

Fasteners

32mm x 6g GIB® Grabber® High Thread Screws, 32mm x 7g GIB® Grabber® Dual Thread Screws or 30mm GIB® Nails.

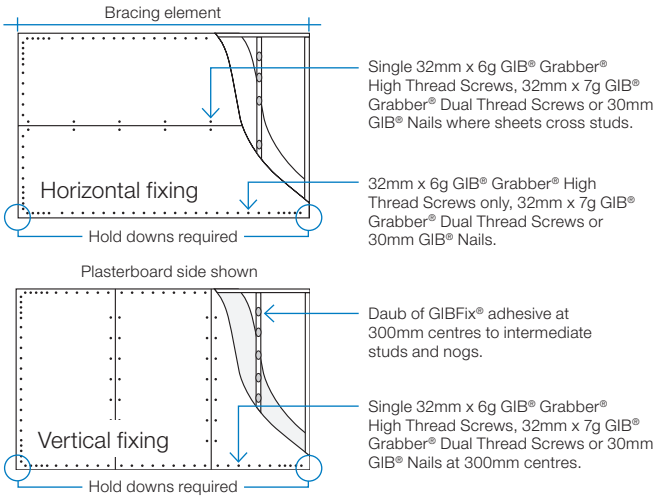
If using the GIBFix® Framing System or if fastening through GIBFix® Angles use only 32mm x 7g GIB® Grabber® Dual Thread Screws. Plywood: 50 x 2.8mm Galv or Stainless steel annular grooved FH nails.

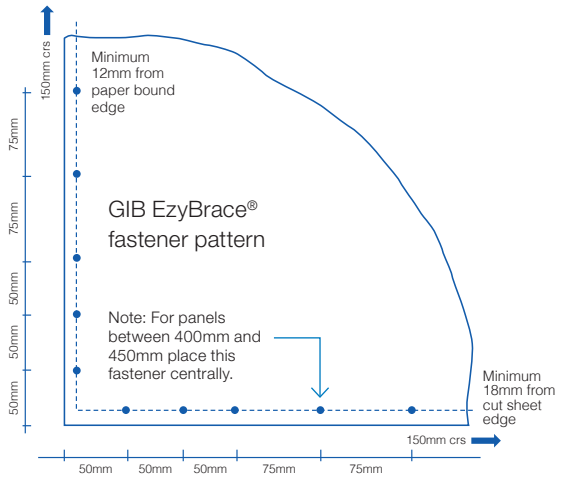
Fastener centres

GIB® plasterboard side: 50,100,150, 225, 300mm maximum from each corner and 150mm thereafter around the perimeter of the bracing element. For vertically fixed sheets place fasteners at 300mm maximum centres to the intermediate sheet joints. For horizontally fixed sheets place single fasteners to the sheet edge where it crosses the stud. Use daubs of GIBFix® adhesive at 300mm maximum centres to intermediate studs. Place fasteners no closer than 12mm from paper bound sheet edges and 18mm from any sheet end or cut edge. Plywood side: 150mm centres to the perimeter of each sheet. GIB® corner fastener pattern does not apply to the plywood side. 300mm centres to intermediate studs.

JOINTING

Joint strength is important in delivering bracing system performance. All fastener heads stopped and all sheet joints GIB® Joint Tape reinforced and stopped in accordance with the GIB® Site Guide.





Unless stated all fastener spacings are maximums.

In order for GIB® systems to perform as tested, all components must be installed exactly as prescribed. Substituting components produces an entirely different system and may seriously compromise performance. Follow the specifications. This specification sheet is issued in conjunction with the publication GIB EzyBrace® Systems

GIB EzyBrace® Systems specification BL1-H

Specification code	Minimum length (m)	Lining requirement	Other requirements
BL1-H	0.4	10mm or 13mm GIB Braceline® to one side only	Hold downs

WALL FRAMING

Wall framing to comply with;

- NZBC B1 — Structure B1/AS1 Clause 3 Timber (NZS 3604:2011).
- NZBC B2 — Durability B2/AS1 Clause 3.2 Timber (NZS 3602).

Framing dimensions and height as determined by NZS 3604:2011 stud and top plate tables for load bearing and non-bearing walls. The use of kiln dried stress graded timber is recommended.

BOTTOM PLATE FIXING

Timber floor

Use panel hold downs at each end of the bracing element. The GIB HandiBrac® is recommended. See details in GIB EzyBrace® Systems or GIB® Site Guide.

Pairs of hand driven 100 x 3.75mm nails at 600mm centres; or Three power driven 90 x 3.15mm nails at 600mm centres.

Concrete floor

Use panel hold downs at each end of the bracing element. The GIB HandiBrac® is recommended. See details in GIB EzyBrace® Systems or GIB® Site Guide. Within the length of the bracing element bottom plates are to be fixed in accordance with the requirements of NZS 3604:2011.

WALL LINING

- A layer of 10mm or 13mm GIB Braceline®
- Sheets can be fixed vertically or horizontally.
- Sheet joints shall be touch fitted.
- Use full length sheets where possible.

PERMITTED ALTERNATIVES

For permitted GIB® plasterboard alternatives refer to p. 5 in GIB EzyBrace® Systems literature.

FASTENING THE LINING

Fasteners

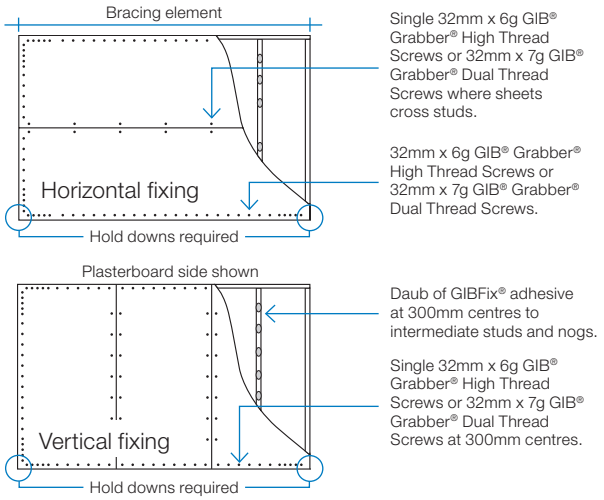
32mm x 6g GIB® Grabber® High Thread Screws or 32mm x 7g GIB® Grabber® Dual Thread Screws. If using the GIBFix® Framing System or if fastening through GIBFix® Angles use only 32mm x 7g GIB® Grabber® Dual Thread Screws.

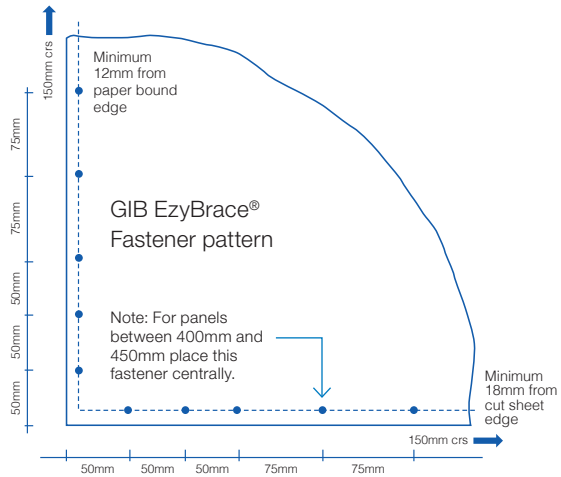
Fastener centres

50,100,150, 225, 300mm from maximum each corner and 150mm thereafter around the perimeter of the bracing element. For vertically fixed sheets place fasteners at 300mm maximum centres to the sheet joint. For horizontally fixed sheets place single fasteners to the sheet edge where it crosses the stud. Use daubs of GIBFix® adhesive at 300mm maximum centres to intermediate studs. Place fasteners no closer than 12mm from paper bound sheet edges and 18mm from any sheet end or cut edge.

JOINTING

Joint strength is important in delivering bracing system performance. All fastener heads stopped and all sheet joints GIB® Joint Tape reinforced and stopped in accordance with the GIB® Site Guide.





Unless stated all fastener spacings are maximums.

In order for GIB® systems to perform as tested, all components must be installed exactly as prescribed. Substituting components produces an entirely different system and may seriously compromise performance. Follow the specifications. This specification sheet is issued in conjunction with the publication GIB EzyBrace® Systems

GIB EzyBrace® Systems specification BLG-H

Specification code	Minimum length (m)	Lining requirement	Other requirements
BLG-H	0.4	10mm or 13mm GIB Braceline® to one side of the frame plus any 10mm or 13mm GIB® plasterboard to the other side	Hold downs

WALL FRAMING

Wall framing to comply with;

- NZBC B1 — Structure B1/AS1 Clause 3 Timber (NZS 3604:2011).
- NZBC B2 — Durability B2/AS1 Clause 3.2 Timber (NZS 3602).

Framing dimensions and height as determined by NZS 3604:2011 stud and top plate tables for load bearing and non-bearing walls. The use of kiln dried stress graded timber is recommended.

BOTTOM PLATE FIXING

Timber floor

Use panel hold downs at each end of the bracing element. The GIB HandiBrac® is recommended. See details in GIB EzyBrace® Systems or GIB® Site Guide. Pairs of hand driven 100 x 3.75mm nails at 600mm centres; or Three power driven 90 x 3.15mm nails at 600mm centres.

Concrete floor

Use panel hold downs at each end of the bracing element. The GIB HandiBrac® is recommended. See details in GIB EzyBrace® Systems 2011 or GIB® Site Guide. Within the length of the bracing element bottom plates are to be fixed in accordance with the requirements of NZS 3604:2011.

WALL LINING

- A layer of 10mm or 13mm GIB Braceline® to one side of the wall plus any 10mm or 13mm GIB® plasterboard lining to the other side.
- Sheets can be fixed vertically or horizontally.
- Sheet joints shall be touch fitted.
- Use full length sheets where possible.

PERMITTED ALTERNATIVES

For permitted GIB® plasterboard alternatives refer to p. 5 in GIB EzyBrace® Systems literature.

FASTENING THE LINING

Fasteners

GIB Braceline® side: 32mm x 6g GIB® Grabber® High Thread Screws or 32mm x 7g GIB® Grabber® Dual Thread Screws.Other side: 32mm x 6g GIB® Grabber® High Thread Screws, 30mm GIB Nails or 32mm x 7g GIB® Grabber® Dual Thread Screws.

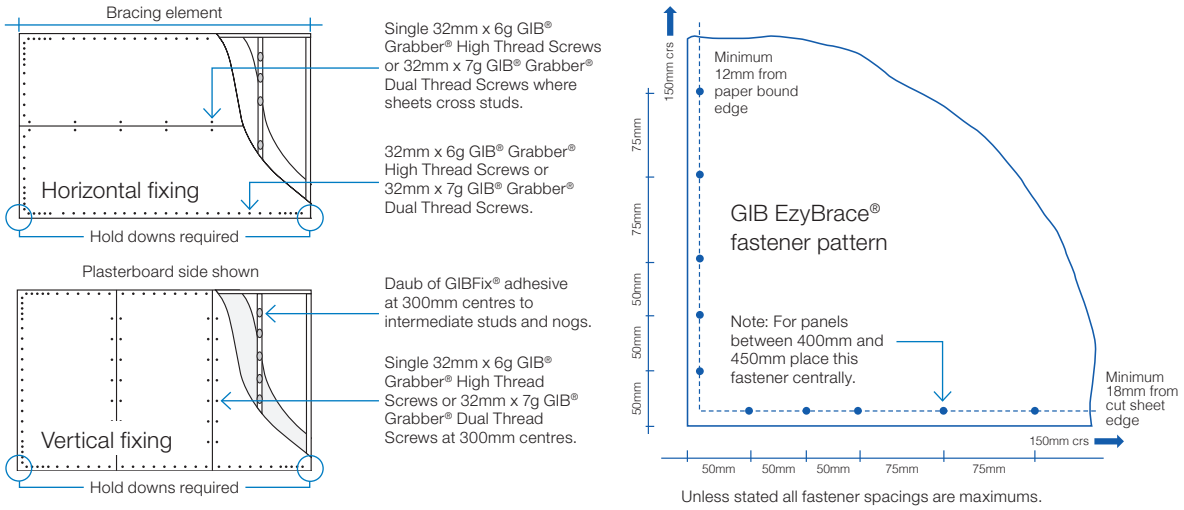
If using the GIBFix® Framing System or if fastening through GIBFix® Angles use only 32mm x 7g GIB® Grabber® Dual Thread Screws.

Fastener centres

50,100,150, 225, 300mm maximum from each corner and then 150mm thereafter around the perimeter of the bracing element. For vertically fixed sheets place fasteners at 300mm maximum centres to the intermediate sheet joints. For horizontally fixed sheets place single fasteners to the sheet edge where it crosses the stud. Use daubs of GIBFix® adhesive at 300mm maximum centres to intermediate studs. Place fasteners no closer than 12mm from paper bound sheet edges and 18mm from any sheet end or cut edge.

JOINTING

Joint strength is important in delivering bracing system performance. All fastener heads stopped and all sheet joints GIB® Joint Tape reinforced and stopped in accordance with the GIB® Site Guide.



Unless stated all fastener spacings are maximums.

In order for GIB® systems to perform as tested, all components must be installed exactly as prescribed. Substituting components produces an entirely different system and may seriously compromise performance. Follow the specifications. This specification sheet is issued in conjunction with the publication GIB EzyBrace® Systems

GIB EzyBrace® Systems specification BLP-H

Specification code	Minimum length (m)	Lining requirement	Other requirements
BLP-H	0.4	10mm or 13mm GIB Braceline® to one side of the frame plus minimum 7mm structural plywood manufactured to AS/NZ 2269.0 :2012 to the other side	Hold downs

WALL FRAMING

Wall framing to comply with;

- NZBC B1 — Structure; B1/AS1 Clause 3 Timber (NZS 3604:2011).
- NZBC B2 — Durability B2/AS1 Clause 3.2 Timber (NZS 3602).

Framing dimensions and height as determined by NZS 3604:2011 stud and top plate tables for load bearing and non-bearing walls. The use of kiln dried stress graded timber is recommended.

BOTTOM PLATE FIXING

Timber floor

Use panel hold downs at each end of the bracing element. The GIB® HandiBrac is recommended. See details in GIB EzyBrace® Systems or GIB® Site Guide.

Pairs of hand driven 100 x 3.75mm nails at 600mm centres; or Three power driven 90 x 3.15mm nails at 600mm centres.

Concrete floor

Use panel hold downs at each end of the bracing element. The GIB HandiBrac® is recommended. See details in GIB EzyBrace® Systems or GIB® Site Guide. Within the length of the bracing element bottom plates are to be fixed in accordance with the requirements of AS/NZ 2269/0 :2012.

WALL LINING

- A layer of 10mm or 13mm GIB Braceline® to one side of the wall plus minimum 7mm structural plywood manufactured to AS/NZS 2269.0 :2012 to the other side.
- Sheets can be fixed vertically or horizontally.
- Plywood is to be fixed vertically with edges supported.
- Sheet joints shall be touch fitted.
- Use full length sheets where possible.

PERMITTED ALTERNATIVES

For permitted GIB® plasterboard alternatives refer to p. 5 in GIB EzyBrace® Systems literature.

FASTENING THE LINING

Fasteners

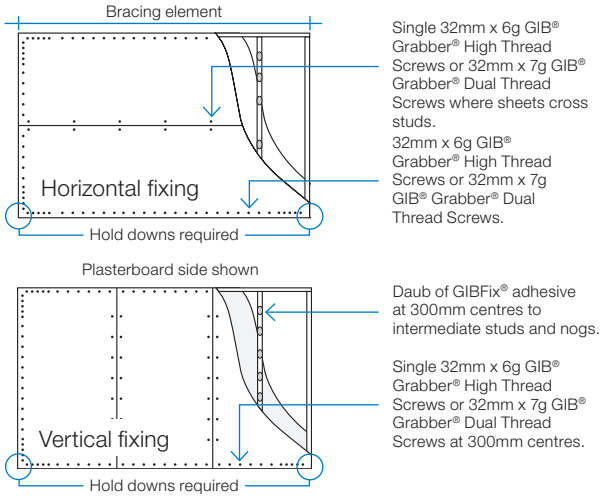
GIB Braceline® side: 32mm x 6g GIB® Grabber® High Thread Screws or 32mm x 7g GIB® Grabber® Dual Thread Screws. Plywood: 50 x 2.8mm Galv or Stainless steel annular grooved FH nails. If using the GIBFix® Framing System or if fastening through GIBFix® Angles use only 32mm x 7g GIB® Grabber® Dual Thread Screws.

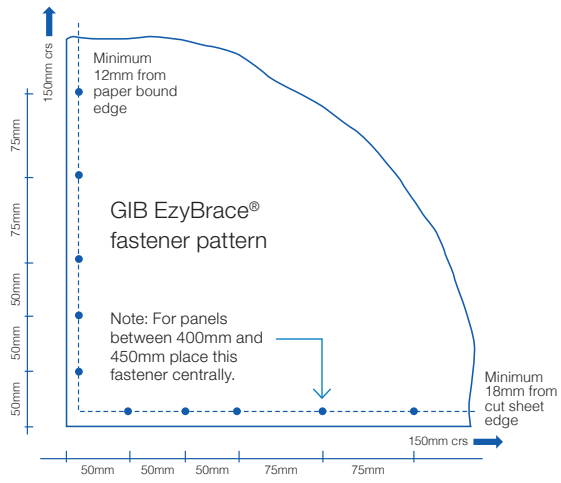
Fastener centres

GIB® Plasterboard side: 50,100,150, 225, 300mm from each corner and then 150mm thereafter around the perimeter of the bracing element. For vertically fixed sheets place fasteners at 300mm centres to the intermediate sheet joints. For horizontally fixed sheets place single fasteners to the sheet edge where it crosses the stud. Use daubs of GIBFix® adhesive at 300mm centres to intermediate studs. Place fasteners no closer than 12mm from paper bound sheet edges and 18mm from any sheet end or cut edge. Plywood side: 150mm centres to the perimeter of each sheet. GIB® corner fastener pattern does not apply to the plywood side. 300mm centres to intermediate studs.

JOINTING

Joint strength is important in delivering bracing system performance. All fastener heads stopped and all sheet joints GIB® Joint Tape reinforced and stopped in accordance with the GIB® Site Guide.





Unless stated all fastener spacings are maximums.

In order for GIB® systems to perform as tested, all components must be installed exactly as prescribed. Substituting components produces an entirely different system and may seriously compromise performance. Follow the specifications. This specification sheet is issued in conjunction with the publication GIB EzyBrace® Systems

SUSTAINABILITY AND THE ENVIRONMENT

Winstone Wallboards is committed to protecting the environment. Environmental matters are integrated into all 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 all must accept.
- We allocate appropriate management time and resources to address relevant environmental issues and continuously improve our activities in that area.
- We will achieve our standards of performance through positive action, employee involvement and constant communication with our neighbours, local authorities and customers.

Minimise on-site waste when designing and/or installing GIB® Systems. For larger projects give consideration to our cut-to-length service to reduce waste. GIB® plasterboard off-cuts, if separated from other waste building materials, can be readily recycled.

For larger projects waste can be diverted to compost manufacturers who grind up the GIB® plasterboard and use it in compost. For smaller projects, the GIB® plasterboard can be ground up and spread around the building site.

GLOBAL GREENTAG^{CERTTM}

The Global GreenTag^{CertTM} certified eco-label acknowledges product as meeting the GreenRate Standard set by Global GreenTag.^{CertTM}

GIB® plasterboard has a Level B green rating.

DECLARE CERTIFICATION

Declare is a database of non-toxic, sustainably sourced building products.

Many GIB® plasterboard products including GIB® Standard, GIB Braceline®, GIB Noiseline® and GIB Aqualine® have achieved Red List Free status in Declare certification.

For more information on Winstone Wallboards sustainability commitments visit gib.co.nz.

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Winstone Wallboards asserts its moral rights and reserves all other intellectual property rights in the materials contained in this brochure and related to GIBFix® Framing System and GIB EzyBrace® Systems.

TRADEMARKS

The names GIB®, GIB Fyreline®, GIB Ultraline®, GIB Braceline®, GIB Toughline®, GIB Noiseline®, GIB Aqualine®, GIB Nail®, GIB Tradeset®, GIB Plus 4®, GIB-Cove®, GIB Lite Blue®, GIBFix®, the colour mauve for GIB Toughline®, GIB HandiBrac®, GIB EzyBrace®, the colour blue for GIB Braceline®, the colour pink for GIB Fyreline®, the colour green for GIB Aqualine®, and the shield device are registered trademarks of Fletcher Building Holdings Limited.

PATENTS

GIBFix® Framing System and GIB EzyBrace® Systems, including componentry and design method, have patents pending (NZ Patent Number 596691, NZ Patent 709159 pending) and design and other IP rights.

GIB®

FOR MORE INFORMATION VISIT

gib.co.nz

OR CALL THE GIB® HELPLINE

0800 100 442

GIB®

Wet Area Systems

Specification and installation manual



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NATIONAL SUPPORT

VISIT: Winstone Wallboards Limited
37 Felix Street, Penrose,
Auckland 1061, New Zealand
POST: PO Box 12 256, Penrose,
Auckland 1642, New Zealand
PHONE: +64 9 633 0100
EMAIL: info@gib.co.nz
WEB: gib.co.nz

GIB® HELPLINE

0800 100 442

RESIDENTIAL AND NON-RESIDENTIAL APPLICATIONS. BATHROOMS, LAUNDRIES, TOILETS AND KITCHENS.

Protection from internal moisture is an important consideration when designing interior lining systems for homes, multi-unit apartments, educational, healthcare and commercial applications.

The New Zealand Building Code sets out minimum standards for wet area spaces in residential dwellings. However, often higher levels of performance and protection from internal moisture is demanded.

The GIB® Wet Areas System specification and installation manual provides internal lining options and details for specifiers, builders and building owners.

USE ONLY THE CURRENT SPECIFICATION

This manual supersedes the publication GIB Aqualine® Wet Area Systems March 2007. Winstone Wallboards Ltd accepts no liability for reliance upon publications that have been superseded.

If you are unsure whether this is the current publication, call the GIB® Helpline on 0800 100 442 or go to gib.co.nz

BEWARE OF SUBSTITUTION

The performance of GIB® Wet Area Systems requires accurate design detailing and construction practices. All GIB® Systems have been developed specifically for New Zealand conditions and independently tested, assessed or appraised, to ensure the required level of performance. It is important to use GIB® components where specified and to closely follow the specified design details and construction practices, to be confident that the required level of performance and quality is achieved on site.

BRANZ Appraised
Appraisal No.427 [2021]

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This publication

This publication is a best practice guide to the design and construction of wall and ceiling linings in wet areas with intermittent water exposure within residential and non-residential buildings, as covered by NZ Building Code Clause E3 Internal Moisture.

The information is designed to be helpful to designers, contractors and home-owners wishing to achieve a result that is easy to incorporate into modern design, simple and clear to construct, and that will satisfy the needs, requirements and expectations of both the NZ Building Code and the end user.

Wet areas in the home often require relatively frequent and expensive renovation or repair, often because of the ingress of water to the structure of the building.

To form a complete wet area system it is important to specify compatible materials and systems, designed to cope with conditions that are common in wet areas, and to ensure correct installation using best practice.

WET AREAS

Generally, wet areas are described as spaces to where fresh water is reticulated, such as bathrooms, toilets, laundries and kitchens. Within wet areas the following requirements apply;

1. NZBC Clause E3.3.4 states that wall surfaces adjacent to sanitary fixtures or sanitary appliances must be impervious and easily cleaned.
2. NZBC Clause E3.3.6 states that surfaces of building elements likely to be splashed must be constructed in a way that prevents water splash from penetrating behind linings or into concealed spaces.

NZ Building Code Clause E3 also refers to other requirements not covered in this publication, such as ventilation, condensation control and overflow management. Ongoing maintenance of wet areas is also important to maximise service life.

GIB AQUALINE®, GIB TOUGHLINE® AQUA AND GIB WEATHERLINE®

Although able to cope with infrequent short-term exposure, standard gypsum plasterboard will have a shortened life expectancy when frequently exposed to water or a high moisture environment.

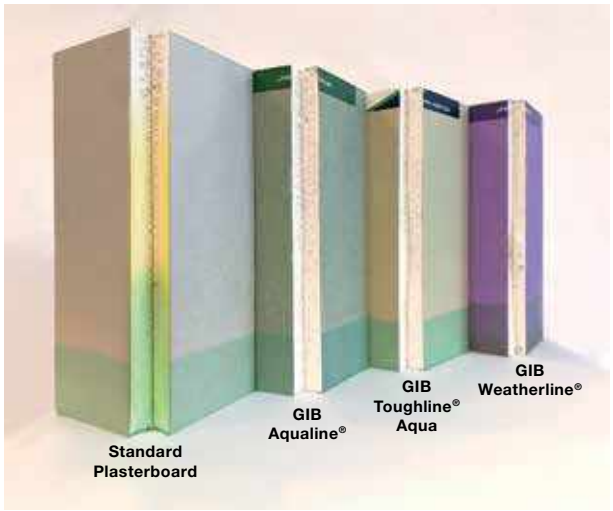
The NZ Building Code does not call for water resistant linings in wet areas but it is desirable to specify lining materials which will maintain their integrity longer when exposed more frequently to moisture, and to one-off events such as leaks or flooding.

GIB Aqualine®, GIB Toughline® Aqua and GIB Weatherline® feature a water-resistant polymer impregnated core, designed for wet area applications. These core formulations not only resist penetration of moisture through the lining into the framing behind, but also resist water “wicking” up the core, a common cause of long-term damage where a water-resistant lining has not been used.

WATER ABSORPTION TEST

The illustrations below show how GIB Aqualine®, GIB Toughline® Aqua and GIB Weatherline® compare with standard plasterboard after soaking for two-hours in green dye.





WHERE TO USE GIB® WET AREA LININGS

In order to prolong the life expectancy of the space it is highly desirable to include wet area linings in situations where there is an increased risk of water or moisture damage. Applications include walls and ceilings in bath and shower rooms, and walls in laundries, toilets and kitchens.

BENEFITS

- Water resistant and durable linings help protect against water damage
- Proven substrate for paint, wallpaper, waterproofing membranes, tiles, sheet vinyl and rigid sheet shower linings
- Suitable for both residential and non-residential applications
- Dimensionally stable and an excellent substrate for ceramic tiles
- Conventional jointing methods
- Easy to cut and form openings
- Contains glass fibres and other additives to increase strength and fire resistance
- May be used in GIB® Bracing, GIB® Fire Rated and GIB Noise Control® Systems (see Compliance with the NZ Building Code, Clauses B1, C3 and G6). Consult the appropriate GIB® literature for installation details

HANDLING AND STORAGE

- GIB® plasterboard must be stored under cover, stacked flat and clear of the floor with sufficient support to avoid sagging
- GIB® plasterboard must be handled as a finishing material

LIMITATIONS

- GIB® wet area linings must not be used for bracing purposes in shower cubicles or above baths. For more information refer to page 9 of this manual
- Do not use GIB® wet area linings where exposed for extended periods to humidity levels above 90% RH, such as in group shower or steam rooms, or where exposed to moisture and chlorine rich environments such as in indoor swimming pools
- GIB® wet area linings used in a bathroom or other high humidity environment must not be directly applied to solid plaster (gypsum or cement), wood-based sheet linings or similar materials, masonry or concrete, without strapping or steel furring channels
- GIB® wet area linings must not be installed over a vapour barrier or a wall acting as a vapour barrier
- Cracked or damaged sheets must never be used
- GIB Aqualine® or GIB Toughline® Aqua must not be used in external applications
- GIB® plasterboard must not be exposed to temperatures in excess of 52°C for prolonged periods. Heat-generating devices may include halogen lighting, cooking elements, radiant heating, solid fuel exhausts and fire surrounds. Consult the appliance manufacturer for installation details

Table 1: GIB® Wet Area linings sheet dimensions and weights

Product	Sheet face colour	Thickness (mm)	Sheet width (mm)	Edge Type	Sheet length (mm)						Max. Weight (kg/m²)
					2400	2450	2700	3000	3600	4800	
GIB Aqualine®	Green	10	1200	TE/TE	■		■	■	■		8.0
			1200	TE/SE	■					■	
			1350	TE/SE	■				■		
		13	1200	TE/TE	■		■	■	■		11.0
GIB Toughline® Aqua	Mauve	13	1200	TE/TE	■		■	■			11.4
GIB Weatherline®	Purple	10	1200	SE/SE		■	■	■			9.0
		13	1200	SE/SE			■	■			11.5

BOARD SUBSTITUTION OPTIONS

Acceptable GIB Aqualine® alternatives	
10mm GIB Aqualine® can be replaced with:	10mm GIB Weatherline® 13mm GIB Toughline® Aqua
13mm GIB Aqualine® can be replaced with:	13mm GIB Weatherline® 13mm GIB Toughline® Aqua

GIB® Wet Area System construction details in this manual refer to the use of GIB Aqualine®, GIB Toughline® Aqua and GIB Weatherline® sheets may also be used in place of GIB Aqualine®.

FLEXIBLE SHEET VINYL – SHOWERS AND OTHER WET AREAS

- GIB Aqualine®, GIB Toughline® Aqua and GIB Weatherline® are suitable substrates for flexible vinyl wall finishes in wet areas of residential, commercial or institutional buildings
- Framing requirements and installation procedures are presented in this literature, except that the lining gap at the floor is no more than 5mm when a pencil cove detail is used
- The installation of galvanised steel reinforcing angles behind internal lining corners is recommended for sheet vinyl applications in showers or shower over bath situations
- The lining must be jointed and stopped to a paint quality finish (Level 4) – trowel marks can telegraph even through a commercial grade 2mm vinyl
- A commercial grade vinyl is recommended in commercial or institutional bathrooms and showers
- In areas directly exposed to liquid water, all joints in flexible sheet vinyl must be heat welded
- Installation of flexible vinyl must be carried out strictly in accordance with the specifications provided by the suppliers/ manufacturers of the vinyl

RIGID SHEET SHOWER LININGS

- The wall surface must be free of dust before installation of the lining
- Avoid lining joints as much as possible and where necessary flush with plaster to achieve a level surface
- Do not preseal or paint areas which are to be covered by the rigid shower linings
- The suppliers of thin (usually 2-3mm) and rigid acrylic shower linings commonly recommend direct adhesive fixing to wall linings using solvent-based adhesives
- Care must be taken to ensure that rooms are adequately ventilated
- Water temperature changes will cause movement of the thin acrylic sheet, which in turn will stress the adhesive and wall lining substrate
- Consult the supplier of the shower lining for full installation details
- Suppliers of rigid sheet acrylic shower linings recommend a minimum of 24 hours for the adhesive to cure fully prior to the shower being put into service

WATERPROOF MEMBRANE SYSTEMS AND TILING

- A waterproof membrane system must be applied to lining materials used as a substrate for ceramic tiles in a shower or shower over bath situation
- The wall surface in a shower or shower over bath situation is not complete and ready for tiling until coated with a waterproof membrane system over the lining and once penetrations for shower mixers, taps and associated fittings are sealed
- The installation of galvanised steel reinforcing angles behind internal lining corners is required for tiled wall applications in showers or shower over bath situations
- In-situ waterproofing membrane materials manufactured to AS/NZS 4858:2004 “Wet Area Membranes” are recommended and must be applied to manufacturer’s recommendations. Typically, these types of membrane systems are not suitable for paint and wallpaper finishes
- Waterproof membrane systems must be fully cured and dry prior to application of tiling adhesives
- Preformed sheet membranes are also available and may be more suitable where curing times or specialist skills are an issue
- The details shown in this manual are generic in nature. For accurate detailing, follow the specifications provided by the supplier of the proprietary waterproof membrane system

For further information on tiling consult the BRANZ Good Practice Guide – Tiling.

PENETRATIONS AND SEALANTS

As leaks and water ingress typically occur at junctions between building elements and at penetrations, it is essential that particular attention is given to these details at the time of installation. Lack of attention to detail can result in water damage that could remain undetected for a long time.

- Ensure that all cut-outs for pipe penetrations are made neatly, and slightly oversize, with a hole saw. These penetrations should be of a diameter no more than 12mm greater than that of the pipe
- Ensure shower mixer and tap penetrations are sealed with a proprietary flange system to prevent the passage of moisture into the wall cavity
- Sealants should be of a mould inhibiting type and be paintable. Neutral cure silicones will generally meet these requirements
- Surfaces should be dry and free from dust before application, a minimum of a 4mm joint width provided and the depth should not exceed the width
- Apply a bead of sealant to the full depth of the lining in the following locations:
  - Around all tap/pipe bodies
  - The gap between the bath rim and the bottom edge of the wet area lining
  - Between the upstand of preformed shower bases and the bottom edge of the lining
  - Where an impervious junction is required at the floor/wall line, carefully seal the gap between the bottom edge of the board and the finished floor. Leave a 5-10mm gap at the bottom of the wall lining for this purpose, ensuring the gap is free from dirt and dust
- Do not locate shower heads or taps on fire rated or intertenancy walls. Should this be unavoidable always use tested and approved proprietary penetration seals

RENOVATIONS

Bathrooms, kitchens and laundries are the most renovated rooms in the house, partly due to fashion considerations and partly because of damage sustained by ingress of water and moisture.

When renovating these rooms it is often easier and more cost-effective to remove the existing linings and replace them. This allows for a new start in the room and offers sound substrates for new surfaces such as tiling and painting, where otherwise flaking paint or damaged plasterboard may compromise good and sound finish or practice. At the very least re-lining will:

- Allow for inspection of framing where damage may have occurred and provide the opportunity to repair such damage
- Allow plumbing and electrics to be checked and altered or replaced where required
- Provide the opportunity to install thermal and acoustic insulation, water-resistant linings, and propriety plumbing penetration flange systems where appropriate
- Make the job easier

MAINTENANCE

Lack of maintenance is frequently the cause of premature and often expensive failure of components and building elements within wet areas.

It is important to regularly inspect and repair any potential problem before it becomes expensive to reinstate. Good maintenance should include:

- Ongoing ventilation. At the very least, good passive ventilation (e.g. window vents); but good active ventilation (e.g. extraction fans) of an appropriate size for the room is recommended
- Impervious coatings and surfaces should be checked for wear and damage and maintained and re-coated before ingress of water to the substrate occurs
- Regular cleaning with appropriate cleaners so that build-up of matter, such as mould, is well controlled
- Sealants at junctions and penetrations should be checked for adhesion on a regular basis and replaced where adhesion failure to substrates occurs
- Where pipe leaks have become evident, however small, they should be repaired promptly and any area around such leaks dried out completely before any other repairs are carried out

Compliance with the NZ Building Code

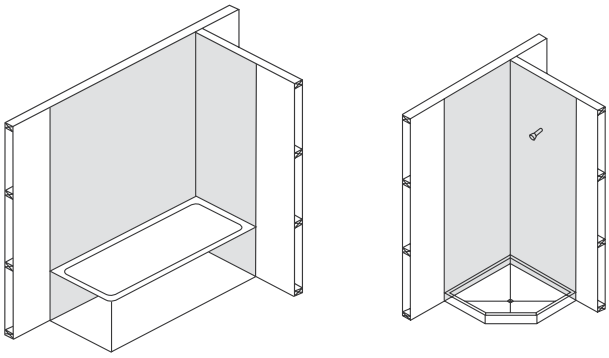
STRUCTURE – CLAUSE B1

The design and material specification for steel and timber framing used in GIB® Wet Area systems must be in accordance with the performance requirements of NZ Building Code Clause B1 (Structure).

Bracing elements are required to have a durability of 50 years. GIB® bracing elements are not to be located in shower cubicles or behind baths because of durability requirements, the likelihood of renovation, and practical issues associated with fixing bracing elements to perimeter framing members, such as at bath and shower tray locations.

Otherwise, GIB® Bracing Systems can be used in water-splash areas, provided these are maintained impervious for the life of the building.

GIB Aqualine®, GIB Toughline® Aqua and GIB Weatherline® can be used in place of GIB® Standard plasterboard in GIB® bracing elements. They can also be used in place of GIB Braceline® in GIB® bracing elements 900mm or longer, provided the perimeter of the element is fixed with GIB® Grabber 32mm x 6g screws at 100mm centres, using the GIB Braceline® corner fixing pattern. Refer to the GIB® Bracing System literature.



No bracing in the shaded areas.

DURABILITY – CLAUSE B2

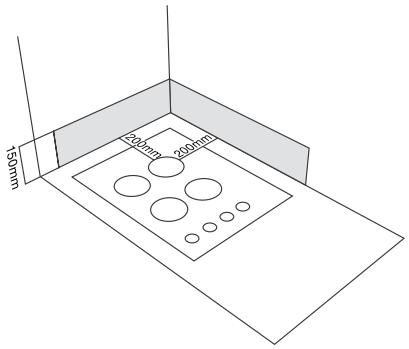
When installed and maintained in accordance with this literature, GIB® Wet Area systems tiled or vinyl covered have a serviceable life of at least 15 years. They comply with the requirements of NZ Building Code Clause B2 (Durability) for use in wet areas directly exposed to liquid water, e.g. showers, showers over baths and splash-backs.

When used as a general wet area lining and maintained under normal dry internal conditions, GIB® Wet Area Systems have a serviceable life of at least 50 years and comply with NZ Building Code Clause B2 (Durability) for use within toilets, kitchens, bathrooms and laundries not directly exposed to liquid water.

FIRE AFFECTING AREAS BEYOND THE SOURCE – CLAUSE C3

GIB® Fire Rated Systems provide passive fire protection in accordance with the requirements of NZ Building Code Clause C3. When GIB Aqualine® or GIB Toughline® Aqua is substituted into fire rated systems in place of the equivalent thickness GIB Fyreline®, the Fire Resistance Rating (FRR) of that system will be maintained.

The protection of combustible surfaces surrounding gas cooking appliances is covered by the latest version of AS/NZS 5601.1.



As a guide the following options are acceptable for wall surfaces within 200mm of the periphery of a gas element to a height of 150mm above the element for the full dimension (width and depth) of the cooktop surface area:

- 5mm tiles on GIB® plasterboard
- 5mm toughened glass on GIB® plasterboard
- or any system that can be demonstrated to meet the specific requirements of AS/NZS 5601.1

GIB® plasterboard products must not be exposed to temperatures in excess of 52°C for sustained periods. Check with the appliance manufacturer that this requirement will be met. It would be unusual for surfaces outside 200mm to exceed 52°C for sustained periods.

INTERNAL MOISTURE – CLAUSE E3

The New Zealand Building Code Clauses that relate to wall surfaces are;

E3.3.4 - Wall surfaces adjacent to sanitary fixtures or sanitary appliances must be impervious and easily cleaned.

E3.3.5 - Surfaces of the building elements likely to be splashed or become contaminated in the course of the intended use of the building, must be impervious and easily cleaned.

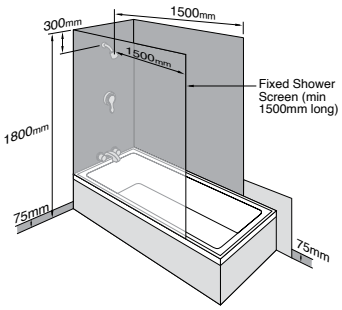
E3.3.6 - Surfaces of building elements likely to be splashed must be constructed in a way that prevents water splash from penetrating behind linings or into concealed spaces.

New Zealand Building Code Acceptable Solution E3/AS2 substantially refers to the Waterproof Membrane Association Incorporated (WMAI) Code of Practice for Internal Wet Area Membrane Systems (IWAM), August 2020.

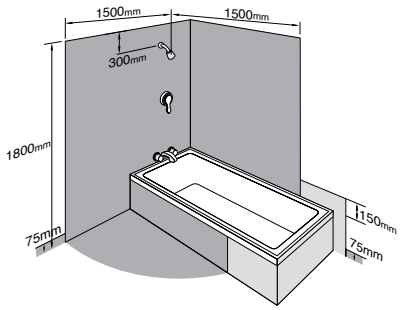
The IWAM Code of Practice refers to wet area membranes and over-surfaces that are easy to clean and suggests an extent as outlined below for a typical bathroom application. For further details refer to the IWAM Code of Practice which also lists suitable rigid sheet materials and tiling membranes.

Shaded areas in the diagrams below represent the minimum extent of wall surfaces requiring impervious sheet materials or waterproof membrane systems prior to tiling.

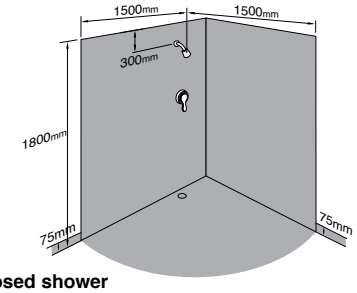
Enclosed shower over bath



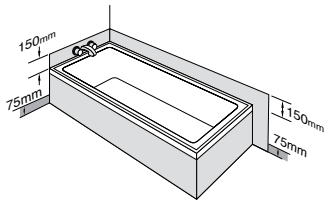
Unenclosed shower over bath



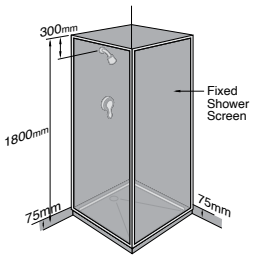
Unenclosed shower



Bath



Enclosed shower



HAZARDOUS BUILDING MATERIALS – CLAUSE F2

At no stage during its serviceable life does GIB Aqualine® constitute a health hazard. It therefore meets the provisions of NZ Building Code Clause F2 (Hazardous Building Materials). Dust resulting from the sanding of stopping compounds may be a respiratory irritant and the use of a suitable facemask is recommended.

VENTILATION – CLAUSE G4

NZ Building Code Clause G4 (Ventilation) requires buildings to have a means of collecting or otherwise removing steam generated from laundering, utensil washing, bathing or showering. To prolong the life of interior linings and surface finishes and to minimise the risk of moisture related problems such as condensation and mould growth, adequate heating, thermal insulation and mechanical ventilation must be provided in kitchens, bathrooms and laundries.

AIRBORNE AND IMPACT SOUND – CLAUSE G6

GIB® Noise Control Systems can be used to provide ratings for Sound Transmission Class (STC) and Impact Insulation Class (IIC) in accordance with the requirements of NZ Building Code Clause G6 (Airborne and Impact Sound). When GIB Aqualine®, GIB Toughline® Aqua or GIB Weatherline® is substituted into GIB® Noise Control systems in place of the equivalent thickness GIB® Standard plasterboard or GIB Fyreline®, the STC and IIC rating of that system will be maintained. When GIB Aqualine®, GIB Toughline® Aqua or GIB Weatherline® is substituted in place of the equivalent thickness GIB Noiseline®, a small performance loss may occur. For further information refer to the GIB Noise Control® Systems literature or contact the GIB® Helpline 0800 100 442.

TIMBER WALL FRAMING

Framing dimensions must comply with the requirements of NZS 3604:2011.

- The moisture content of timber framing shall be 18% or less at the time of lining
- Studs shall be spaced at 600mm centres maximum for both 10mm and 13mm GIB® plasterboard
- Nogs to be evenly spaced with a maximum spacing of 1350mm. Alternatively, nogs may be staggered 150mm maximum either side of a horizontal joint line
- Nogs are not required behind horizontal joints except in shower situations or specific fire or noise control systems

FASTENERS

- Minimum 32mm x 6g GIB® Grabber® High Thread screws.

FASTENER CENTRES

- 300mm centres to top and bottom plates and to perimeter studs
- Single fasteners to each stud where the horizontal joint crosses the studs
- Place fasteners 12mm from sheet edges and 18mm from sheet ends
- Daubs of GIBFix® adhesive at 300mm centres to intermediate studs
- Do not place adhesive at sheet edges or under fasteners. Sheet edges at door or window openings can be adhesive fixed unless forming part of the perimeter of a bracing element

For bracing, noise control or fire rating applications including fastener lengths consult the relevant GIB® technical publication.

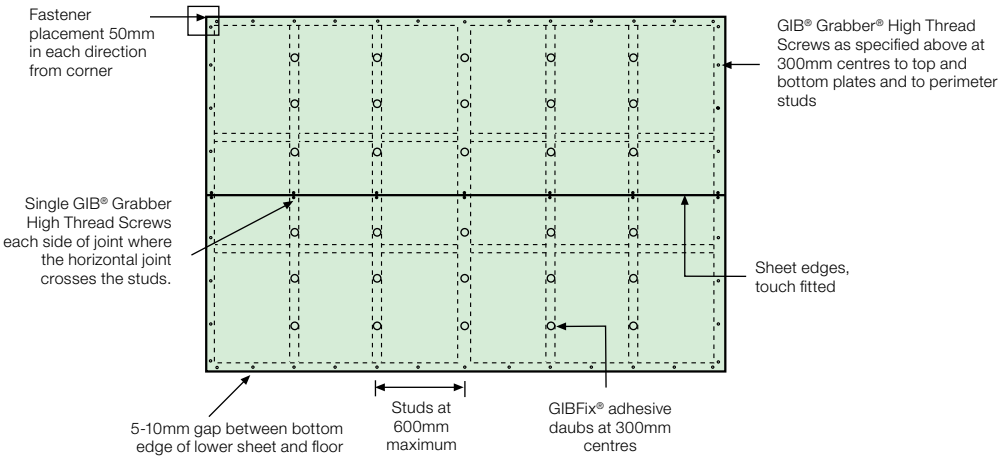
LINING

- Use minimum 10mm GIB® plasterboard
- Install the sheets leaving a 5-10mm gap at the floor line to allow for movement of the framing members and to allow for cleaning dirt and rubbish before sealing
- Sheets to be touch fitted.

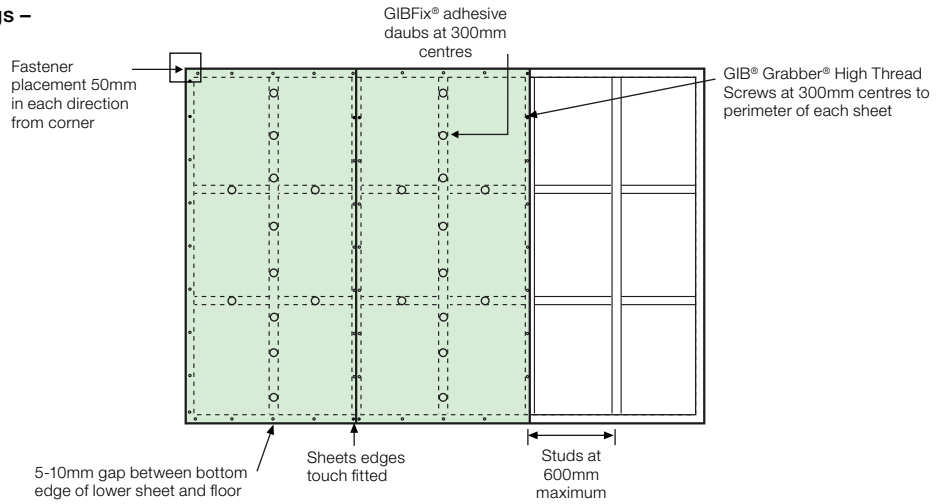
JOINTING

- Jointing shall be carried out in accordance with the instructions in the GIB® Site Guide.

Fastening the Linings – Horizontal Fixing Only



Fastening the Linings – Vertical Fixing Only



STEEL WALL FRAMING

The minimum sheet thickness for fixing on light gauge 0.55mm base metal thickness (BMT) steel framing is 13mm GIB® plasterboard. For bracing, noise control or fire rating applications consult the relevant GIB® technical publication.

Steel frame for residential construction is in accordance with NZBC B1/AS1 9.1 NASH Standard Part 2 Light Steel Framed Buildings, or by specific design. 10mm GIB plasterboard is commonly used on minimum 0.75mm BMT residential steel framing.

FASTENERS

— Minimum 25mm x 6g GIB® Grabber® Self Tapping Screws.

FASTENER CENTRES

— 300mm centres to top and bottom channels and to end studs

— Single screws to each stud where the horizontal joint crosses the studs

— Place fasteners 12mm from sheet edges and 18mm from sheet ends

— Daubs of GIBFix® All-Bond adhesive or screws at 300mm centres to intermediate studs

— Do not place adhesive at sheet edges or under fasteners.

— Sheet edges at door or window openings can be adhesive fixed.

For bracing, noise control or fire rating applications including fastener lengths consult the relevant GIB® technical publication.

LINING

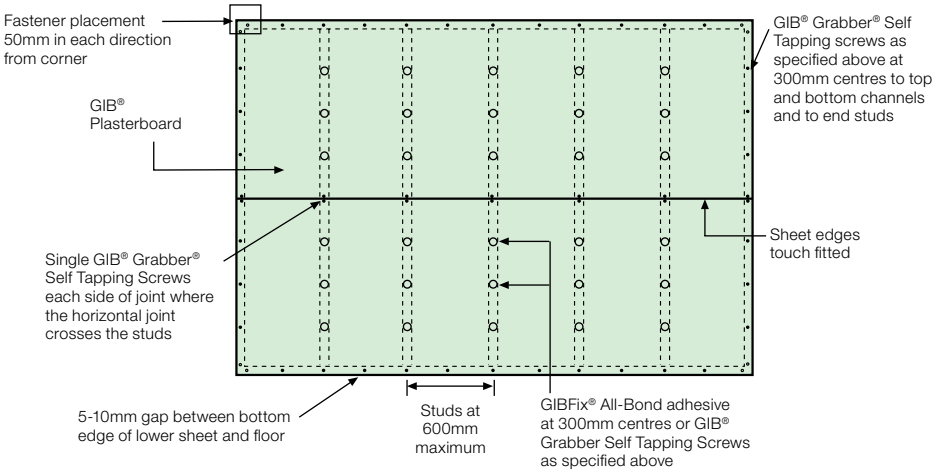
— Lay the sheets, leaving a 5-10mm gap at the floor line. Note: If friction fitted steel studs have been used, sheets must be fitted hard to the floor. Ensure floor is cured and dry

— Sheets to be touch fitted.

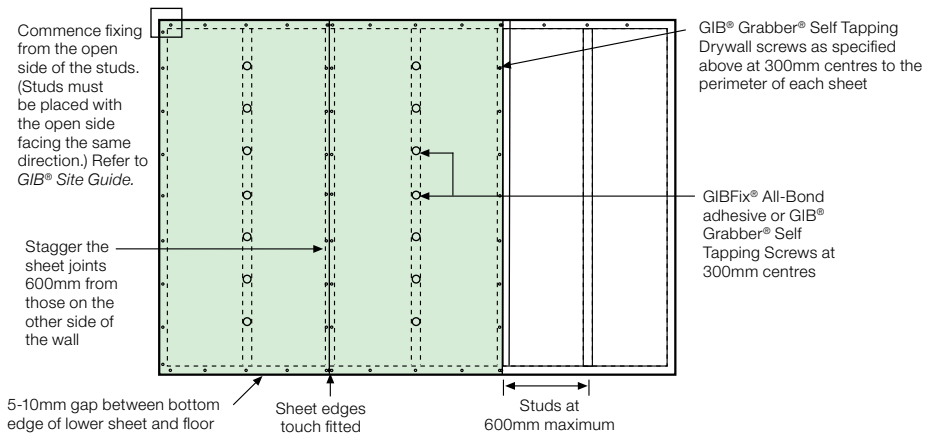
JOINTING

— Jointing shall be carried out in accordance with the instructions in the GIB® Site Guide

Fastening the Linings – Horizontal Fixing Only



Fastening the Linings – Vertical Fixing Only



TIMBER WALL FRAMING

Framing dimensions and spacing must be appropriate for the tile weight and comply with the requirements of NZS 3604:2011 Timber Framed Buildings, or relevant specific design Standard.

NOGS

For impact protection in shower cubicles or shower over bath situations it is important that all sheet joints are made on solid framing. This may require vertical fixing or the installation of additional nogs. Also provide nogs:

- Adjacent to each pipe penetration and behind sink and tub flashings
- Between all studs above bath flanges and preformed shower bases

CORNER REINFORCING

- Prior to lining in tiled areas (shower cubicles and shower over bath only) the internal corners shall be reinforced with a minimum
- 32 x 32 x 0.55mm NZ18 or 45 x 45 x 0.55mm GIBFix® Angle. Each leg shall be fastened to the framing at 300mm centres

FASTENERS

- Minimum 32mm x 6g GIB® Grabber® High Thread Screws

FASTENER CENTRES

- 150mm centres to perimeter of wall and all intermediate studs
- Adhesive is not to be used in place of mechanical fasteners
- Place fasteners 12mm from sheet edges and 18mm from sheet ends
- Single fasteners to each stud where the horizontal joint crosses the studs
- Where relevant, fastener lengths must comply with the requirements of GIB® Fire Rated Systems or GIB® Noise Control Systems

For bracing, noise control or fire rating applications including fastener lengths consult the relevant GIB® technical publication.

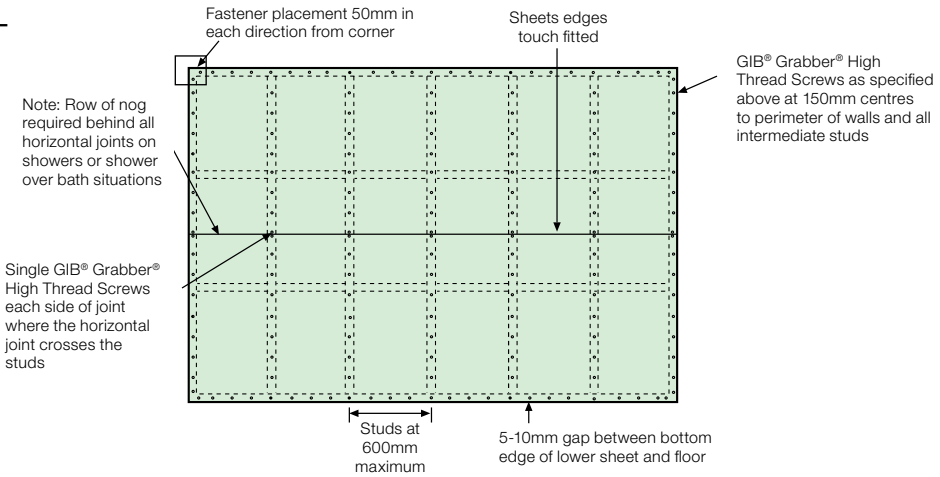
LINING AND TILE WEIGHTS

- Use minimum 10mm GIB® plasterboard
- For maximum permitted tile weights refer to pg 16 of this manual
- GIB® Wet Area linings may be fixed vertically or horizontally
- Sheets are touch fitted
- Provide a 5-10mm gap at the wall/floor junction and between the bottom edge of the lining and any bath rim or preformed shower base to allow for placement of sealant
- Do not tile on the resilient side of GIB Rail® or STWC Acoustic Clip (ST001) and channel noise control system
- GIB® Wet Area linings are suitable for tiling full height of walls, but if a wall is to be partially tiled (e.g. half high), only the area of wall under the tiles needs to be fixed as required for tiled areas. The remainder of the wall may be fixed as for non-tiled areas

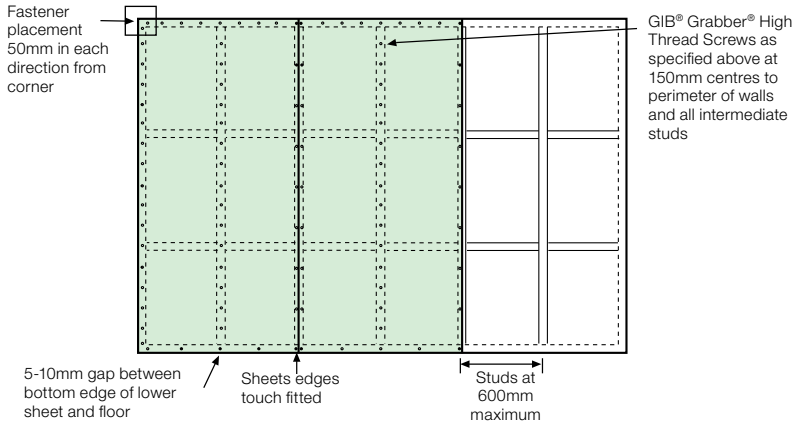
JOINTING

- Jointing shall be carried out in accordance with the instructions of the GIB® Site Guide

Fastening the Linings – Horizontal Fixing Only



Fastening the Linings – Vertical Fixing Only



STEEL WALL FRAMING

Framing dimensions and spacing must be appropriate for the tile weight and comply with the requirements of NASH Standard Part 2:2019 Light Steel Framed Buildings, or relevant specific design Standard.

- Linings are placed hard to floor, bedded into a sealant bead
- Steel framing for tiling to have a minimum base metal thickness (BMT) of 0.75mm

NOGS

For impact protection in shower cubicles or shower over bath situations it is important that all sheet joints are made on solid framing. This may require vertical fixing or the installation of additional nogs. Also provide nogs:

- Adjacent to each pipe penetration and behind sink and tub flashings
- Between all studs above bath flanges and preformed shower bases

CORNER REINFORCING

- Prior to lining in tiled areas (shower cubicles and shower over bath only) the internal corners shall be reinforced with a minimum
- 32 x 32 x 0.55mm NZ18 or 45 x 45 x 0.55mm GIBFix® Angle. Each leg is fastened to the framing at 600mm centres

FASTENERS

- Minimum 32mm x 6g GIB® Grabber® Self Tapper screws

FASTENER CENTRES

- 150mm centres to perimeter of wall and all intermediate studs
- Adhesive is not to be used in place of mechanical fasteners
- Single screws to each stud where the horizontal joint crosses the studs
- Place fasteners 12mm from sheet edges and 18mm from sheet ends.

For bracing, noise control or fire rating applications including fastener lengths consult the relevant GIB® technical publication.

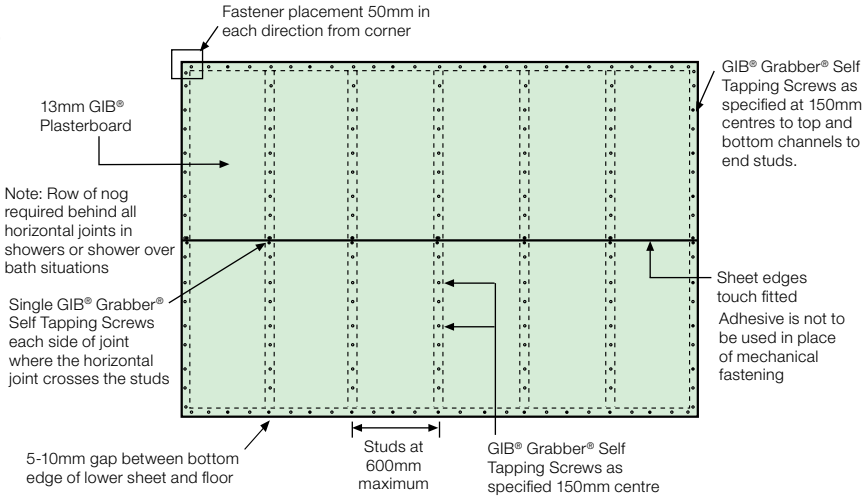
LINING AND TILE WEIGHTS

- Use minimum 13mm GIB® plasterboard
- For maximum permitted tile weights refer to pg 16 of this manual
- GIB® Wet Area linings may be fixed vertically or horizontally
- Sheets are touch fitted
- Provide a 5-10mm gap at the wall/floor junction and between the bottom edge of the lining and any bath rim or preformed shower base to allow for placement of sealant
- Do not tile on the resilient side of GIB Rail® or STWC Acoustic Clip (ST001) and channel noise control system
- GIB® Wet Area linings are suitable for tiling full height of walls, but if a wall is to be partially tiled (e.g. half high), only the area of wall under the tiles needs to be fixed as required for tiled areas. The remainder of the wall may be fixed as for non-tiled areas

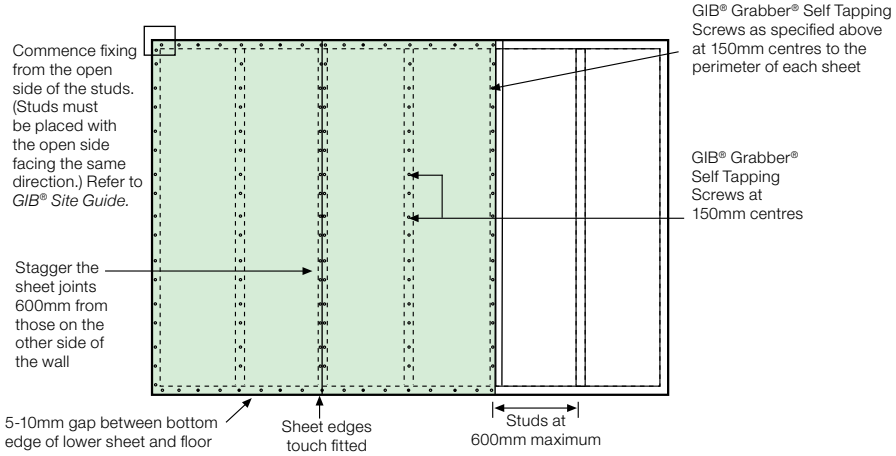
JOINTING

- Jointing shall be carried out in accordance with the instructions of the GIB® Site Guide

Fastening the Linings – Horizontal Fixing Only



Fastening the Linings – Vertical Fixing Only

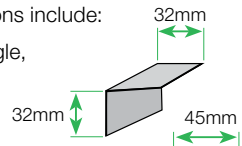


METAL ANGLES FOR TILED INTERNAL CORNERS

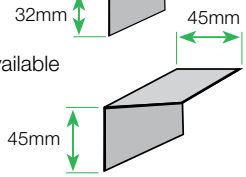
— Prior to lining in tiled areas (shower cubicles and shower over bath only) the internal corners shall be reinforced with a minimum 32 x 32 x 0.55mm galvanised metal angle.

— Suitable GIB® metal angle options include:

– GIB® Rondo® NZ18 metal angle, available length: 3.0m

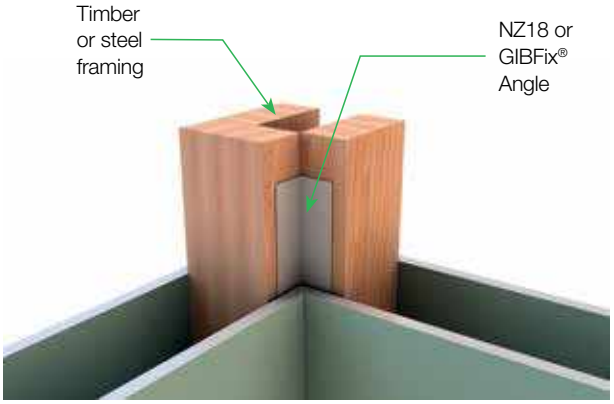


– GIBFix® Angle metal angle, available lengths: 2.4m and 2.7m



— Each side of the angle is secured to the framing with at 600mm centres

— Minimum height of the metal angle is 1800mm



WATERPROOF MEMBRANE SYSTEMS

A waterproof membrane system must be applied to all lining materials used as a substrate for ceramic tiles in a shower or shower over a bath application, or any other tiled application exposed to frequent water splash.

For further information see p10.

TILES AND TILE WEIGHTS

In areas likely to be directly exposed to water, tiles may be ceramic, porcelain or stone must comply with the over-surface finish requirements of the IWAM Code of Practice and be bedded with a suitable tile adhesive on the waterproof membrane system. See page 10 for the minimum extent of wall surfaces requiring impervious sheet materials or waterproof membrane systems prior to tiling.

Smaller mosaic tiles are often lighter, but the integrity of grout joints might be more prone to impact, whilst heavier tiles are larger and have less and deeper grout and sealant joints. For more information also see AS 3958:2007 Ceramic tiles – Guide to the installation of ceramic tiles.

Table 2: Recommended maximum tile weights

Maximum Tile Weights for GIB Aqualine®, GIB Toughline® Aqua or GIB Weatherline®			
Stud Centre (maximum)	**Fasteners Centre (maximum)**	**Lining Thickness**	**Tile Weight**
600mm maximum	150mm maximum	10mm	26kg/m^2
		13mm	40kg/m^2

ADHESIVE AND GROUT WEIGHTS

The weight of adhesive and grout can vary depending on the type of tile and the installation process used. The maximum tile weights stated in table 2 are conservative and refer to the tile weight excluding grout and adhesive used. An additional 3kg/m^2 has been factored into tile adhesion testing on top of the above stated tile weights to account for adhesive and grout weight used during the installation of the tile.

CEILING FRAMING

Framing dimensions and spacing must comply with the requirements of NZS 3604:2011, NASH for steel or relevant NZ Standard.

For noise control or fire rating applications consult the relevant GIB® technical publication.

FASTENERS

- Steel battens – 25mm x 6g GIB® Grabber® Self Tapping screws
- Timber battens or Joists – 32mm x 6g GIB® Grabber® High Thread screws

ADHESIVES

- Steel battens - GIBFix® All-Bond
- Timber battens - GIBFix® All-Bond or GIBFix® One

FASTENERS CENTRES

- Single screws to the edges and centre of the sheets across each batten
- Single screw at 600mm maximum to the perimeter of the ceiling
- Screws to be 12mm from sheet edges
- Daubs of adhesive at 200mm centres between the screws
- Do not place adhesive at sheet edges or under fasteners, this may lead to screw pops

LINING

- The lining shall be fixed at right angles to the battens or joists
- Commence fixing from the centre of the sheets outwards.
- Sheets to be touch fitted
- Use long length sheets to minimise sheet end butt joints.
- Back-block sheet end butt joints
- See GIB® Site Guide for sheet edge backblocking requirements

BATTEN SPACINGS

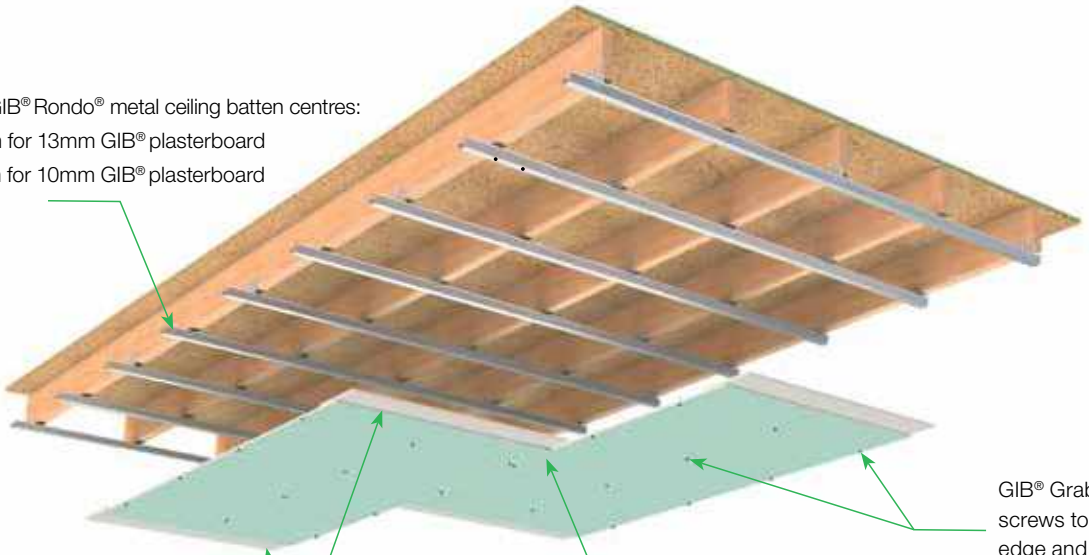
- 13mm GIB® plasterboard – 600mm centres maximum
- 10mm GIB® plasterboard – 450mm centres maximum

JOINTING

- All sheet joints must be paper tape reinforced and stopped in accordance with instructions in the GIB® Site Guide
- Do not fix tiles to GIB® plasterboard ceilings

Maximum GIB® Rondo® metal ceiling batten centres:

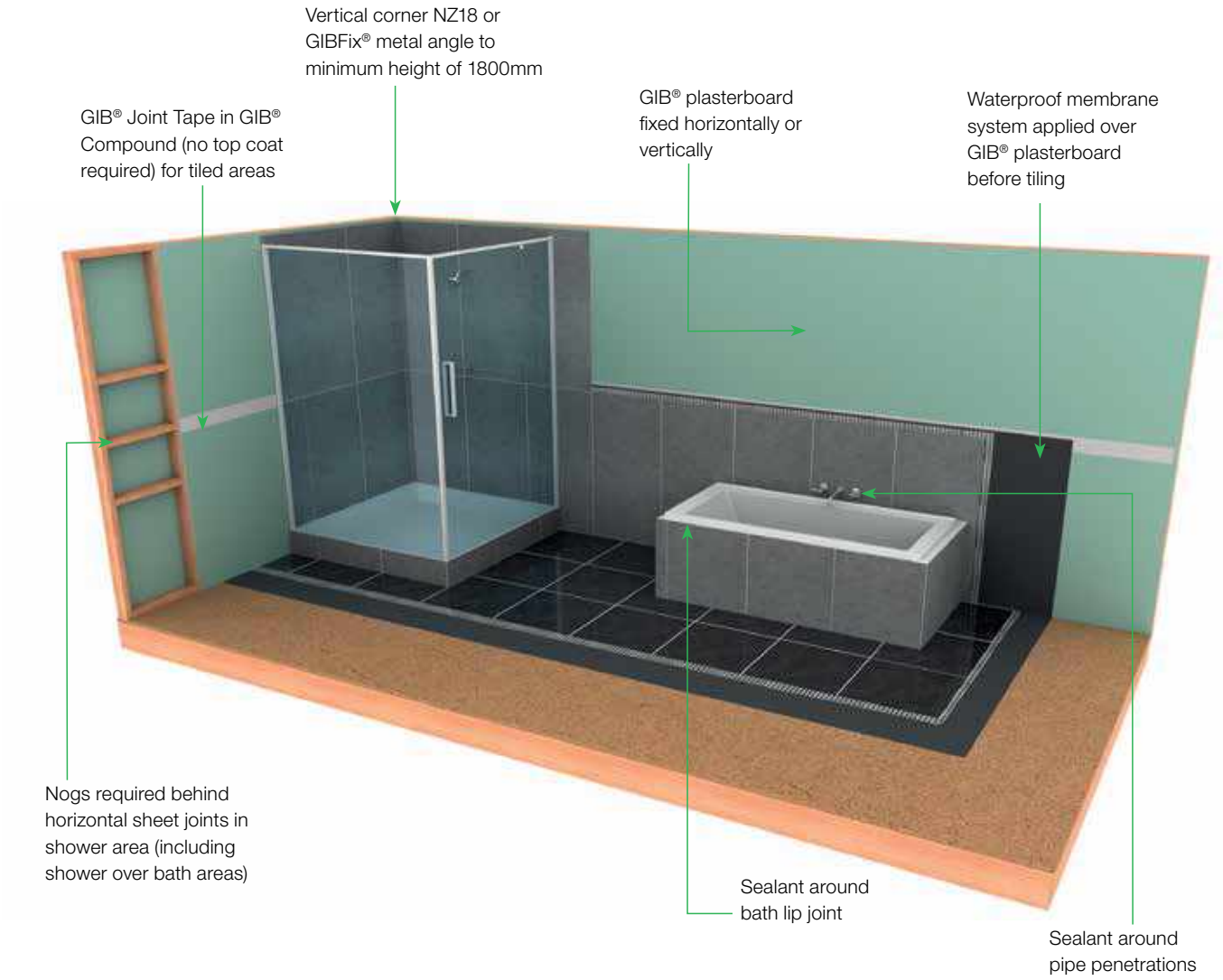
- 600mm for 13mm GIB® plasterboard
- 450mm for 10mm GIB® plasterboard



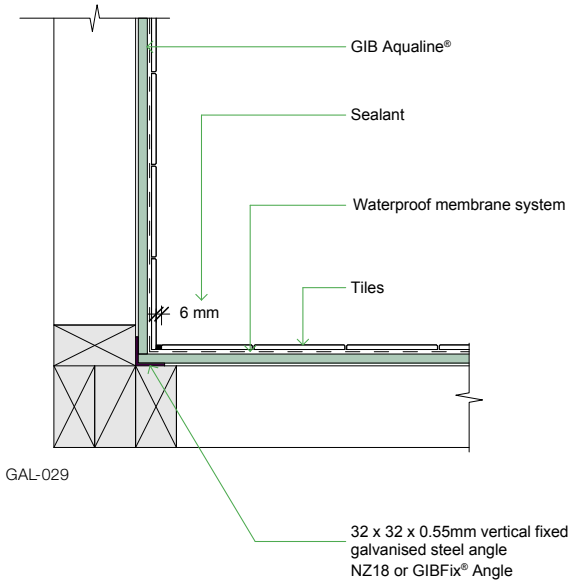
GIB® Grabber® screws to sheet edge and sheet centre at each batten intersection

Back-block sheet end joints (see GIB® Site Guide)

Stagger sheet end joints by 600mm or nearest batten

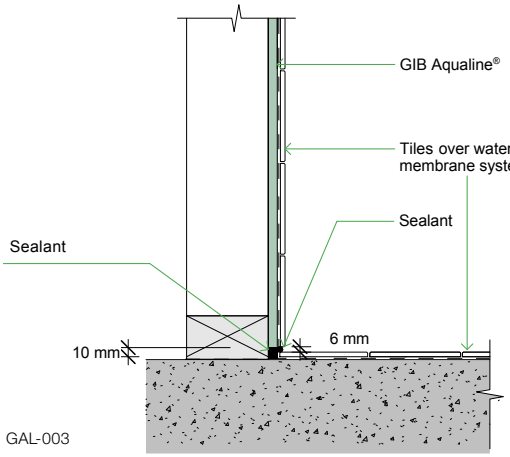

Vertical corner NZ18 or GIBFix® metal angle to minimum height of 1800mm
GIB® Joint Tape in GIB® Compound (no top coat required) for tiled areas
GIB® plasterboard fixed horizontally or vertically
Waterproof membrane system applied over GIB® plasterboard before tiling
Nogs required behind horizontal sheet joints in shower area (including shower over bath areas)
Sealant around bath lip joint
Sealant around pipe penetrations

A: TILED INTERNAL CORNER



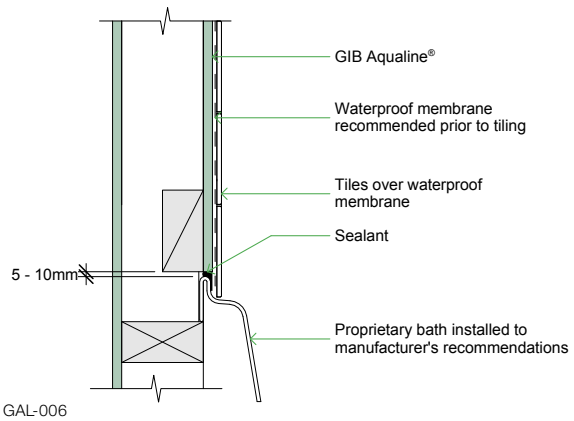
GAL-029

B: CERAMIC FLOOR LINING JUNCTION



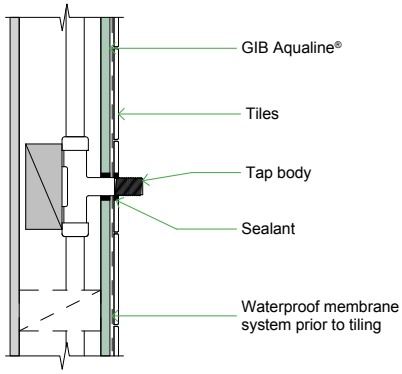
GAL-003

C: BATH LINING JUNCTION



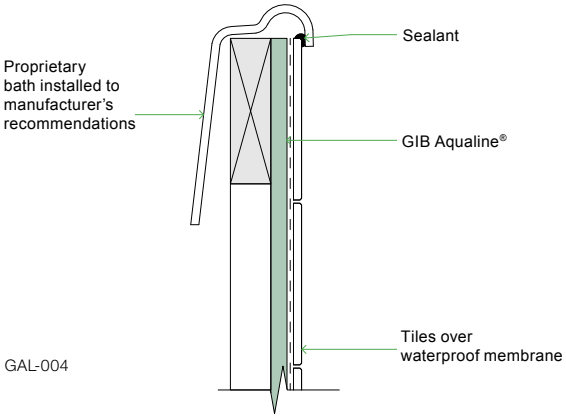
GAL-006

D: SEALING WET AREA PENETRATION



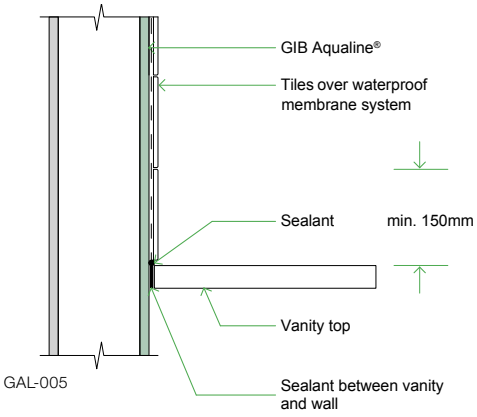
GAL-002

E: BATH CRADLE LINING DETAIL



GAL-004

F: VANITY TOP LINING JUNCTION



GAL-005

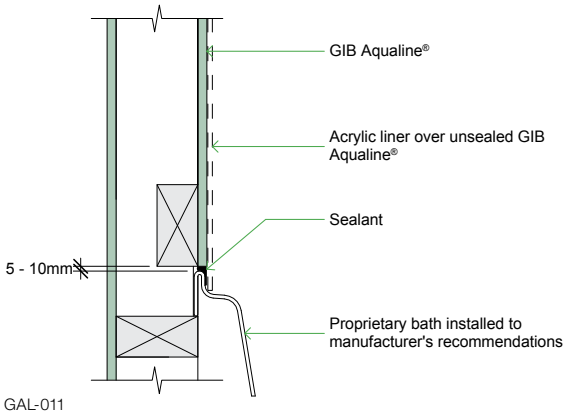


G: SHOWER MIXER PENETRATION IN WET WALL LININGS

Refer to the shower mixer manufacturer for shower mixer installation detailing including the use of proprietary products to prevent water or moisture ingress behind the wet wall lining.

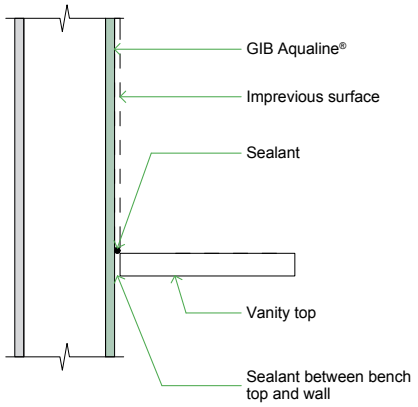
SHOWER OVER BATH – ACRYLIC LINER DETAILS

A: BATH LINING JUNCTION



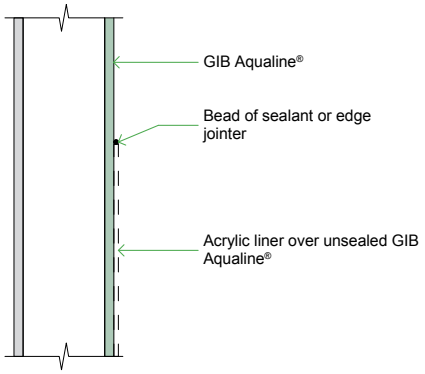
GAL-011

B: VANITY TOP LINING JUNCTION



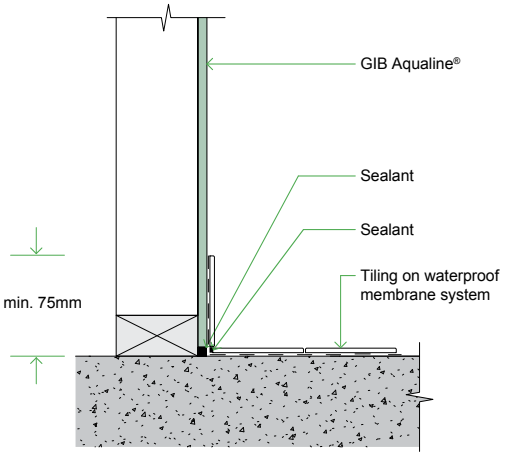
GAL-023A

C: UNSEALED PLASTERBOARD LINING



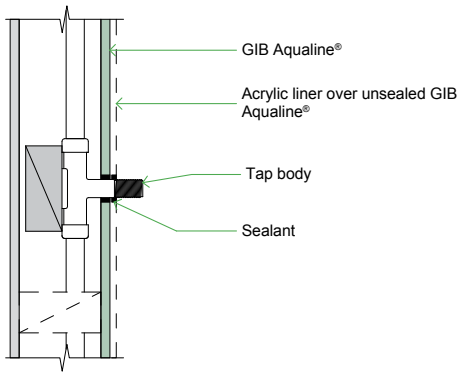
GAL-028

D: CERAMIC FLOOR SKIRTING LINING JUNCTION



GAL-001

E: SEALING SEMI WET AREA PENETRATION



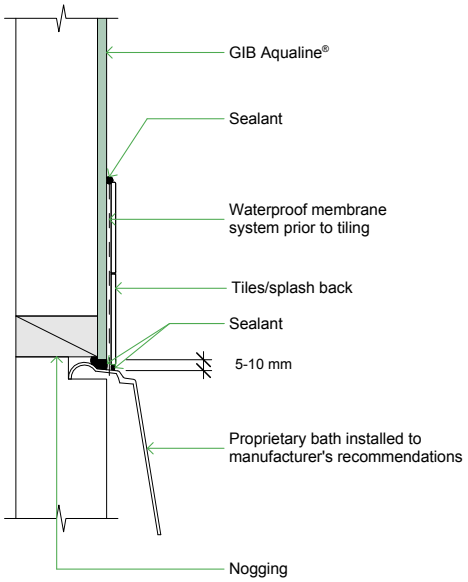
GAL-019

F: SHOWER MIXER PENETRATION IN WET WALL LININGS

Refer to the shower mixer manufacturer for shower mixer installation detailing including the use of proprietary products to prevent water or moisture ingress behind the wet wall lining.

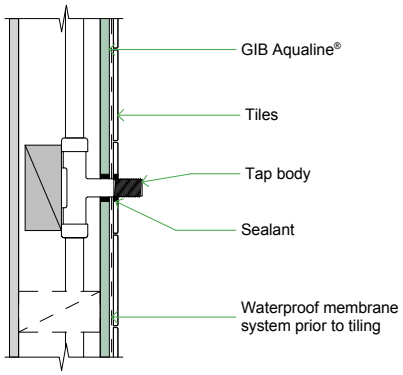


A: BATH LINING JUNCTION



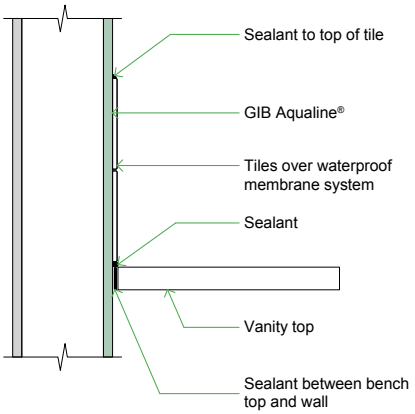
GAL-009

B: SEALING SEMI WET AREA PENETRATION



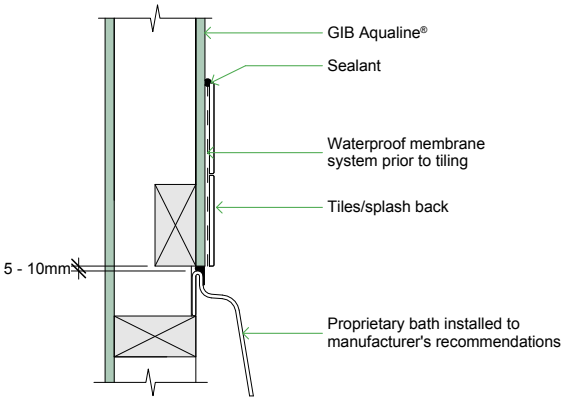
GAL-020

C: VANITY TOP LINING JUNCTION



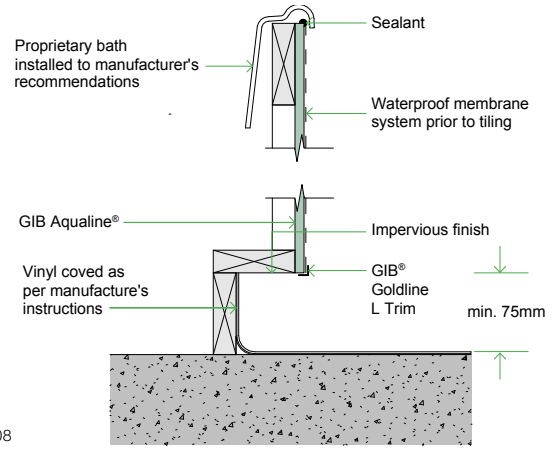
GAL-024

D: BATH LINING JUNCTION

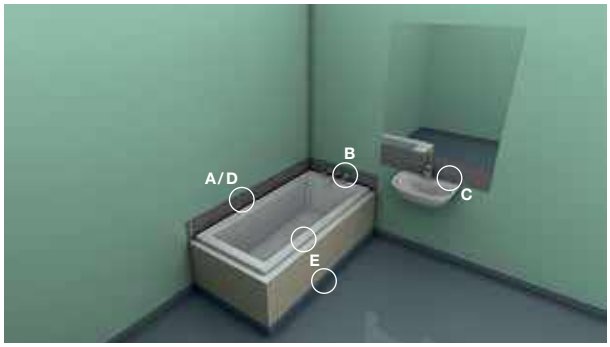


GAL-010

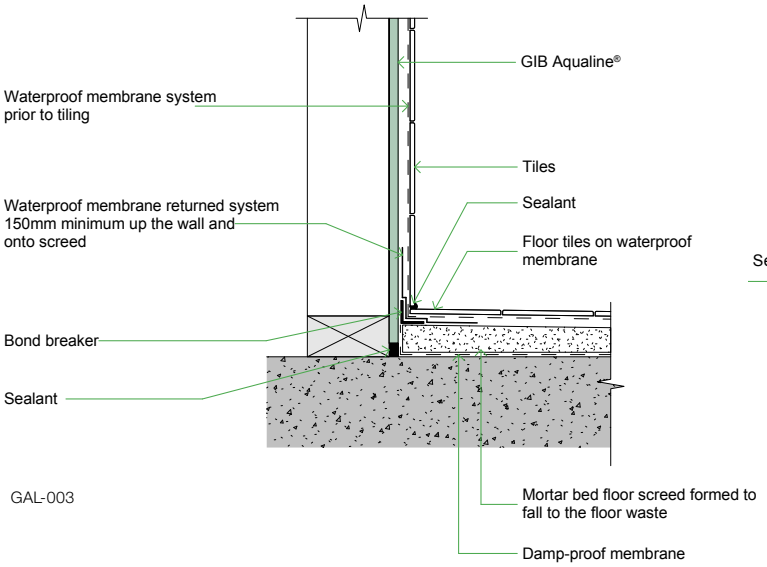
E: CRADLE VINYL LINING JUNCTION



GAL-008

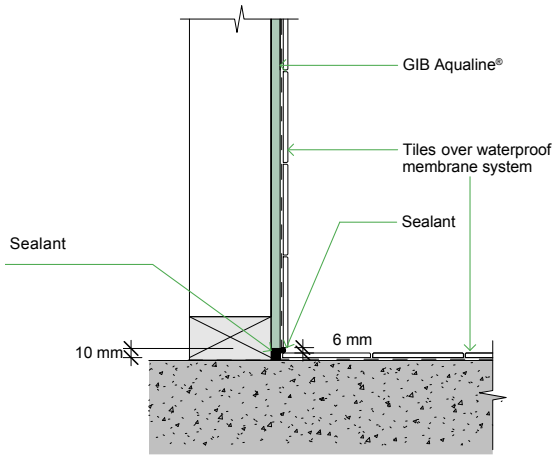


A: MORTAR UNDER CERAMIC FLOOR LINING JUNCTION



GAL-003

C: CERAMIC FLOOR LINING JUNCTION

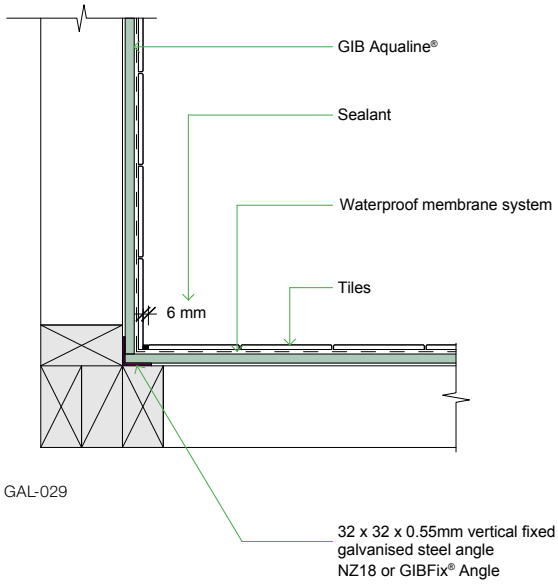


GAL-002A

PREFORMED SHOWER BASE JUNCTIONS

Refer to the shower base manufacturer for proprietary shower tray installation detailing including wet wall lining junction detailing.

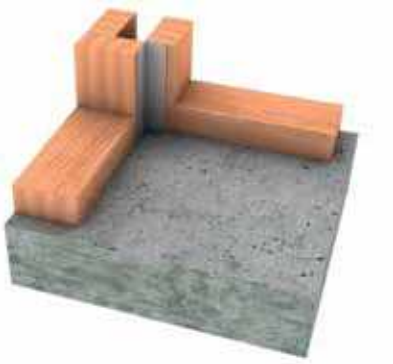
B: TILED INTERNAL CORNER



GAL-029

D: TILED INTERNAL CORNER METAL ANGLE POSITION

Refer to page 16 of this publication for specification and installation guidance.

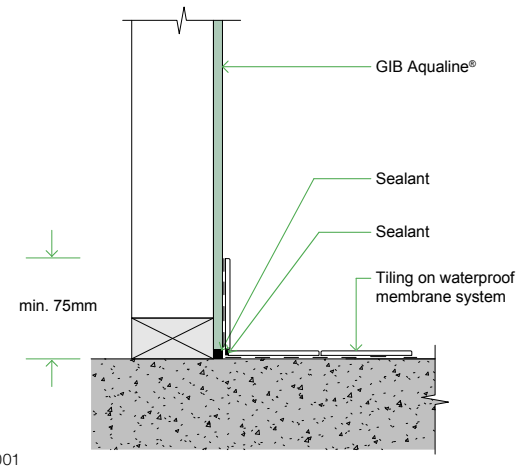


E: SHOWER MIXER PENETRATION IN WET WALL LININGS

Refer to the shower mixer manufacturer for shower mixer installation detailing including the use of proprietary products to prevent water or moisture ingress behind the wet wall lining.

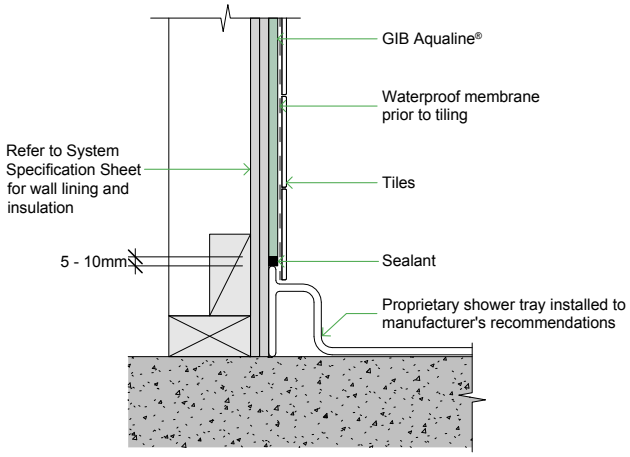


A: CERAMIC FLOOR SKIRTING LINING JUNCTION



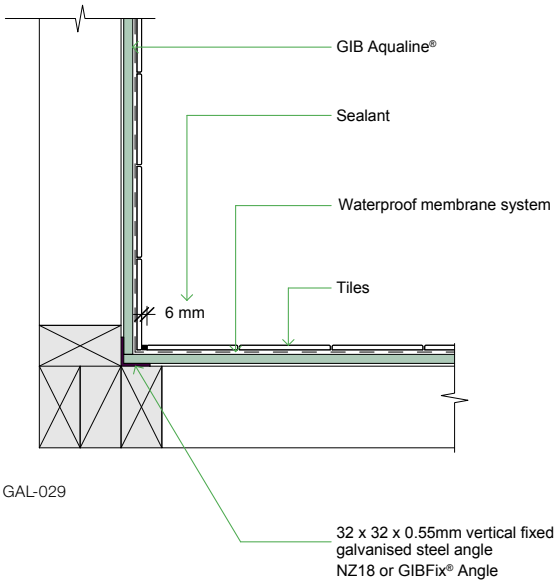
GAL-001

B: MOULDED SHOWER TRAY DOUBLE LINING JUNCTION



GAL-016

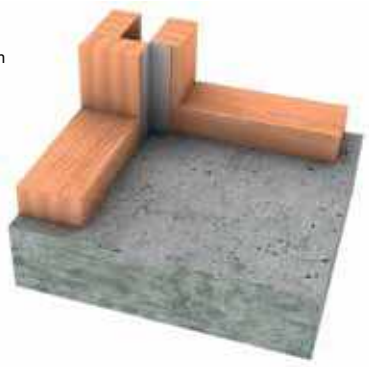
C: TILED INTERNAL CORNER



GAL-029

D: TILED INTERNAL CORNER METAL ANGLE POSITION

Refer to page 16 of this publication for specification and installation guidance.



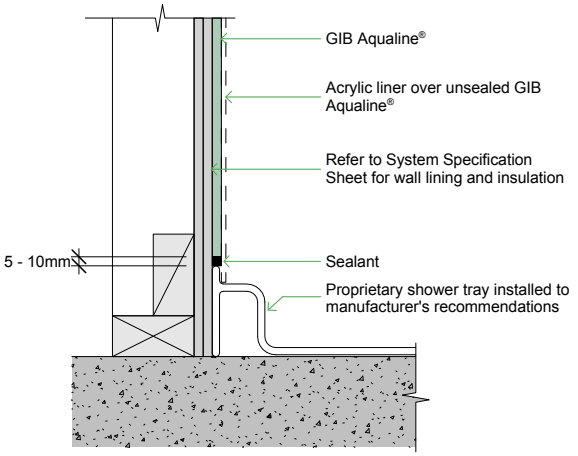
E: SHOWER MIXER PENETRATION IN WET WALL LININGS

Refer to the shower mixer manufacturer for shower mixer installation detailing including the use of proprietary products to prevent water or moisture ingress behind the wet wall lining.



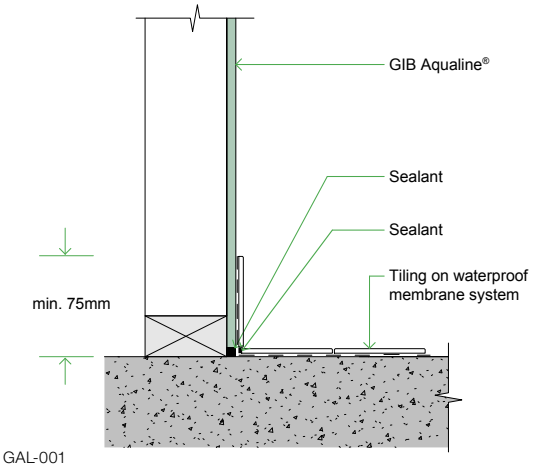
SHOWER – ACRYLIC LINER AND BASE DETAILS

A: MOULDED SHOWER TRAY DOUBLE LINING JUNCTION



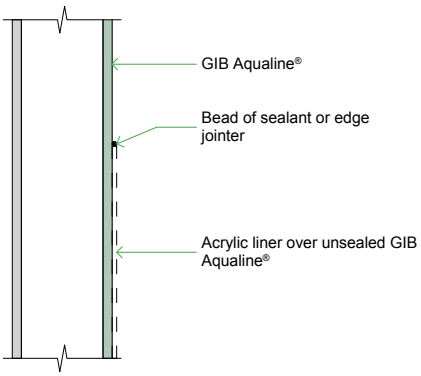
GAL-015

B: CERAMIC FLOOR SKIRTING LINING JUNCTION



GAL-001

C: UNSEALED PLASTERBOARD LINING



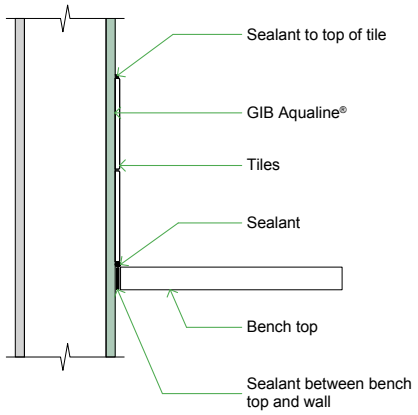
GAL-028

D: SHOWER MIXER PENETRATION IN WET WALL LININGS

Refer to the shower mixer manufacturer for shower mixer installation detailing including the use of proprietary products to prevent water or moisture ingress behind the wet wall lining.

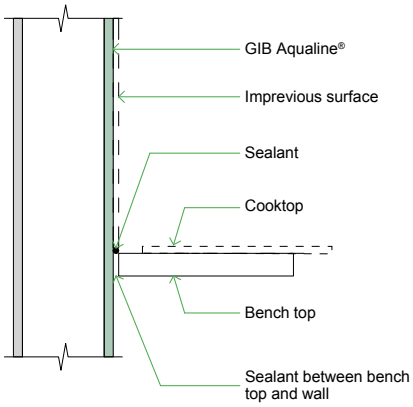


A: BENCH TOP LINING JUNCTION



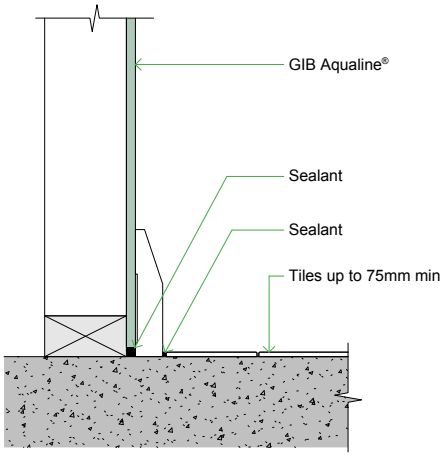
GAL-024

B: COOKTOP LINING JUNCTION



GAL-023B

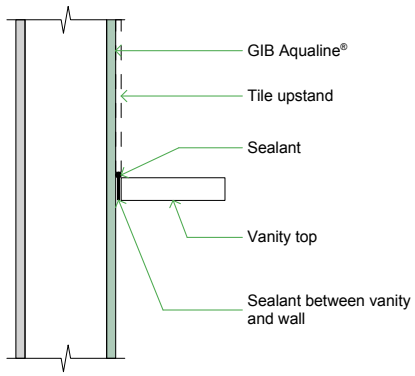
CERAMIC FLOOR SKIRTING LINING JUNCTION



GAL-001A

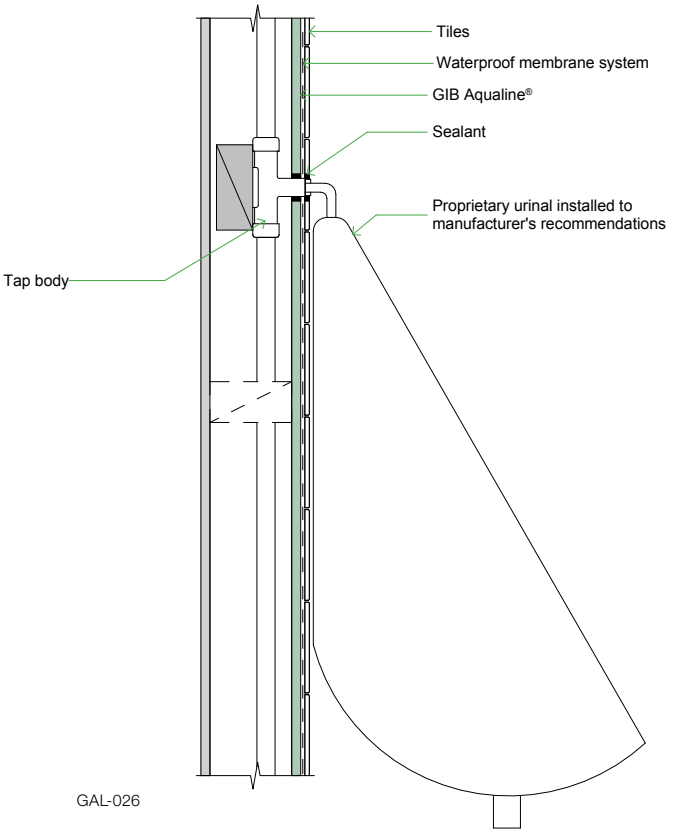


A: VANITY TOP LINING JUNCTION



GAL-022

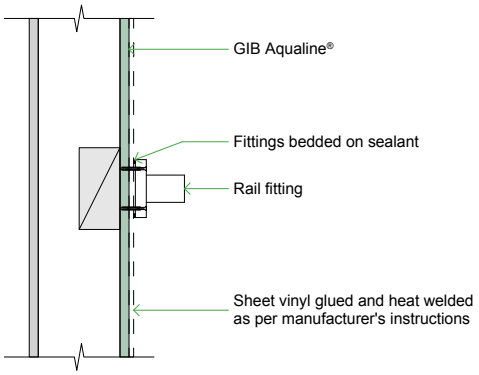
B: SEALING WET AREA PENETRATION LINING JUNCTION



GAL-026

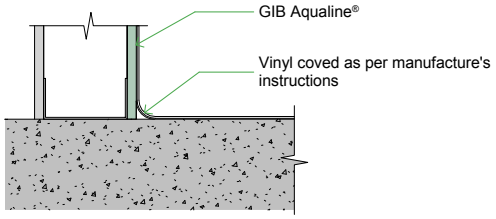


A: SURFACE MOUNTED WITH NOG



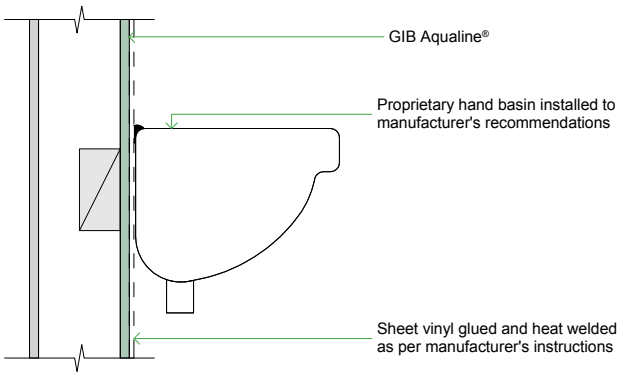
GAL-027

B: VINYL FLOOR LINING JUNCTION



GAL-006A

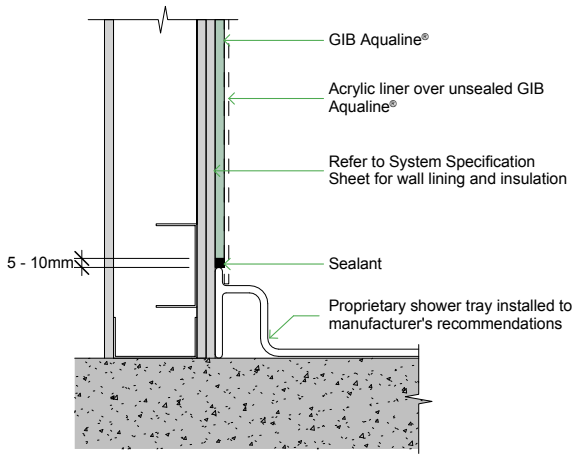
C: BASIN LINING JUNCTION



GAL-025

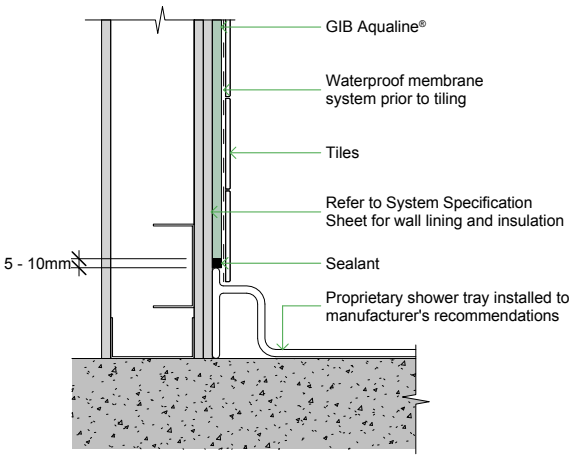


A: MOULDED SHOWER TRAY DOUBLE LINING JUNCTION



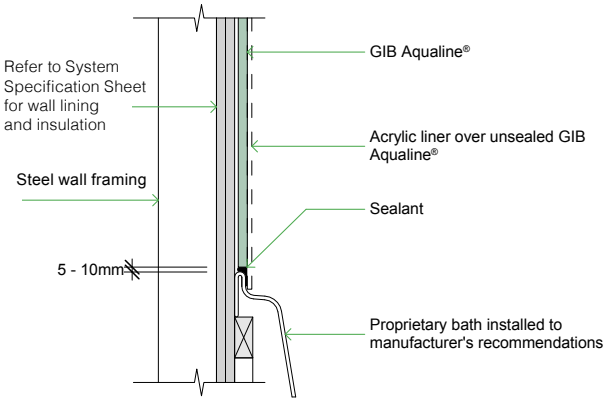
GAL-017

C: MOULDED SHOWER TRAY DOUBLE LINING JUNCTION



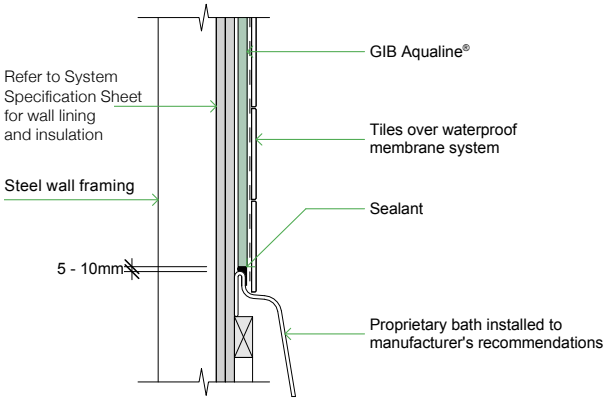
GAL-018

B: BATH DOUBLE LINING JUNCTION



GAL-013

D: BATH DOUBLE LINING JUNCTION



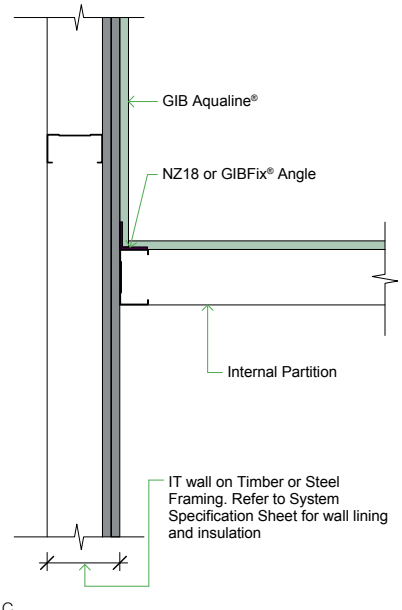
GAL-014

GIB® WET AREA SYSTEMS FIRE RESISTANCE AND NOISE CONTROL PERFORMANCE

Given recesses required for shower trays, bath upstands, etc., and the likelihood of renovations during the service life of the building, it is recommended that GIB® Wet Area linings in water splash areas are installed in addition to and over required fire and noise control systems in commercial or multi-residential applications.

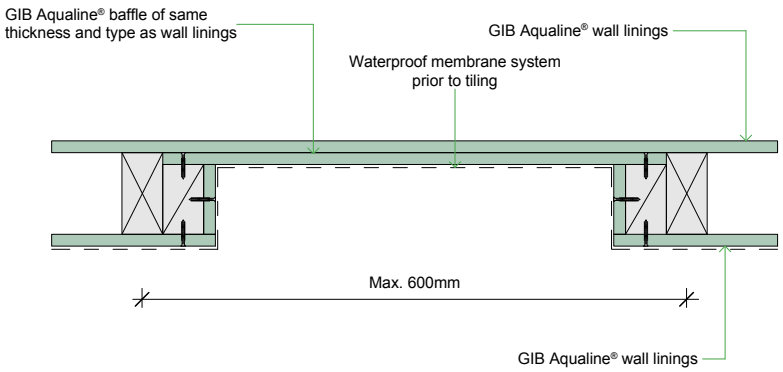
Do not tile on the resilient side of a GIB Rail® or Acoustic Resilient Mount (ST-001) and channel noise control system.

E: INTERTENANCY WALL AND WET AREA WALL JUNCTION

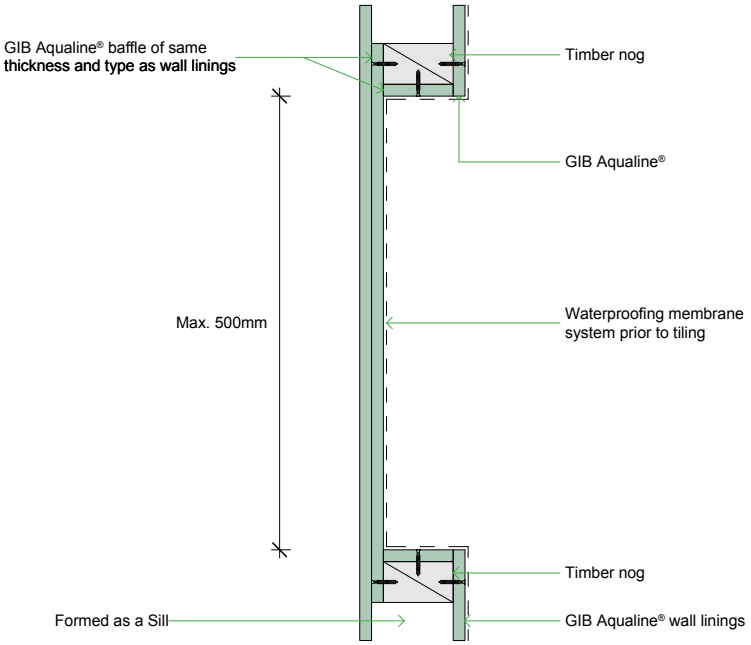


GAL-031C

TIMBER FRAME TILE RECESS

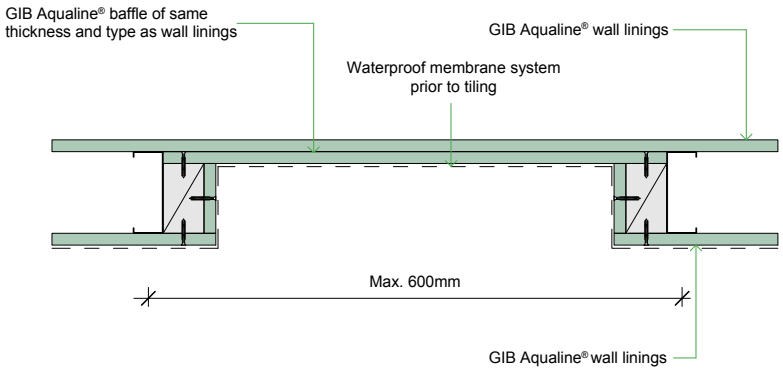


Larger recesses can be accommodated depending on specific framing layout provided 500mm is not exceeded in at least one direction.

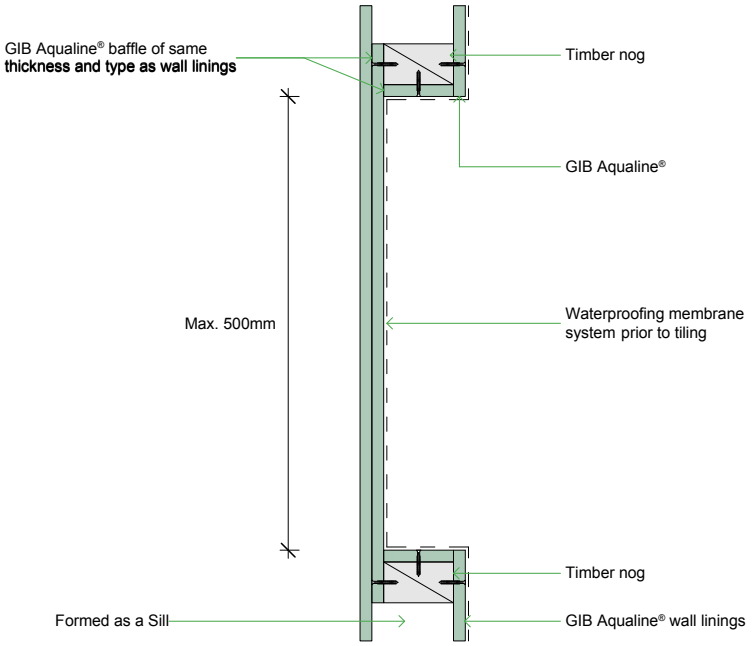


GAL-029B

STEEL FRAME TILE RECESS



Larger recesses can be accommodated depending on specific framing layout provided 500mm is not exceeded in at least one direction.



GAL-030

GIB® Wet Area Systems, February 2021

LIMITATIONS

Winstone Wallboards Ltd accepts no liability if the GIB® Wet Area Systems and junction details are not installed in strict accordance with instructions contained within this publication.

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. You should check the GIB® website to ensure you are using the current publication. If you are unsure whether this is the current publication, simply call the GIB® Helpline on 0800 100 442.

SUBSTITUTION

GIB® Wet Area 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® Wet Area 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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GIB®

FOR MORE INFORMATION VISIT

gib.co.nz

OR CALL THE GIB® HELPLINE

0800 100 442

February 2021

FRAMELESS GLASS SHOWER SPECIFICATIONS

Glassfit custom made frameless glass showers use only "Metroglass" 10mm "TempaFloat"toughened safety glass.

"TempaFloat" is a Grade A safety glass in accordance with NZS 4223: part 3 and AS/NZS2208 safety standards and has Bureau Veritas Certification.

Glassfit use only Metro Frameless Glass (MFG) shower fittings, hinges and handles and come with a 5 year warranty.

Showers mounting channel is bonded to the tile surface using a specific structural silicone, there is no perforation of waterproof membrane (i.e. screws).

230413
Received by
Kapiti Coast District Council
26/05/23

122 RIMU RD
PARAPARAUMU
P O BOX 768

PH 04-298-6284
FAX 04 2986280
E-MAIL glassfit@xtra.co.nz

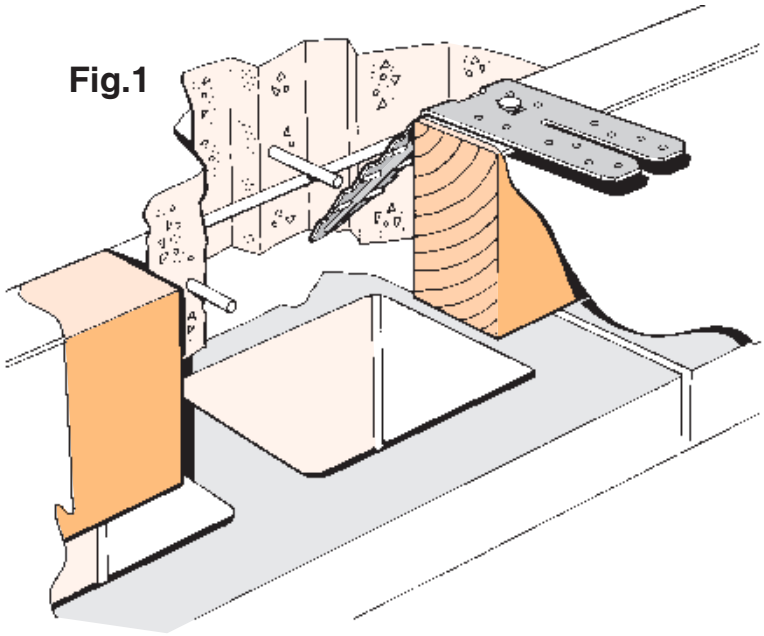
LUMBERLOK®

BOTTOM PLATE FIXING ANCHOR

- ★ Eliminates the drilling of bottom plates
- ★ Makes the fixing of timber framework easier and quicker
- ★ Saves hand trowelling around cast-in anchor bolts or rods
- ★ Use at 900mm centres max.
- ★ Complies with Clause 7.5.12.2 NZS 3604:2011

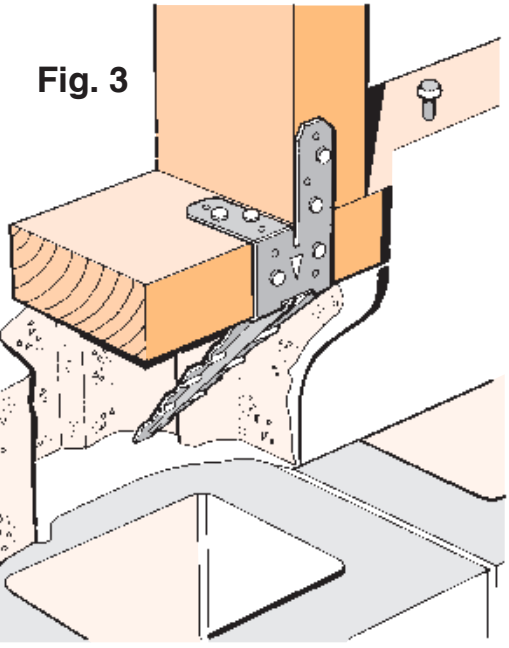
230413
Received by
Kapiti Coast District Council
26/05/23

Fig.1



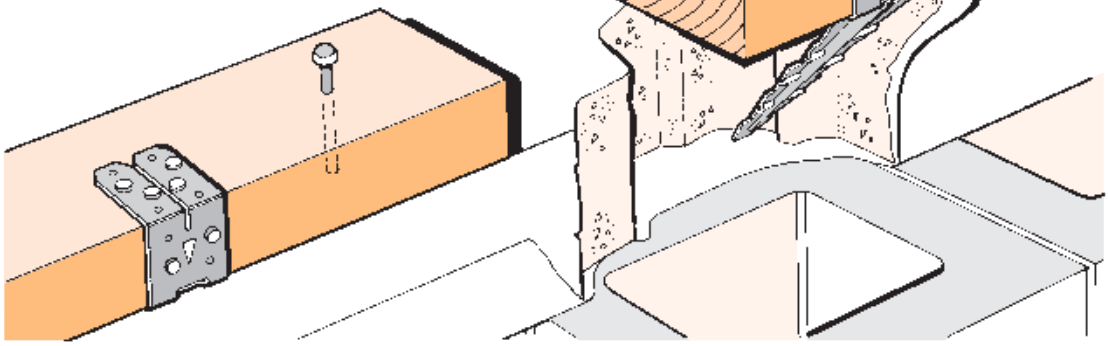
1. Bottom Plate Fixing Anchors shall be fixed at 900mm centres max. to the boxing for concrete floor slabs, over a continuous vapour barrier. Each Fixing Anchor is nailed prior to concrete pour, and shall be left undisturbed until concrete has hardened ready for timber frames to be installed. (Fig.1).
2. When timber framing is in place, the Fixing Anchors are folded up and over the bottom plate. (Fig. 2).
3. Two LUMBERLOK Product Nails 30mm x 3.15 dia. shall then be driven into the side of the bottom plate and two additional nails applied through each of the lugs. Should a stud coincide with the position of a Fixing Anchor, nail as shown in Fig. 3.

Fig. 3



4. A 75mm x 4 dia. concrete nail must be fixed adjacent to each Fixing Anchor, through the bottom plate into the concrete, at no less than 70mm from the concrete edge. When used as a Bracing Wall hold-down, a Fixing Anchor must be positioned within 150mm from the end of that wall. Bracing wall must not exceed 70 BU/m.

Fig. 2

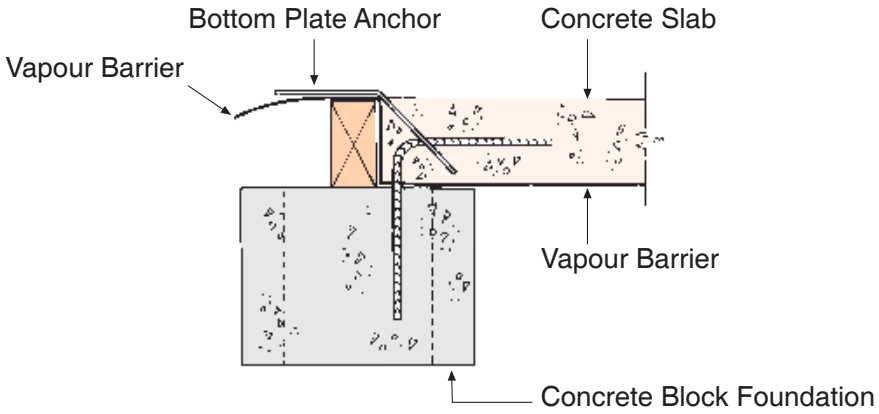


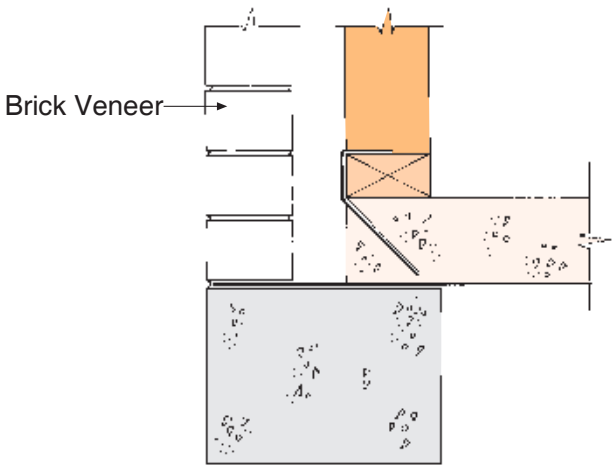
Available from leading Builders Supply Merchants throughout New Zealand

MiTek®

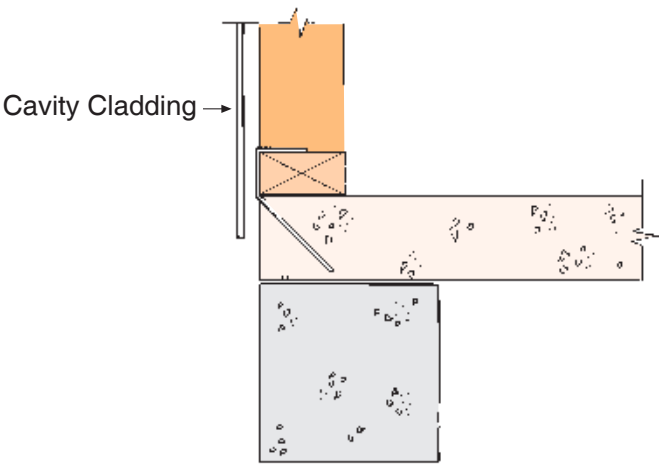
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LUMBERLOK®



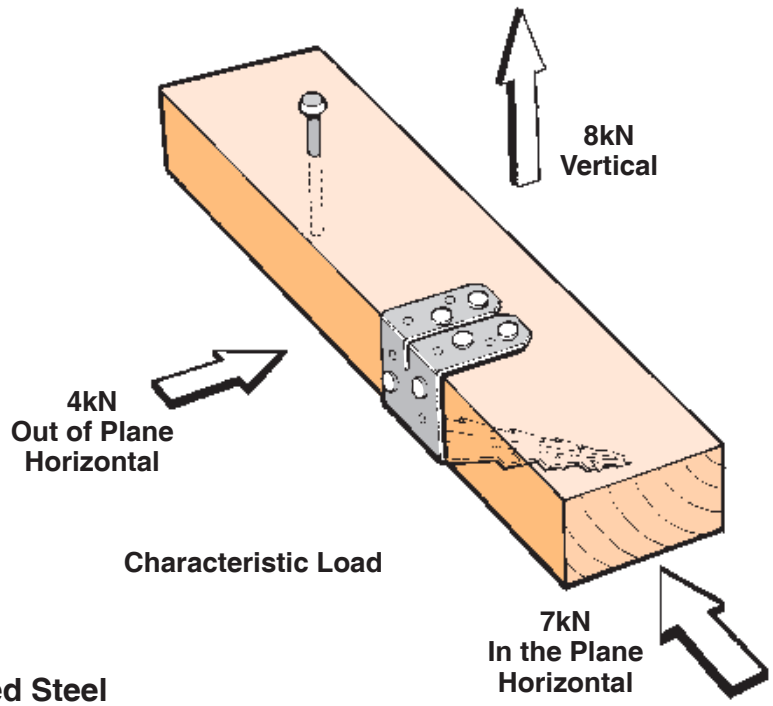


BRICK VENEER



CAVITY CLADDING

Design Loads
Concrete compressive strength 20MPa min.



Code: **BPA**
Material: **0.95mm G300 Z450 Galvanised Steel**
Code: **SSBPA**
Material: **0.9mm Stainless Steel 304-2B**
Packed: **50 per Carton**

MiTek New Zealand Limited

AUCKLAND
PO Box 58-014, Botany 2163
Phone: 09-274 7109
Fax: 09-274 7100

CHRISTCHURCH
PO Box 8387, Riccarton 8440
Phone: 03-348 8691
Fax: 03-348 0314

www.miteknz.co.nz

MiTek®
MITEK® LUMBERLOK® BOWMAC®

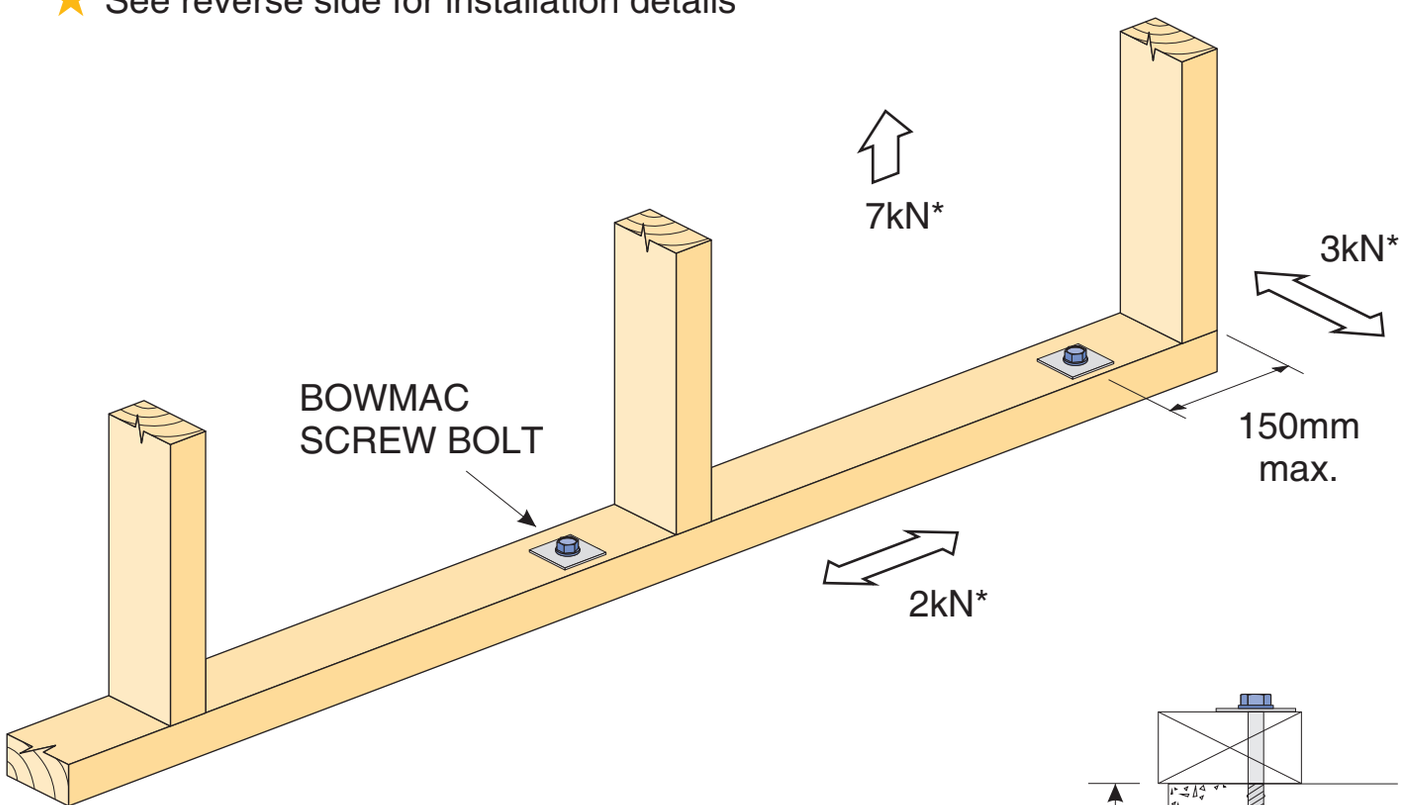
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BOWMAC®

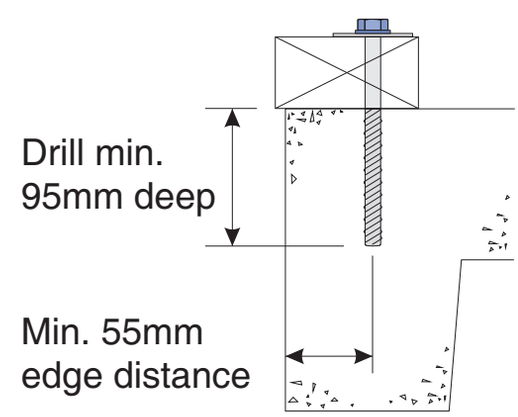
BOTTOM PLATE SCREW BOLT

M10 X 140 BOWMAC BLUE HEAD

- ★ Complies with Clause 7.5.12.2 NZS 3604:2011 Proprietary Post Fixed Anchors
- ★ BRANZ tested. Ref# ST0895 Oct. 2012
- ★ Suitable for both external and internal wall frame anchor to concrete slab or masonry header blocks
- ★ Complies with durability requirements for “All Zones” in a “CLOSED” environment as defined in Table 4.1 NZS 3604:2011
- ★ See reverse side for installation details



* Min. load capacity per anchor
from Clause 7.5.12.3 NZS 3604:2011



Available from leading Builders Supply Merchants throughout New Zealand

MiTek®

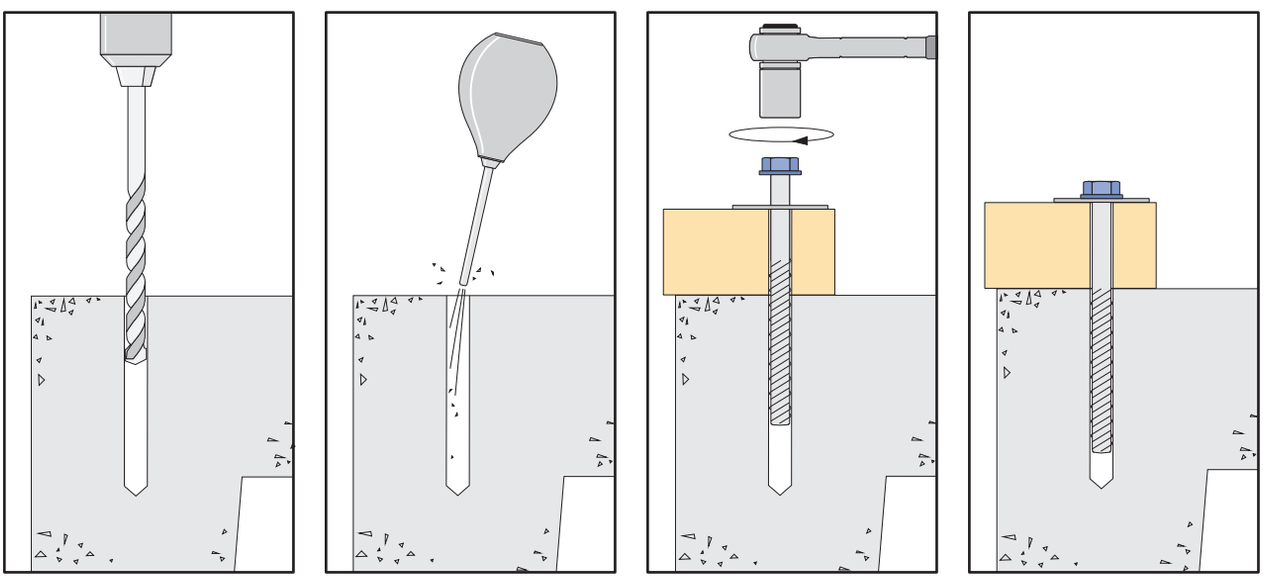
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BOWMAC®

Installation Details

★ Install BOWMAC SCREW BOLT and washer supplied to concrete slabs at 900mm max. crs., or 600mm max. crs. when using masonry header blocks.

★ SCREW BOLT must be located within 150mm from end of timber wall frame.



- Use a 10mm diameter masonry bit for drilling into concrete substrate.
- Drill a hole into the concrete base to a minimum depth of 95mm and clean out dust and debris from hole prior to installation of BOWMAC SCREW BOLT.
- Insert SCREW BOLT through washer and timber and into the hole.
- Begin tightening SCREW BOLT by applying downward pressure when engaging the first thread.
- Additional downward pressure may be required for installation in high strength, dense concrete.
- Continue tightening SCREW BOLT until the head is firmly seated against the washer.
- In extremely dense material, use of an impact wrench is recommended.
- Ensure SCREW BOLT is at the required embedment depth.
- Don't exceed the maximum clamping torque of 80Nm.
- The installation is now complete.

Installation Tips

- Use quality hexagonal socket with a ratchet spanner.
- Where substrate allows, a torque controlled wrench can be used.
- During installation debris or dust created by the thread cutting action may cause some resistance to be experienced. This is easily overcome by unscrewing the BOWMAC SCREW BOLT for one turn, or more and then continue to fix to the full embedment.

Code: **BPS**
Packed: **10 SCREW BOLTS & washers per bag**
5 bags per carton outer

MiTek New Zealand Limited

AUCKLAND
PO Box 58-014, Botany 2163
Phone: 09-274 7109
Fax: 09-274 7100

CHRISTCHURCH
PO Box 8387, Riccarton 8440
Phone: 03-348 8691
Fax: 03-348 0314

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MiTek®

INTERNAL LOAD BEARING
ON CONCRETE FLOOR SLABS



★ Covers floor thickening and supporting stud requirements.
★ Covers floor slabs on buildings complying with NZS 3604:2011.
★ All concrete slabs to be constructed as per NZS 3604:2011.
★ Thickening requirements apply to reinforced floor slabs.
★ Provides solutions for stud requirements where point loads exceed 10 kN.
★ All slabs assumed to be supported on soils that have Ultimate Bearing Capacity of 300 kPa ($Ø_b$=0.50).

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Establishing Thickening & Stud Requirements

1. Establish the type of load applied to the floor as being either a UDL (uniformly distributed load) or a concentrated load. Girder trusses will always give concentrated loads and a run of two or more trusses with the same loads will give a UDL.

2. Establish the maximum load value via the MiTek 20/20® Truss Design Software by using the Truss Bearings Exceeding 10 kN Report (see example below). Choose the maximum DOWN value in kN.

3. Go to the Slab Thickening & Stud Requirement Table on page 3 and choose from the appropriate section; either no change for up to 10 kN, FP1 and FS1 for up to 20 kN, or FP2 and FS2 for up to 30 kN.

4. Choose from the selection of stud options (height, centres and grade).

5. Apply the relevant slab and stud requirements as specified and detailed on page 3.

6. Where the maximum positive bearing reaction exceeds 10 kN (uplift), refer to MiTek for Special Design.

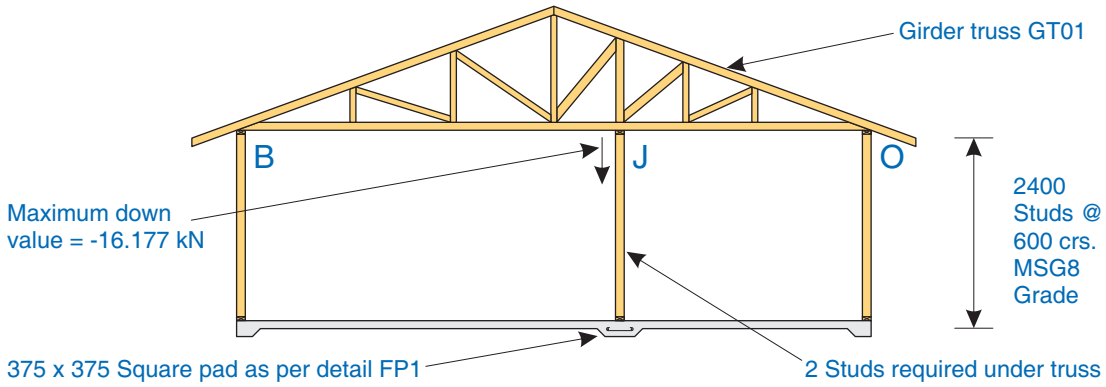
MiTek 20/20® Example Selection

TRUSS BEARINGS EXCEEDING 10 kN REPORT

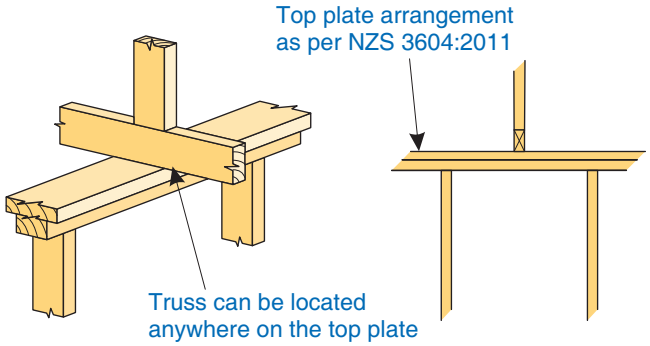
Truss List

Legend: ? = input only, ~~Txx~~ = failed design, Unmarked trusses = designed successfully

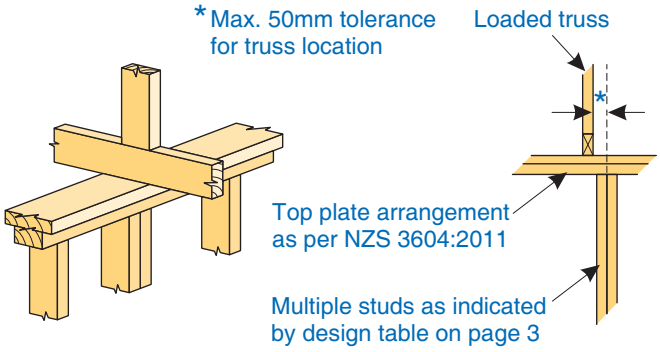
Critical Trusses	Qty	Span (mm)	Joint	Bearing Reactions (kN) Down	Uplift
GT01	1	8000	J	16.177	7.292



SINGLE STUD OPTION



MULTIPLE STUD OPTION



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Slab Thickening & Stud Requirement Table

CONSTRUCTION SPECIFICATIONS

Max. truss crs. @ 1200mm, Min. truss crs. @ 600mm.
Assume walls are fully lined on at least one face.
Assume full bearing on top plate (i.e. no eccentric loading).

TRUSS BEARING REACTION	SLAB THICKENING DETAIL		STUD REQUIREMENTS UNIFORM DIST. LOADS OR CONCENTRATED LOADS		
	CONCENTRATED LOAD	UNIFORM DIST. LOAD	STUD HEIGHT	STUD REQUIREMENTS	
Bearing reaction up to & including 10 kN	STANDARD reinforced slab floor as per NZS 3604:2011	STANDARD reinforced slab floor as per NZS 3604:2011	2400 2700 3000	Refer to NZS 3604:2011	
			STUD HEIGHT	NO. OF STUD UNDER TRUSS	MIN. TIMBER SIZE
Bearing reaction up to & including 20 kN	TYPE FP1 375 x 375 PAD	TYPE FS1 300 STRIP THICKENING	2400	2	90 x 35
			2700	2	90 x 45
			3000	3	90 x 45
			STUD HEIGHT	NO. OF STUD UNDER TRUSS	MIN. TIMBER SIZE
Bearing reaction up to & including 30 kN	TYPE FP2 450 x 450 PAD	TYPE FS2 450 STRIP THICKENING	2400	3	90 x 45
			2700	3	90 x 45
			3000	4	90 x 45

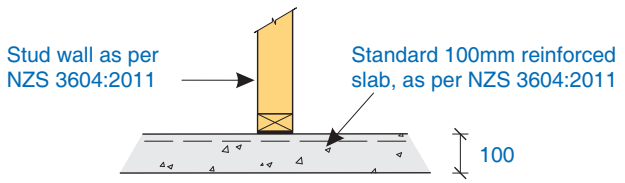
TIMBER SPECIFICATIONS

Timber properties based on NZS 3603:1993 Amendment No.4 March 2005.
Minimum grade specified is SG8 unless otherwise noted.
For SG6 use the studs for the next highest category.
i.e. - For loads up to 10 kN select studs from the 20 kN table.
- For loads up to 20 kN select studs from the 30 kN table.
- For loads above 20 kN Special Design is required.

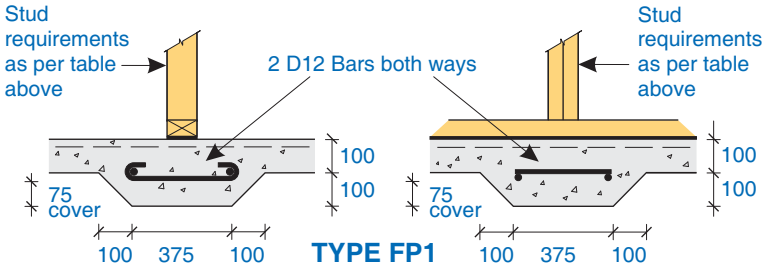
* Note: The stud requirement for 20 kN & 30 kN bearing reactions can be applied to external walls as well.

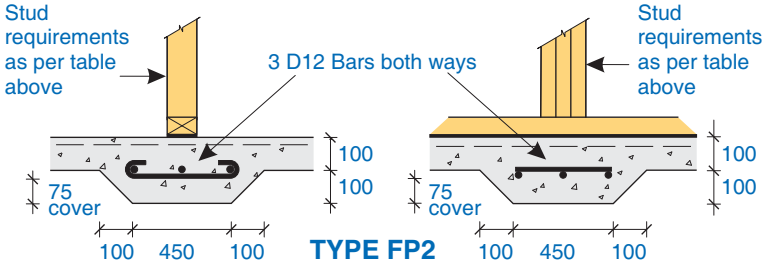
Slab Thickening Details

CONCRETE PAD OPTIONS
(for concentrated loads)

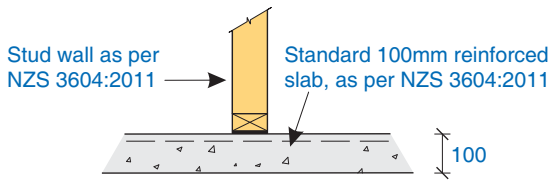


STANDARD 100mm SLAB

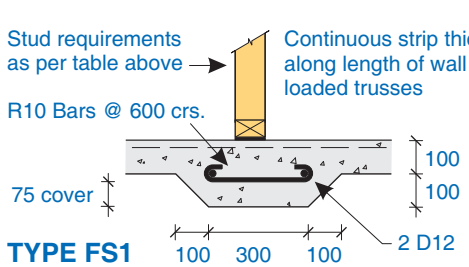


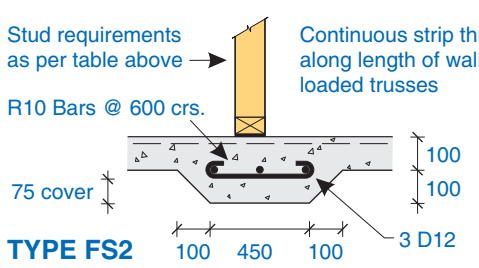


CONTINUOUS CONCRETE THICKENING OPTIONS
(for uniformly distributed loads)



STANDARD 100mm SLAB





NOTE: FP = Foundation Pad FS = Foundation Strip

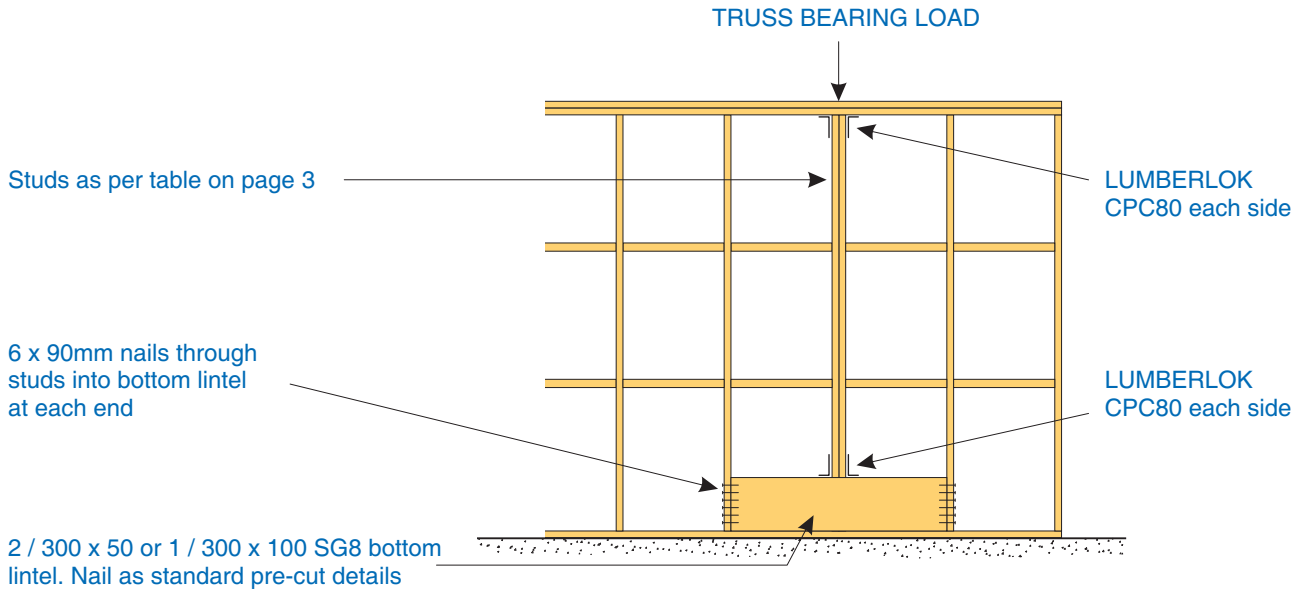
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Retro Fitted Load Bearing Option

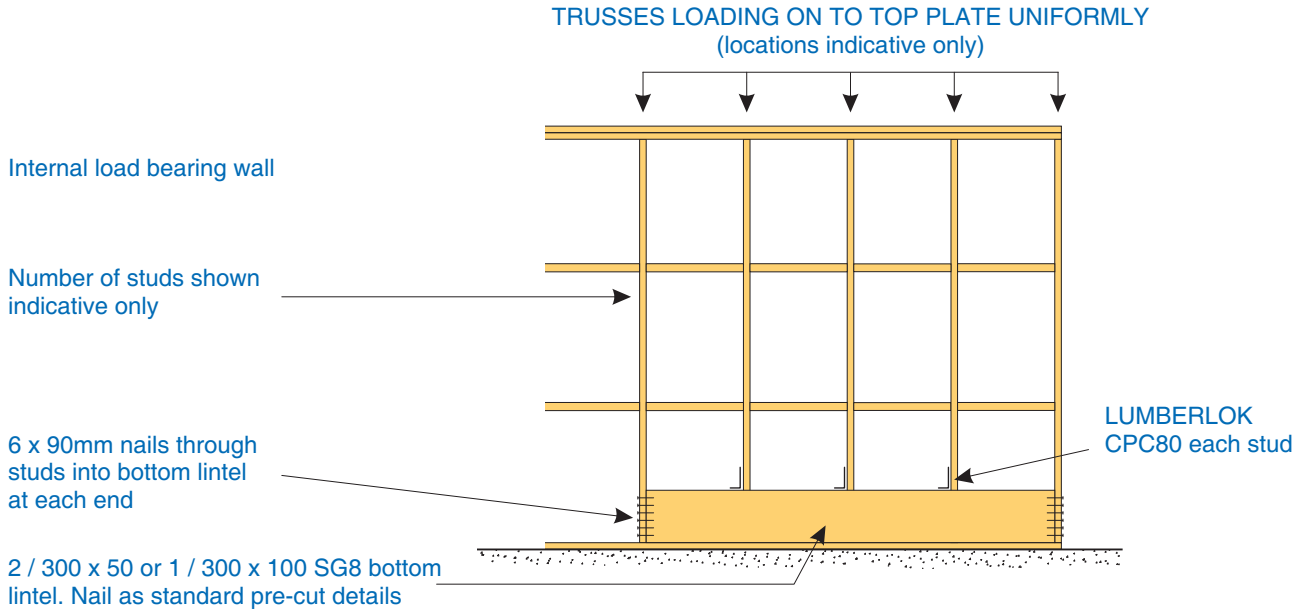
Note:

- Covers slab details where no thickening has been built into the foundation.
- For loads exceeding 10 kN install bottom lintel (300 x 100) between two adjacent studs as detailed below. For loads 30 kN or more, special design is required.
- Ensure the studs comply with requirements on page 3 and are located directly under concentrated loads. This may require on-site installation of these studs.

Concentrated Load



Uniformly Distributed Loads



MiTek New Zealand Limited

AUCKLAND
PO Box 58-014, Botany 2163
Phone: 09-274 7109
Fax: 09-274 7100

CHRISTCHURCH
PO Box 8387, Riccarton 8440
Phone: 03-348 8691
Fax: 03-348 0314

www.miteknz.co.nz

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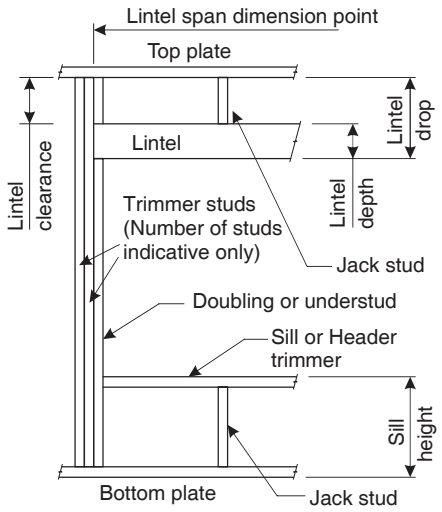
LINTEL FIXING SCHEDULE

ALTERNATIVE TO TABLE 8.14 & FIGURE 8.12
NZS 3604:2011

NOTE:

- ★ All fixings are designed for vertical loads only. Dead loads include the roof weight and standard ceiling weight of 0.20kPa.
- ★ Refer to Table 8.19 NZS 3604:2011 for nailing schedule to resist horizontal loads.
- ★ These fixings assume the correct choice of rafter/truss to top plate connections have been made.
- ★ All fixings assume bottom plate thickness of 45mm maximum. Note: TYLOK options on timber species.
- ★ Wall framing arrangements under girder trusses are not covered in this schedule.
- ★ All timber selections are as per NZS 3604:2011.

DEFINITIONS



Lintel Supporting Girder Trusses						
Roof Tributary Area	Light Roof			Heavy Roof		
	Wind Zone			Wind Zone		
	L, M, H	VH	EH	L, M, H	VH	EH
8.6m²	G	G	H	G	G	H
11.6m²	G	H	H	G	G	H
12.1m²	G	H	H	G	H	H
15.3m²	H	H	-	G	H	H
19.1m²	H	-	-	G	H	-
20.9m²	H	-	-	H	H	-
21.8m²	H	-	-	H	-	-
34.3m²	-	-	-	H	-	-

NOTES:

1. Roof Tributary Area = approx. 1/2 x (Total roof area on girder and rafter trusses supported by lintel)
2. Assumed girder truss is at mid-span or middle third span of lintel
3. Use similar fixings for both ends of lintel
4. All other cases require specific engineering design

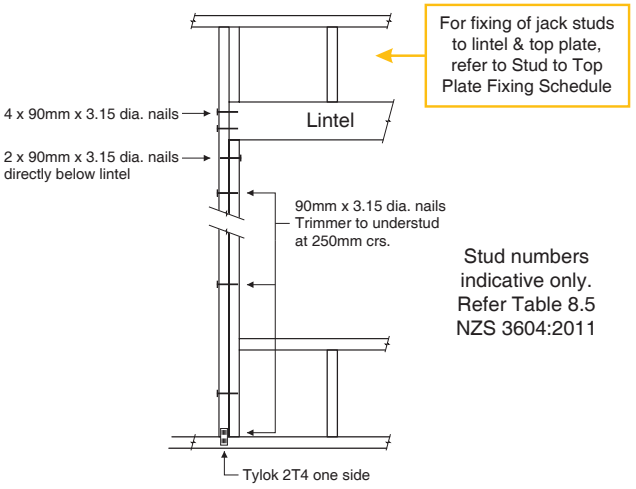
Lintel Span (m)	Loaded Dimension (m) (See Fig. 1.3 NZS 3604:2011)	Light Roof Wind Zone					Heavy Roof Wind Zone				
		L	M	H	VH	EH	L	M	H	VH	EH
1.0	2.0	E	E	E	F	F	E	E	E	E	F
	3.0	E	E	F	F	F	E	E	E	F	F
	4.0	E	F	F	F	G	E	E	F	F	F
	5.0	E	F	F	G	G	E	E	F	F	G
	6.0	E	F	F	G	G	E	E	F	F	G
1.2	2.0	E	E	F	F	F	E	E	E	F	F
	3.0	E	E	F	F	F	E	E	F	F	F
	4.0	E	F	F	G	G	E	E	F	F	G
	5.0	E	F	F	G	G	E	E	F	F	G
	6.0	F	F	G	G	H	E	E	F	G	G
1.5	2.0	E	E	F	F	F	E	E	E	F	F
	3.0	E	F	F	F	G	E	E	F	F	F
	4.0	E	F	F	G	G	E	E	F	F	G
	5.0	F	F	G	G	H	E	E	F	G	G
	6.0	F	F	G	H	H	E	E	F	G	H
2.0	2.0	E	F	F	F	G	E	E	F	F	F
	3.0	E	F	F	G	G	E	E	F	F	G
	4.0	F	F	G	G	H	E	E	F	G	G
	5.0	F	F	G	H	H	E	E	F	G	H
	6.0	F	G	G	H	H	E	F	G	H	H
2.4	2.0	E	F	F	G	G	E	E	F	F	G
	3.0	F	F	G	G	H	E	E	F	G	G
	4.0	F	F	G	H	H	E	E	F	G	H
	5.0	F	G	G	H	H	E	F	G	H	H
	6.0	F	G	H	H	-	E	F	G	H	H
3.0	2.0	E	F	F	G	G	E	E	F	F	G
	3.0	F	F	G	H	H	E	E	F	G	H
	4.0	F	G	G	H	H	E	F	G	H	H
	5.0	F	G	H	H	-	E	F	G	H	H
	6.0	F	G	H	-	-	E	F	G	H	-
3.6	2.0	F	F	G	G	H	E	E	F	G	G
	3.0	F	F	G	H	H	E	F	G	G	H
	4.0	F	G	H	H	-	E	F	G	H	H
	5.0	F	G	H	-	-	E	F	G	H	-
	6.0	G	H	H	-	-	E	F	H	-	-
4.2	2.0	F	F	G	G	H	E	E	F	G	G
	3.0	F	G	H	H	-	E	F	G	H	H
	4.0	F	G	H	-	-	E	F	G	H	-
	5.0	G	H	H	-	-	E	F	H	-	-
	6.0	G	H	-	-	-	E	F	H	-	-
4.5	2.0	F	F	G	H	H	E	E	F	G	H
	3.0	F	G	H	H	-	E	F	G	H	H
	3.4	F	G	H	H	-	E	F	G	H	H
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	5.0	G	H	-	-	-	E	F	H	-	-
	6.0	G	H	-	-	-	E	F	H	-	-
4.8	2.0	F	F	G	H	H	E	E	F	G	H
	3.0	F	G	H	H	-	E	F	G	H	H
	3.2	F	G	H	H	-	E	F	G	H	H
	4.0	F	G	H	-	-	E	F	H	H	-
	5.0	G	H	-	-	-	E	F	H	-	-
	6.0	G	H	-	-	-	E	F	H	-	-
5.1	2.0	F	F	G	H	H	E	F	G	G	H
	3.0	F	G	H	H	-	E	F	G	H	H
	3.5	F	G	H	-	-	E	F	G	H	-
	4.0	G	G	H	-	-	E	F	H	H	-
	5.0	G	H	-	-	-	E	F	H	-	-
	6.0	G	H	-	-	-	E	G	H	-	-
5.4	2.0	F	F	G	H	H	E	F	G	G	H
	2.8	F	G	H	H	-	E	F	G	H	H
	3.0	F	G	H	-	-	E	F	G	H	-
	4.0	G	H	H	-	-	E	F	H	-	-
	5.0	G	H	-	-	-	E	F	H	-	-
	6.0	G	H	-	-	-	E	G	H	-	-

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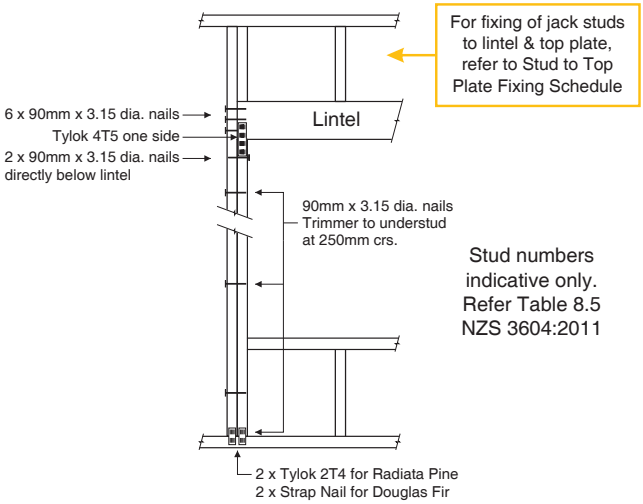
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LINTEL FIXING OPTIONS

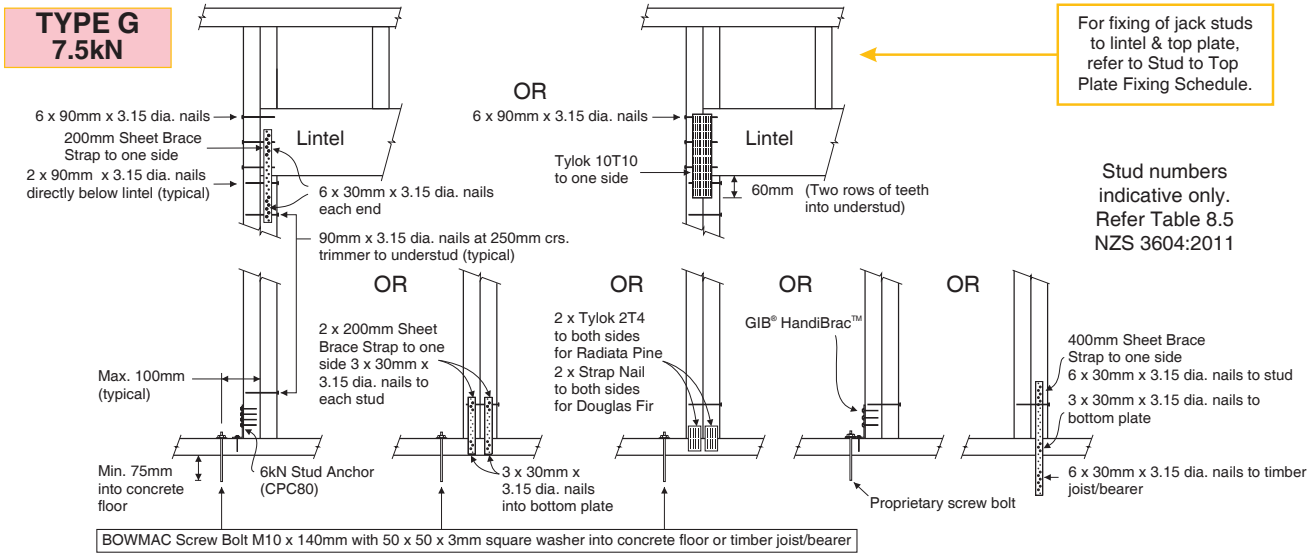
TYPE E 1.4kN



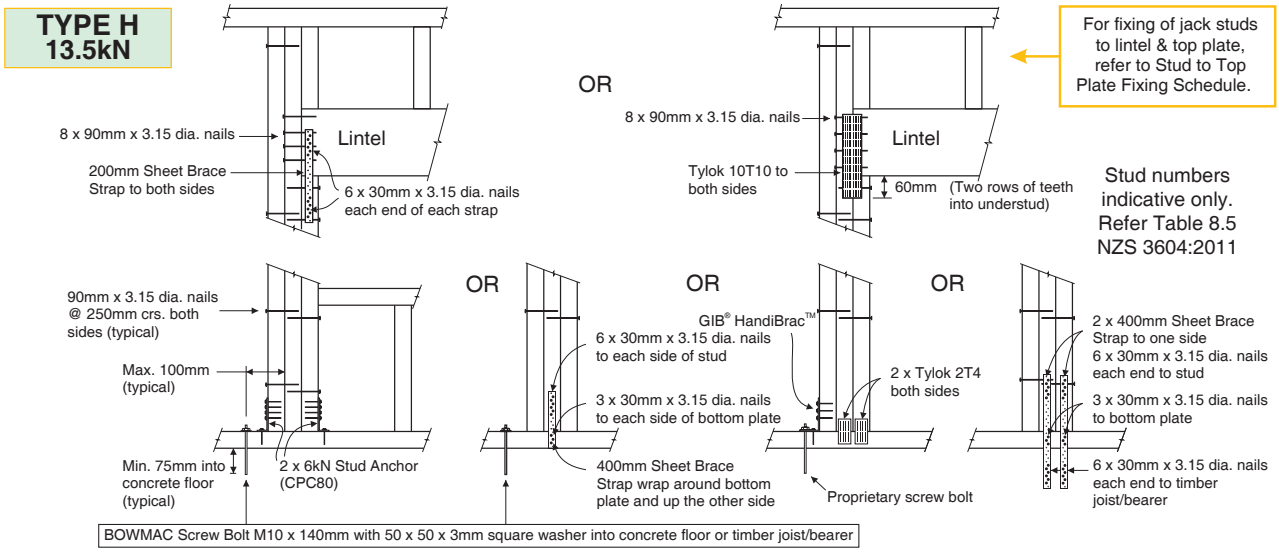
TYPE F 4.0kN



TYPE G 7.5kN



TYPE H 13.5kN



MiTek New Zealand Limited

AUCKLAND
PO Box 58-014, Botany 2163
Phone: 09-274 7109
Fax: 09-274 7100

CHRISTCHURCH
PO Box 8387, Riccarton 8440
Phone: 03-348 8691
Fax: 03-348 0314

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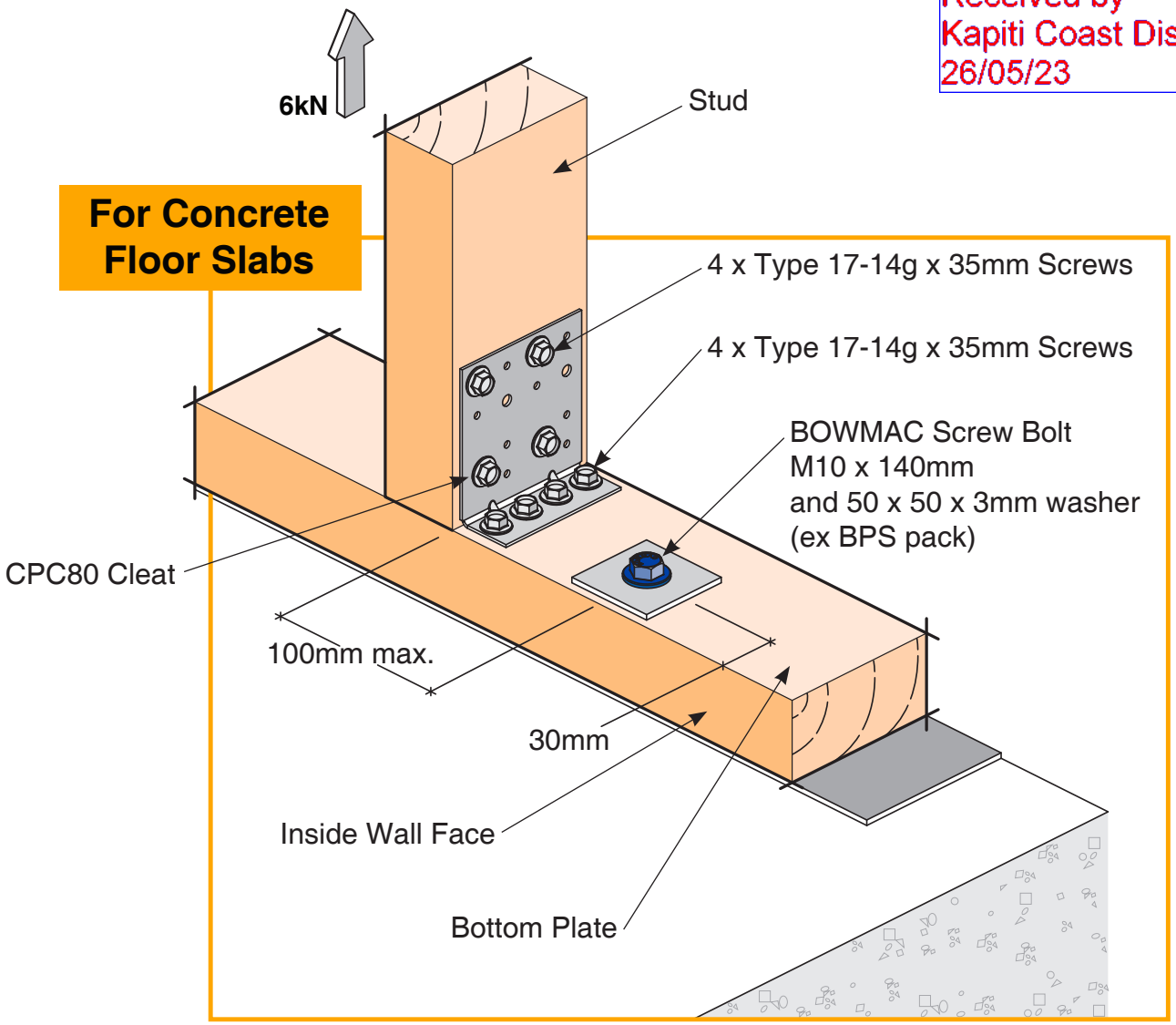
LUMBERLOK®

6kN STUD TO BOTTOM PLATE FIXING

★ Ideal as retro fit fixing after lining/cladding is installed

230413
Received by
Kapiti Coast District Council
26/05/23

For Concrete Floor Slabs



Code: SBP
Material: CPC80 1.55mm G300 Z275 Galvanised Steel
Packed: 2 x CPC80 Cleats
16 x Type 17-14g x 35mm Hex Head Galvanised Screws

Available from leading Builders Supply Merchants throughout New Zealand

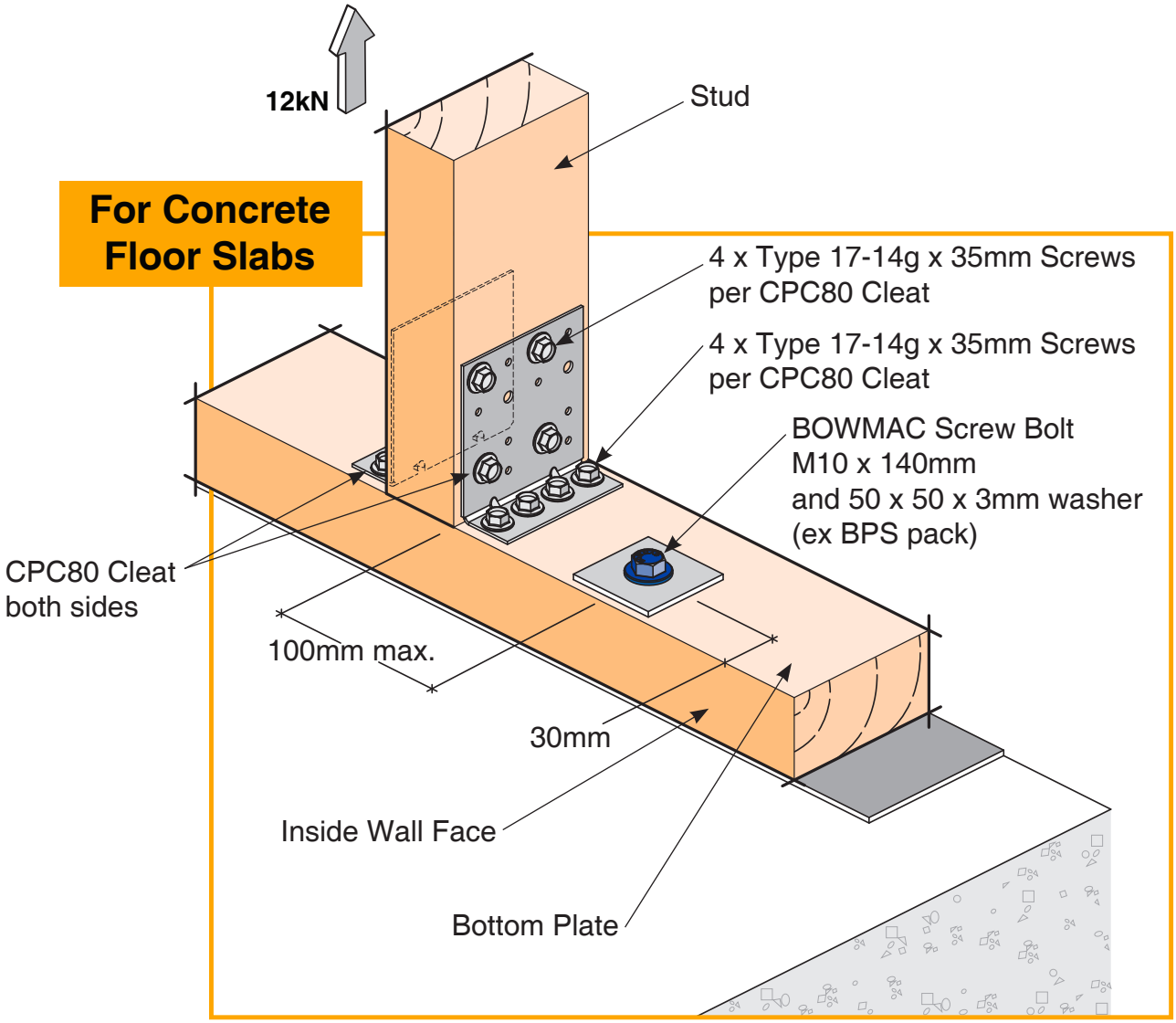
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LUMBERLOK®

12kN STUD TO BOTTOM PLATE FIXING

- ★ Ideal as retro fit fixing after lining/cladding is installed
- ★ Two fixings per stud as shown



Code: SBP

Material: CPC80 1.55mm G300 Z275 Galvanised Steel

Packed: 2 x CPC80 Cleats
16 x Type 17-14g x 35mm Hex Head Galvanised Screws

Available from leading Builders Supply Merchants throughout New Zealand

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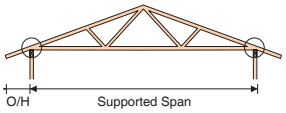
STUD TO TOP PLATE FIXING SCHEDULE

ALTERNATIVE TO TABLE 8.18 NZS 3604:2011

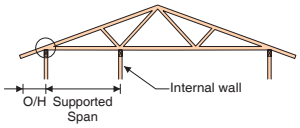
NOTE:

- ★ All fixings are designed to resist vertical loads only. Dead loads include the roof weight and standard ceiling weight of 0.20kPa.
- ★ Refer to Table 8.19 NZS 3604:2011 for nailing schedule to resist lateral loads.
- ★ These fixings assume the correct choice of rafter/truss to top plate connections have been made.
- ★ For gable end walls where the adjacent rafter/truss is located within 1200mm and with a maximum verge overhang of 750mm, select stud to top plate fixing using a loaded dimension of 1.5m.
- ★ All fixings assume top plate thickness of 45mm maximum.
- ★ Wall framing arrangements under girder trusses are not covered in this schedule.
- ★ All timber selections are as per NZS 3604:2011.

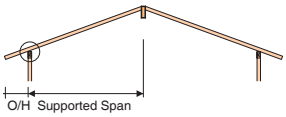
LOADED DIMENSION DEFINITION



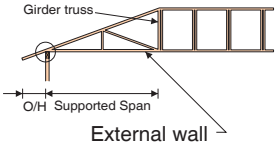
External wall
Standard truss



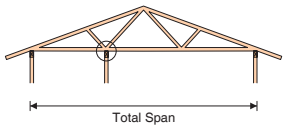
External wall
Internally supported truss



External wall
Rafter roof



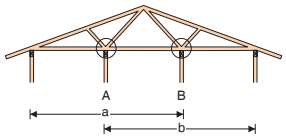
External wall
Jack truss



Internal wall
Internally supported truss
(overhang dimension does not apply)

EXTERNAL WALL
LOADED DIMENSION =
$\frac{\text{SUPPORTED SPAN}}{2}$ + O/H

INTERNAL WALL
LOADED DIMENSION =
$\frac{\text{TOTAL SPAN}}{2}$



Multiple internal walls
(overhang dimension does not apply)

MULTIPLE INTERNAL WALL
LOADED DIMENSION FOR
WALL A = $\frac{a}{2}$
WALL B = $\frac{b}{2}$

FIXING SELECTION CHART

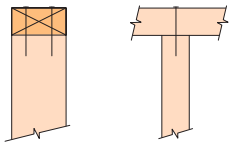
(Suitable for walls supporting roof members at 600, 900 or 1200mm crs.)
Wind Zones L, M, H, VH, EH, as per NZS 3604:2011

Loaded Dimension (m) Stud Centres			Light Roof Wind Zone					Heavy Roof Wind Zone				
300mm	400mm	600mm	L	M	H	VH	EH	L	M	H	VH	EH
3.0	2.3	1.5	A	A	B	B	B	A	A	B	B	B
4.0	3.0	2.0	A	A	B	B	B	A	A	B	B	B
5.0	3.8	2.5	A	B	B	B	B	A	A	B	B	B
6.0	4.5	3.0	A	B	B	B	B	A	A	B	B	B
7.0	5.3	3.5	A	B	B	B	B	A	A	B	B	B
8.0	6.0	4.0	A	B	B	B	B	A	A	B	B	B
9.0	6.8	4.5	B	B	B	B	B	A	A	B	B	B
10.0	7.5	5.0	B	B	B	B	B	A	A	B	B	B
11.0	8.3	5.5	B	B	B	B	B	A	A	B	B	B
12.0	9.0	6.0	B	B	B	B	B	A	A	B	B	B

FIXING OPTIONS

FIXING TYPE A 0.7kN

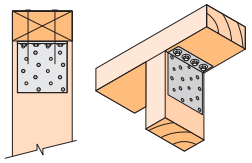
2 x 90mm x 3.15 dia. plain steel wire nails driven vertically into stud.



FIXING TYPE B 4.7kN

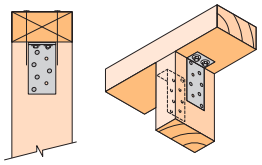
CHOOSE ANY OF THE 3 OPTIONS BELOW

2 x 90mm x 3.15 dia. plain steel wire nails driven vertically into stud.



Plus
LUMBERLOK
6kN Stud Anchor
(CPC80)

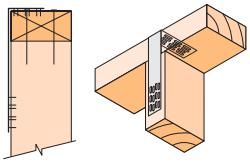
2 x 90mm x 3.15 dia. plain steel wire nails driven vertically into stud.



Plus
2 x LUMBERLOK
CPC40

Recommended for internal wall options to avoid lining issues

2 x 90mm x 3.15 dia. plain steel wire nails driven vertically into stud.



Plus
LUMBERLOK
Stud Strap
(one face only)

NOTE:
To calculate the number of B type fixings required, divide the wall length by the stud centres, add 1 to this figure and locate this number of fixings as evenly as possible along the wall length. This figure includes the start and end studs in each wall length.

SCAN FOR INSTALLATION VIDEO

https://vimeo.com/117353604

MiTek New Zealand Limited

AUCKLAND
PO Box 58-014, Botany 2163
Phone: 09-274 7109
Fax: 09-274 7100

CHRISTCHURCH
PO Box 8387, Riccarton 8440
Phone: 03-348 8691
Fax: 03-348 0314

www.miteknz.co.nz

MiTek®
MITEK® LUMBERLOK® BOWMAC®

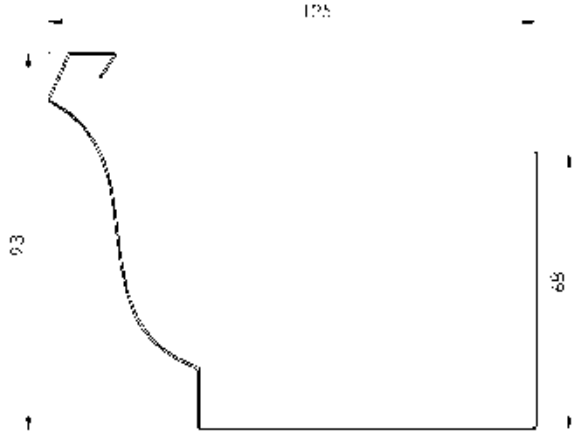
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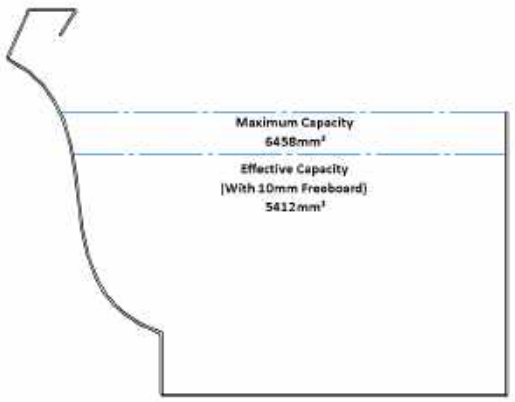
Continuous Group®

Spouting Fascia Downpipes

made for your place Since 1991

CHIEF 125mm OG CLASSIC SPOUTING





PRODUCT SPECIFICATIONS	
MagnaFlow™ Pre-painted Steel	0.55mm G300 with a minimum of 240gsm alloy/zinc coating.
AlumiGard™ Pre-painted Aluminium	0.70mm Grade 5005 H34
Pure Copper Copper 3/4 Hard	0.55mm Grade C12200
Internal Bracket	2.00mm Aluminium 5052 H34 2.00mm Copper–hard (C12200)
External Bracket	3.00mm Aluminium 5052 H34 2.50mm Copper or Brass–hard
Recommended Maximum bracket spacing	750mm 600mm where snow fall is possible
Recommended Fixings	Minimum Class 4 screw &/or rivet fasteners compatible with substrate

CAPACITY SPECIFICATIONS	
Maximum cross sectional area	6,458mm²
Effective cross sectional area with 10mm freeboard	5,412mm²
Flow Capacity	74 Litres/min
Recommended fall	1:500 – 2mm per 1 metre
Minimum Downpipe cross section	3,215mm²
Recommended round standard downpipe sizes	80mm Ø – 4,776mm² 65mm Ø – 3,215mm²
Recommended rectangle standard downpipe sizes	4x2" – 5,346mm² 3x2" – 3,996mm²

Scope of use	Continuous Group rainwater systems are intended to collect and channel water that runs off a roof. It is intended that the metal spouting be placed at the perimeter of the building (Positioned outside the building envelope).
NZBC Compliance	Test information available from Pacific Coilcoaters, New Zealand Steel and Ambro Metals, combined with past history of rainwater products indicate, that provided the product use and maintenance is in line with the guidelines contained in the current literature, Continuous Group rainwater systems can be expected to meet the performance criteria in clause E2 of the New Zealand building code.
Durability	All copper, brass and aluminium products listed above are fit for purpose in environment zone B, C, D and E* Pre-painted steel products are fit for purpose in environment Zone B and C* They may be used in environment zone D subject to a pre-approval warranty application based on site address* *In a few cases, areas with high wind &/or salt &/or thermal/industrial atmospheric conditions may require specific engineering design (S.E.D) Reference: Section 4, "Durability" from NZS3604:2011.
Maintenance	Continuous Group rainwater systems require regular maintenance to ensure the useful life of the products. Minimum maintenance interval of every 6 months or as often as needed to avoid build up of contaminants (dirt, salt, pollen etc.) on the spouting surface. Simply spray and rinse with water and/or if necessary scrub with a soft nylon brush. More information and specific maintenance products are available on our website www.continuous.co.nz/care-and-maintenance
Warranty	***MagnaFlow***™ : Environment zone B & C–10 year paint warranty ; 12 year perforation warranty. ***MagnaFlow***™ : Environment zone D–10 year paint warranty ; 10 year perforation warranty. ***AlumiGard***™ : 10 year paint warranty ; 12 year perforation warranty. *Pure Copper* : 20 year material and perforation warranty. Full details and conditions of our comprehensive warranty can be found at www.continuous.co.nz/warranties

Prolam®
Engineered Laminated Timber

230413
Received by
Kapiti Coast District Council
26/05/23

Structural Timber Guide 2019

Register Free for our Beam Calculator
www.prolamnz.com/specifiers

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98 — Prolam Crib Walls
99 — Bollards

The Prolam® Product Range

- Prolam® Laminated Beams
- Prolam® Posts
- Prolam® Formwork
- Prolam® LVL 15
- Prolam® Kicker
- Prolam® Rim Board
- Prolam® T & G Flooring
- Prolam® Crib Walls
- Prolam® I-Joists
- Prolam® Pro Calculator — Specify with Certainty

Visual/Appearance A H5/ H3.2 KD Posts PLP – Prolam® Post



PLP8H5-100 / PLP8H3-100	88 x 88mm
PLP8H5-125 / PLP8H3-125	112 x 112mm
PLP8H5-150 / PLP8H3-150	135 x 135mm
PLP8H5-200 / PLP8H3-200	180 x 180mm
PLP8H5-250 / PLP8H3-250	220 x 220mm
PLP8H5-300 / PLP8H3-300	260 x 260mm
PLP17H5-125 / PLP17H3-125	112 x 112mm
PLP17H5-150 / PLP17H3-150	125 x 125mm
PLP17H5-200 / PLP17H3-200	170 x 170mm
PLP17H5-250 / PLP17H3-250	220 x 220mm
PLP17H5-300 / PLP17H3-300	255 x 255mm

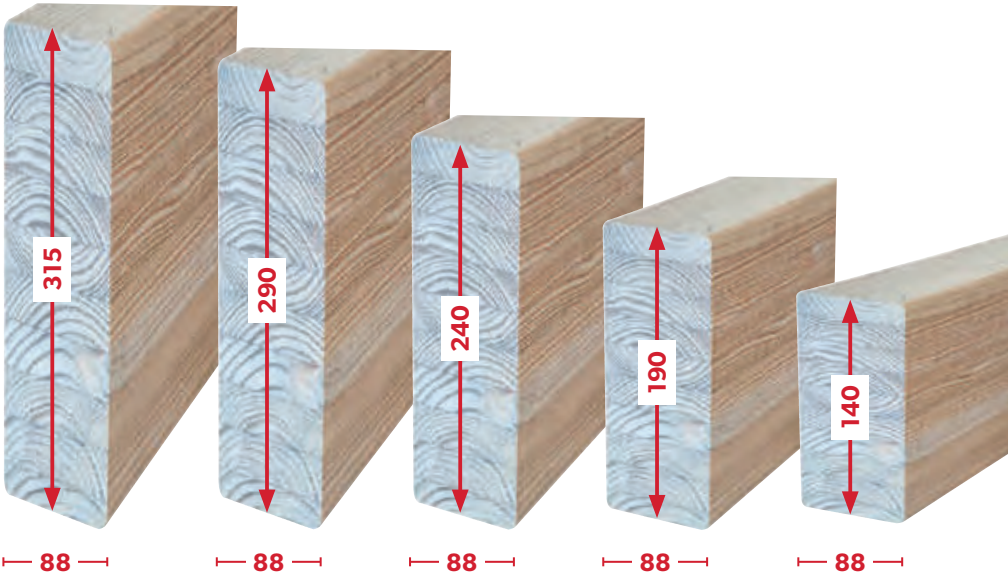
Visual Posts

Stock lengths:	2.4, 2.7, 3.0, 3.6, 4.2, 4.8, 5.4, 6.0, 7.2
Grade:	Visual / Appearance A Finger Jointed
Structural grade:	PL8 and PL17
Treatment:	CCA H5, H3.2 KD
Finishes:	Machined (in stock) Bandsawn (-6mm in size, per side) Sanded & Sealed Primed
Advantages:	Can be stained or painted Do not need postbrackets Gives you bracing units (pg 83)

Visual/Appearance A Beams 88mm

PLVL – Prolam® Visual Lintel
PL8, PL12, PL17 H3.2KD

(Bigger sizes available, refer pg 21)



PLVL8H3-350100	PLVL8H3-300100	PLVL8H3-250100	PLVL8H3-200100	PLVL8H3-150100
PLVL12H3-350100	PLVL12H3-300100	PLVL12H3-250100	PLVL12H3-200100	PLVL12H3-150100
PLVL17H3-350100	PLVL17H3-300100	PLVL17H3-250100	PLVL17H3-200100	PLVL17H3-150100

Stock lengths: 3.6, 4.2, 4.8, 5.4, 6.0, 7.2

Grade: Visual / Appearance A Finger Jointed

Structural grade: PL8, P12 and PL17

Treatment: CCA H3.2 KD

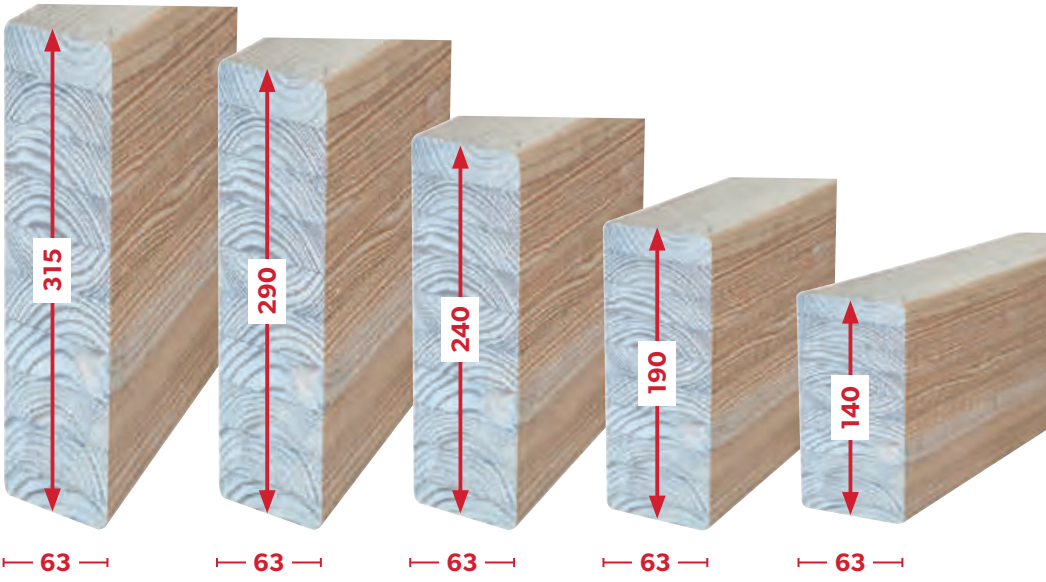
Finishes: Machined (in stock)
Sanded & Sealed
Bandsawn (-6mm in size, per side)
Primed

Other lengths: 7.8, 8.4, 9.0, 9.6, 10.2, 10.8, 11.4, 12.0

Visual/Appearance A Beams 63mm

PLVL – Prolam® Visual Lintel
PL8, PL12, PL17 H3.2KD

(Bigger sizes available, refer pg 21)



PLVL8H3-35075 PLVL12H3-35075 PLVL17H3-35075	PLVL8H3-30075 PLVL12H3-30075 PLVL17H3-30075	PLVL8H3-25075 PLVL12H3-25075 PLVL17H3-25075	PLVL8H3-20075 PLVL12H3-20075 PLVL17H3-20075	PLVL8H3-15075 PLVL12H3-15075 PLVL17H3-15075

Uses: Verandah Lintels
Verandah Rafters

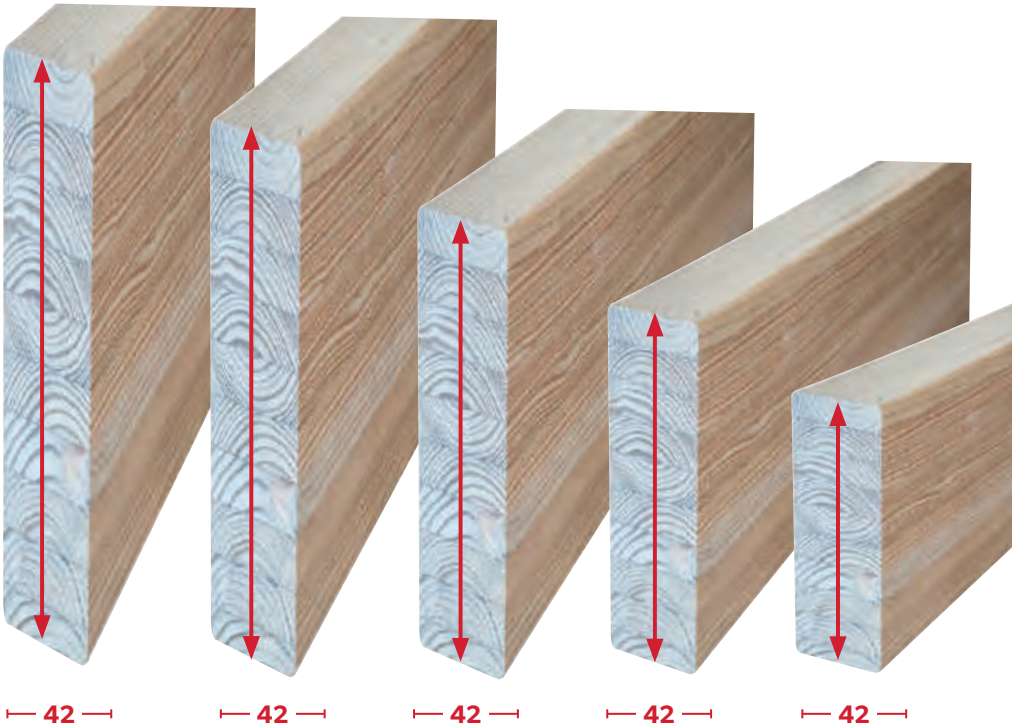
Advantages: Exterior treatment
Can be stained or painted

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Visual/Appearance A Beams 42mm

PLVL – Prolam® Visual Lintel
PL8, PL12, PL17 H3.2KD

(Bigger sizes available, refer pg 21)



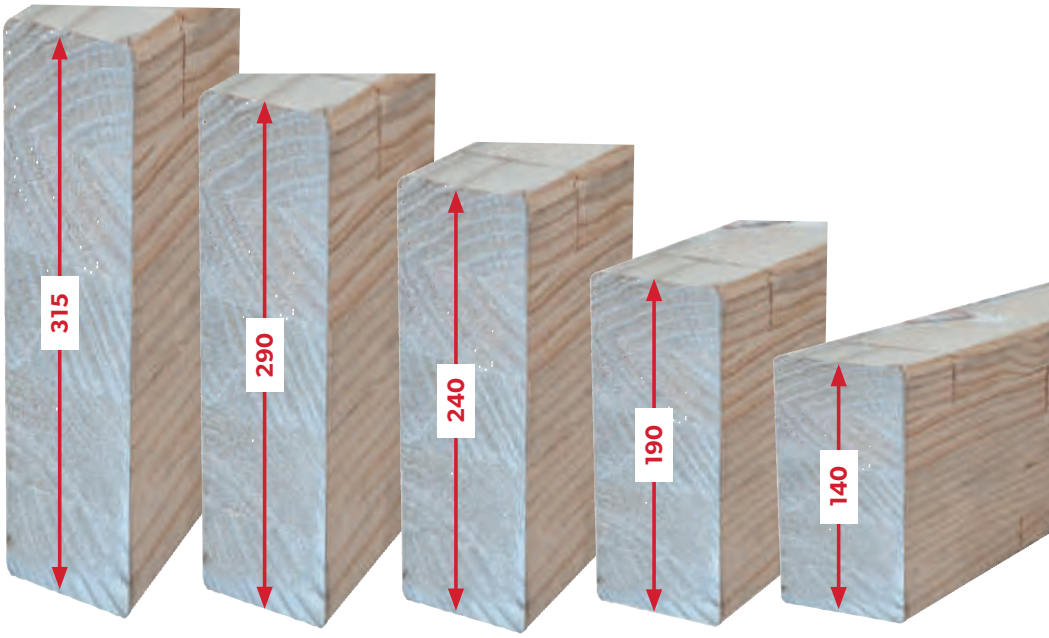
PLVL8H3-35050 PLVL12H3-35050 PLVL17H3-35050	PLVL8H3-30050 PLVL12H3-30050 PLVL17H3-30050	PLVL8H3-25050 PLVL12H3-25050 PLVL17H3-25050	PLVL8H3-20050 PLVL12H3-20050 PLVL17H3-20050	PLVL8H3-15050 PLVL12H3-15050 PLVL17H3-15050

Uses: Verandah Rafters
Pergolas

Non-Visual Beams 90mm

PL – Prolam® Lintel
PL8, PL12, PL17, H3.2, H1.2

(Bigger sizes available, refer pg 22)



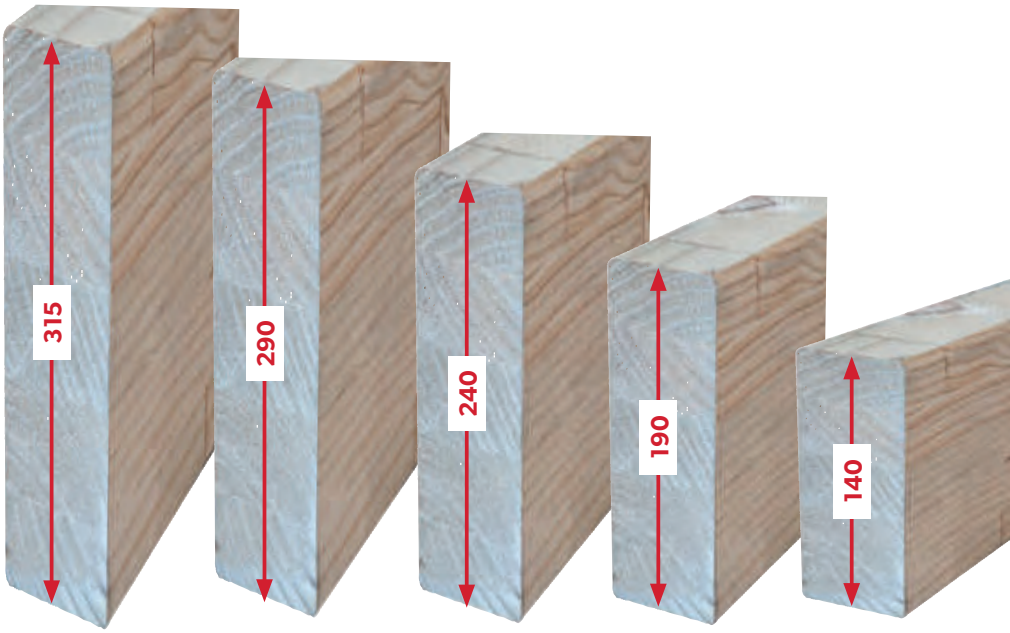
90	90	90	90	90
PL8H3-350100 PL12H3-350100 PL17H3-350100	PL8H3-300100 PL12H3-300100 PL17H3-300100	PL8H3-250100 PL12H3-250100 PL17H3-250100	PL8H3-200100 PL12H3-200100 PL17H3-200100	PL8H3-150100 PL12H3-150100 PL17H3-150100

Stock lengths:	3.6, 4.2, 4.8, 5.4, 6.0, 7.2
Grade:	Non-visual, Utility
Structural grade:	PL8 / PL12 / PL17
Treatment:	CCA H3.2 KD / H1.2
Finishes:	Dressed
Other lengths:	7.8, 8.4, 9.0, 9.6, 10.2, 10.8, 11.4, 12.0
Species:	Radiata, Douglas Fir

Non-Visual Beams 63mm

PL – Prolam® Lintel
PL8, PL12, PL17, H3.2, H1.2

(Bigger sizes available, refer pg 22)



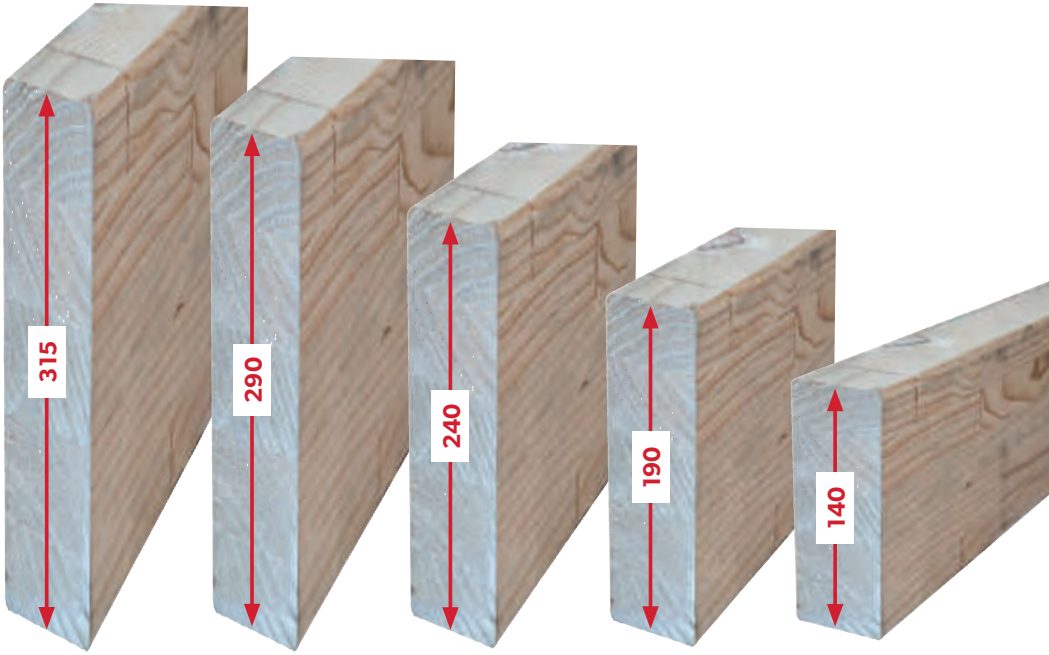
PL8H3-35075 PL12H3-35075 PL17H3-35075	PL8H3-30075 PL12H3-30075 PL17H3-30075	PL8H3-25075 PL12H3-25075 PL17H3-25075	PL8H3-20075 PL12H3-20075 PL17H3-20075	PL8H3-15075 PL12H3-15075 PL17H3-15075

Uses:
- Garage Door Lintels
- Deck Bearers
- Deck Joists
- Floor Joists
- General Lintels
- Rafters

Non-Visual Beams 42mm

PL – Prolam® Lintel
PL8, PL12, PL17, H3.2KD, H1.2

(Bigger sizes available, refer pg 22)



42	42	42	42	42
PL8H3-35050 PL12H3-35050 PL17H3-35050	PL8H3-30050 PL12H3-30050 PL17H3-30050	PL8H3-25050 PL12H3-25050 PL17H3-25050	PL8H3-20050 PL12H3-20050 PL17H3-20050	PL8H3-15050 PL12H3-15050 PL17H3-15050

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Prolam® LVL 15

Prolam LVL 15 is manufactured from laminated Douglas Fir LVL and offers superior strength, stability, stiffness and decay resistance. LVL 15 Smartframe is available Boron treated or untreated as required. The 45mm LVL 15 actual size of 43.5mm fits within the 1.5mm nailplate tolerance as required by the Mitek and Pryda Manufacturing Specifications. Prolam LVL15 is available to specify on the Prolam specifier giving more options when specifying rafters, floor joists, lintels, roof trusses and framing! Superior strength, stability, stiffness and decay resistence.

Description

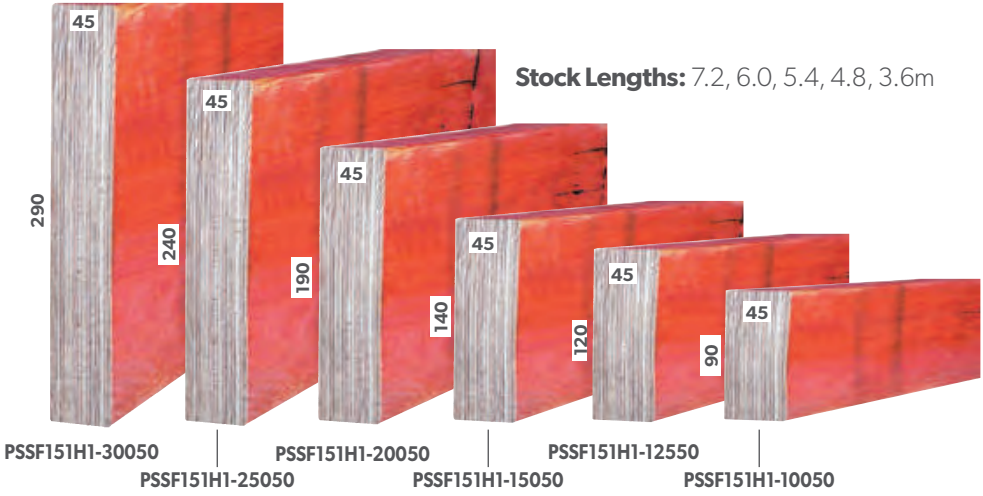
LVL15 is a Douglas Fir structural laminated veneer lumber (LVL) manufactured by Pacific Woodtech Corporation, Washington State, USA to meet the quality controlled process requirements of AS/NZS 4357 - Structural Laminated Veneer Lumber.

Treatment

LVL 15 can be supplied untreated, or treated in accordance with the Prolam LVL preservation treatment standard 20 June 2017 to meet the durability requirements where hazard class H1.2 or less applies.

Benefits

-Superior Strength product without the extra cost!
-Having increased strength its ideal for high stress cantilever situations where a larger member is often required.
-Ideal for low pitch roofs where there's limited space.
-Great for longer studs outside 3604 around stairs and chimneys.
-Loaded into MiTek and Pryda Systems.
-Quick Lead Times - Product is in stock ready for dispatch.



Stock Lengths: 7.2, 6.0, 5.4, 4.8, 3.6m

Prolam® I-Joists

Prolam I-Joists are manufactured from Ultra High strength Douglas Fir LVL flanges, and Orientated Strand board webs. The flanges are made up from ultrasonically graded LVL, bonded with exterior adhesive for more load bearing capacity. The webs being Orientated Strand Board (OSB) are known for their superior strength and consistant performance. I-Joists resists shrinking, twisting, warping and splitting for a squeak resistant floor and quality roofs and ceilings.

Advantages

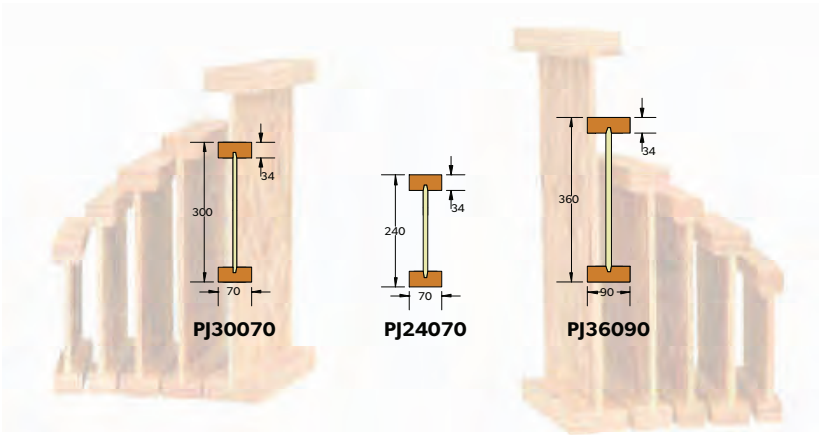
Holes may be easily cut in the web, allowing ducts and utilities to be run through the joists. Prepunched 40mm knockout holes are provided in the web for small diameter services or wiring.

Quality

I-Joists are manufactured by Pacific Woodtech Corporation to the ASTM D 5055 standard for monitoring the structural capacities of prefabricated wood I Joists.

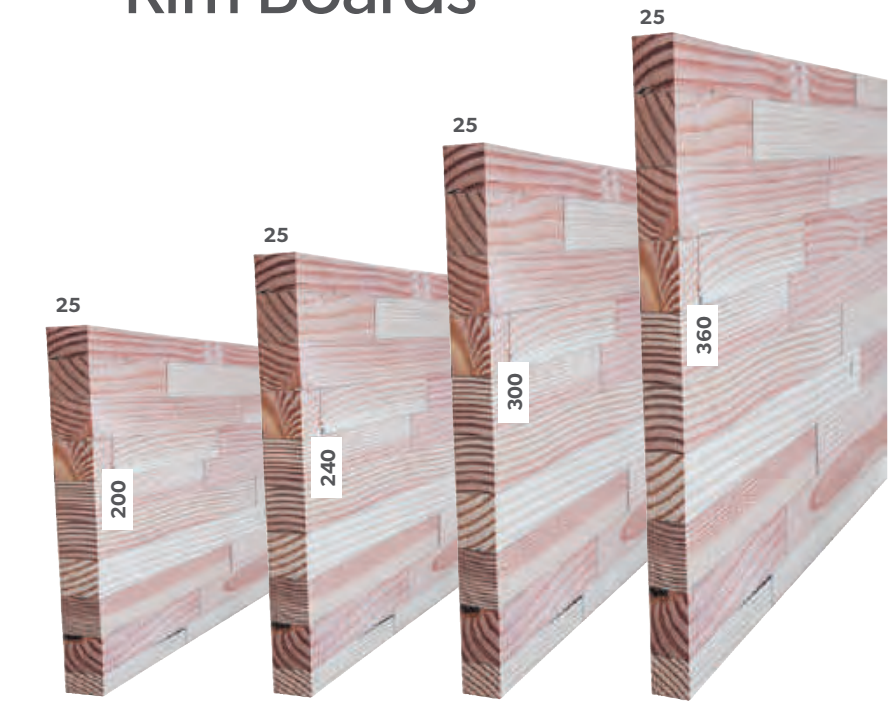
Treatment

I-Joists can be supplied untreated, or treated in accordance with the Prolam LVL preservation treatment standard 20 June 2017 to meet the durability requirements where hazard class H1.2 or less applies.



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Prolam® Rim Boards

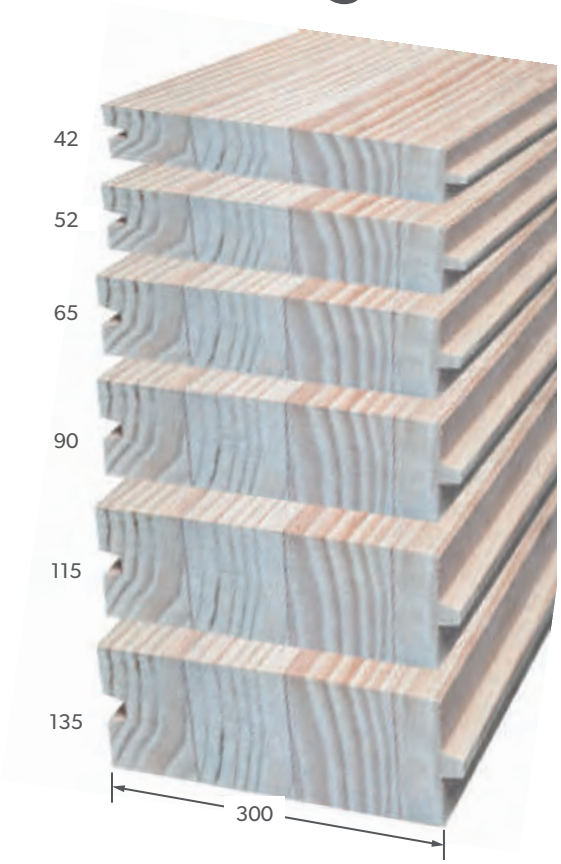


PLRBH1-22533 | **PLRBH1-25033** | **PLRBH1-35033** | **PLRBH1-40033**

Stock lengths:	4.2, 4.8, 5.4, 6.0
Grade:	Rim Board
Treatment:	H1.2
Ideal for:	Rim Board
Advantages:	Laminated to eliminate twisting

Prolam® T & G Flooring

PLF-50	42
PLF-60	52
PLF-75	65
PLF-100	90
PLF-125	115
PLF-150	135



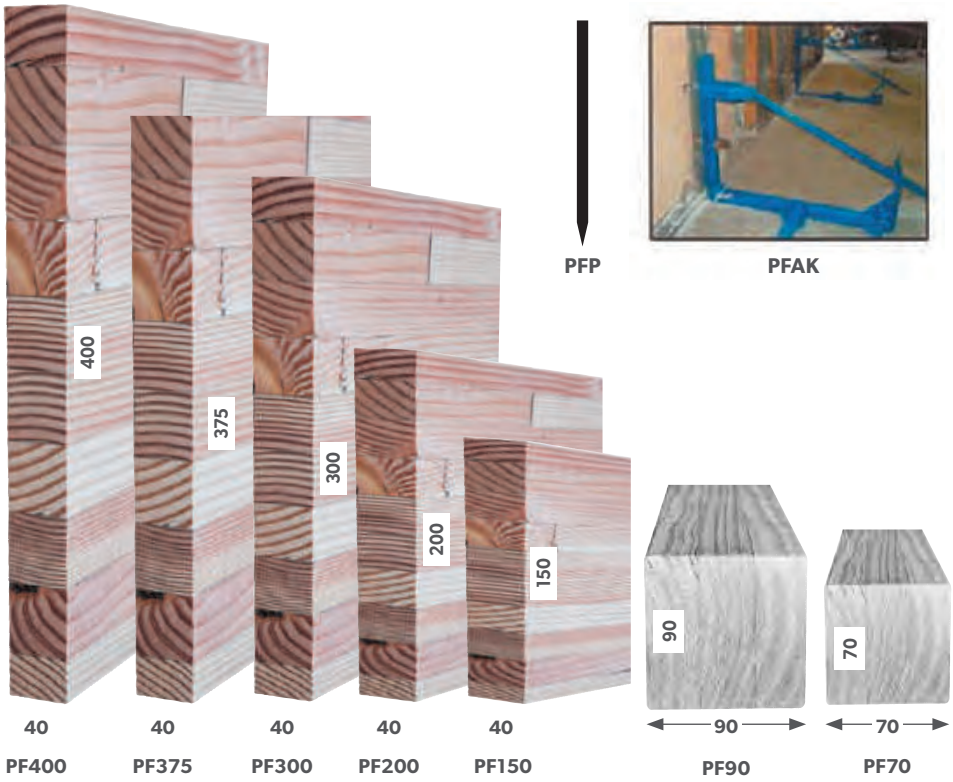
Prolam Tongue & Groove Flooring panels are a solid timber structural floor system. The beauty of T & G Flooring is that it gives you a very low profile floor cross section, as well as an attractive ceiling all in one. T & G Flooring is available in the sizes above and has spanning capabilities as on page 80. Effective fire resistance is also achieved as the natural benefits of Prolam, see page 44. Can also be used for roof panels. Available in both Radiata and Douglas Fir.

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Notes

Prolam® Formwork

Prolam Formwork is manufactured from laminated Douglas Fir, offering superior strength, stability, stiffness and decay resistance. As a refractory species, Douglas Fir resists wetting, with natural ability. Formwork will withstand decay for longer. It also reduces the risk of cupping due to shrinkage by wetting and drying.



Stock lengths: 4.8, 5.4, 6.0m

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Prolam® Kicker

The Better Way

Prolam Kicker is the only steel brace that attaches to wood or steel forms and can be used on dirt, wood, or concrete surfaces. It eliminates the inefficiency of wood bracing resulting in higher profits. The quick adjustability allows for a faster, straighter wall line with zero waste, increasing production between 30% - 60%. With three standard and custom sizes available, it can withstand up to a 600mm pour. When the job is completed, it detaches and folds down for the next application.







Key Benefits

Adjustment Positions

The Kicker will adjust to various surface angles and establish required height elevations.



Straighter Edges

The precision of the Kicker allows for straighter edges with less work than wood bracing.



Fascia Any Size
PL8 / H3.2KD



Custom surface rebate

PL Fascia ___ width ___ thickness

Rebate height , depth , width

Treatment:	CCA H3.2 KD
Finishes:	Dressed, Bandsawn
Lengths:	Made to order – 2 week lead time
Other sizes:	Made to order
Advantages:	Exterior treatment Can be stained or painted

Prolam® Order Codes

Posts Visual PL8 H3.2

Width & Thickness

	88	112	135	180	220	260	300
Code	PLPH3-100	PLPH3-125	PLPH3-150	PLPH3-200	PLPH3-250	PLPH3-300	PLPH3-350

Posts Visual PL8 H5

Width & Thickness

	88	112	135	180	220	260	300
Code	PLPH5-100	PLPH5-125	PLPH5-150	PLPH5-200	PLPH5-250	PLPH5-300	PLPH5-350

Posts Visual PL17 H5

Width & Thickness

	112	125	170	220	255	300
Code	PLP17H5-125	PLP17H5-150	PLP17H5-200	PLP17H5-250	PLP17H5-300	PLP17H5-350

Beams Visual PL8 H3.2

Width and Thickness

		140	190	240	290	315	360
42	**Code**	PLVL8H3-15050	PLVL8H3-20050	PLVL8H3-25050	PLVL8H3-30050	PLVL8H3-35050	PLVL8H3-40050
63	**Code**	PLVL8H3-15075	PLVL8H3-20075	PLVL8H3-25075	PLVL8H3-30075	PLVL8H3-35075	PLVL8H3-40075
88	**Code**	PLVL8H3-150100	PLVL8H3-200100	PLVL8H3-250100	PLVL8H3-300100	PLVL8H3-350100	PLVL8H3-400100
112	**Code**	PLVL8H3-150125	PLVL8H3-200125	PLVL8H3-250125	PLVL8H3-300125	PLVL8H3-350125	PLVL8H3-400125
135	**Code**	PLVL8H3-150150	PLVL8H3-200150	PLVL8H3-250150	PLVL8H3-300150	PLVL8H3-350150	PLVL8H3-400150

Beams Visual PL12 H3.2

Width and Thickness

		140	190	240	290	315	360
42	**Code**	PLVL12H3-15050	PLVL12H3-20050	PLVL12H3-25050	PLVL12H3-30050	PLVL12H3-35050	PLVL12H3-40050
63	**Code**	PLVL12H3-15075	PLVL12H3-20075	PLVL12H3-25075	PLVL12H3-30075	PLVL12H3-35075	PLVL12H3-40075
88	**Code**	PLVL12H3-150100	PLVL12H3-200100	PLVL12H3-250100	PLVL12H3-300100	PLVL12H3-350100	PLVL12H3-400100
112	**Code**	PLVL12H3-150125	PLVL12H3-200125	PLVL12H3-250125	PLVL12H3-300125	PLVL12H3-350125	PLVL12H3-400125
135	**Code**	PLVL12H3-150150	PLVL12H3-200150	PLVL12H3-250150	PLVL12H3-300150	PLVL12H3-350150	PLVL12H3-400150

Beams Visual PL17 H3.2

Width and Thickness

		140	190	240	290	315	360
40*	**Code**	PLVL17H3-15050	PLVL17H3-20050	PLVL17H3-25050	PLVL17H3-30050	PLVL17H3-35050	PLVL17H3-40050
63	**Code**	PLVL17H3-15075	PLVL17H3-20075	PLVL17H3-25075	PLVL17H3-30075	PLVL17H3-35075	PLVL17H3-40075
85	**Code**	PLVL17H3-150100	PLVL17H3-200100	PLVL17H3-250100	PLVL17H3-300100	PLVL17H3-350100	PLVL17H3-400100
112	**Code**	PLVL17H3-150125	PLVL17H3-200125	PLVL17H3-250125	PLVL17H3-300125	PLVL17H3-350125	PLVL17H3-400125
135	**Code**	PLVL17H3-150150	PLVL17H3-200150	PLVL17H3-250150	PLVL17H3-300150	PLVL17H3-350150	PLVL17H3-400150

Non-Visual Beams PL8 H3.2

Width

		140	190	240	290	315	360
42	Code	PL8H3-15050	PL8H3-20050	PL8H3-25050	PL8H3-30050	PL8H3-35050	PL8H3-40050
63	Code	PL8H3-15075	PL8H3-20075	PL8H3-25075	PL8H3-30075	PL8H3-35075	PL8H3-40075
88	Code	PL8H3-150100	PL8H3-200100	PL8H3-250100	PL8H3-300100	PL8H3-350100	PL8H3-400100
112	Code	PL8H3-150125	PL8H3-200125	PL8H3-250125	PL8H3-300125	PL8H3-350125	PL8H3-400125
140	Code	PL8H3-150150	PL8H3-200150	PL8H3-250150	PL8H3-300150	PL8H3-350150	PL8H3-400150

Non-Visual Beams PL12 H3.2

Width

		140	190	240	290	315	360
42	Code	PL12H3-15050	PL12H3-20050	PL12H3-25050	PL12H3-30050	PL12H3-35050	PL12H3-40050
63	Code	PL12H3-15075	PL12H3-20075	PL12H3-25075	PL12H3-30075	PL12H3-35075	PL12H3-40075
88	Code	PL12H3-150100	PL12H3-200100	PL12H3-250100	PL12H3-300100	PL12H3-350100	PL12H3-400100
112	Code	PL12H3-150125	PL12H3-200125	PL12H3-250125	PL12H3-300125	PL12H3-350125	PL12H3-400125
140	Code	PL12H3-150150	PL12H3-200150	PL12H3-250150	PL12H3-300150	PL12H3-350150	PL12H3-400150

Non-Visual Beams PL17 H3.2

Width

		140	190	240	290	315	360
42	Code	PL17H3-15050	PL17H3-20050	PL17H3-25050	PL17H3-30050	PL17H3-35050	PL17H3-40050
63	Code	PL17H3-15075	PL17H3-20075	PL17H3-25075	PL17H3-30075	PL17H3-35075	PL12H3-40075
88	Code	PL17H3-150100	PL17H3-200100	PL17H3-250100	PL17H3-300100	PL17H3-350100	PL17H3-400100
112	Code	PL17H3-150125	PL17H3-200125	PL17H3-250125	PL17H3-300125	PL17H3-350125	PL17H3-400125
140	Code	PL17H3-150150	PL17H3-200150	PL17H3-250150	PL17H3-300150	PL17H3-350150	PL17H3-400150

Non-Visual Beams PL8 H1.2

Width

		140	190	240	290	315	360
42	Code	PL8H1-15050	PL8H1-20050	PL8H1-25050	PL8H1-30050	PL8H1-35050	PL8H1-40050
63	Code	PL8H1-15075	PL8H1-20075	PL8H1-25075	PL8H1-30075	PL8H1-35075	PL8H1-40075
88	Code	PL8H1-150100	PL8H1-200100	PL8H1-250100	PL8H1-300100	PL8H1-350100	PL8H1-400100
112	Code	PL8H1-150125	PL8H1-200125	PL8H1-250125	PL8H1-300125	PL8H1-350125	PL8H1-400125
140	Code	PL8H1-150150	PL8H1-200150	PL8H1-250150	PL8H1-300150	PL8H1-350150	PL8H1-400150

Non-Visual Beams PL12 H1.2

Width

		140	190	240	290	315	360
42	Code	PL12H1-15050	PL12H1-20050	PL12H1-25050	PL12H1-30050	PL12H1-35050	PL12H1-40050
63	Code	PL12H1-15075	PL12H1-20075	PL12H1-25075	PL12H1-30075	PL12H1-35075	PL12H1-40075
88	Code	PL12H1-150100	PL12H1-200100	PL12H1-250100	PL12H1-300100	PL12H1-350100	PL12H1-400100
112	Code	PL12H1-150125	PL12H1-200125	PL12H1-250125	PL12H1-300125	PL12H1-350125	PL12H1-400125
140	Code	PL12H1-150150	PL12H1-200150	PL12H1-250150	PL12H1-300150	PL12H1-350150	PL12H1-400150

Non-Visual Beams PL17 H1.2

Width

		140	190	240	290	315	360
42	Code	PL17H1-15050	PL17H1-20050	PL17H1-25050	PL17H1-30050	PL17H1-35050	PL17H1-40050
63	Code	PL17H1-15075	PL17H1-20075	PL17H1-25075	PL17H1-30075	PL17H1-35075	PL12H1-40075
88	Code	PL17H1-150100	PL17H1-200100	PL17H1-250100	PL17H1-300100	PL17H1-350100	PL17H1-400100
112	Code	PL17H1-150125	PL17H1-200125	PL17H1-250125	PL17H1-300125	PL17H1-350125	PL17H1-400125
140	Code	PL17H1-150150	PL17H1-200150	PL17H1-250150	PL17H1-300150	PL17H1-350150	PL17H1-400150

Phone 03 526 7436 | info@prowoodnz.com

Prolam®

Engineered Laminated Timber

Prowood
283 Waiwhero Road, Motueka
Phone: 03 526 7436 Fax: 03 526 7437
sales@prowoodnz.com

Scan QR barcode to place your order

Order from / Delivery address:

Alternate Delivery address:

Date	
Order #	
Quote #	

Product	Order Code, if known	Grade	Strength	Treatment	Size		Length	Finish	QTY
Prolam	PLVL12H3-300100SS	Visual	PL12	H3.2	290	88	5.4	Sanded & Sealed	2
Prospan		Non-Visual	LVL15	H1.2	240	42	3.6	---	6
Projoist		Non-Visual	----	H1.2	240	70	5.4	---	12
Proform		Non-Visual	----	NC	300	35	5.4	---	18
Prolam		Non-Visual	PL17	H1.2	315	90	6.0	---	22

Please use the below box to specify any sizes or finishes that do not appear in the drop down options or for any other special instructions.

Other:

Specials

Bridge Beams
Curved Fascia
Truss Cords
Curved Framing Plates
Hand Rails
Stair Stringers

Other species

Douglas Fir
Macrocarpa
Lawson Cyprus
Kwila
Plus any others

Alternative to hy90

Prolam® sizes are based on equivalent defection. These tables are for guidance only, and any Prolam substitution should be verified against the complete selection chart or the Prolam online calculator. Alternatives may not be suitable for all situations.

hy90 E = 9.5GPa	Prolam PL8 Alternative	Prolam PL12 Alternative	Prolam PL17 Alternative
150 x 90	190 x 63	140 x 88	140 x 63
200 x 90	240 x 63	190 x 88	190 x 63
240 x 90	290 x 63	240 x 88	240 x 63
300 x 90	360 x 63	290 x 88	290 x 63
360 x 90	405 x 88	360 x 88	360 x 63 or 315 x 88
400 x 90	450 x 88	405 x 88	405 x 63 or 360 x 88

Alternative to hyONE (LVL16)

Prolam sizes are based on equivalent defection. These tables are for guidance only, and any Prolam substitution should be verified against the complete selection chart or the Prolam online calculator. Alternatives may not be suitable for all situations.

hyONE E = 16GPa	Prolam PL8 Alternative	Prolam PL12 Alternative	Prolam PL17 Alternative
240 x 90	315 x 88	290 x 88	240 x 88
300 x 90	405 x 88	360 x 88	315 x 88
360 x 90	N/A	405 x 88	360 x 88
400 x 90	N/A	450 x 88	405 x 88

This schedule applies only to Prolam products

Comparison with hyJOISTS
Domestic Floors

1.5kPa Live load SINGLE SPAN

Prolam® sizes are based on equivalent defection. These tables are for guidance only, and any Prolam substitution should be verified against the complete selection chart or the Prolam online calculator. Alternatives may not be suitable for all situations.

hyJOIST	Joist Spacing	Span Range	Prolam Equivalent			
			Joist size	Spacing	Grade	Max Span
HJ200 45	450	3.5 to 3.8	190x63	450	PL8	3.85
			240x42	450	PL8	4.15
			190x42	450	PL12	3.75
			140x63	450	PL17	3.70
HJ200 45	600	3.1 to 3.6	190x63	600	PL8	3.50
			240x42	600	PL8	3.75
			190x42	600	PL12	3.45
			140x63	600	PL17	3.40
HJ240 63	450	4.4 to 4.9	240x63	450	PL8	4.85
			290x42	450	PL8	5.00
			240x42	450	PL12	4.70
			190x42	450	PL17	4.45
			190x63	450	PL17	4.90
HJ240 63	600	4.0 to 4.5	240x63	600	PL8	4.35
			290x42	600	PL8	4.55
			240x42	600	PL12	4.25
			190x42	600	PL16	4.05
			190x63	600	PL16	4.55
HJ240 90	450	4.9 to 5.4	290x63	450	PL8	5.60
			315x42	450	PL8	5.40
			240x63	450	PL12	5.35
			290x42	450	PL12	5.55
			240x42	450	PL17	5.30
			190x63	450	PL17	4.90
HJ240 90	600	4.5 to 5.0	290x63	600	PL8	5.25
			315x42	600	PL8	4.95
			240x63	600	PL12	4.90
			290x42	600	PL12	5.15
			190x63	600	PL17	4.55
			240x42	600	PL17	4.95

This schedule applies only to Prolam products

Comparison with hyJOISTS continued
Domestic Floors

1.5kPa Live load SINGLE SPAN

Prolam® sizes are based on equivalent defection. These tables are for guidance only, and any Prolam substitution should be verified against the complete selection chart or the Prolam online calculator. Alternatives may not be suitable for all situations.

hyJOIST	Joist Spacing	Span Range	Prolam Equivalent			
			Joist size	Spacing	Grade	Max Span
HJ300 63	450	5.0 to 5.5	290x63	450	PL8	5.60
			315x42	450	PL8	5.40
			240x63	450	PL12	5.35
			290x42	450	PL12	5.55
			240x42	450	PL17	5.30
			240x63	600	PL17	5.45
HJ300 63	600	4.6 to 5.1	290x63	600	PL8	5.25
			315x42	600	PL8	4.95
			240x63	600	PL12	4.90
			290x42	600	PL12	5.15
			240x42	600	PL17	4.95
			190x63	450	PL17	4.90
HJ300 90	450	5.6 to 6.1	315x63	450	PL8	6.00
			360x42	400	PL8	6.15
			290x63	450	PL12	6.15
			315x42	400	PL12	6.10
			290x42	450	PL17	6.10
HJ300 90	600	5.2 to 5.7	315x63	450	PL8	6.00
			360x42	450	PL8	5.95
			290x63	600	PL12	5.75
			315x42	450	PL12	5.90
			290x42	600	PL17	5.70
HJ360 63	450	5.6 to 6.2	315x63	400	PL8	6.15
			360x42	400	PL8	6.15
			290x63	450	PL12	6.15
			315x42	400	PL12	6.10
			290x42	450	PL17	6.10
HJ360 63	600	5.2 to 5.7	315x63	450	PL8	6.00
			360x42	450	PL8	5.95
			290x63	600	PL12	5.75
			315x42	450	PL12	5.90
			290x42	600	PL17	5.70

This schedule applies only to Prolam products

Comparison with hyJOISTS continued
Domestic Floor

1.5kPa Live load SINGLE SPAN

Prolam® sizes are based on equivalent defection. These tables are for guidance only, and any Prolam substitution should be verified against the complete selection chart or the Prolam online calculator. Alternatives may not be suitable for all situations.

hyJOIST	Joist Spacing	Span Range	Prolam Equivalent			
			Joist size	Spacing	Grade	Max Span
HJ360 90	450	6.3 to 6.8	360x63	400	PL8	6.80
			405x42	400	PL8	6.70
			315x63	400	PL12	6.75
			360x42	400	PL12	6.75
			290x63	450	PL17	6.75
			315x42	400	PL17	6.70
HJ360 90	600	5.8 to 6.3	360x63	450	PL8	6.60
			405x42	450	PL8	6.55
			315x63	450	PL12	6.55
			360x42	450	PL12	6.55
			315x42	600	PL17	6.05
			290x63	600	PL17	6.30
HJ400 90	450	6.8 to 7.2	405x63	450	PL8	7.25
			360x63	450	PL12	7.25
			405x42	450	PL12	7.15
			360x42	450	PL17	7.20
			315x63	450	PL17	7.20
HJ400 90	600	6.3 to 6.7	405x63	600	PL8	6.70
			360x63	600	PL12	6.75
			405x42	600	PL12	6.65
			360x42	600	PL17	6.70
			315x63	600	PL17	6.70
HJ360 63	600	5.2 to 5.7	315x36	450	PL8	6.00
			360x42	450	PL8	5.95
			290x63	600	PL12	5.75
			315x42	450	PL12	5.90
			290x42	600	PL17	5.70

This schedule applies only to Prolam products

Comparison with hyJOISTS continued
Domestic Floors

1.5kPa Live load SINGLE SPAN

Prolam® sizes are based on equivalent defection. These tables are for guidance only, and any Prolam substitution should be verified against the complete selection chart or the Prolam online calculator. Alternatives may not be suitable for all situations.

hyJOIST	Joist Spacing	Span Range	Prolam Equivalent			
			Joist size	Spacing	Grade	Max Span
HJ360 90	450	6.3 to 6.8	360x63	400	PL8	6.80
			405x42	400	PL8	6.70
			315x63	400	PL12	6.75
			360x42	400	PL12	6.75
			290x63	450	PL17	6.75
			315x42	400	PL17	6.70
HJ360 90	600	5.8 to 6.3	360x63	450	PL8	6.60
			405x42	450	PL8	6.55
			315x63	450	PL12	6.55
			360x42	450	PL12	6.55
			315x42	600	PL17	6.05
			290x63	600	PL17	6.30
HJ400 90	450	6.8 to 7.2	405x63	450	PL8	7.25
			360x63	450	PL12	7.25
			405x42	450	PL12	7.15
			360x42	450	PL17	7.20
			315x63	450	PL17	7.20
HJ400 90	600	6.3 to 6.7	405x63	600	PL8	6.70
			360x63	600	PL12	6.75
			405x42	600	PL12	6.65
			360x42	600	PL17	6.70
			315x63	600	PL17	6.70

This schedule applies only to Prolam products

Alternative to Hyne 17c Glulam

Prolam® sizes are based on equivalent defection. These tables are for guidance only, and any Prolam substitution should be verified against the complete selection chart or the Prolam online calculator. Alternatives may not be suitable for all situations.

Hyne 17c E = 16.7GPa	Prolam PL8 Alternative	Prolam PL12 Alternative	Prolam PL17 Alternative
130 x 65	190 x 63	190 x 42 or 140 x 88	140 x 63
165 x 65	240 x 63 or 190 x 88	190 x 63	190 x 63
195 x 65	240 x 88 or 290 x 42	240 x 63	240 x 42 or 190 x 63
230 x 65	290 x 88	240 x 88	240 x 63
245 x 65	315 x 63 or 290 x 88	290 x 63	240 x 85
260 x 65	315 x 88	315 x 63 or 290 x 88	290 x 63
295 x 65	360 x 88	315 x 88 or 405 x 42	315 x 63 or 290 x 85
330 x 65	405 x 88	405 x 63	360 x 63 or 315 x 85
360 x 65	450 x 88	450 x 63	405 x 63 or 360 x 85
395 x 65	N/A	450 x 63	405 x 63 or 360 x 85
425 x 65	N/A	450 x 88	450 x 63 or 405 x 85
525 x 65	N/A	N/A	495 x 85
295 x 85	405 x 88	360 x 88	290 x 85
330 x 85	450 x 88	405 x 88	360 x 85
360 x 85	N/A	405 x 88	360 x 85
425 x 85	N/A	N/A	450 x 85
460 x 85	N/A	N/A	495 x 85
525 x 85	N/A	N/A	525 x 85

This schedule applies only to Prolam products

Alternative to hySPAN or LVL13

Prolam® sizes are based on equivalent defection. These tables are for guidance only, and any Prolam substitution should be verified against the complete selection chart or the Prolam online calculator. Alternatives may not be suitable for all situations.

hySPAN E = 13.2GPa	Prolam PL8 Alternative	Prolam PL12 Alternative	Prolam PL17 Alternative
150 x 45	190 x 42 or 140 x 88	140 x 63	140 x 42
170 x 45	240 x 42 or 190 x 63	190 x 63	190 x 42
200 x 45	240 x 42 or 190 x 88	190 x 63	190 x 42
240 x 45	290 x 42 or 240 x 88	240 x 63	240 x 42
300 x 45	315 x 63 or 290 x 88	290 x 63	290 x 42
360 x 45	360 x 88	360 x 63	360 x 42
400 x 45	405 x 88	405 x 63	405 x 42
150 x 63	190 x 63	140 x 88	140 x 63
170 x 63	190 x 88 or 240 x 63	190 x 63	190 x 63
200 x 63	240 x 63	190 x 88	190 x 63
240 x 63	290 x 63	240 x 88	240 x 63
300 x 63	315 x 88 or 360 x 63	290 x 88	290 x 63
360 x 63	405 x 88 or 450 x 63	360 x 88	360 x 63
400 x 63	450 x 88	450 x 88	405 x 63
600 x 63	N/A	585 x 88	485 x 63
150 x 90	190 x 88	190 x 88	140 x 85
170 x 90	240 x 88	240 x 63	190 x 85
200 x 90	240 x 88	240 x 88	190 x 85
240 x 90	315 x 88	290 x 88	240 x 85
300 x 90	360 x 88	315 x 88	290 x 85
360 x 90	450 x 88	405 x 88	360 x 85
400 x 90	N/A	450 x 88	405 x 85

This schedule applies only to Prolam products

Alternative to LVL11

Prolam® sizes are based on equivalent defection. These tables are for guidance only, and any Prolam substitution should be verified against the complete selection chart or the Prolam online calculator. Alternatives may not be suitable for all situations.

LVL11 E = 11GPa	Prolam PL8 Alternative	Prolam PL12 Alternative	Prolam PL17 Alternative
140 x 45	190 x 42 or 140 x 63	140 x 42	140 x 42
190 x 45	190 x 63 or 240 x 42	190 x 42	190 x 42 or 140 x 88
200 x 45	240 x 42 or 190 x 88	190 x 63 or 240 x 42	240 x 42 or 190 x 63
240 x 45	290 x 42 or 240 x 63	240 x 42	290 x 42 or 240 x 63
300 x 45	315 x 63 or 290 x 88	315 x 42 or 290 x 63	315 x 42 or 290 x 63
360 x 45	360 x 63	360 x 42	360 x 42 or 315 x 63
400 x 45	405 x 63	405 x 42	405 x 42 or 360 x 42
140 x 63	190 x 63	140 x 63	140 x 42
190 x 63	190 x 88 or 240 x 63	190 x 63	190 x 42
200 x 63	240 x 63	190 x 88 or 240 x 42	240 x 42 or 190 x 63
240 x 63	290 x 63	240 x 63	240 x 42 or 190 x 88
300 x 63	315 x 88 or 360 x 63	290 x 88 or 315 x 63	315 x 42 or 290 x 63
360 x 63	360 x 88 or 405 x 63	315 x 88 or 360 x 63	360 x 42 or 315 x 63
400 x 63	405 x 88	405 x 63	405 x 42 or 360 x 63
140 x 90	190 x 88	140 x 88	140 x 63
190 x 90	240 x 88	190 x 88	190 x 63
200 x 90	240 x 88	240 x 88 or 290 x 63	190 x 88
240 x 90	315 x 88	240 x 88 or 290 x 63	240 x 63
300 x 90	360 x 88	315 x 88 or 360 x 63	315 x 63 or 290 x 88
360 x 90	405 x 88	360 x 88 or 405 x 63	360 x 63 or 315 x 88
400 x 90	450 x 88	405 x 88	405 x 63 or 360 x 88

This schedule applies only to Prolam products

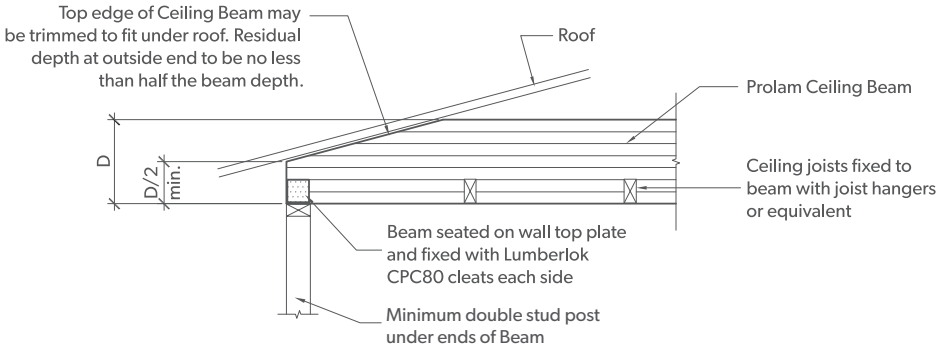
Alternative to GL13 (includes Hyne LGL)

Prolam® sizes are based on equivalent defection. These tables are for guidance only, and any Prolam substitution should be verified against the complete selection chart or the Prolam online calculator. Alternatives may not be suitable for all situations.

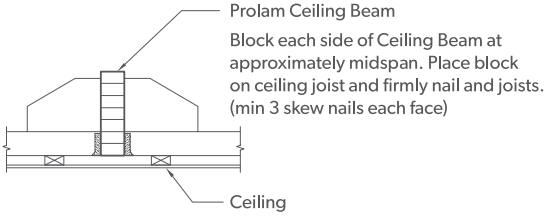
GL13 E = 13.3GPa	Prolam PL8 Alternative	Prolam PL12 Alternative	Prolam PL17 Alternative
140 x 42	190 x 42 or 140 x 88	140 x 63 or 190 x 42	140 x 42
190 x 42	240 x 42 or 190 x 88	190 x 63 or 240 x 42	190 x 42 or 140 x 88
240 x 42	290 x 42 or 240 x 88	240 x 63 or 290 x 42	240 x 42 or 190 x 88
290 x 42	315 x 63 or 290 x 88	290 x 63 or 315 x 42	290 x 42 or 240 x 63
315 x 42	360 x 63 or 290 x 88	315 x 63 or 360 x 42	315 x 42 or 290 x 63
360 x 42	360 x 88	360 x 63 or 405 x 42	360 x 42 or 315 x 63
405 x 42	405 x 88	405 x 63	405 x 42 or 360 x 63
140 x 63	190 x 63	140 x 88 or 190 x 42	140 x 63
190 x 63	240 x 63	190 x 88 or 240 x 63	190 x 63
240 x 63	290 x 63	240 x 88 or 290 x 63	240 x 63
290 x 63	315 x 88	290 x 88 or 315 x 63	290 x 63 or 240 x 88
315 x 63	360 x 88	315 x 88 or 360 x 63	315 x 63 or 290 x 88
360 x 63	405 x 88 or 450 x 63	360 x 88 or 405 x 63	360 x 63 or 315 x 88
405 x 63	450 x 88	405 x 88 or 450 x 63	405 x 63 or 360 x 88
140 x 90	190 x 63	190 x 42	140 x 88
190 x 90	240 x 88	240 x 63	190 x 88
240 x 90	290 x 88	290 x 63	240 x 88
290 x 90	360 x 88	315 x 88	290 x 88
315 x 90	405 x 88	360 x 88	315 x 88
360 x 90	450 x 88	405 x 88	360 x 88

This schedule applies only to Prolam products

Prolam®
Tapered Ceiling Beam Detail



ELEVATION AT END OF CEILING BEAM



SECTION THROUGH CEILING BEAM

This schedule applies only to Prolam products

info@prowoodnz.com | Phone 03 526 7436

Stud Requirement Table

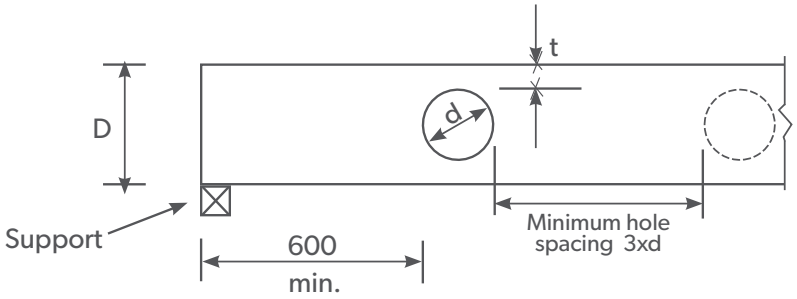
Construction Specifications

Walls are to be fully lined on at least one face. Full bearing on top plate (i.e. no eccentric loading).

Bearing Reaction	Stud Requirement for Concentrated Loads	
	Stud Height	**Requirements**
Bearing reaction up to & including 10kN	2400	Refer to NZS 3604:2011
	2700	
	3000	
	Stud Height	**Stud Required**
Bearing reaction up to & including 20kN	2400	PLL100 90 x 90
	2700	PLL100 90 x 90
	3000	PLL150 140 x 90
	Stud Height	**Stud Required**
Bearing reaction up to & including 30kN	2400	PLL150 140 x 90
	2700	PLL150 140 x 90
	3000	PLL200 190 x 90

* Notes: The stud requirement for 20 kN & 30 kN bearing reactions can be applied to external walls as well. Reactions over 30kN will require specific design.

Prolam® Holes in Laminated Timber



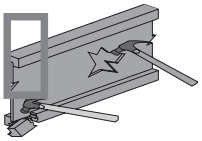
Circular Holes are only Permitted		
Joist Depth D	**Max Hole Dia. (d)**	**Min. Edge Dist. (t)**
140	40	45
190	50	65
240	70	80
290	90	95
315	100	100
360	120	110
405	135	120

No holes in cantilever joist

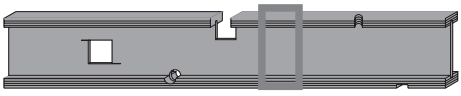
This schedule applies only to Prolam products

Prolam®
I-Joists Hole Charts

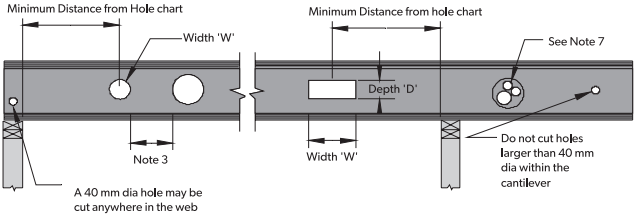
DON'T
make holes with hammer other than pre-punched knockouts



DON'T
hammer on flanges and damage joint



DO NOT cut or notch flanges
DO NOT over cut holes in web



Note: The most accurate method to design the allowable web penetration size and distance from support for Prolam I-Joists is to use the Prolam online software. The table below will give conservative results in some instances.

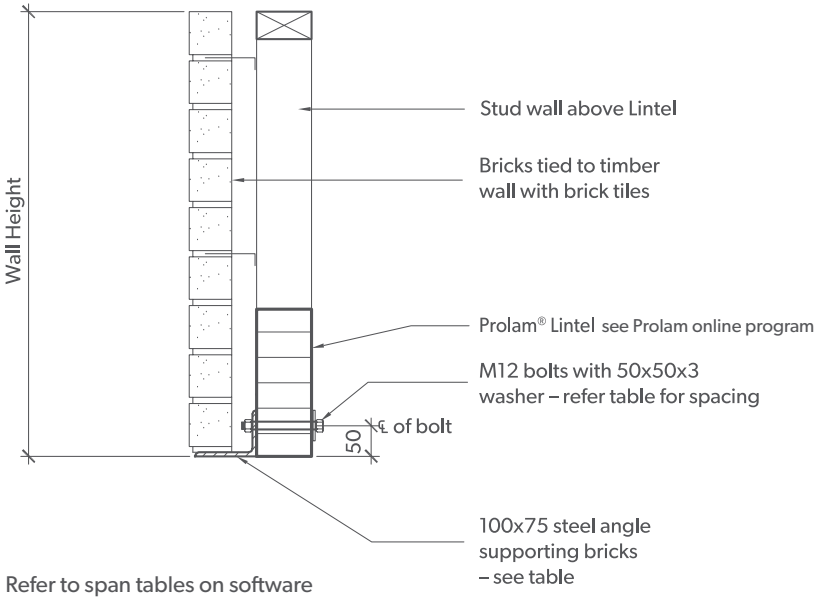
Joist Code	Joist span (mm)	Joist spacing (mm)	Circular Holes								Re ctangular Holes			
			Hole Diameter/Square Hole Width (mm)								Depth x Width (mm)			
			75	100	125	150	175	200	225	250	125x150	150x300	175x350	200x400
			Minimum distance from any support to the centre of the hole (mm)											
PJ20058	3000	600	300	400	-	-	-	-	-	-	-	-	-	-
	3500	600	300	700	-	-	-	-	-	-	-	-	-	-
PJ24070	3500	600	300	300	300	1100	-	-	-	-	1450	1750	-	-
	4000	600	300	300	300	1400	-	-	-	-	1800	2000	-	-
	4500	600	300	300	600	1600	-	-	-	-	2250	2250	-	-
PJ24090	4000	600	300	300	300	1300	-	-	-	-	1650	1900	-	-
	4500	600	300	300	300	1550	-	-	-	-	1950	2250	-	-
	4700	600	300	300	400	1600	-	-	-	-	2150	2350	-	-
SJ30070	4500	600	300	300	300	300	450	1400	-	-	1550	2100	2200	2250
	5000	600	300	300	300	300	700	1650	-	-	2000	2400	2500	2500
SJ30090	5000	600	300	300	300	300	400	1500	-	-	1600	2350	2400	2450
	5300	600	300	300	300	350	600	1650	-	-	1850	2500	2600	2650
SJ36090	5500	600	300	300	300	300	300	300	700	1600	400	1950	2450	2650
	5800	600	300	300	300	300	300	300	850	1750	700	2150	2650	-

Notes:
1. The hole chart is generated on a maximum floor dead load of 40 kg/m with no wall or roof loads. It therefore does not apply for joists supporting either parallel or perpendicular load bearing walls.
2. Hole locations are suitable for joist spacings up to 600 mm centres. Holes may be permitted closer to supports for some member when spacings of 450 or 300 mm are used.
3. The clear distance between holes must equal or exceed twice the diameter of the largest hole, or twice the longest side of a rectangular hole and no more than 3 holes in excess of 75 mm are allowed in any span.
4. Do not cut or damage flanges under any circumstances.
5. Except as noted in 1 and 2 above, a 40 mm hole at a minimum of 450 mm centres is allowed to be drilled anywhere in the web EXCEPT in cantilevered spans.
6. If possible, holes in web should be positioned mid height, minimum edge clearance from any flange is 6 mm.
7. A group of round holes at approximately the same location shall be permitted if they meet the requirements for a single round hole circumscribed around them.

Prolam® Support for Bricks

Wall Height	Angle Size	Bolt Spacing
600mm	100 x 75 x 6mm	900mm
1200mm	100 x 75 x 6mm	900mm
1800mm	100 x 75 x 6mm	600mm
2100mm	100 x 75 x 8mm	500mm
2400mm	100 x 75 x 8mm	450mm
2700mm	100 x 75 x 8mm	400mm

Applies to bricks up to 90mm thickness.



Refer to span tables on software program for lintel sizes.

This schedule applies only to Prolam products

info@prowoodnz.com | Phone 03 526 7436

Specifications

Description

Prolam® is engineered, precambered timber with unsurpassed performance, using CCA H5 and H3.2 treatments means it can be used in almost any situation. Prolam is made to standards AS/NZS 1328.1 and AS/NZS 1491 and treated to NZS 3640. Using Prolam elimates the wide variations in solid timber, and allows wide openings to be spanned with ease, along with keeping the lintel depth to a minimum. Prolam is available in many different sizes/grades, meaning there's is a beam for every application.

Design Criteria

Prolam is designed to comply with AS/NZS 1170.0, .1, .2, .3, and .5, structural design actions, NZS3603 Timber Structures, and to comply with the NZBC.

Fixings

Joist Hangers

Top mount hanger, full depth face mount hanger and partial depth face mount hanger. Nails and screws to manufacturer's technical literature requirements.

Steel Brackets - Straps

Mild steel galvanized or stainless steel straps and brackets to suit application. Refer to Prolam User Guide and Prolam Pro Calculator for fixing and support details.

Fixing Plates

Tylok plates to suit application. Refer to Prolam User Guide and Prolam Pro Calculator for fixing and support details.

Installation

Qualifications

Carry out the installation of the laminated engineered timber work with experienced and competent tradesmen familiar with the materials and techniques specified.

Deliver and Handle

Deliver and handle members so no structural damage occurs, corners and edges are not damaged, or surfaces marked or stained.Handle laminated timber products with nylon strops or similar to prevent damage.

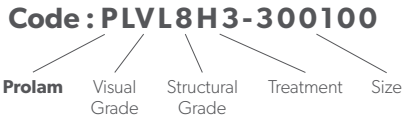
Erection

Carry out the erection of laminated and associated support framing for houses and similar structures to the requirements of NZS 3604. Comply with NZBC B1/VM1, 6.0 Timber. Refer to Prolam guidelines for the installation of laminated structural framing. Prop long length beams and lintels at the mid span until the moisture content has reached a suitable level for the application of internal linings.

Co-ordination

Refer to all drawings to ensure details and fixings required are provided for in the laminated structural work.

Sizes and Codes



Specifications

Storage and Handling

Storage and handling of Prolam® is the same as any dry timber. As timber naturally absorbs moisture from surrounding environment, exposure to wet weather will dimensionally change the product and cause cracking. The end grain of timber is particularly vunerable.

Stack on level bearers, 150 mm minimum clear of the ground. Store under cover to keep dry prior to installation. Keep unsealed product wrapped.

Traceability

All Prolam products are branded for your protection. Each visual beam or post has an individual removable barcode, these must be removed and kept in order for warranty claims to be validated. This is a part of the AS/NZS 1328.1 requirement. Non visual beams are branded down the length.

Inground Use

When using posts inground, we recommend sealing the portion that goes in ground to prevent the post taking up moisture and help prevent cracking of the concrete around the post.

No Substitutions

Substitutions are not permitted to any specified Prolam products or associated components or accessories. The structural properties of other manufactures laminated products may not be comparable, as all Prolam is precambered.

Prolam Sealing Specifications

This Prolam laminated product, must be kept dry and sealed immediately upon being installed for protection from climatic elements.

Timber naturally absorbs moisture from the surrounding environment; this can cause the product to alter dimensionally and cause resin bleeding, distortion and cracking.

Sealing the product with a good quality oil-based paint or oil-based stain system dramatically reduces the incidence of dimensional change and increases longevity.

Recommended procedure:

1. Fill nail holes with an exterior grade wood filler.

2. Sand back until surface is smooth and completely free from dirt and dust.

3. Painting: Prime all surfaces and cut ends and joints with a good quality alkyd primer and allow drying as per paint manufacturer's instructions. Apply 2 full top coats of premium oil-based paint -Recommended to recoat every 2 years. Dulux Weather Shield X10 is recommended paint to use. Prolam recommend standard trade practice: 1 x undercoats and 2 x topcoats = 80 microns DFT and to recoat every 2 years.

-Undercoat DFT (dry film thickness) 30microns

-Top Coat DFT 25microns (2 Top coats 50 microns).

4. Staining: Apply 3 coats of premium oil-based stain, including cut ends and joint. CD50X or Dryden's Penetrating wood oil are some recommended oils. Recommended to recoat every 12 months.

NOTE: Dark colours not recommended and will void the warranty. These will make the timber move more with environmental changes which may cause resin bleeding, distortion and cracking to occur. Prolam should always be painted with colours with an LRV greater than 45%

NO WARRANTY APPLIES TO ANY PRODUCT THAT HAS NOT BEEN KEPT DRY OR HAS NOT BEEN SEALED AS RECOMMENDED ABOVE.

FAQ – Frequently Asked Questions

Why should I use Prolam Glulam instead of steel?

Here are just a few reasons:

- Easier and lighter to handle and fix
- Friendlier on the environment - stores carbon rather than emitting it
- Uses NZ's only renewable construction material - plantation timber
- Uses 14 times less energy to produce than equivalent steel beam
- Superior Fire Resistance compared to steel
- Lower maintenance - Glulam does not rust or corrode
- Cost effective - no boxing in or covering as with steel beams
- Appearance - natural warmth and beauty of timber cannot be reproduced in steel
- Will not buckle or distort in response to temperature changes
- Direct fixing of plates, joists and other connections is much easier

Why should I use Prolam Glulam instead of solid timber?

Because Prolam Glulam is manufactured from selected grade, kiln-dried material it is more stable than a sawn timber beam of the same section. The tendency of large section sawn timber to twist, split and shrink is greatly minimised in Prolam. A Prolam beam can reduce the overall section of members up to 40% compared to unseasoned timber, as they are pretensioned.

What type of quality assurance comes with Prolam Glulam Beams?

All Prolam Glulam is manufactured to comply with the Australia and New Zealand Standard AS/NZS1328 and AS5096 - Glue Laminated Structural Timber A.

Can Prolam Glulam beams be used in exterior situations?

Yes. Treatment to hazard class 3 (H3.2 or H5) is recommended for all Prolam beams exposed to the weather. Along with this treatment an exterior adhesive resorcinol is used. The finished beams must be suitably coated with either a penetrating sealer or film-forming coating (refer to pg 41). When painting or staining external Prolam Glulam beams it is preferable to use lighter colours. Dark colours attract heat and may cause surface shrinkage. Because Prolam Glulam is chemically inert it is ideal for corrosive atmospheres such as swimming pools, marine structures, fertilisers and scouring plants where steel is subject to rust and corrosion.

What finish should I ask for on my beams?

If your beam is going to be used in a situation where appearance is important such as house interiors, halls etc - Visual Appearance Grade A should be specified. If you require a sanded finish, please specify. Non visual grade is intended for use where the product is not seen and occasional chips and voids are acceptable.

What strength grades should Glulam be designed to?

The Glulam standard, AS/NZS 1328 states grades from GL8 to GL17, Prowood is certified to produce PL8, PL12 and PL17 grades.

FAQ – Frequently Asked Questions

Will CCA treated Prolam® cause corrosion on galvanised fixings?

While this may be a problem with solid unseasoned timber, Prolam does not act in the same way. Because all Prolam is manufactured from material that is kiln dried after treatment, the treatment salts are thoroughly fixed into the timber. They will therefore not subsequently leach out or affect galvanised fixings. For additional protection it is recommended that bolts be greased before inserting into CCA treated Prolam beams that are exposed to the weather.

How long should I keep the wrapping on?

Wrapping of Prolam beams is primarily to protect them from marking during handling and transport. This is not designed to be a waterproof protection. Once on-site water can often get in under the wrapping and cannot get out. Wrapping should be slit to provide drainage. Wrapping can be left on Prolam beams for as long as possible (even during construction) to protect against accidental marking. Also be aware that partial removal of wrapping to access connections may cause patches of discolouration by exposure to weather.

Do I need special connections for my beams?

Prolam can be treated as natural solid timber when it comes to fixings. The use of standard nailing systems and bolts is normal. In exposed situations dark stains can appear from the use of unprotected steel brackets and bolts. Use galvanised metalwork where there is any possibility of moisture.

Can finished Prolam beams be re-cut and drilled?

Any cutting, drilling or slotting that exposes unsealed timber must be protected with an application of appropriate weather or treatment sealer. Avoid cut-outs, rebating or drilling in the top and bottom edges of Prolam beams. These could cause serious weakness in tension and compression areas. Consult the manufacturer or designer first.

Do splits along glue lines mean delamination has occurred?

Actual delamination is a failure in the laminating process. While an opening along a glue line may be indicative of delamination there are other more common causes. Typical checking that occurs in large section timber in response to moisture variation will most naturally occur in Prolam along a glue line where the natural continuation of the timber fibres is interrupted. This is often mistaken for delamination. (Refer to pg 47)

How serious are checks and why do they appear?

Surface checking and splits occur as timber is allowed to absorb moisture then dries out in response to environmental changes. Surface fibres are more severely exposed to these changes than the inner core and as a result of the movement in these fibres as they dry and shrink, surface splits may occur. Changes in atmospheric conditions will affect the appearance and disapperarance of these checks. The effect of surface checks are superficial only and do not usually have any effect on the structural performance of the Prolam.

How can these checks be minimised?

Prolam® beams are provided with a sealer coating if requested, which controls the ingress of moisture into the timber, and is done before the beams leave the factory. If the beams are exposed to the weather for a greater period that 8-10 weeks, a further coating should be applied. Consult our painting instructions for permanent sealing requirements.

Where can H1.2 treatment be used?

Prolam treated to H1.2 is only suitable to be used in the building envelope as in NZS3604.

What is the difference between Visual and Non-Visual grades?

Prolam Visual is made from visually selected sharts that are then finger jointed together into a long length and laminated into the required beam. This grade is recommended for use in highly visual areas and when a paint or stain quality finish is required. Prolam Non-Visual is made up from stress graded timber and is not visually graded. The non-visual grade is recommended where the beams are not seen. [Refer to pg 83 for more detail]

What is the difference between GL and PL grade?

The GL prefix is a reference to the old term "Glulam", where the PL is the prefix for branded "Prolam" structural timber.

Why is bandsawn finished smaller than standard?

Bandsawn finished Prolam posts and beams are 6mm smaller than standard, because we have to cut the bandsawn finish into the beams after they are made. Use the Prolam Online calculator to specify this product.

What is the fire rating of Prolam?

The BRANZ appraisal states a charring rate from the table below:

Density (kg/m^3)	Charring Rate (mm/min)
400	0.75
500	0.70
600	0.65

It is recommended that this simplified table of data derived from "White's" model and should be adopted for design of fire resistant timber structures in New Zealand. Prolam density is 550 Kg/m^3.

Can you cut drill, machine Prolam after manufacturing?

Yes, because Prolam is pretreated before laminating, all pieces are fully treated, so any cutting etc. does not need apaint on treatment applied to the cut portion. However, any cuts of be sealed as page 41.

Licensed Builders Practitioners LBP Points Here

This Prolam® Builders Booklet will give you LBP points if you record reading it as your **Skills Maintenance Activity.**

- Log onto **https://lbp.dbh.govt.nz/OnlineAccount/Login.aspx** to set up your user account, or if you are already set up, log in here to record your learning.
- Or you can record your learning by making a note in your Diary.
- One hour of learning = 1 point
- Be sure to write down how and what you learnt and include the date and the time taken.
- You can also go to our web site and download a Q & A sheet as a record of learning.

Record of Skills Maintenance Form

Return this form with your annual licence fee

Full Name	
LBP Number	

Enter details of your Skills Maintenance. Remember to include all of your activities, and include additional pages if needed.

Activity			
Date Completed		Hours	
Details of Activity			

Activity			
Date Completed		Hours	
Details of Activity			

Activity			
Date Completed		Hours	
Details of Activity			

Declaration

I declare this is a true record of my skills maintenance activities. I understand that the Registrar can ask to see my personal skill maintenance records that support this claim. I understand that it is an offence under the Building Act 2004 to provide incorrect or misleading information.

..... / / .....

Signature Date

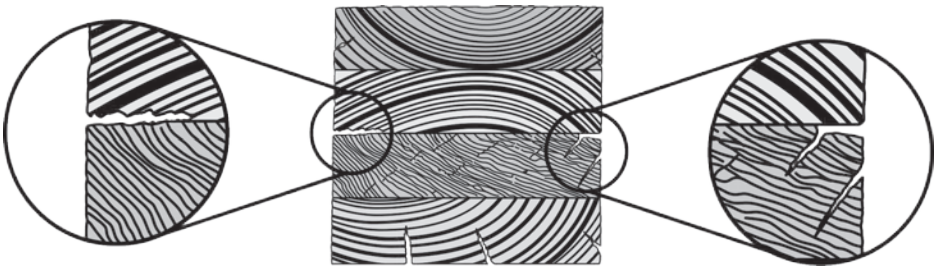
Please Post to: **The Registrar**
Ministry of Business, Innovation and Employment
PO Box 50041, Porirua 5240

Checking in Prolam® Glulam

One of the advantages of glued laminated timber construction is that while seasoning checks may occur for the same reasons that they do in sawn members, checking in glued laminated timber will generally occur to a much lesser degree because of careful control of the moisture content of timber used for laminating. Checks in wood are separations along the fibres normally occurring across the rings of annual growth resulting from stresses developed during changes in moisture content. Checks in glued laminated timber may appear as openings parallel to the grain on the sides of members. As wood loses moisture to the surrounding atmosphere, the outer fibres of the member lose moisture at a more rapid rate than do the inner fibres. As outer fibres try to shrink, they are restrained by the inner portion of the member that has higher moisture content. The more rapid the rate of drying, the greater will be the differential in shrinkage between the outer and inner fibres resulting in higher shrinkage stresses. These resultant stresses perpendicular to the grain of the wood can cause characteristic wood seasoning checks. The influence of checks on the structural performance of glued laminated timber members is generally minor. Checking can be minimised by careful installation practices that avoid prolonged exposure of the members during construction.

Identification of Checking

Checks occur as transverse separations or openings that are nearly parallel to the grain direction in glued laminated timber and generally follow the grain direction around knots and along sloping grain. Differences in the shrinkage rate of individual laminations used is glued laminated timber tend to concentrate shrinkage stresses at or near glue lines, resulting in checks. Checks are often confused with delamination that occurs when the glue bond is not adequate. The presence of wood fibre separation in these openings is the key distinguishing characteristic of seasoning checks. Openings due to inadequate adhesive bonding may appear as smooth wood surface separations, possibly darkened by the adhesive film, or as glossy surface areas of adhesive with an absence of torn wood fibres.



Extract from Issue 2 – Volume 8
NZ Timber Design Journal Exposed

It can be assumed that stresses will develop along glue-lines in exposed glulam, simply because the grain orientation, ring orientation, wood density, response to moisture etc. thus will differ between adjacent laminations. European specifications for exposed glulam state that the growth rings in the laminations must all be oriented the same way, and they show a diagram of flat-sawn laminations all with the pith-side downwards.

This is hardly practical in New Zealand with Radiata as the ring orientation is likely to change across a finger joint, and many laminations will be quarter-sawn, flat sawn and everything in between.

Therefore delamination is to be expected but generally should not penetrate more than 20 mm in properly cured glulam, made with resorcinol adhesive. Exposed treated solid timber is likely to develop similar checking. The reason for this is that the moisture fluctuations that give rise to the stresses do not penetrate far, i.e. they are damped out by the resistance of the wood to diffusion of moisture.

Forest Research has tested glulam from a cool store that showed obvious delamination. There appeared to be little effect on strength unless the delamination goes right through. There have been experiments to determine how much delamination can be tolerated before an effect on shear is noticed. Where the glue-line was artificially narrowed by placing adhesive tape along the laminations prior to gluing, there was no effect down to 25% of the width remaining. When the glued area was reduced by placing adhesive strips across the wood at intervals, an immediate effect was noticed. It all has to do with the stress-raisers generated by the delamination.

Some type of sealing is certainly helpful, and painting is excellent but it must be maintained. An oil-based preservative such as creosote is effective because the oiliness acts as a water repellent. I have seen a thick tacky substance applied to glulam bridge stringers, same as can be applied to steel as a rust preventative.

The bridge in question is at the entrance to the Whakarewarewa village in Rotorua and is still giving good service after 40 years. There are several proprietary formulations of water repellent sealants on the market, and some manufacturers apply "Ensele" as a matter of course.

Written by Bryan Walford, Forest Research Institute, Rotorua



230413
Received by
Kapiti Coast District Council
26/05/23

Design Data

The tables herein have been designed according to the following loads:

Roof			
Dead Load			Live Load
Lighweight Roof	Heavyweight Roof	Ceiling	0.25 kPa Uniform
0.25 kPa	0.65 kPa	0.20 kPa	1.0 kN point load

Note: 750mm overhang has been included in the derivation of the tables. Spans are horizontal measurements. For heavy roofs over 30° pitch, use the online Prolam® program.

Floor	
Dead Load	Live Load
Particle Board Floor (including ceiling)	Domestic Floor
0.40 kPa	1.50 kPa, 1.80 kN

SNOW: 0.5kPa snow load has been allowed for in the charts.

WIND: The tables are applicable for wind zones up to HIGH WIND, as defined by NZS3604. For other snow, wind and roof loads, use the Prolam online software program.

Deflection Criteria	
Deflection Max long term deflection	Span / 450 or 10mm
Criteria Max live load deflection	Span / 400 or 12mm
Wind Load	Span / 250 or 12mm
Snow Load	Span / 250 or 12mm

Note: The span tables in this booklet do not apply to the bandsawn product. Use the Prolam Online calculator.

Timber Properties in Used Span Table Calculations

Dry Use

Characteristic Stresses and Elastic Moduli for Prolam (Glulam Grades)

		Characteristic Strengths (MPa)				Elastic Moduli (MPa)	
	PL Grade	Bending	Tension parallel to grain	Shear in Beam	Compression parallel to grain	Short modulus of elasticity parallel to the grain	Short duration modulus of rigidity for beams
Prolam	PL 17	42	21	3.7	35	16700	1100
Prolam	PL 12	25	12.5	3.7	29	11500	770
Prolam	PL 8	19	10	3.7	24	8000	530
Prolam	LVL 15	59	35	4.2	39	15000	775

For compression perpendicular to the grain, use 8.9 MPa dry and 5.3 MPa wet as per NZS 3603 for Radiata Pine for all PL grades.

Wet Use – (H5 & H3.2 treated)

Characteristic Stresses and Elastic Moduli for Prolam (Glulam Grades)

	Characteristic Strengths (MPa)				Elastic Moduli (MPa)	
PL Grade	Bending	Tension parallel to grain	Shear in Beam	Compression parallel to grain	Short modulus of elasticity parallel to the grain	Short duration modulus of rigidity for beams
PL 17	33.6	16.8	2.5	28	13400	880
PL 12	20	10	2.5	23.2	9200	610
PL 8	15.2	8.0	2.5	19.2	6400	420

Note: Higher grades (i.e. GL10, PL12, etc) will give greater span and load carrying capability than PL8 for the same section size.

October 2019

TASMAN CONSULTING ENGINEERS

PRODUCER STATEMENT

Tasman Consulting Engineers Ltd have been engaged by Prowood to prepare span tables and charts for the Prolam® lintels, beams and posts as presented in the Prolam® Post and Beam Manual.

The design has been carried out using sound and widely accepted engineering principles to the requirements of AS/NZS1170:2002, NZS3603:1993 and NZS3604:2011 using the timber properties for PL8, PL12 and PL17 glue laminated timber.

Tasman Consulting Engineers Limited
3/237 Queen St, PO Box 3631
Richmond, NELSON 7050

ME(Civil) MIPENZ (No.145511) CPEng IntPE

Durability Statement

Prolam® products are manufactured to the requirements of AS/NZS 1328.1:1998, under an approved quality system based on the 1S0 9000 series of standards. As such if the product is used in accordance with Prolam product literature, it will meet the durability clauses of the New Zealand Building Code B2.

Subfloor Applications

- Prolam may be used where approved practices for clearance and ventilation are used.

External Use

- Prolam is recommended for weather exposed applications if sealed and maintained in accordance with Prolam literature.

Preservative Treatment

- Prolam Beams are CCA H3.2 or H1.2 treated as defined by NZS 3640:2011, H3.2 must be used for weather exposed applications, such as verandah beams, deck bearers, and subfloor applications.
- Prolam Posts are CCA H5 treated as defined by NZS 3640:2011 for in-ground and weather exposed applications, such as deck piles, verandah posts and similar applications.

Storage of Prolam

- To ensure Prolam remains straight and true at the time of installation, follow the below recommendations:

  1. Store under cover so that it remains dry until installation.
  2. Stack clear of the ground for good ventilation.
  3. Stack on bearers to keep flat and straight.

Branded Prolam

- Prolam is branded for your protection. Lookalike materials may not perform to the same standard.
- For your protection do not accept unauthorized substitution

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26/05/23

ORICA
ADHESIVES
& RESINS

24 November 2005

John Woodman
Prowood Ltd
283 Waiwhero Rd
Motueka

John,

To follow up your call yesterday, I can confirm that, provided the Sylvic R15/L5 adhesive system is used in accordance with the manufacturers instructions then H5 CCA post-treatment of laminated products is possible. The finished laminated product remains durable when in ground contact situations.

If you require further information please do not hesitate to contact me.

Best Regards,

Scott Earnshaw
Australasian Technical Manager

Orica Adhesives and Resins
Mount Maunganui,
New Zealand.

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26/05/23

AsureQuality

This is to certify that

Prowood Ltd

Waiwhero Road, Motueka

Has been assessed by AsureQuality Limited and found to have a production system that meets the requirements of the:

Engineered Wood Products Programme

Scope of Certification

Prowood Ltd has demonstrated compliance to the AsureQuality Engineered Wood Products Programme for the following standards and products:

Finger Joint and Glue Laminated Standards

AS/NZS 1328.1 Glued laminated structural timber – Part 1 Performance requirements and minimum production requirements

AS/NZS 1328.2 Glued laminated structural timber – Part 2 Guidelines for AS/NZS 1328 – Part 1 for the selection, production and installation of glued laminated structural timber

AS 5068 – Timber – Finger joints in structural products – Production requirements

For the following products

GL8, GL12, GL17, PL8, PL12, PL17

Registration No: AEWP05
Certificate Number: 03
Date of Initial Certification: 31st August 2012
Date of Issue: 3rd July 2017
Re-Issue Date: 3rd July 2020

This certificate is issued on the basis that surveillance audits during the certification period are undertaken annually or at a frequency determined by AsureQuality Limited.

JAS-ANZ

Accreditation by the Joint Accreditation System of Australia and New Zealand, Acc No:

S2080600NH (QMS)

www.jas-anz.org/register

John McKay Chief Executive Officer

This certificate remains the property of AsureQuality Ltd
74 Pacific Rise | Mt Wellington | Auckland 1741 | New Zealand
+64 9 525 8000 | www.asurequality.com | info@asurequality.com

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26/05/23

AsureQuality

This is to Certify

Prowood Ltd

Waiwhero Road, Molueka

Has been assessed by AsureQuality Limited and found to have a production system that meets the requirements of the:

AsureQuality Timber Treatment Programme

Scope of Certification

NZ Approved Code of Practice for the safe use of - Timber Preservatives and Antisapstain Chemicals
Best Practice Guideline - For the safe use of Timber Preservative and Anti-Sapstain Chemicals
NZS 3640 – Chemical Preservation of Round and Sawn Timber
AS/NZS 1604 - Specification for preservative timber
AS/NZS 1604.5 - Specification for preservative timber - Glue Laminated Timber Products

For the following products and preservatives:

Boron

Glue Laminated Timber Products

Registration No:	TTP34
Certificate Number:	1
Certification Date:	25th August 2013
Date of Issue:	26th August 2013
Re-Evaluation:	30th July 2015

JAS-ANZ

Michael Thomas
Chief Executive Officer

A world-class provider of food safety and biosecurity services

The certificate remains the property of AsureQuality Ltd
8 Pacific Rise | Mt Wellington | Auckland 1060 | New Zealand
+64 9 573 8080 | www.asurequality.com | info@asurequality.com

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26/05/23

THE JOINT FORCES OF CSIRO & SCION

ensis

Te Papa Tipu Innovation Park
49 Sala Street
Private Bag 3020
Rotorua
New Zealand
Telephone: +64 7 343 5777
Facsimile: +64 7 348 0952
www.ensisjv.com

To:	John Woodman	**From:**	Dave Page
Organisation:	Prowood	**Subject:**	Timber analyses
Location:	Motueka	**Date:**	12th December '05
Fax No.:	(03) 528 1035	**No. of Pages:**	1

Please call +64 7 343 5777 if transmission incomplete

Dear John

I had a look at the penetration tests and the analytical results from four glulam post samples tested by Veritec earlier in the month (report AL05557).

All met the minimum requirements of the H5 specification (NZS 3640:2003) , i.e., 100% sapwood penetration and 0.95% TAE retention in the outer 30mm retention zone.

The samples were all sapwood with 100% penetration and analytical results indicate preservative retention approximately 50% higher than the H5 specification minimum.

Regards

Dave Page

CSIRO SCION

THE JOINT FORCES OF CSIRO & SCION

CAUTION

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SCION
Next generation biomaterials

Te Papa Tipu Innovation Park
49 Sala Street
Private Bag 3020
Rotorua
New Zealand
Telephone: +64 7 343 5899
Facsimile: +64 7 348 0952
www.scionresearch.com

4 June 2010

John Woodman
Prowood
283 Waiwhero Road
Motueka

The reason why AS/NZS 1604.5 does not include H5 treatment was because nobody on the standards committee believed any company was (or would be) treating glue laminated products to an H5 specification.

However, there is no technical reason why H5 is or should be excluded, so long as treatment meets penetration requirements for H4 and the preservative retention is at the H5 level, i.e. 0.95% TAE.

Current penetration requirements for H4 glue laminated products in AS/NZS 1604.5 are full sapwood penetration and a minimum of 10 mm heartwood penetration from the face and edge of each laminate.

Thus if treated to H5 retention and H4 penetration, the product would comply with NZS 3602 and the NZ Building Code B2,to meet the 50 year durability requirement for H5 treated products.

Yours sincerely



Mick Hedley B.Sc (Hons) Ph.D
Project Leader, Wood Preservation
Scion Wood and Biofibre Technologies

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26/05/23

pass™ PRODUCT ASSURANCE SUPPLIER STATEMENT
pass™ no: 19030 | Expires: 08/2020

Prolam®
Engineered Laminated Timber

PROLAM LAMINATED H3.2 POSTS



PURPOSE

Prolam glue laminated H3.2 posts are supplied as a grade PL8 structural member. The post can be supported on a structural bracket above ground.

EXPLANATION

Prolam H3.2 posts are manufactured from N.Z. grown Pinus Radiata. The laminates are glued with resorcinol adhesive.

Prolam H3.2 posts are supplied in:

- a range of sizes
- structural grade PL8
- appearance grades A & C
- treatment hazard class H3.2 (CCA)

Prolam lamina are individually treated prior to lamination and finishing. This is to ensure each lamina achieves the same penetration and retention as solid lumber treated under NZS 3640:2003.

The manufacture of Prolam H3.2 posts are third-party certified by AsureQuality to AS/NZS 1328 part 2 or AS 1720.1:2010 (but branded with the prefix PL). Prowood NZ is registered by the Timber Preservation Association of Australia in respect of the CCA treatment protocol.

For further assistance please contact:
03 526 7436
info@prowoodnz.com
www.prolamnz.com

WE COMPLY s14G BUILDING ACT 2004

SCOPE AND LIMITATIONS OF USE

Scope	Limitations
Building	
In accordance with NZS3604:2011 or specifically engineered to NZS 3603:1993 and AS/NZS 1170:2002.	› Prolam H3.2 posts must not be ripped where this would result in a reduction in the number of lamina; dimensional stability and strength relies on the width and thickness remaining unchanged › Fixing material to be in accordance with section 4, NZS 3604:2011. › Where NZ Building Code Clause C3 applies, the use of Prolam H3.2 posts is subject to specific design by a fire engineer

USEFUL INFORMATION

For information on the design, installation and maintenance of Prolam H3.2 posts and for our warranty refer to www.prolamnz.com.

OTHER CERTIFICATIONS AND APPROVALS HELD BY PROWOOD NZ

The following certifications and approvals are held by Prowood Ltd.

- AsureQuality Engineered Wood Products Programme (AEWP) Reg no: AEWP05/Certificate No: 03, 3/7/2017.
- Certificate of Registration of Preservative Treatment & Allocated Brand, 709 01 H3.2, 708 90 H3.2.



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Prolam
Engineered Laminated Timber

PERFORMANCE CLAIMS

If designed, installed and maintained in accordance with all Prowood Ltd requirements, the Prolam H3.2 posts will comply with or contribute to compliance with the following performance claims:

N.Z. Building Code clauses	BASIS OF COMPLIANCE[1]	
	Compliance statement	Demonstrated by
B1 Structure B1.3.1 B1.3.2 B1.3.3 (a, b, f, j, m, q) B1.3.4 (a, b, c, d, e)	ACCEPTABLE SOLUTION B1/AS1: NZS 3604:2011, clause 2.3.9.3. AS/NZS 1170.2002 (set)	❯ NZS 3604:2011, clause. 2.3.9.3 requires glue laminated timber to be manufactured in accordance with AS/NZS 1328 (Parts 1, 2) ❯ Prowood Ltd third party certified, AsureQuality Engineered Wood Products Programme: AS/NZS 1328:1998 (Parts 1, 2) ❯ AsureQuality is JAS-ANZ accredited
B2 Durability B2.3.1(a) B2.3.2(a)	VERIFICATION METHOD B2/VM1: Clause 1.3 Verification through comparison with similar material.	❯ AS/NZS1604.5, clause 1.9 requires the same characteristic values for penetration and retention as defined in NZS 3640:2003 ❯ Registered by Timber Preservers Association of Australia (CCA) ❯ Subject to Prowood treatment protocol to AS/NZS 1604.5:2012 and NZS 3640:2003
C Protection from Fire C6.3 C6.4	ALTERNATIVE SOLUTION NZS 3603:2011, clause 9.4.2.	❯ NZS 3603:1993, clause 9.4.2 specifies charring rate of radiata pine and other timber species of approximately the same density to be taken as 0.65 mm/min ❯ APA Evaluation of Char Rate (ASTM E119), TT-118 January 2015 ❯ Glue laminated timber elements have a fire performance comparable to solid wood members of equivalent size; Timber Industry Federation New Zealand Timber Design Guide 2007
F2 Hazardous Building Materials F2.3.1	ALTERNATIVE SOLUTION. NZTPC *Best Practice Guideline for the Safe Use of Timber Preservatives & Anti-sapstain Chemicals.* Establishes drying & flash off requirements.	❯ Subject to Prowood treatment protocol and Prowood health and safety plan ❯ TBB audited manufacturing/treatment process

1. The Compliance Statement is the pass holder's statement that they have met their obligations under s14G(2) of the Building Act 2004.

SOURCES OF INFORMATION

- AS/NZS 1328:1998 (parts 1, 2) *Glued laminated structural timber*
- NZS 3603:1993 *Timber structures*
- NZS 3604:2011 *Timber-framed buildings*
- NZS 3640:2003 *Chemical preservation of round and sawn timber*
- AS/NZS 1604.5:2012 *Specification for preservative treatment Part 5; Glue laminated timber products*



VERSION: v1.0 **DATE:** 07/08/2019

Note: Uncontrolled in printed format.

NAME: John Woodman

POSITION: Managing Director

Signed on behalf of Prowood Ltd:

John Woodman

Digitally signed by John Woodman
Date: 2019.08.07 14:59:18 +12'00'

By signing this pass™ the signatory confirms that, in respect of the subject of this pass™, the company has met their s14G obligations under the Building Act 2004.

pass

283 Waiwhero Road, Motueka ❯ info@prowoodnz.com ❯ 03 526 7436 ❯ www.prolamnz.com

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26/05/23

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pass™ no: 19031 | Expires: 08/2020

Prolam®
Engineered Laminated Timber

PROLAM H5 POSTS



PURPOSE

Prolam H5 posts are glue laminated structural posts treated to H5. They can be supported on a structural bracket above ground or cast below ground, in a concrete foundation.

EXPLANATION

Prolam H5 posts are manufactured using NZ grown Pinus Radiata. They are third party certified by AsureQuality to AS/NZS 1328 part 2 or AS 1720.1:2010, but branded with the prefix PL.

They are supplied in:

- a range of sizes
- structural grade PL8, PL17
- appearance grades A & C
- treated to hazard class H5 (CCA).

Prolam lamina are individually treated and this ensures each lamina meets the penetration and retention requirements in accordance with NZS 3640:2003. Following treatment, the laminates are dried and glued with resorcinol adhesive and then finished to final dimensions.

Given the size of the individual lamina, this has the effect of achieving a penetration greater than solid lumber where the solid lumber's dimensions exceed 60 mm in thickness as per the following diagram. It demonstrates that the lamination/finishing will have no effect on the penetration or retention achieved.

Where used in-ground, the post must be fully encased in concrete to ground level. This ensures that the structural performance and durability of a post is maintained.

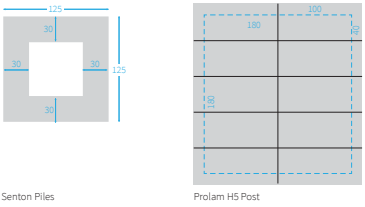
When used in accordance with Prolam's installation, care and maintenance instructions, the Prolam H5 posts will not warp, twist or delaminate.

Prowood NZ is registered by the Timber Preservation Association of Australia in respect of the CCA treatment protocol.

For further assistance please contact:
03 526 7436
info@prowoodnz.com
www.prolamnz.com

WE COMPLY s14G BUILDING ACT 2004

Figure 1: Required penetration as required by NZS3640, dark grey shows penetration.



SCOPE AND LIMITATIONS OF USE

Scope	Limitations
Building	
In accordance with NZS 3604:2011 or specifically engineered to NZS 3603:1993 and AS 1720.1:2010.	› Prolam H5 posts must not be ripped where this would result in a reduction in the number of lamina; dimensional stability and strength relies on the width and thickness remaining unchanged. › Fixing material to be in accordance with section 4, NZS 3604:2011. › Where NZ Building Code clause C3 applies, the use of Prolam H5 posts is subject to specific design by a fire engineer.
Above and below-ground applications.	› Above ground the post must be attached to a structural bracket that will resist all applied loads. › Where installed below ground, the post must be: • seated on a punch pad of a 100 mm, and • fully encased in concrete with a minimum 75 mm side cover.

USEFUL INFORMATION

For information on the design, installation and maintenance of Prolam H5 posts and for our warranty, refer to www.prolamnz.com.

VERSION: v1.0

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26/05/23

Prolam
Engineered Laminated Timber

PERFORMANCE CLAIMS

If designed, installed and maintained in accordance with all Prowood Ltd requirements, the Prolam H5 posts will comply with or contribute to compliance with the following performance claims.

N.Z. Building Code clauses	BASIS OF COMPLIANCE[1]	
	Compliance statement	Demonstrated by
B1 Structure B1.3.1 B1.3.2 B1.3.3 (a, b, f, j, m, q) B1.3.4 (a, b, c, d, e)	ACCEPTABLE SOLUTION B1/AS1 NZS 3604:2011, clause 2.3.9.3 AS 1720.1:2010 NZS 3603:1993	› NZS 3604:2011, clause. 2.3.9.3 requires glue laminated timber to be manufactured in accordance with AS/NZS 1328 (parts 1, 2). › Prowood Ltd third party certified, AsureQuality Engineered Wood Products Programme: AS/NZS 1328:1998 (parts 1, 2). › AsureQuality is JAS-ANZ accredited.
B2 Durability B2.3.1(a) B2.3.2(a)	ACCEPTABLE SOLUTION B2/AS1	› Treated in accordance with NZS 3640:2003 to achieve the same or greater treatment penetration than solid timber. › Registered by Timber Preservers Association of Australia (CCA).
C6 Structural Stability C6.3 C6.4	ALTERNATIVE SOLUTION NZS 3603:2011, clause 9.4.2	› NZS 3603:1993, clause 9.4.2 specifies charring rate of radiata pine and other timber species of approximately the same density to be taken as 0.65 mm/min. › APA Evaluation of Char Rate (ASTM E119), TT-118 January 2015. › Glue laminated timber elements have a fire performance comparable to solid wood members of equivalent size; Timber Industry Federation New Zealand Timber Design Guide 2007.
F2 Hazardous Building Materials F2.3.1	ALTERNATIVE SOLUTION	› Subject to Prowood treatment protocol and Prowood health and safety plan. › TBB audited manufacturing/treatment process.

1. The Compliance Statement is the pass holder's statement that they have met their obligations under s14G(2) of the Building Act 2004.

SOURCES OF INFORMATION

› AS/NZS 1328:1998 (parts 1, 2) Glued laminated structural timber.
› AS 1720.1: 2010 Timber Structure Design Methods.
› NZS 3603:1993 Timber structures.
› NZS 3604:2011 Timber-framed buildings.
› NZS 3640:2003 Chemical preservation of round and sawn timber.

OTHER CERTIFICATIONS AND APPROVALS HELD BY PROWOOD LTD

› AsureQuality Engineered Wood Products Programme (AEWP) Reg no: AEWP05/Certificate No: 03, 3/7/2017.
› Certificate of Registration of Preservative Treatment & Allocated Brand 709 90 H5, 709 01 H5, 708 89 H5, 1/7/18.

VERSION: v1.0 **DATE:** 07/08/2020

Note: Uncontrolled in printed format.

NAME: John Woodman

POSITION: Managing Director

Signed on behalf of Prowood Ltd:

John Woodman

Digitally signed by John Woodman
Date: 2019.08.07 15:00:56 +12'00'

By signing this pass™ the signatory confirms that, in respect of the subject of this pass™, the company has met their s14G obligations under the Building Act 2004.

pass

283 Waiwhero Road, Motueka › info@prowoodnz.com › 03 526 7436 › www.prolamnz.com

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PRODUCT ASSURANCE SUPPLIER STATEMENT
pass™ no: 19013 | Expires: 06/2020

Prolam®
Engineered Laminated Timber

PROLAM BEAMS



PURPOSE

Prowood Ltd supplies Prolam laminated H1.2 and H3.2 treated beams (Prolam Beams) for use as structural members in buildings.

PROLAM BEAMS EXPLAINED

Prolam Beams are glue laminated, branded with the prefix PL and manufactured from NZ grown Pinus Radiata and Douglas Fir.

The manufacturing of Prolam Beams is third-party certified by AsureQuality.

Structural performance is to AS/NZS 1328 part 2 or AS 1720.1:2010.

They are available in visual and non-visual grades.

Prolam beams are supplied in a range of; sizes; structural grades PL8, PL12 and PL17; appearance grades visual and non-visual; and treatment levels H1.2 (boron) and H3.2 (CCA).

For further assistance please contact:
03 526 7436
info@prowoodnz.com
www.prolamnz.com

WE COMPLY s14G BUILDING ACT 2004

SCOPE AND LIMITATIONS OF USE

Scope	Limitations
Building	
As a direct substitute to SG8 and SG12 (or other equivalent) as referenced in Section 8 NZS 3604:2011; or specifically engineered to NZS 3603:1993 or AS/NZS 1170:2002 (set).	› Prolam beams must not be ripped where this would result in a reduction of width or thickness. Structural performance on the width and thickness remaining unchanged. › Fixing material to be in accordance with section 4, NZS 3604:2011.
In applications appropriate to the hazard class to which the supplied Prolam beams are treated.	› Prolam beams must be separated from exposed uncured concrete and concrete that continues to be exposed to moisture.
In applications where NZ Building Code Clause C3 obligations for Fire affecting areas beyond the source apply.	› The use of Prolam beams is subject to specific design by a fire engineer.

USEFUL INFORMATION

For information on the design, installation and maintenance of Prolam beams, and for our warranty, refer to www.prolamnz.com.

OTHER CERTIFICATIONS HELD BY PROWOOD LTD

The following certifications and approvals are held by Prowood Ltd.

› Certificate of Registration of Preservative Treatment & Allocated Brand (Timber Treatment Plant Registration Authority;
  - 709 11 H1.2, 614 11 H1.2,
  - 709 01 H3.2, 709 90 H3.2.

› AsureQuality Engineered Wood Products Programme Reg: AEWPO5/03 exp 3/7/2020



VERSION: v1.0

Prolam
Engineered Laminated Timber

PERFORMANCE CLAIMS

If designed, installed and maintained in accordance with all of Prowood Ltd requirements, Prolam beams will comply with or contribute to compliance with the following performance claims..

NZ Building Code clauses	BASIS OF COMPLIANCE	
	Compliance statement[1]	Demonstrated by
B1 Structure B1.3.1 B1.3.2 B1.3.3 (a, b, f, j, m, q) B1.3.4 (a, b, c, d, e)	ACCEPTABLE SOLUTION B1/AS1: NZS 3604:2011, clause 2.3.9.3.	› NZS 3604:2011, clause 2.3.9.3 requires glue laminated timber to be manufactured in accordance with AS/NZS 1328 (Parts 1, 2). › Prowood Ltd third party certified, AsureQuality Engineered Wood Products Programme: AS/NZS 1328:1998 (parts 1, 2). › AsureQuality is JAS-ANZ accredited.
B2 Durability B2.3.1(a) B2.3.2(a)	ALTERNATIVE SOLUTION	› AS/NZS1604.5, clause 1.9 requires the same characteristic values for penetration and retention as defined in NZS 3640:2003. › Registered by Timber Preservers Association of Australia H1.2 (boron)
C6 Protection from Fire C6.2 C6.3 C6.4	ALTERNATIVE SOLUTION NZS 3603:2011, clause 9.4.2.	› NZS 3603:1993, clause 9.4.2 specifies charring rate of radiata pine and other timber species of approximately the same density to be taken as 0.65 mm/min. › APA Evaluation of Char Rate (ASTM E119), TT-118 January 2015. › Glued laminated timber elements have a fire performance comparable to solid wood members of equivalent size; Timber Industry Federation New Zealand Timber Design Guide 2007.
F2 Hazardous Building Materials F2.3.1	ALTERNATIVE SOLUTION. NZTPC *Best Practice Guideline for the Safe Use of Timber Preservatives & Anti-sapstain Chemicals. Establishes drying & flash off requirements.*	› Subject to Prowood treatment protocol and Prowood health and safety plan. › TBB audited manufacturing/treatment process.

1. The Compliance Statement is the pass holder's statement that they have met their obligations under s14G(2) of the Building Act 2004.

SOURCES OF INFORMATION

The following information was relied upon to prepare this pass.

- ICC-ES and APA Joint Evaluation Report ESR-1225 Pacific Woodtech Corporation PWI Joists 10/17.
- IVS Timber Testing Report 39361 19/11/18.
- IVS Labs Analysis Report R32568 Boron Preservative in Timber 5/12/18.
- NZS 3603:1993 *Timber structures.*
- NZS 3604:2011 *Timber-framed buildings.*
- NZS 3640:2003 *Chemical preservation of round and sawn timber.*
- AS/NZS 1604.5:2012 *Specification for preservative treatment: Glued laminated timber products.*

VERSION: v1.0 **DATE:** 07/06/2019

Note: Uncontrolled in printed format.

NAME: John Woodman

POSITION: Managing Director

Signed on behalf of Prowood Ltd:

John Woodman

Digitally signed by John Woodman
Date: 2019.06.07 10:54:21 +12'00'

By signing this pass™ the signatory confirms that, in respect of the subject of this pass™, the company has met their s14G obligations under the Building Act 2004.

pass

283 Waiwhero Road, Motueka › info@prowoodnz.com › 03 526 7436 › www.prolamnz.com

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pass™ no: 19014 | Expires: 06/2020

Prolam®
Engineered Laminated Timber

PROLAM SMARTFRAME LVL15 LAMINATED VENEER LUMBER



PURPOSE

Prowood Ltd supplies Prolam Smartframe LVL15 (Smartframe) for use as structural timber beams and studs in buildings.

PROLAM SMARTFRAME EXPLAINED

Smartframe is laminated veneer lumber manufactured from Douglas Fir.

It is manufactured to AS/NZS 4357:2005 under an SAIGlobal StandardsMark licence.

It is supplied boron treated to H1.2 or untreated and is supplied in the following finished dimensions.

- Widths (mm): 90, 120, 140, 190, 240, 290
- Depth (mm): 45 mm
- Stock lengths (m): 3.6, 4.8, 5.4, 6.0, and 7.2

For further assistance please contact:
03 526 7436
info@prowoodnz.com
www.prolamnz.com

WE COMPLY s14G BUILDING ACT 2004

SCOPE AND LIMITATIONS OF USE

Scope	Limitations
Building	
To the requirements of NZS 3604:2011 or NZS 3603:1993, and in accordance with Smartframe span tables.	
Within the building envelope.	› Smartframe must not be exposed to the environment for more than 90 days. › Where the Smartframe is to be left exposed or used in a moisture laden environment it must be protected with an impervious coating.
In applications where NZ Building Code Clause C3 obligations for Fire affecting areas beyond the source apply.	› The use of Smartframe must be specifically designed by a fire engineer.



USEFUL INFORMATION

For information on the design, installation and maintenance of Smartframe, and for our warranty, refer to www.prolamnz.com.

OTHER CERTIFICATIONS HELD BY PROWOOD LTD

The following certifications and approvals are held by Prowood Ltd.

- Certificate of Registration of Preservative Treatment & Allocated Brand Timber Treatment Plant Registration Authority;
  - 709 11 H1.2, 614 11 H1.2

VERSION: v1.0

588

Prolam
Engineered Laminated Timber

PERFORMANCE CLAIMS

If designed, installed and maintained in accordance with the all Prowood Ltd requirements, Smartframe will comply with or contribute to compliance with the following performance claims.

NZ Building Code clauses	BASIS OF COMPLIANCE	
	Compliance statement[1]	Demonstrated by
B1 Structure B1.3.1 B1.3.2 B1.3.3 (a, b, f, j, m, q) B1.3.4 (a, b, c, d, e)	ACCEPTABLE SOLUTION B1/AS1: NZS 3604:2011, clause 2.3.9.2.	› NZS 3604:2011, clause 2.3.9.2 requires LVL to be manufactured in accordance with AS/NZS 4357. › Smartframe manufactured to AS/NZS 4357:2005 under SAIGlobal StandardsMark licence. › SAIGlobal is JAS-ANZ accredited.
B2 Durability B2.3.1(a) B2.3.2(a)	ALTERNATIVE SOLUTION	› AS/NZS1604.4:2012, clause 1.9 requires same characteristic values for penetration and retention as defined in NZS 3640:2003. › In accordance with Prowood treatment protocol to AS/NZS 1604.4:2012 and NZS 3640:2003. › Passed IVS Labs penetration and retention testing of LVL samples to AS/NZS 1605:2018, parts 1 and 2.
C6 Protection from Fire C6.2 C6.3 C6.4	ALTERNATIVE SOLUTION NZS 3603:2011, clause 9.4.2.	› NZS 3603:1993, clause 9.4.2 specifies charring rate of radiata pine and other timber species of approximately the same density to be taken as 0.65 mm/min. › APA Evaluation of Char Rate (ASTM E119), TT-118 January 2015.
F2 Hazardous Building Materials F2.3.1	ALTERNATIVE SOLUTION. NZTPC *Best Practice Guideline for the Safe Use of Timber Preservatives & Anti-sapstain Chemicals. Establishes drying & flash off requirements.*	› In accordance with Prowood treatment protocol and Prowood health and safety plan. › TBB audited manufacturing/treatment process.

1. The Compliance Statement is the pass holder's statement that they have met their obligations under s14G(2) of the Building Act 2004.

SOURCES OF INFORMATION

The following information was relied upon to prepare this pass.

- SAIGlobal StandardsMark Licence Certificate Number SMKB25220 Tilling Timber Pty Ltd.
- IVS Timber Testing Report 39361 19/11/18.
- IVS Labs Analysis Report R32568 Boron Preservative in Timber 5/12/18.
- AS/NZS 4357:2005 *Structural laminated veneer lumber.*
- NZS 3603:1993 *Timber structures.*
- NZS 3604:2011 *Timber-framed buildings.*
- NZS 3640:2003 *Chemical preservation of round and sawn timber.*
- AS/NZS 1604.4:2012 *Specification for preservative treatment Part 4; Laminated Veneer Lumber (LVL).*

VERSION: v1.0 **DATE:** 07/06/2019

Note: Uncontrolled in printed format.

NAME: John Woodman

POSITION: Managing Director

Signed on behalf of Prolam Ltd:

John Woodman

Digitally signed by John Woodman
Date: 2019.06.07 10:52:38 +12'00'

By signing this pass™ the signatory confirms that, in respect of the subject of this pass™, the company has met their s14G obligations under the Building Act 2004.

pass

283 Waiwhero Road, Motueka › info@prowoodnz.com › 03 526 7436 › www.prolamnz.com

This Product Assurance Supplier Statement (pass™) has been prepared by TBB in accordance with MBIE PTS guidelines and the recommendations of s9.2, Determination No. 2019-011 (issued 12 April 2019). TBB is ISO9001:2016 certified. Copyright © 2017, The Building Business Limited (TBB). All rights reserved.

PRODUCT ASSURANCE SUPPLIER STATEMENT
pass™ no: 19012 | Expires: 06/2020

Prolam®
Engineered Laminated Timber

PROLAM SMARTJOISTS



PURPOSE

Prowood Ltd supplies Prolam Smartjoists for use as rafters and floor joists in buildings.

PROLAM SMARTJOISTS EXPLAINED

Smartjoists are manufactured from graded Douglas Fir LVL15 flanges and Oriented Strand Board webs bonded together with an exterior, heat durable adhesive that complies with ASTM D5055.

They are supplied boron treated to H1.2 or untreated and are available in:

Overall height	Flange width
240 mm	70 mm
300 mm	70mm
360 mm	90 mm

For further assistance please contact:
03 526 7436
info@prowoodnz.com
www.prolamnz.com

WE COMPLY s14G BUILDING ACT 2004

SCOPE AND LIMITATIONS OF USE

Scope	Limitations
Building	
In conjunction with timber or lightweight steel structural framing and in accordance with the Smartjoist span tables.	
Where the framing complies with the NZ Building Code or for existing buildings, where the designer and/or installer have established that the existing structure is suitable for the intended building work.	› Fixing material to be in accordance with section 4, NZS 3604:2011.
Within the building envelope where hazard class H1.2 or less applies.	› The Smartjoist must not be exposed to the environment for more than 90 days. › Where the Smartjoist is to be left exposed or used in a moisture laden environment it must be protected with an impervious coating.

USEFUL INFORMATION

For information on the design, installation and maintenance of Smartjoists, and for our warranty, refer to www.prolamnz.com.

OTHER CERTIFICATIONS HELD BY PROWOOD LTD

The following certifications and approvals are held by Prowood Ltd.

› Certificate of Registration of Preservative Treatment & Allocated Brand Timber Treatment Plant Registration Authority;
  - 709 11 H1.2 (13/7/18), 614 11 H1.2 (5/7/18)



VERSION: v1.0

590

Prolam
Engineered Laminated Timber

PERFORMANCE CLAIMS

If designed, installed and maintained in accordance with all of Prowood Ltd requirements, Smartjoists will comply with or contribute to compliance with the following performance claims.

NZ Building Code clauses	BASIS OF COMPLIANCE	
	Compliance statement[1]	Demonstrated by
B1 Structure B1.3.1 B1.3.2 B1.3.3 (a, b, f, j, m, q) B1.3.4 (a, b, c, d, e)	ALTERNATIVE SOLUTION IBC section 2303.1.2 and 2015 IRC section R502.1.2 and 2012, 2009 and 2006 IRC Section R502.1.4 for allowable stress design.	› Evaluated by ICC-Evaluation Service (ICC-ES) and APA (The Engineered Wood Association) as manufactured in accordance with IBC and IRC and in accordance with the approved Pacific Woodtech Corporation I-Joist Quality Control Manual. › ICC-ES is accredited by the American National Standards Institute and by the Standards of Council of Canada under ISO/IEC Guide 17065, Conformity Assessment – Requirements for Bodies Certifying Products, Processes, and Services.
B2 Durability B2.3.1(a) B2.3.2(a)	ALTERNATIVE SOLUTION	› AS/NZS1604:2012, clause 1.9 requires same characteristic values for penetration and retention as defined in NZS 3640:2003. › Subject to Prowood treatment protocol to AS/NZS 1604:2012 and NZS 3640:2003.
F2 Hazardous Building Materials F2.3.1	ALTERNATIVE SOLUTION. NZTPC *Best Practice Guideline for the Safe Use of Timber Preservatives & Anti-sapstain Chemicals. Establishes drying & flash off requirements.*	› Subject to Prowood treatment protocol and Prowood health and safety plan. › TBB audited manufacturing/treatment process.

1. The Compliance Statement is the pass holder's statement that they have met their obligations under s14G(2) of the Building Act 2004.

SOURCES OF INFORMATION

The following information was relied upon to prepare this pass.

- ICC-ES and APA Joint Evaluation Report ESR-1225 Pacific Woodtech Corporation PWI Joists 10/17.
- IVS Timber Testing Report 39361 19/11/18.
- IVS Labs Analysis Report R32568 Boron Preservative in Timber 5/12/18.
- NZS 3603:1993 *Timber structures.*
- NZS 3604:2011 *Timber-framed buildings.*
- NZS 3640:2003 *Chemical preservation of round and sawn timber.*
- AS/NZS 1604:2012 *Specification for Preservative treatment (parts 2 & 4).*

VERSION: v1.0 **DATE:** 07/06/2019

Note: Uncontrolled in printed format.

NAME: John Woodman

POSITION: Managing Director

Signed on behalf of Prowood Ltd:

John Woodman

Digitally signed by John Woodman
Date: 2019.06.07 11:09:42 +12'00'

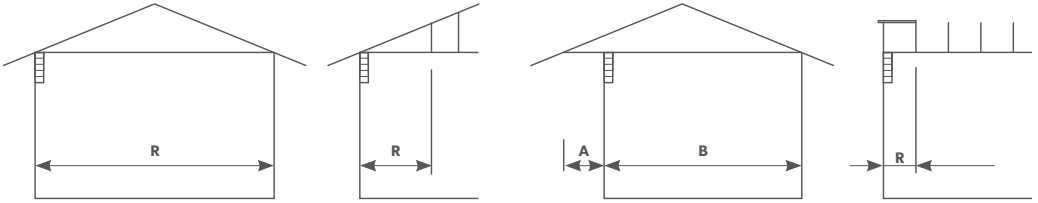
By signing this pass™ the signatory confirms that, in respect of the subject of this pass™, the company has met their s14G obligations under the Building Act 2004.

pass

283 Waiwhero Road, Motueka › info@prowoodnz.com › 03 526 7436 › www.prolamnz.com

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Selection Charts



$A \leq \frac{1}{4} (A + B)$, $R = B + 2A$

Table 1

Prolam® Lintels supporting roof and ceiling only.

		Lintel Size	Maximum Lintel Span (m)												
			Supported Roof Span 'R' (m)												
			2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0
PL8	Light Roof	**PL8H1-150100** 140 x 90mm	3.30	3.10	2.85	2.65	2.45	2.35	2.20	2.10	2.00	1.95	1.85	1.80	1.75
		PL8H1-200100 190 x 90mm	4.40	4.15	3.90	3.60	3.35	3.15	3.00	2.85	2.75	2.60	2.50	2.45	2.35
		PL8H1-250100 240 x 90mm	5.20	4.90	4.70	4.50	4.20	4.00	3.80	3.60	3.40	3.30	3.20	3.00	2.90
		PL8H1-300100 290 x 90mm	6.00	5.70	5.40	5.20	5.00	4.80	4.50	4.30	4.10	4.00	3.80	3.70	3.60
		PL8H1-350100 315 x 90mm	6.40	6.10	5.80	5.60	5.40	5.20	4.90	4.70	4.50	4.30	4.10	4.00	3.90
		PL8H1-400100 360 x 90mm	7.10	6.70	6.40	6.10	5.90	5.80	5.50	5.30	5.10	4.90	4.70	4.50	4.40
PL12	Light Roof	**PL12H1-150100** 140 x 90mm	3.75	3.50	3.30	3.05	2.85	2.65	2.55	2.40	2.30	2.20	2.15	2.05	2.00
		PL12H1-200100 190 x 90mm	4.80	4.55	4.35	4.15	3.85	3.65	3.45	3.30	3.15	3.00	2.90	2.80	2.70
		PL12H1-250100 240 x 90mm	5.70	5.40	5.20	5.00	4.80	4.60	4.30	4.10	3.90	3.80	3.60	3.50	3.40
		PL12H1-300100 290 x 90mm	6.60	6.20	6.00	5.70	5.50	5.40	5.20	5.00	4.80	4.60	4.40	4.20	4.10
		PL12H1-350100 315 x 90mm	7.00	6.60	6.30	6.10	5.90	5.70	5.50	5.40	5.10	4.90	4.80	4.60	4.40
		PL12H1-400100 360 x 90mm	7.80	7.30	7.00	6.70	6.50	6.30	6.10	6.00	5.80	5.60	5.40	5.20	5.00
PL17	Light Roof	**PL17H1-150100** 140 x 90mm	4.15	3.90	3.65	3.50	3.35	3.20	3.10	3.00	2.90	2.80	2.70	2.60	2.50
		PL17H1-200100 190 x 90mm	5.20	4.95	4.70	4.50	4.35	4.25	4.10	4.00	3.95	3.80	3.65	3.55	3.40
		PL17H1-250100 240 x 90mm	6.20	5.90	5.60	5.40	5.20	5.00	4.90	4.80	4.70	4.60	4.50	4.40	4.30
		PL17H1-300100 290 x 90mm	7.10	6.80	6.40	6.20	6.00	5.80	5.60	5.50	5.40	5.30	5.20	5.10	5.00
		PL17H1-350100 315 x 90mm	7.60	7.20	6.90	6.60	6.40	6.20	6.00	5.90	5.70	5.60	5.50	5.40	5.30
		PL17H1-400100 360 x 90mm	8.40	8.00	7.60	7.30	7.00	6.80	6.60	6.50	6.30	6.20	6.10	6.00	5.90

Note: For heavy roof refer to Prolam Online at www.prolamnz/specifiers

These span tables apply only to Prolam products

Selection Charts

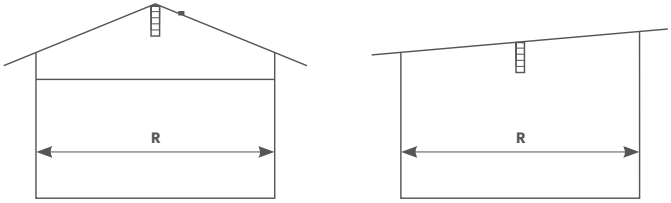


Table 2

Prolam® Ridge Beam supporting roof and sarking or ceiling. (Rafters at 1200mm CRS MAX)

		Lintel Size	Maximum Lintel Span (m) Supported Roof Span 'R' (m)												
			2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0
PL8	Light Roof	PL8H1-150100 140 x 90mm	4.05	3.55	3.25	3.05	2.80	2.60	2.40	2.25	2.15	2.05	1.95	1.90	1.80
		PL8H1-200100 190 x 90mm	5.30	4.80	4.40	4.10	3.75	3.50	3.25	3.10	2.95	2.80	2.70	2.55	2.50
		PL8H1-250100 240 x 90mm	6.20	5.70	5.40	5.10	4.70	4.40	4.10	3.90	3.70	3.50	3.40	3.20	3.10
		PL8H1-300100 290 x 90mm	7.10	6.60	6.20	5.90	5.60	5.30	5.00	4.70	4.40	4.20	4.10	3.90	3.80
		PL8H1-35000 315 x 90mm	7.60	7.00	6.50	6.20	6.00	5.70	5.40	5.10	4.80	4.60	4.40	4.20	4.10
		PL8H1-400100 360 x 90mm	8.30	7.70	7.10	6.70	6.30	6.00	5.80	5.60	5.40	5.20	5.00	4.80	4.60
PL12	Light Roof	PL12H1-150100 140 x 90mm	4.55	4.05	3.70	3.45	3.20	2.95	2.75	2.60	2.50	2.35	2.25	2.15	2.10
		PL12H1-200100 190 x 90mm	5.80	5.30	4.95	4.65	4.35	4.00	3.75	3.55	3.35	3.20	3.05	2.95	2.85
		PL12H1-250100 240 x 90mm	6.80	6.30	5.90	5.60	5.30	5.00	4.70	4.50	4.20	4.00	3.90	3.70	3.60
		PL12H1-300100 290 x 90mm	7.80	7.20	6.70	6.40	6.20	5.90	5.70	5.40	5.10	4.90	4.70	4.50	4.30
		PL12H1-350100 315 x 90mm	8.30	7.60	7.20	6.80	6.50	6.30	6.10	5.80	5.50	5.30	5.00	4.90	4.70
		PL12H1-400100 360 x 90mm	9.10	8.40	7.90	7.50	7.10	6.80	6.50	6.30	6.10	5.90	5.70	5.50	5.30
PL17	Light Roof	PL17H1-150100 140 x 90mm	5.05	4.50	4.10	3.80	3.60	3.40	3.30	3.15	3.05	2.95	2.85	2.75	2.65
		PL17H1-200100 190 x 90mm	6.30	5.75	5.40	5.10	4.85	4.65	4.45	4.30	4.15	4.00	3.90	3.75	3.60
		PL17H1-250100 240 x 90mm	7.40	6.80	6.40	6.10	5.80	5.60	5.40	5.30	5.10	5.00	4.90	4.70	4.50
		PL17H1-300100 290 x 90mm	8.50	7.80	7.30	7.00	6.70	6.40	6.20	6.10	5.90	5.80	5.60	5.50	5.40
		PL17H1-350100 315 x 90mm	9.00	8.30	7.80	7.40	7.10	6.80	6.60	6.40	6.30	6.10	6.00	5.90	5.80
		PL17H1-400100 360 x 90mm	9.90	9.10	8.60	8.10	7.80	7.50	7.30	7.00	6.80	6.60	6.40	6.20	6.10

Note: For heavy roof refer to Prolam Online at www.prolamnz/specifiers

These span tables apply only to Prolam products

Selection Charts

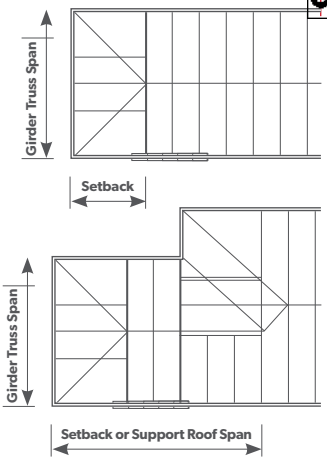


Table 3

PL8 Lintel supporting girder/setback trusses with light roof.

Note: For heavy roof refer to Prolam Online at www.prolamnz/specifiers

Lintel Size	Setback (m)	Maximum Lintel Span (m)										
		Girder Truss Span (m)										
		5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0
PL8H1-150100 140 x 90mm	1.2	2.45	2.25	2.10	1.95	1.80	1.70	1.60	1.55	1.45	1.40	1.35
	2.4	2.06	1.80	1.65	1.50	1.40	1.30	1.20	1.10	1.05	1.00	0.95
	3.6	1.70	1.50	1.35	1.20	1.10	1.00	0.90	0.85			
	4.8	1.46	1.25	1.10	1.00	0.90	0.80					
	6.0	1.25	1.05	0.95	0.80							
	7.5	1.05	0.90									
	10.0	0.80										
PL8H1-200100 190 x 90mm	1.2	3.45	3.20	3.00	2.85	2.70	2.60	2.50	2.40	2.30	2.20	2.15
	2.4	3.25	2.95	2.70	2.50	2.30	2.15	2.00	1.90	1.80	1.70	1.60
	3.6	2.80	2.50	2.25	2.05	1.85	1.70	1.60	1.50	1.40	1.30	1.25
	4.8	2.40	2.10	1.90	1.70	1.55	1.40	1.30	1.20	1.10	1.05	1.00
	6.0	2.10	1.85	1.60	1.45	1.30	1.20	1.10	1.00	0.95	0.85	
	7.5	1.80	1.55	1.35	1.20	1.05	0.95	0.90	0.80			
	10.0	1.45	1.20	1.06	0.95	0.85						
PL8H1-250100 240 x 90mm	1.2	4.30	4.00	3.70	3.50	3.40	3.20	3.10	2.95	2.80	2.70	2.60
	2.4	3.95	3.60	3.35	3.10	2.90	2.70	2.55	2.40	2.30	2.20	2.10
	3.6	3.55	3.20	2.90	2.65	2.45	2.30	2.15	2.00	1.90	1.80	1.70
	4.8	3.15	2.80	2.55	2.30	2.10	1.95	1.80	1.70	1.60	1.50	1.40
	6.0	2.85	2.50	2.25	2.00	1.85	1.70	1.55	1.45	1.35	1.30	1.20
	7.5	2.50	2.20	1.95	1.75	1.60	1.45	1.35	1.25	1.15	1.05	1.00
	10.0	2.10	1.80	1.55	1.40	1.25	1.15	1.05	0.95	0.90	0.85	0.80
PL8H1-300100 290 x 90mm	1.2	4.90	4.70	4.50	4.30	4.10	3.90	3.70	3.60	3.50	3.30	3.20
	2.4	4.80	4.60	4.45	4.25	3.95	3.75	3.55	3.35	3.20	3.05	2.95
	3.6	4.65	4.45	4.05	3.70	3.45	3.20	3.00	2.85	2.65	2.55	2.40
	4.8	4.40	3.95	3.55	3.25	3.00	2.75	2.55	2.40	2.25	2.10	2.00
	6.0	4.00	3.55	3.15	2.85	2.60	2.40	2.20	2.05	1.95	1.80	1.70
	7.5	3.55	3.10	2.75	2.45	2.25	2.05	1.90	1.75	1.65	1.50	1.45
	10.0	2.95	2.55	2.25	2.00	1.80	1.65	1.50	1.40	1.30	1.20	1.10
PL8H1-350100 315 x 90mm	1.2	5.50	5.30	5.10	5.00	4.70	4.50	4.30	4.20	4.00	3.90	3.80
	2.4	5.45	5.25	5.05	4.85	4.70	4.50	4.30	4.10	3.90	3.75	3.50
	3.6	5.25	5.05	4.90	4.60	4.30	4.00	3.75	3.55	3.35	3.20	3.05
	4.8	5.10	4.90	4.45	4.10	3.75	3.50	3.25	3.05	2.90	2.75	2.60
	6.0	4.95	4.45	4.00	3.65	3.35	3.10	2.85	2.70	2.50	2.35	2.25
	7.5	4.50	3.95	3.55	3.20	2.90	2.65	2.45	2.30	2.15	2.00	1.90
	10.0	3.80	3.30	2.90	2.60	2.35	2.15	2.00	1.85	1.70	1.60	1.50

These span tables apply only to Prolam products

Selection Charts

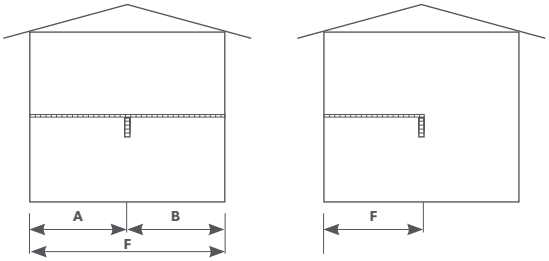


Table 4

1.5kPa L.L. Floor Beam supporting joists.

	Beam Size		Maximum Floor Beam Span (m) Joist Span 'F' (m)					
			2.4	3.6	4.8	6.0	7.2	8.4
PL8	PL8H1-150100	140 x 90mm	2.40	2.20	2.00	1.75	1.60	1.45
	PL8H1-200100	190 x 90mm	3.30	3.00	2.75	2.40	2.15	1.95
	PL8H1-250100	240 x 90mm	4.00	3.75	3.45	3.05	2.70	2.50
	PL8H1-300100	290 x 90mm	4.65	4.40	4.20	3.65	3.30	3.00
	PL8H1-350100	315 x 90mm	4.90	4.70	4.50	4.00	3.60	3.30
PL12	PL12H1-150100	140 x 90mm	2.75	2.50	2.30	2.00	1.80	1.65
	PL12H1-200100	190 x 90mm	3.70	3.40	3.15	2.75	2.45	2.25
	PL12H1-250100	240 x 90mm	4.40	4.20	4.00	3.50	3.15	2.85
	PL12H1-300100	290 x 90mm	5.05	4.80	4.65	4.20	3.80	3.45
	PL12H1-350100	315 x 90mm	5.40	5.15	4.90	4.55	4.10	3.75
PL17	PL17H1-150100	140 x 90mm	3.15	2.90	2.75	2.50	2.35	2.15
	PL17H1-200100	190 x 90mm	4.05	3.85	3.70	3.45	3.20	2.95
	PL17H1-250100	240 x 90mm	4.85	4.60	4.40	4.15	3.90	3.70
	PL17H1-300100	290 x 90mm	5.55	5.30	5.10	4.75	4.50	4.30
	PL17H1-350100	315 x 90mm	5.90	5.65	5.40	5.05	4.80	4.60

Note: For 3.0 kPa L.L. refer to Prolam Online at www.prolamnz/specifiers

These span tables apply only to Prolam products

Selection Charts

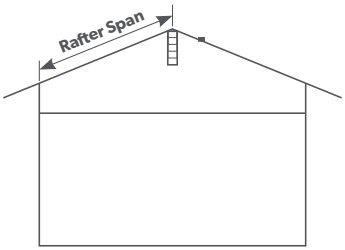


Table 5

Rafters for internal use. Visual ie PLVL, PLVR and Structural ie PLL, PLR light roof – with ceiling – snow loading 0.5 kPa – high wind zone Glulam Grade PL8.

Rafter Size	Maximum Rafter Span (m)				
	Rafter Spacing (m)				
	0.6	0.75	0.9	1.0	1.2
PLVL8H3-15075 140 x 63mm	3.80	3.50	3.30	3.20	3.00
PLVL8H3-20075 190 x 63mm	4.75	4.45	4.30	4.20	4.00
PLVL8H3-25075 240 x 63mm	5.15	4.75	4.50	4.35	4.10
PLVL8H3-30075 290 x 63mm	6.45	6.05	5.80	5.65	5.25
PLVL8H3-35075 315 x 63mm	7.25	6.80	6.25	5.95	5.45
PLVL8H3-15075 140 x 63mm	B	B	B	B	B
PLVL8H3-20075 190 x 63mm	B	B	B	C	C
PLVL8H3-25075 240 x 63mm	B	B	B	C	C
PLVL8H3-30075 290 x 63mm	B	C	C	C	C
PLVL8H3-35075 315 x 63mm	C	C	C	C	C

Rafter Size	Maximum Rafter Span (m)				
	Rafter Spacing (m)				
	0.6	0.75	0.9	1.0	1.2
PLVL8H3-10050 88 x 42mm	1.80	1.75	1.75	1.70	1.70
PLVL8H3-15050 140 x 42mm	3.30	3.00	2.75	2.60	2.40
PLVL8H3-20050 190 x 42mm	3.75	3.30	3.05	2.905	2.65
PLVL8H3-25050 240 x 42mm	4.05	3.60	3.30	3.15	2.85
PLVL8H3-30050 290 x 42mm	4.30	3.80	3.50	3.30	3.00
PLVL8H3-35050 315 x 42mm	4.65	4.10	3.75	3.60	3.25
PLVL8H3-10050 88 x 42mm	B	B	B	B	B
PLVL8H3-15050 140 x 42mm	B	B	B	B	B
PLVL8H3-20050 190 x 42mm	B	B	B	B	B
PLVL8H3-25050 240 x 42mm	B	B	B	B	B
PLVL8H3-30050 290 x 42mm	B	B	B	B	C
PLVL8H3-35050 315 x 42mm	B	B	B	C	C

Fixing type	
B	2/100 x 3.75 skewed nails and 1 wire dog or 2.7kN connection
C	2/100 x 3.75 skewed nails and 2 wire dog or 4.7kN connection
D	2/100 x 3.75 skewed nails and 3 wire dog or 6.7kN connection

End fixing to resist uplift – refer also to NZS3604: 1999

Codes for Structural or Visual	
Visual	PLVL, ie PLVL8H3-25075 250
Structural	PLL, ie PL8H3-25050

These span tables apply only to Prolam products

Selection Charts

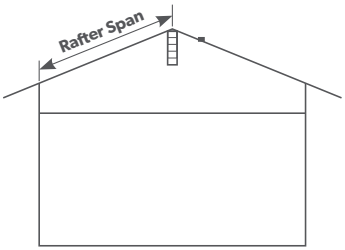


Table 6a

Prolam® LVL 15 rafters for internal use.

Light roof – with ceiling – snow loading 0.5 kPa – high wind zone LVL 15.

Joist Code/Rafter Size	Roof Mass (Kg/m²)	Maximum Rafter Span (m)			
		Rafter Spacing (m)			
		0.45	0.6	0.9	1.2
PSSF15H1-10050 90 x 42mm	40	2.50	2.40	2.30	2.10
PSSF15H1-12550 120 x 42mm	40	3.80	3.50	3.10	2.80
PSSF15H1-15050 140 x 42mm	40	4.50	4.10	3.60	3.30
PSSF15H1-20050 190 x 42mm	40	6.30	5.90	5.20	4.60
PSSF15H1-25050 240 x 42mm	40	7.30	7.00	6.40	5.80

Table 6b

Prolam I-Beam rafters for internal use.

Light roof – with ceiling – snow loading 0.5 kPa – high wind zone – max slope 25° – I-Joists.

Joist Code/Rafter Size	Roof Mass (Kg/m²)	Maximum Rafter Span (m)			
		Rafter Spacing (m)			
		0.45	0.6	0.9	1.2
PJ24070 240 x 70mm	0.4	6.60	6.05	5.35	4.85
PJ30070 290 x 70mm	0.4	7.80	7.20	6.35	5.80
PJ36090 360 x 90mm	0.4	9.15	8.65	7.80	7.15

These span tables apply only to Prolam products

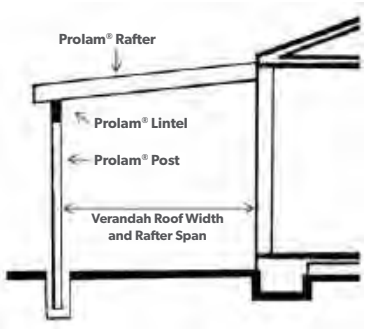
Selection Charts

Table 7

Verandah Rafters (Visual).

Light roof – no ceiling – snow loading 0.5 kPa – high wind zone – Glulam Grade PL8.

Rafter Size	Maximum Rafter Span (m)				
	Rafter Spacing (m)				
	0.6	0.75	0.9	1.0	1.2
PLVL8H3-10050 88 x 42mm	1.80	1.75	1.75	1.70	1.70
PLVL8H3-15050 140 x 42mm	3.30	3.00	2.75	2.60	2.40
PLVL8H3-20050 190 x 42mm	3.75	3.30	3.05	2.905	2.65
PLVL8H3-25050 240 x 42mm	4.05	3.60	3.30	3.15	2.85
PLVL8H3-30050 290 x 42mm	4.30	3.80	3.50	3.30	3.00
PLVL8H3-35050 315 x 42mm	4.65	4.10	3.75	3.60	3.25
PLVL8H3-10050 88 x 42mm	B	B	B	B	B
PLVL8H3-15050 140 x 42mm	B	B	B	B	B
PLVL8H3-20050 190 x 42mm	B	B	B	B	B
PLVL8H3-25050 240 x 42mm	B	B	B	B	B
PLVL8H3-30050 290 x 42mm	B	B	B	B	C
PLVL8H3-35050 315 x 42mm	B	B	B	C	C



Fixing type	End fixing to resist uplift
B	2/100 x 3.75 skewed nails and 1 wire dog or 2.7kN connection
C	2/100 x 3.75 skewed nails and 2 wire dog or 4.7kN connection
D	2/100 x 3.75 skewed nails and 3 wire dog or 6.7kN connection

Rafter Size	Maximum Rafter Span (m)				
	Rafter Spacing (m)				
	0.6	0.75	0.9	1.0	1.2
PLVL8H3-150100 140 x 88mm	4.15	3.90	3.75	3.65	3.40
PLVL8H3-200100 190 x 88mm	5.15	4.85	4.65	4.55	4.35
PLVL8H3-250100 240 x 88mm	5.75	5.30	5.05	4.85	4.55
PLVL8H3-300100 290 x 88mm	7.00	6.60	6.35	6.15	5.90
PLVL8H3-350100 315 x 88mm	7.85	7.40	7.10	6.90	6.60
PLVL8H3-150100 140 x 88mm	B	B	B	C	C
PLVL8H3-200100 190 x 88mm	B	C	C	C	C
PLVL8H3-250100 240 x 88mm	B	C	C	C	C
PLVL8H3-300100 290 x 88mm	C	C	C	C	D
PLVL8H3-350100 315 x 88mm	C	C	D	D	D

Rafter Size	Maximum Rafter Span (m)				
	Rafter Spacing (m)				
	0.6	0.75	0.9	1.0	1.2
PLVL8H3-15075 140 x 63mm	3.80	3.50	3.30	3.20	3.00
PLVL8H3-20075 190 x 63mm	4.75	4.45	4.30	4.20	4.00
PLVL8H3-25075 240 x 63mm	5.15	4.75	4.50	4.35	4.10
PLVL8H3-30075 290 x 63mm	6.45	6.05	5.80	5.65	5.25
PLVL8H3-35075 315 x 63mm	7.25	6.80	6.25	5.95	5.45
PLVL8H3-15075 140 x 63mm	B	B	B	B	B
PLVL8H3-20075 190 x 63mm	B	B	B	C	C
PLVL8H3-25075 240 x 63mm	B	B	B	C	C
PLVL8H3-30075 290 x 63mm	B	C	C	C	C
PLVL8H3-35075 315 x 63mm	C	C	C	C	C

These span tables apply only to Prolam products

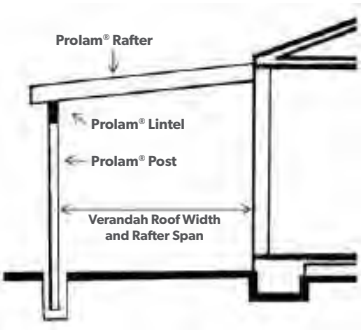
Selection Charts

Table 8

Verandah Rafters. Light roof – with ceiling – snow loading 0.5 kPa – high wind zone – Glulam Grade PL8.

Rafter Size	Maximum Rafter Span (m)				
	Rafter Spacing (m)				
	0.6	0.75	0.9	1.0	1.2
PLVL8H3-15075 140 x 63mm	3.80	3.50	3.30	3.20	3.00
PLVL8H3-20075 190 x 63mm	4.75	4.45	4.30	4.20	4.00
PLVL8H3-25075 240 x 63mm	5.15	4.75	4.50	4.35	4.10
PLVL8H3-30075 290 x 63mm	6.45	6.05	5.80	5.65	5.25
PLVL8H3-35075 315 x 63mm	7.25	6.80	6.25	5.95	5.45
PLVL8H3-15075 140 x 63mm	B	B	B	B	B
PLVL8H3-20075 190 x 63mm	B	B	B	C	C
PLVL8H3-25075 240 x 63mm	B	B	B	C	C
PLVL8H3-30075 290 x 63mm	B	C	C	C	C
PLVL8H3-35075 315 x 63mm	C	C	C	C	C

Rafter Size	Maximum Rafter Span (m)				
	Rafter Spacing (m)				
	0.6	0.75	0.9	1.0	1.2
PLVL8H3-10050 88 x 42mm	1.70	1.65	1.60	1.55	1.50
PLVL8H3-15050 140 x 42mm	3.25	3.00	2.85	2.70	2.50
PLVL8H3-20050 190 x 42mm	4.05	3.60	3.30	3.15	2.85
PLVL8H3-25050 240 x 42mm	4.40	3.90	3.55	3.40	3.10
PLVL8H3-30050 290 x 42mm	4.65	4.10	3.80	3.60	3.25
PLVL8H3-35050 315 x 42mm	5.00	4.45	4.10	3.90	3.65
PLVL8H3-10050 88 x 42mm	B	B	B	B	B
PLVL8H3-15050 140 x 42mm	B	B	B	B	B
PLVL8H3-20050 190 x 42mm	B	B	B	B	B
PLVL8H3-25050 240 x 42mm	B	B	B	B	B
PLVL8H3-30050 290 x 42mm	B	B	B	B	B
PLVL8H3-35050 315 x 42mm	B	B	B	B	C



Fixing type	End fixing to resist uplift
B	2/100 x 3.75 skewed nails and 1 wire dog or 2.7kN connection
C	2/100 x 3.75 skewed nails and 2 wire dog or 4.7kN connection

Codes for Structural or Visual	
Visual	PLVL, ie PLVL8H3-25075 250
Structural	PLL, ie PL8H3-25050

Rafter Size	Maximum Rafter Span (m)				
	Rafter Spacing (m)				
	0.6	0.75	0.9	1.0	1.2
PLVL8H3-150100 140 x 88mm	4.15	3.90	3.70	3.55	3.35
PLVL8H3-200100 190 x 88mm	5.15	4.85	4.65	4.55	4.35
PLVL8H3-250100 240 x 88mm	5.75	5.30	5.05	4.85	4.55
PLVL8H3-300100 290 x 88mm	7.00	6.60	6.35	6.15	5.90
PLVL8H3-350100 315 x 88mm	7.85	7.40	7.10	6.90	6.60
PLVL8H3-150100 140 x 88mm	B	B	B	C	C
PLVL8H3-200100 190 x 88mm	B	C	C	C	C
PLVL8H3-250100 240 x 88mm	B	C	C	C	C
PLVL8H3-300100 290 x 88mm	C	C	C	C	D
PLVL8H3-350100 315 x 88mm	C	C	D	D	D

These span tables apply only to Prolam products

Selection Charts

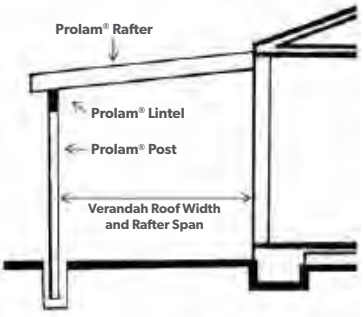


Table 9

Verandah Lintels (Visual). Light roof – no ceiling & with ceiling – high wind zone. Rafters supporting verandah roof only – high wind zone.

		LINTEL SIZE		Maximum lintel span (m)					
				Verandah roof width (m)					
				1.8	2.4	3.0	3.6	4.2	4.8
PL8	No Ceiling	PLVL8H3-15075	140 x 63mm	3.20	3.00	2.85	2.70	2.60	2.50
		PLVL8H3-20075	190 x 63mm	4.10	3.95	3.80	3.65	3.50	3.35
		PLVL8H3-25075	240 x 63mm	4.90	4.60	4.40	4.30	4.10	3.90
		PLVL8H3-30075	290 x 63mm	5.06	5.30	4.90	4.50	4.30	4.00
		PLVL8H3-35075	315 x 63mm	6.10	5.50	5.10	4.70	4.40	4.20
		PLVL8H3-150100	140 x 88mm	3.55	3.35	3.20	3.05	2.90	2.80
		PLVL8H3-200100	190 x 88mm	4.50	4.30	4.10	3.95	3.85	3.75
		PLVL8H3-250100	240 x 88mm	5.30	5.00	4.80	4.70	4.50	4.40
		PLVL8H3-300100	290 x 88mm	6.10	5.80	5.60	5.40	5.20	5.10
		PLVL8H3-350100	315 x 88mm	6.80	6.50	6.20	6.00	5.80	5.70
	With Ceiling	PLVL8H3-15075	140 x 63mm	2.65	2.50	2.40	2.30	2.20	2.10
		PLVL8H3-20075	190 x 63mm	3.50	3.35	3.15	3.05	2.90	2.80
		PLVL8H3-25075	240 x 63mm	4.40	4.10	3.90	3.80	3.60	3.50
		PLVL8H3-30075	290 x 63mm	5.20	4.90	4.70	4.50	4.30	4.20
		PLVL8H3-35075	315 x 63mm	6.00	5.70	5.40	5.20	5.00	4.80
		PLVL8H3-150100	140 x 88mm	2.95	2.80	2.65	2.55	2.45	2.35
		PLVL8H3-200100	190 x 88mm	3.90	3.70	3.50	3.35	3.25	3.15
		PLVL8H3-250100	240 x 88mm	4.80	4.50	4.30	4.20	4.00	3.90
		PLVL8H3-300100	290 x 88mm	5.70	5.40	5.20	5.00	4.80	4.60
		PLVL8H3-350100	315 x 88mm	6.60	6.30	6.00	5.80	5.60	5.40

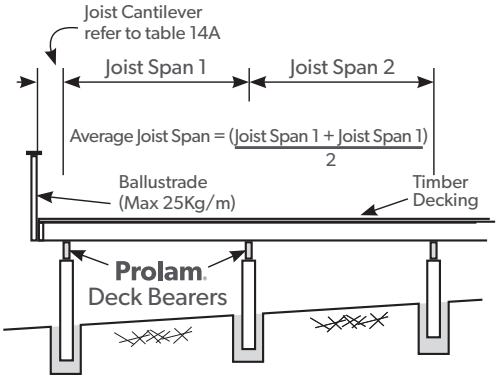
These span tables apply only to Prolam products

Selection Charts

Table 10

Deck Bearers supporting deck and cantilever.

Loads:	**Deck 0.35 kPa** **Live 2.0 kPa**
Deflection Limits:	**Long Term span/400 or 12mm** **Short Term span/400 or 9mm**



Notes:

1. *Timber grade PL8, minimum H3.2 treated – wet use.*
2. *Bearers do not support roof loads.*
3. *Maximum ballustrade weight 25kg/m.*
4. *Maximum joist cantilever 400mm.*
5. *Spans may be increased by 10% for bearers or joists continuous over 2 or more spans.*

	Bearer Size		Maximum Bearer Span (m)								
			Average Joist Span (m)								
			0.9	1.2	1.5	1.8	2.4	3.0	3.6	4.2	4.8
PL8	PL8H3-150100	140 x 90mm	2.20	2.15	2.05	1.95	1.80	1.65	1.50	1.40	1.35
	PL8H3-200100	190 x 90mm	2.95	2.85	2.75	2.60	2.40	2.20	2.05	1.90	1.80
	PL8H3-250100	240 x 90mm	3.65	3.55	3.40	3.25	3.00	2.75	2.55	2.40	2.25
	PL8H3-300100	290 x 90mm	4.15	4.05	3.95	3.85	3.60	3.30	3.05	2.85	2.70
	PL8H3-350100	315 x 90mm	4.65	4.55	4.45	4.35	4.15	3.85	3.60	3.35	3.15
	PL8H3-400100	360 x 90mm	5.15	5.00	4.90	4.80	4.60	4.40	4.10	3.85	3.60
PL12	PL12H3-150100	140 x 90mm	2.50	2.40	2.30	2.25	2.05	1.90	1.75	1.65	1.55
	PL12H3-200100	190 x 90mm	3.30	3.20	3.10	3.00	2.75	2.50	2.35	2.20	2.05
	PL12H3-250100	240 x 90mm	4.00	3.90	3.80	3.70	3.45	3.15	2.95	2.75	2.60
	PL12H3-300100	290 x 90mm	4.55	4.45	4.35	4.25	4.05	3.80	3.50	3.30	3.10
	PL12H3-350100	315 x 90mm	5.10	5.00	4.85	4.75	4.55	4.35	4.10	3.85	3.65
	PL12H3-400100	360 x 90mm	5.65	5.50	5.35	5.25	5.05	4.85	4.65	4.40	4.15

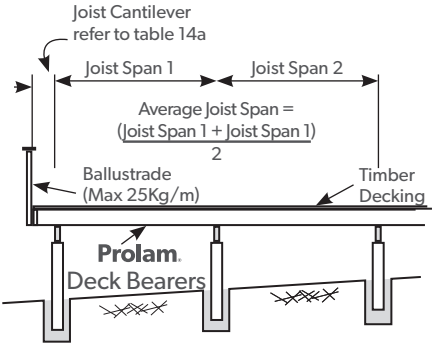
These span tables apply only to Prolam products

Selection Charts

Table 11

Deck joists.

Loads:	**Deck 0.35 kPa** **Live 2.0 kPa** **1.8 kN**
Deflection Limits:	**Long Term span/400 or 12mm** **Short Term span/400 or 9mm**



Notes:

1. *Timber grade PL8, minimum H3.2 treated – wet use.*
2. *Joists do not support roof loads.*
3. *Spans may be increased by 10% for bearers or joists continuous over 2 or more spans.*
4. *Blocking required in accordance with NZS3604:2011 Clause 7.1.2.*

	Joist Size		Deck Joists Single Span (m)		
			Joist Spacing (m)		
			0.40	0.45	0.60
PL8	PL8H3-15050	140 x 42mm	2.20	2.10	1.95
	PL8H3-20050	190 x 42mm	2.90	2.80	2.60
	PL8H3-25050	240 x 42mm	3.85	3.50	3.25
	PL8H3-30050	290 x 42mm	4.40	4.25	3.90
	PL8H3-35050	315 x 42mm	5.10	4.95	4.60
	PL8H3-15075	140 x 63mm	2.55	2.45	2.25
	PL8H3-20075	190 x 63mm	3.40	3.30	3.05
	PL8H3-25075	240 x 63mm	4.25	4.10	3.80
	PL8H3-30075	290 x 63mm	5.05	4.90	4.55
	PL8H3-35075	315 x 63mm	5.70	5.55	5.15
	PL8H3-40075	360 x 63mm	6.80	6.10	5.70
	PL8H3-45075	405 x 63mm	6.90	6.70	6.20

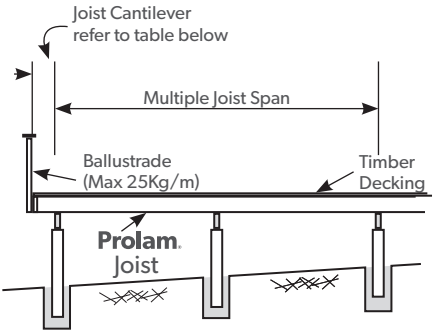
These span tables apply only to Prolam products

Selection Charts

Table 12

Cantilever Deck Joist. 2.0 kPa. No ceiling.

Loads:	**Deck 0.35 kPa** **Live 2.0 kPa** **1.8 kN**
Deflection Limits:	**Long Term span/400 or 12mm** **Short Term span/400 or 9mm**



Notes:

1. *Timber grade PL8, minimum H3.2 treated – wet use.*
2. *Joists do not support roof loads.*
3. *Spans may be increased by 10% for bearers or joists continuous over 2 or more spans.*
4. *Blocking required in accordance with NZS3604:2011 Clause 7.1.2.*

	Joist Size		Deck Joists Cantilever (m)		
			Joist Spacing (m)		
			0.40	0.45	0.60
PL8	**PL8H3-15050**	140 x 42mm	0.95	0.90	0.80
	PL8H3-20050	190 x 42mm	1.35	1.30	1.20
	PL8H3-25050	240 x 42mm	1.80	1.75	1.0
	PL8H3-30050	290 x 42mm	2.25	2.20	2.00
	PL8H3-35050	315 x 42mm	2.65	2.55	2.30
	PL8H3-15075	140 x 63mm	1.10	1.05	0.95
	PL8H3-20075	190 x 63mm	1.65	1.55	1.40
	PL8H3-25075	240 x 63mm	2.15	2.10	1.90
	PL8H3-30075	290 x 63mm	2.60	2.55	2.30
	PL8H3-35075	315 x 63mm	3.10	3.00	2.70

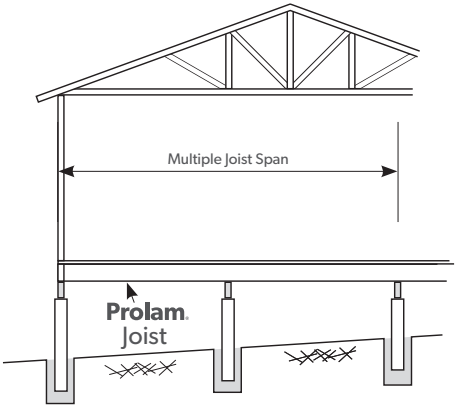
These span tables apply only to Prolam products

Selection Charts

Table 13a

Floor Joists PL8.

Loads:	**Deck**	**0.5 kPa**
	Live	**1.5 kPa**
		1.8 kN
Deflection Limits:	**Long Term span/350 or 12mm**	
	Short Term span/350 or 9mm	
		1kN 2mm



Notes:

1. *Timber grade PL8 – dry use.*
2. *Joists do not support roof loads.*
3. *Spans may be increased by 10% for joists continuous over 2 or more equal spans.*
4. *Blocking required in accordance with NZS3604:2011 Clause 7.1.2.*

	Joist Size		Floor Joists Single Span (m)		
			Joist Spacing (mm)		
			400	450	600
PL8	**PL8H3-15050**	140 x 42mm	2.60	2.50	2.05
	PL8H3-20050	190 x 42mm	3.40	3.30	3.05
	PL8H3-25050	240 x 42mm	4.30	4.15	3.75
	PL8H3-30050	290 x 42mm	5.20	5.00	4.55
	PL8H3-35050	315 x 42mm	5.55	5.40	4.95
	PL8H3-40050	360 x 42mm	6.15	5.95	5.40
	PL8H3-45050	405 x 42mm	6.70	6.55	6.05
	PL8H3-15075	140 x 63mm	3.05	2.90	2.35
	PL8H3-20075	190 x 63mm	3.95	3.85	3.50
	PL8H3-25075	240 x 63mm	5.00	4.85	4.35
	PL8H3-30075	290 x 63mm	5.80	5.60	5.25
	PL8H3-35075	315 x 63mm	6.15	6.00	5.55
	PL8H3-40075	360 x 63mm	6.80	6.60	6.15
	PL8H3-45075	405 x 63mm	7.45	7.25	6.70

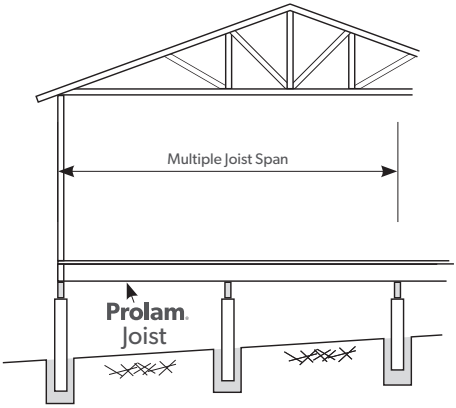
These span tables apply only to Prolam products

Selection Charts

Table 13b

Floor Joists PL12.

Loads:	**Deck**	**0.5 kPa**
	Live	**1.5 kPa**
		1.8 kN
Deflection Limits:	**Long Term span/350 or 12mm**	
	Short Term span/350 or 9mm	
		1kN 2mm



Notes:

1. *Timber grade PL12 – dry use.*
2. *Joists do not support roof loads.*
3. *Spans may be increased by 10% for joists continuous over 2 or more equal spans.*
4. *Blocking required in accordance with NZS3604:2011 Clause 7.1.2.*

	Joist Size		Floor Joists Single Span (m)		
			Joist Spacing (mm)		
			400	450	600
PL12	PL12H3-15050	140 x 42mm	2.90	2.80	2.30
	PL12H3-20050	190 x 42mm	3.80	3.75	3.45
	PL12H3-25050	240 x 42mm	4.85	4.70	4.25
	PL12H3-30050	290 x 42mm	5.75	5.55	5.15
	PL12H3-35050	315 x 42mm	6.10	5.90	5.50
	PL12H3-40050	360 x 42mm	6.75	6.55	6.10
	PL12H3-45050	405 x 42mm	7.35	7.15	6.65
	PL12H3-15075	140 x 63mm	3.40	3.25	2.70
	PL12H3-20075	190 x 63mm	4.45	4.35	3.95
	PL12H3-25075	240 x 63mm	5.50	5.35	4.90
	PL12H3-30075	290 x 63mm	6.35	6.15	5.75
	PL12H3-40075	360 x 63mm	7.45	7.25	6.75
	PL12H3-45075	405 x 63mm	8.15	7.90	7.35

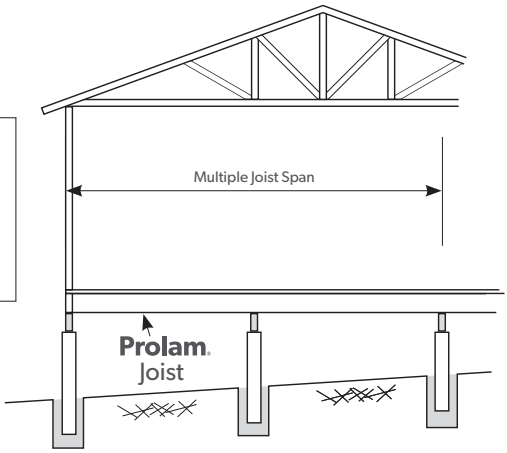
These span tables apply only to Prolam products

Selection Charts

Table 13c

Floor Joists PL17.

Loads:	**Deck**	**0.5 kPa**
	Live	**1.5 kPa**
		1.8 kN
Deflection Limits:	**Long Term span/350 or 12mm**	
	Short Term span/350 or 9mm	
		1kN 2mm



Notes:

1. *Timber grade PL17 – dry use.*
2. *Joists do not support roof loads.*
3. *Spans may be increased by 10% for joists continuous over 2 or more equal spans.*
4. *Blocking required in accordance with NZS3604:2011 Clause 7.1.2.*

	Joist Size		Floor Joists Single Span (m)		
			Joist Spacing (mm)		
			400	450	600
PL17	PL17H3-15050	140 x 42mm	3.30	3.15	2.90
	PL17H3-20050	190 x 42mm	4.55	4.45	4.05
	PL17H3-25050	240 x 42mm	5.45	5.30	4.95
	PL17H3-30050	290 x 42mm	6.30	6.10	5.70
	PL17H3-35050	315 x 42mm	6.70	6.50	6.05
	PL17H3-40050	360 x 42mm	7.40	7.20	6.70
	PL17H3-45050	405 x 42mm	8.10	7.85	7.30
	PL17H3-15075	140 x 63mm	3.90	3.70	3.40
	PL17H3-20075	190 x 63mm	5.05	4.90	4.55
	PL17H3-25075	240 x 63mm	6.05	5.85	5.45
	PL17H3-30075	290 x 63mm	6.95	6.75	6.30
	PL17H3-35075	315 x 63mm	7.40	7.20	6.70
	PL17H3-40075	360 x 63mm	8.20	7.95	7.40
	PL17H3-45075	405 x 63mm	8.95	8.70	8.10

These span tables apply only to Prolam products

Selection Charts

Table 13d

Prolam® **Floor Joists** supporting floor loads only. Prolam LVL15.

Joist Code/Joist Size	Maximum Joist Span (m)		
	Joist Spacing (m)		
	0.30	0.45	0.60
PSSF15H1-10050 90 x 42mm	2.10	1.80	1.65
PSSF15H1-12550 120 x 42mm	3.15	2.50	2.30
PSSF15H1-15050 140 x 42mm	3.60	2.95	2.70
PSSF15H1-20050 190 x 42mm	4.75	4.20	3.80
PSSF15H1-25050 240 x 42mm	5.60	5.15	4.85
PSSF15H1-30050 290 x 42mm	6.40	5.90	5.55

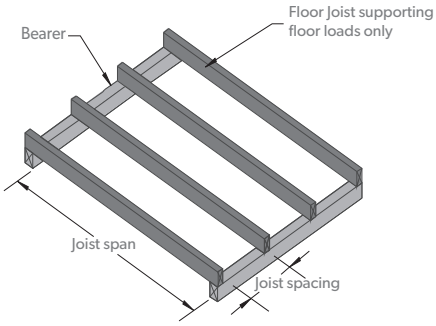


Table 13e

Recommended maximum **Prolam I-Joist** spans for residential floors. 1.5kPa – I-Joist Beam

Projoist Code /Projoist Size	Maximum Floor Joist Span (m)			
	Joist Spacing (m)			
	0.30	0.40	0.45	0.60
PJ20058 200 x 58mm	4.70	4.35	4.10	3.70
PJ24070 240 x 70mm	5.80	5.40	5.20	4.85
PJ24090 240 x 90mm	6.15	5.70	5.60	5.10
PJ30070 300 x 70mm	6.60	6.10	6.00	5.50
PJ30090 300 x 90mm	6.95	6.50	6.30	5.90
PJ36090 360 x 90mm	7.70	7.20	7.00	6.50

These span tables apply only to Prolam products

Selection Charts

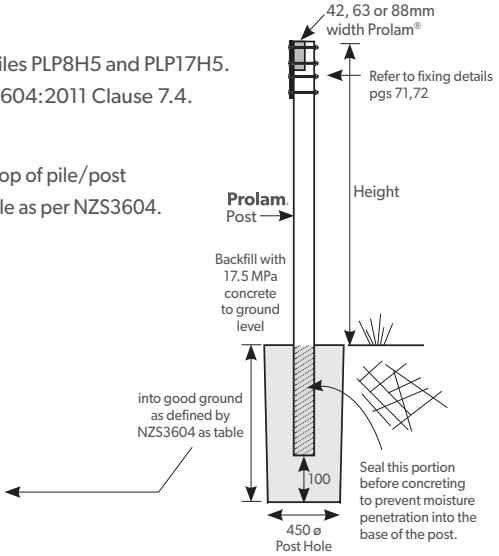
Table 14

Bracing units for Prolam® Posts. For use as Deck Piles PLP8H5 and PLP17H5. Piles supporting timber deck constructed to NZS 3604:2011 Clause 7.4.

Deck Pile Bracing Units

Prolam post height measured from top of concrete to top of pile/post

Piles rated at 120 * BU's are equivalent to an anchor pile as per NZS3604.



Prolam Post Deck Pile	Pile/Post Height (m)	Bracing Units	Bearer / pile connection	Min footing depth @ 450 dia (m)
PLP8H5-150 135x135	0.75	120 *	12 kN Kit	1.2
	1.00	53	6 kN Kit	1.1
	1.20	30	6 kN Kit	1.0
	1.50	19	6 kN Kit	1.0
	1.80	13	6 kN Kit	0.9
	2.10	10	6 kN Kit	0.9
PLP17H5-150 125x125	0.85	120 *	12 kN Kit	1.2
	1.00	80	12 kN Kit	1.2
	1.20	59	6 kN Kit	1.1
	1.50	35	6 kN Kit	1.1
	1.80	24	6 kN Kit	1.0
	2.10	17	6 kN Kit	1.0
	2.40	13	6 kN Kit	1.0
PLP8H5-200 180x180	1.00	120 *	12 kN Kit	1.3
	1.20	95	12 kN Kit	1.2
	1.50	60	6 kN Kit	1.2
	1.80	40	6 kN Kit	1.2
	2.10	30	6 kN Kit	1.2
	2.40	24	6 kN Kit	1.2
	2.70	19	6 kN Kit	1.2
	3.00	15	6 kN Kit	1.2
PLP17H5-200 170x170	1.40	120 *	12 kN Kit	1.3
	1.50	100	12 kN Kit	1.3
	1.80	70	12 kN Kit	1.2
	2.10	50	6 kN Kit	1.2
	2.40	40	6 kN Kit	1.2
	2.70	30	6 kN Kit	1.2
	3.00	25	6 kN Kit	1.2
	3.30	20	6 kN Kit	1.2
	3.60	17	6 kN Kit	1.2
PLP8H5-250 220x220	1.60	120 *	12 kN Kit	1.3
	1.80	95	12 kN Kit	1.3
	2.10	70	12 kN Kit	1.2
	2.40	54	6 kN Kit	1.2
	2.70	42	6 kN Kit	1.2
	3.00	34	6 kN Kit	1.2
	3.30	19	6 kN Kit	1.2
	3.60	24	6 kN Kit	1.2

PLP17H5-250 220x220	2.30	120 *	12 kN Kit	1.4
	2.40	110	12 kN Kit	1.4
	2.70	90	12 kN Kit	1.3
	3.00	70	12 kN Kit	1.3
	3.30	60	12 kN Kit	1.3
	3.60	50	6 kN Kit	1.2
	3.90	43	6 kN Kit	1.2
	4.20	37	6 kN Kit	1.2
	4.50	32	6 kN Kit	1.2
PLP8H5-300 260x260	2.25	120 *	12 kN Kit	1.4
	2.40	105	12 kN Kit	1.4
	2.70	80	12 kN Kit	1.3
	3.00	65	12 kN Kit	1.3
	3.30	55	12 kN Kit	1.3
	3.60	47	12 kN Kit	1.3
	3.90	40	6 kN Kit	1.3
	4.20	34	6 kN Kit	1.3
PLP17H5-300 255x255	3.10	120 *	12 kN Kit	1.5
	3.30	105	12 kN Kit	1.5
	3.60	90	12 kN Kit	1.4
	3.90	75	12 kN Kit	1.4
	4.20	65	12 kN Kit	1.4
	4.50	58	12 kN Kit	1.4
	4.80	50	12 kN Kit	1.4
	5.10	45	12 kN Kit	1.4
	5.40	40	12 kN Kit	1.4

These span tables apply only to Prolam products

Selection Charts

Table 15

Bracing units for Prolam® Posts. Verandah Posts PLP8H5 Treated.

Verandah Bracing Units

Prolam Post - Height measured from top of concrete to top of Post. Confirm post/post fixing from uplift requirements. Minimum 6kN fixing for posts rated under 60 bracing units. Minimum 12kN fixings for posts rated 60 bracing units and over.

Prolam Post Verandah Posts	Post Height (m)	Bracing Units	Min post depth @ 450 dia (m)
PLP8H5-125 112x112	1.8	10	0.9
	2.1	7	0.9
	2.4	5	0.9
PLP17H5-125 112x112	1.8	21	1.2
	2.1	15	1.2
	2.4	12	1.2
	2.7	9	1.2
PLP8H5-150 135x135	1.8	21	1.2
	2.1	16	1.2
	2.4	12	1.2
	2.7	9	1.2
PLP17H5-150 125x125	1.8	33	1.2
	2.1	24	1.2
	2.4	18	1.2
	2.7	14	1.2
	3.0	12	1.2
	3.3	10	1.2
PLP8H5-200 180x180	1.8	60	1.4
	2.1	50	1.4
	2.4	35	1.4
	2.7	30	1.4
	3.0	30	1.4
	3.3	15	1.4
	3.6	12	1.4

Prolam Post Verandah Posts	Post Height (m)	Bracing Units	Min post depth @ 450 dia (m)
PLP17H5-200 170x170	1.8	115	1.4
	2.1	80	1.4
	2.4	60	1.4
	2.7	50	1.4
	3.0	40	1.4
	3.3	34	1.4
	3.6	28	1.4
PLP8H5-250 220x220	2.1	110	1.4
	2.4	85	1.4
	2.7	65	1.4
	3.0	55	1.4
	3.3	45	1.4
	3.6	35	1.4
PLP17H5-250 220x220	2.4	120	1.5
	2.7	120	1.5
	3.0	110	1.5
	3.3	95	1.5
	3.6	80	1.5
PLP8H5-300 260x260	2.4	120	1.5
	2.7	120	1.5
	3.0	110	1.5
	3.3	85	1.5
	3.6	75	1.5
	3.9	64	1.5
PLP17H5-300 255x255	2.4	120	1.5
	2.7	120	1.5
	3.0	120	1.5
	3.3	120	1.5
	3.6	120	1.5
	3.9	120	1.5

Footing Size:

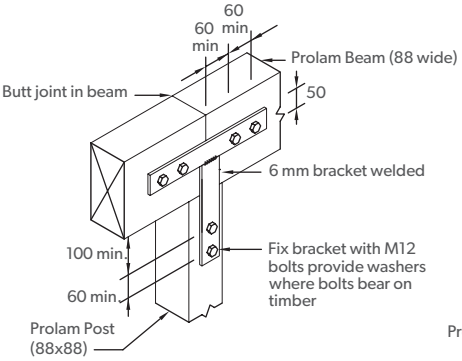
88 x 88, 112 x 112 & 135 x 135 – 900 deep x 450 diameter
180 x 180 – 1200 deep x 450 diameter
} **2 / M12 Bolts - Verandah beam to post connection**

1 kN = 20 Bu's. Linear interpolation between the bracing values given is permitted for intermediate heights

Note: Bracing units have been determined from the lateral load required to give a maximum deflection at the top of the post of H/24.

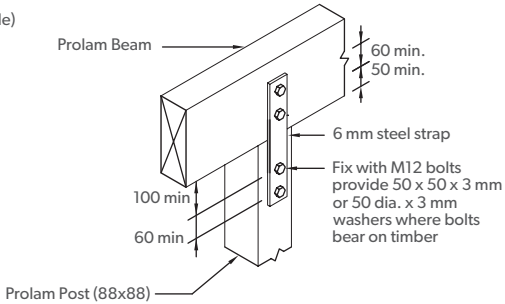
These span tables apply only to Prolam products

Prolam® Post Fixings



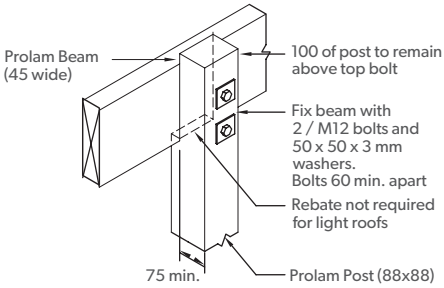
NOTE -
(1) Capacity 12.2 kN for 1 bracket.
(2) Capacity 25.5 kN for 2 brackets.

(A)



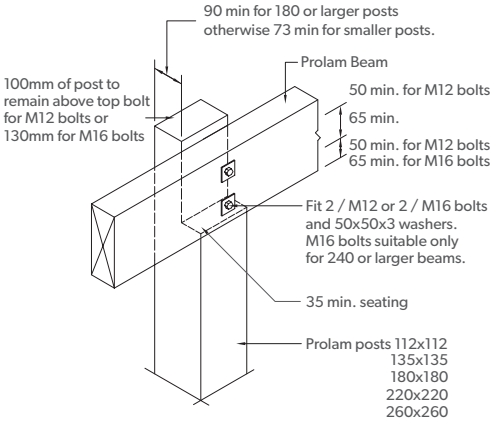
NOTE -
(1) Capacity 6.8 kN for 1 bracket.
(2) Capacity 13.7 kN for 2 brackets.

(B)



NOTE -
Capacity 6.8 kN.

(C)



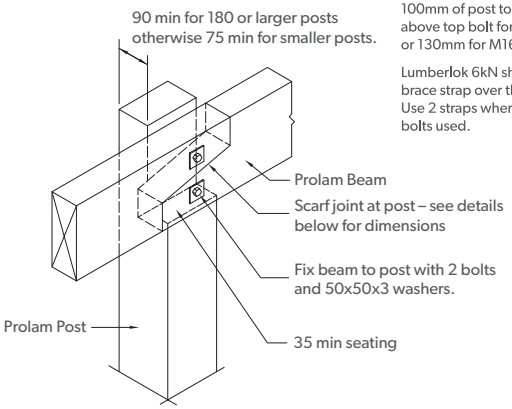
BEAM FIXING

(D)

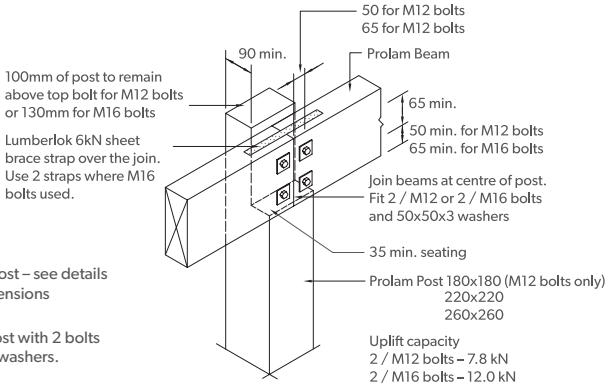
Uplift capacity
2 / M12 bolts – 7.8 kN
2 / M16 bolts – 12.0 kN

Unless otherwise stated, all dimensions are in mm.

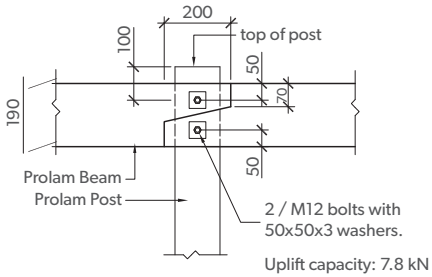
Prolam® Post Fixings



SCARF JOINT AT POSTS

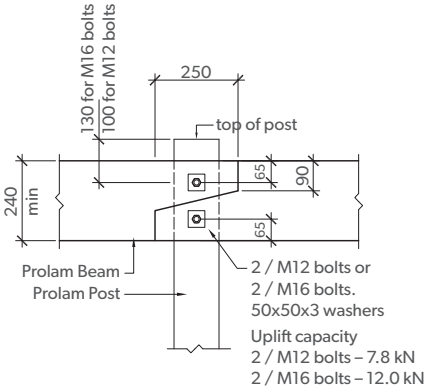


BEAM SPLICE FOR 180x180 OR LARGER POSTS



SCARF JOINT FOR 190 BEAMS

Not suitable for M16 bolts



SCARF JOINT FOR 240 OR LARGER BEAMS

Selection Charts

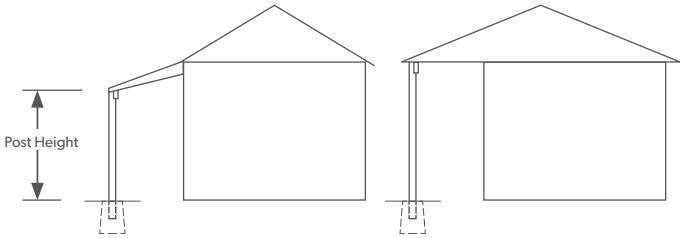


Table 17

Posts supporting verandah roof only – light roof – attached to house.
Snow load 0.5 kPa – all wind zones.
Glulam Grade PL8 - Post height is measured from ground level to top of roof beam.

Verandah Posts	Maximum Supported Roof Area per Post (m^2)					
	Post Height From Ground (m)					
	1.8	2.4	2.7	3.0	3.6	4.2
PLP8H5-100 88 x 88mm	11.6	10.0	8.2	7.8	6.6	
PLP8H5-125 112 x 112mm	20.4	17.8	16.6	15.4	12.5	10.8
PLP8H5-150 135 x 135mm	30.0	27.4	26.2	25.0	22.0	19.0
PLP8H5-200 180 x 180mm	41.6	38.2	36.6	35.0	31.6	28.2

Verandahs or Carports 2.0m and less and attached to the house, do not require bracing.
Refer to NZS3604:2011 section 9 for size of concrete footings to resist uplift.
For posts sizes to roofs that require bracing refer to separate tables.

These span tables apply only to Prolam products

Selection Charts

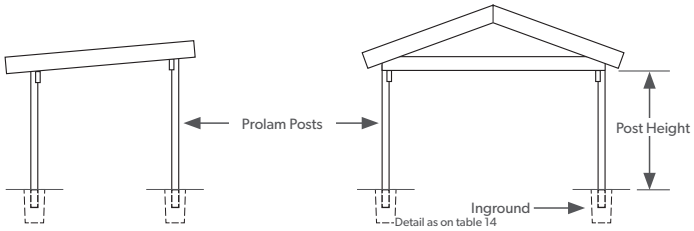


Table 18

Posts bracing carport.

Snow load 0.5 kPa – all wind zones.

Glulam Grade PL8 - Post height is measured from ground level to top of roof beam.

Verandah Posts	Maximum Supported Roof Area per Post (m^2)					
	Post Height From Ground (m)					
	1.8	2.4	2.7	3.0	3.6	4.2
PLP8H5-125 112 x 112mm	10.2	8.9	8.3			
PLP8H5-150 135 x 135mm	15.0	13.7	13.1	12.5	11.0	9.5
PLP8H5-200 180 x 180mm	20.8	19.1	18.3	17.5	15.8	14.1

For Carports attached to the house, use table 17.

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Selection Charts

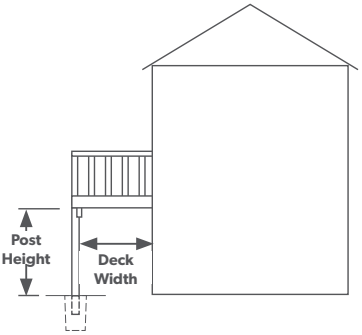


Table 19

Posts supporting verandah or deck floor only.
Floor live load 2.0 kPa.
Glulam Grade PL8.

Post Size	Maximum Supported Deck Area per Post (m²)					
	Post Height From Ground (m)					
	1.8	2.4	2.7	3.0	3.6	4.2
PLP8H5-125 112 x 112mm	4.2	2.2	1.7	1.4	0.9	
PLP8H5-150 135 x 135mm	9.1	5.1	4.0	3.1	1.9	
PLP8H5-200 180 x 180mm	28.5	16.5	13.1	10.2	6.2	4.2

$$\text{Deck Area} = \frac{\text{Deck Width}}{2} \times \text{Post Spacing}$$

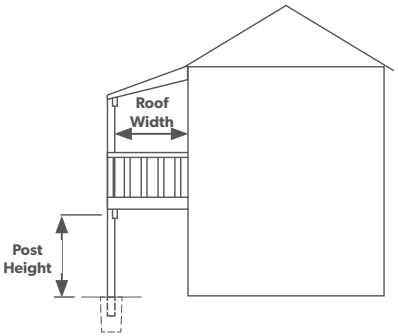


Table 19

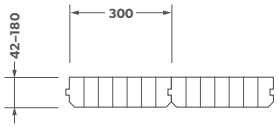
Posts bracing verandah deck floor and roof.
Floor live load 2.0 kPa – Light roof with ceiling.
Glulam Grade PL8. Tributary roof area must be no greater than the tributary floor area.
Post height is measured from ground level to floor bearer connection point.

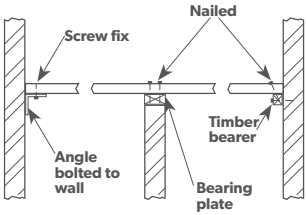
Post Size	Maximum Supported & Verandah Roof Area per Post (m²)					
	Post Height From Ground (m)					
	1.8	2.4	2.7	3.0	3.6	4.2
PLP8H5-125 112 x 112mm	2.8	1.4	1.1	0.9	0.6	
PLP8H5-150 135 x 135mm	6.1	3.4	5.8	4.5	2.7	
PLP8H5-200 180 x 180mm	41.9	24.2	19.2	15.0	9.1	6.1

$$\text{Roof Area} = \frac{\text{Roof Width}}{2} \times \text{Post Spacing}$$

These span tables apply only to Prolam products

Prolam® Laminated Timber Flooring





PANEL TO CONCRETE

Table 20

Allowable spans for Prolam Flooring.

Decking Thickness	Live Load (kPa)	Length in metres (m)					
		Two Spans		Single Span		Cantilever	
PLF50 300x42	Domestic - 1.5	2.6	*1.7	2.0	*1.3	0.8	*0.5
	Office - 2.5	2.2	*1.7	1.7	*1.3	0.7	*0.5
	Storage - 5.0	1.5		1.1		0.4	
PLF60 300x52	Domestic - 1.5	3.1	*2.2	2.4	*1.7	1.0	*0.7
	Office - 2.5	2.7	*2.2	2.1	*1.7	0.8	*0.7
	Storage - 5.0	1.8		1.3		0.5	
PLF75 300x65	Domestic - 1.5	3.9	*2.8	3.0	*2.2	1.2	*0.9
	Office - 2.5	3.4	*2.8	2.6	*2.2	1.0	*0.9
	Storage - 5.0	2.3		1.7		0.6	
PLF100 300x90	Domestic - 1.5	5.1	*3.8	3.9	*2.9	1.6	*1.2
	Office - 2.5	4.7	*3.8	3.6	*2.9	1.4	*1.2
	Storage - 5.0	3.1		2.3		0.9	
PLF125 300x115	Domestic - 1.5	6.4	*4.8	4.9	*3.7	2.0	*1.6
	Office - 2.5	5.7	*4.8	4.4	*3.7	1.8	*1.6
	Storage - 5.0	4.0		2.9		1.1	
PLF150 300x135	Domestic - 1.5	7.3	*5.8	5.6	*4.4	2.2	*1.8
	Office - 2.5	6.7	*5.8	5.1	*4.4	2.1	*1.8
	Storage - 5.5	4.6		3.4		1.1	

Fixing

Fixing of the decking panels is achieved by either nailing or screwing. Coach screwing or bolting may be used on the thicker decking where the heads would be recessed. Loose tongues in decking 115mm and over are fitted on site and only elastomeric glues should be used if the tongue is to be glued. Span governed by deflection 1/400, or strength. *These limits on spans have been set to reduce floor liveliness. Floor dynamics is a complex consideration and experience shows that floor spans based on strength and static load deflection limits alone can be unacceptably lively.

These span tables apply only to Prolam products

The Prolam® Finishes



Visual - Appearance A

This grade is intended for use in applications where appearance of the member is important and clear or painted finishes are used. All surface voids are filled, small tight knots are permitted. The surfaces are planer machined to a high quality finish.



Non-Visual - Appearance C

This grade is intended for use in applications where appearance is unimportant. All appearance blemishes are permitted in this grade. The surfaces are machined, but machine skip is permissible and blemishes, voids and manufacturing will remain unrepaired. Loose, knots, wane, pith and open knot holes may be present.



Bandsawn

This is usually required in the visual grade, as it is used for its rustic visual appearance, the "roughness" of the bandsawn finish will vary as every saw will put a different finish on the product.

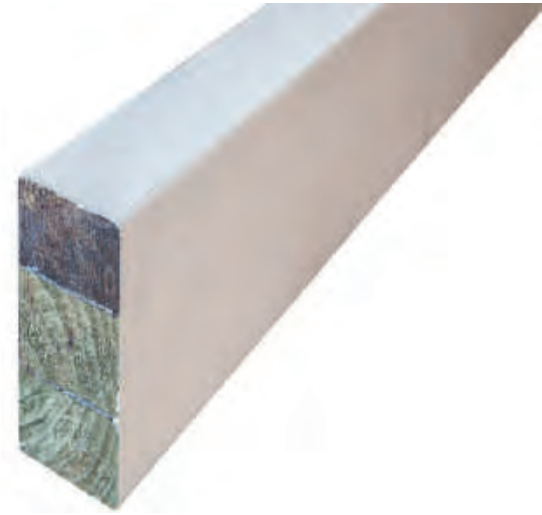
Sanded and sealed

This is a premium finish added to a visual product, where all blemishes are filled, the whole product is sanded and then coated with a sealer that will protect the product from ingress of moisture for 6 weeks. This sealer is not a long term sealer. The product must be sealed for the long term as per our painting/sealing requirements on page 40.



Preprimed

This is a primary coat that is applied in our factory as a protective coat to stop ingress of moisture until the undercoat and top coats are applied. This primer coat is not to be used as the final finish and the product must be sealed for the long term as per our painting/sealing requirements on page 40.



Visual Posts PLP H5



Visual Beams PLVL8 H3.2



Non-Visual PL8 H3.2



Non-Visual PL8 H1.2



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Non-Visual PL12 H3.2



Non-Visual PL12 H1.2



Non-Visual PL17 H3.2



Non-Visual PL17 H1.2



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The ultimate kitset post and rail fencing that will enhance your boundary.

- Rails slot into posts for quick & easy installation
- Maintenance-free
- Made of sustainable treated Pinus Radiata



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Retaining wall system for DIY or commercial jobs.

- Easy to install
- Refreshing modern look
- Installation manual available



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Provide safe barriers using these superior bollards, sized to suit your job.

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Technical/Installation Manual

V3 - 2022

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26/05/23



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Introduction to Dux Industries Limited

Dux Industries Limited has been, and remains, synonymous with plumbing in New Zealand. Starting from humble beginnings as a small engineering firm based out of Wellington in 1936. Dux introduced the iconic Centreflush in 1964, quickly followed by New Zealand's first plastic wastewater traps in 1966. Dux has grown into a competitive force able to offer the plumbing industry of New Zealand a large and growing range of plumbing and drainage solutions.



Dux revolutionised the plumbing market in the early 1990's introducing the SecuraGold™ system for Hot & Cold Potable Water reticulation using polybutene-1 pipe and de-zincification resistant brass fittings that have grown into one of New Zealand's most commonly used piping systems used in New Zealand.

Today, Dux has a strong focus on innovation and collaboration and providing our customers with solutions developed to improve efficiency by regular engagement with plumbers Dux frequently investigates new fitting or pipe solutions and regularly holds plumber focus groups to gain feedback from plumbers using Dux product, as well as competitive product.

WaterMark Standards

All materials and components used in the SecuraGold™ range are sourced and produced in ISO accredited facilities and holds Australian Water Mark licence number 1289.



CERTIFICATE OF CONFORMITY

SAI Global hereby grants:

Dux Industries Limited

32 Mahia Road, Manurewa, Auckland, New Zealand

WaterMark Certificate of Conformity – Level 1

Evaluated to:

AS/NZS 2642.3:2008 - Polybutylene (PB) plumbing pipe systems - Mechanical jointing fittings for use with polybutylene (PB) pipes for hot and cold water applications

Certificate No.: WMKA1289-1

Issued: 2 February 2017
Expires: 31 March 2022

Originally Certified: 1 April 2011
Current Certification: 2 February 2017

Nicole Grantham
General Manager SAI Global Certification Services

WaterMark

SAI GLOBAL



WaterMark

Certificate of Conformity

Marley New Zealand Limited

Trading as Marley New Zealand Limited

Product Type: Polybutylene (PB) Pipe
Product Use: Cold and Heated Water Supply
Grade: DL/P
Certification Specification(s): AS/NZS 2642.2:2008 Amd1 November 2018 Polybutylene (PB) plumbing pipe systems Part 2: Polybutylene (PB) pipe for hot and cold water systems

Issue Date: 27th February 2019
Initial Issue Date: 30th October 2008 (SAI G)
Expiry Date: 31st February 2024

Paul Greig
General Manager

Certificate No: [2289/1]

The WaterMark is a registered certification trademark of Australian Building Codes Board (ABN 74 569 631 765) and is used under licence by SAI Global Certification Services Pty Limited (ABN 108 716 669) ("SAI Global") 680 George Street, Sydney NSW 2000, GPO Box 5420 Sydney NSW 2001. This certificate remains the property of SAI Global and must be returned to SAI Global upon request. Refer to www.saiglobal.com for the list of product models.

The SecuraGold™ piping system complies with all relevant requirements of the following standards and Codes:

AS/NZS3500	AS/NZS1568
AS/NZS2642	AS2345
AS/NZS1567	C35200

SecuraGold™ meets the requirements of the New Zealand Building Code Clause G12 Water Supplies when installed by a registered plumber to the requirements of this Technical Manual.

Durability

Where SecuraGold™ is Installed by a registered plumber and meets the requirements of this Technical Manual, SecuraGold™ can be expected to meet the requirements of Clause B2/AS1 Table 1 Durability Requirements for Nominated Building Elements (Plumbing and Piping).

Section One – Polybutene Pipe properties

Polybutene-1 (PB-1) resins are high molecular weight isotactic, semi-crystalline thermoplastic polyolefins produced through the polymerisation of Butene-1, Ethylene, and/or Propylene co-monomers.

Polybutene-1 combines the typical characteristics of polyolefins with a unique property mix of high flexibility and outstanding creep resistance over a wide temperature range. Due to a similar molecular structure, PB-1 is very compatible with Polypropylene (PP) and Propylene based thermoplastic elastomers. PB-1 is easily dispersible in Polyethylene (PE) notwithstanding its limited molecular compatibility. SecuraGold™ PB-1 is extruded from grade 4267 PB-1 resin manufactured by Lyondell Basell.

Polybutene-1 Properties	
Temperature	Polybutene-1 will withstand all temperatures in a normal Hot & Cold water reticulation system and can endure temperature variations from -50˚C up to 99˚C. However, restrictions are in place to ensure that H&C systems are protected and under AS/NZS 3500 a maximum temperature of 80˚C should be adhered to.
Freezing	Ice formation will not cause damage to the pipes in a system that has relatively long lengths of pipe as the natural flexibility will accommodate the expansion caused by ice, the pipe will return to its normal state upon thawing. However, a small section of pipe may not have enough flexibility to prevent damage, it is recommended that the minimum length of pipe required to prevent damage is 500mm without lagging. If this length cannot be maintained lagging is essential in areas prone to freezing. Always check with your local council for any specific lagging requirements.
Bending and Flexing	Polybutene-1 pipe can be repeatedly flexed with the smallest bend radius being eight times the outside diameter of the pipe. Care should always be taken when bending pipe to ensure that the pipe does not kink. If a pipe is kinked, then that section should be cut out and not used.
Pressure	Polybutene-1 is pressure rated to PN16 at 20˚C. Due to the standard pressure/temperature relationship, the allowable pressure decreases as temperature increases.

Mechanical	Polybutene-1 is a strong and robust material, its strength is not significantly impacted with temperatures and pressures found in normal residential H&C reticulation systems. It exhibits the highest creep resistance of any of the polyolefins and as a result retains its strength even under long term stress.
Chemical Resistance	Polybutene-1 is resistant to a large number of chemicals including soaps, detergents, acids and alkalis as well as many solvents however, there are a number of chemicals that will attack and damage Polybutene -1, a full chemical resistance chart can be found in Section 4.
Thermal	Polybutene-1 has a high thermal insulation value. This means the pipe will not allow the temperature of the water to drop quickly, so cold or hot water will maintain their respective temperatures between opening of the taps for a longer period making Polybutene-1 more energy efficient. The expansion rate of Polybutene-1 is unusual for a plastic as it is only 1.3×10^{4} m/m/˚C the thermal conductivity rating is 0.22 W/(m.k).
Volatile Organic Compound (VOC) Rating	Polybutene-1 pipe is very inert and has been tested for the release of Volatile Organic Compounds and complies with EN852-1, ISO 4120 and ISO 5495, as part of the WaterMark certification Polybutene-1 is required to pass AS/NZS 4020 Testing of products for use in contact with drinking water. Polybutene-1 has a VOC rating of <0.02 mg C/L and <0.02 mg C/m^2/day
Electrical	Polybutene-1 has good dielectric properties over a wide range of ambient conditions so is an excellent insulator. Warning – because of its good insulation qualities Polybutene-1 cannot be used for earthing or bonding, a bonding lead should be connected to both ends of any existing metal pipe work.
Anti-Fouling	Due to its relatively high thermal insulation value, exceptionally smooth bore, and high abrasion resistance, scale build up does not normally occur which ensures the maintenance of high flow rates throughout the working life of the pipe.
Water Hammer and Surge	Polybutene-1 can withstand the effect of water hammer because of its high elastic modulus. Polybutene-1 dampens, rather than propagates, pressure waves reducing any associated pipe noise. Under extreme conditions of service water hammer arrestors may be necessary.
Fire Resistance	Polybutene-1 is not a highly flammable material but will still burn, the by products from burning are not toxic or harmful if inhaled.

Performance Characteristics

PB-1 satisfies the demands of the hot and cold pressurised water pipe market with the right balance of properties, including excellent flexibility combined with superior resistance to stress over long periods of time at high temperatures. As a result, PB-1 piping systems are easy to work with, economical to install and deliver long-term performance quality in residential and light commercial piping applications.

Flexibility

	PB-1	PEX	PE-RT	PP-r	PVC-C
Flexural Elasticity Modulus (MPa) Method ISO 178	450	600	550 - 650	800	3500

The advantages of a flexible pipe like PB-1 are translated directly to installation costs, it stands to reason that when a pipe is flexible it is far easier to work with than a more rigid pipe, resulting in faster installation and therefore reduced installation costs.

WelTec carried out a study to determine which system was consistently faster to install, with SecuraGold™ proving to be 45% faster than the nearest competitor system.

Care must be taken as while PB-1 is very flexible, the minimum bend radius of 8 times the pipe diameter should not be exceeded as it will cause the pipe to kink. If the pipe does kink it must be removed from the installation and replaced.

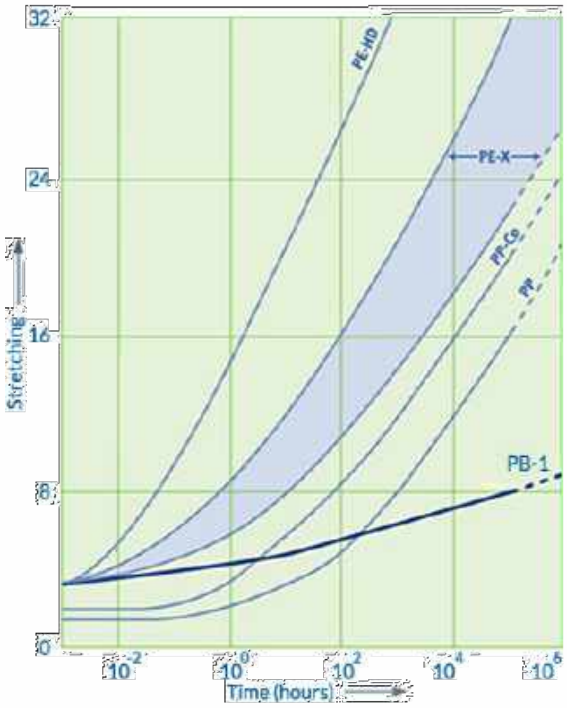
Creep Resistance

Creep is the amount of stretch or give in a material under a given load over time. In pipe systems internal and external pressure works to stretch, expand, pull, and push material away from the point load of a joint or seal.

One of the most important properties or characteristics which sets PB-1 apart from other materials is its outstanding resistance to internal pressure creep over a wide range of temperatures.

All polyolefin materials tend to creep when exposed to continuous applied stress over a long period of time. This cold flow behaviour can be suppressed by creating a three-dimensional network in the polymer structure by either physical or chemical cross linking, as can be found in the manufacture of PEX pipes.

In contrast to other thermoplastics used in these applications, performance modification via compounding, cross-linking or copolymerisation is not necessary for PB-1 piping systems to fulfill the stringent performance standards applied to their use.



In comparison with other polyolefin materials, PB-1 has a higher level of resistance to strain under continually applied stress over long periods of time. This is known as creep behaviour and the graph illustrates the increasingly superior performance of PB-1 over other pipe materials.

The variation you can see in the PEX material is due to the varying processes used to cross link the material of which there are three main methods, (Engel or peroxide method PEX-a, Silane method PEX-b and the Electron Beam method which uses very high energy radiation for PEX-c). Each of these cross-linking processes are open to manufacturing variations which can have a marked effect on how well the cross linking is carried out in contrast to PB-1 where there are no additional modifications necessary.

Acoustic Characteristics

What is water hammer?

Water hammer is a pressure surge or wave resulting when a fluid in motion is forced to stop or change velocity.

Water hammer commonly occurs when a valve closes suddenly at the end of a pipeline system, and a pressure wave propagates in the pipe, it is also known as hydraulic shock.

A significant, nearly instantaneous pressure shock wave may be generated when a valve opens or closes too quickly, or when a pump starts with an empty discharge line or suddenly shuts down. This phenomenon is the result of the sudden change in velocity of the fluid flow in combination with the characteristics of the piping. This shock wave is manifested by a series of hammer blow-like sounds, called water hammer, which may have sufficient magnitude to cause catastrophic failure within the piping system.

There are five factors that determine the severity of water hammer:

- Velocity
- Modulus of elasticity of the pipe material
- Inside diameter of the pipe
- Wall thickness of the pipe
- Valve closing time

The maximum surge pressures caused by water hammer can be calculated using the following equation taken from the 'Handbook of Thermoplastic Piping System Design', Thomas Sixsmith and Reinhard Hanselka, Marcel Dekker Inc., pp 65-69.

$$Ps = V((3960\ E\ t)/(E\ t + 3 \times 105\ DI))^{1/2}$$

where:

Ps = surge pressure (psi/bar)

V = water velocity (ft/sec)

DI = inside diameter of the pipe (in)

E = modulus of elasticity of the pipe material (psi/MPa)

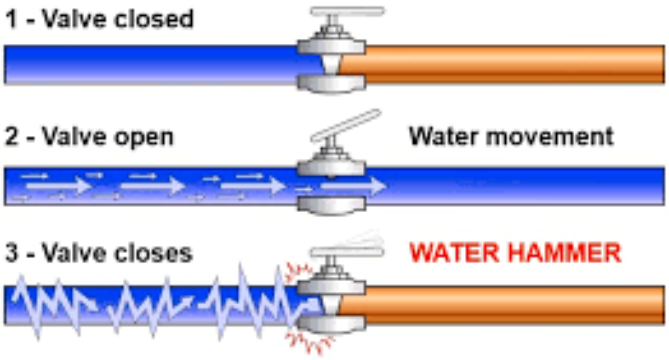
t = pipe wall thickness (in)

The low elastic modulus of Polybutene-1 combined with reduced wall thickness gives rise to a low surge pressure for a given pipe Outer Diameter (OD) and pressure rating. The table below compares maximum surge pressure for 38.1 mm (1-1/2") OD pipes of different plastic materials, designed for the same pressure service.

	E	E	DI	t	V	Ps	Ps
	[psi]	[MPa]	[mm]	[mm]	[ft/s]	[psi]	[bar]
PB-1	65000	450	32.5(1.28")	3.8(0.15")	5.0	49.5	3.4
PEX	87000	600	28.9(1.14")	5.6(0.22")	5.0	72.4	5.0
PP	116000	800	26.7(1.05")	6.6(0.26")	5.0	93.0	6.4
CPVC	117000	3500	30.9(1.22")	4.6(0.18")	5.0	140.6	9.7

Water hammer is a prevalent issue with more rigid pipe systems and can be quite catastrophic in extreme cases, in these types of incidences water hammer arrestors are required, adding significant costs to the plumbing installation. If water hammer goes unchecked the resulting damage may not be immediately evident but will over the medium-term damage the system as well as the fixtures resulting in large maintenance and repair costs.





PB-1 systems such as SecuraGold™ do not experience this issue to the same degree.

Bending, Flexing and Changes of Direction

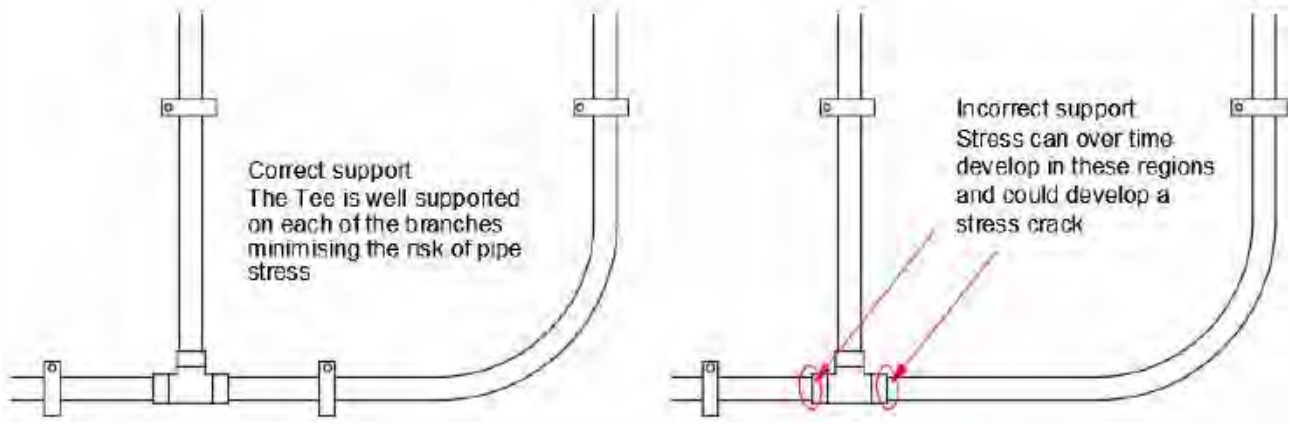
Polybutene-1 pipe is extremely flexible and can be repeatedly bent and flexed with no harm to the pipe. There is an absolute bend radii limit of 8 times the pipe diameter however, it is recommended that no more than 10 times the pipe diameter should be used, extreme bends and kinks will place very high local stress on the pipe wall.

When a pipe is kinked, apart from the obvious collapse of the pipe wall the two sides develop stress marks, seen as whitish areas at the pinch points. These stressed areas will have damaged the walls integrity and will be the point of failure in a reasonably short time. Always check your installation, if any section of pipe has accidently kinked it must be cut out and replaced. If you need to turn a pipe in a tight area it is advisable to use either a 90˚ elbow or multiple 45˚ elbows to negotiate the area.



Wherever there is a change of direction involving a fitting, protection against stress is important and correct application of pipe clips is essential. To ensure that the pipe is stable during the lifetime of an installation especially in areas where a pipe is to be bent around a tight area the correct use of Dux Pipe clips needs to be carried out.

Below is an example of a fully supported fitting and bend and an incorrectly supported bend.



Chemical & Corrosion Resistance

PB-1 is a chemically inert product and as such the chemical and corrosion resistance is very good, a full chart of known resistances can be found as an appendix to this manual. While PB-1 is used as the pipe of choice for the SecuraGold™ Hot & Cold system, some of the concentrations of chemicals being dosed into our potable water systems can be detrimental not only to PB-1 but to all pipe systems, metal and plastic. Chlorine (Cl) and chlorine dioxide (ClO_2) used to treat our water supply When maintained to the dosing rate prescribed by the Drinking Water Standards for New Zealand this is not an issue.

We are all keenly aware of the Havelock North incident in August 2016, where the drinking-water became contaminated causing a widespread outbreak of gastroenteritis during which more than 5000 people were estimated to have fallen ill. Consequently, councils around the country began upping their chlorine dosage rates to prevent a similar situation. At times this was extreme, to the point where hundreds of copper cylinders in the Christchurch region had to be replaced. While replacing the cylinders was the immediate symptom there is a longer term effect on the pipework that is yet to really show itself.

Elevated temperatures, normally found in hot lines, will 'excite' the chlorine molecules making them more aggressive. Pipe materials are designed to withstand this for the duration of their service life when at reasonable levels below 5 ppm which is the limit set by the drinking water standards, typically in a well maintained system levels should be around 2 ppm. At 2 ppm you

can start to smell the chlorine, at 4 – 5 ppm the smell and taste would be quite noticeable, and it is advised that drinking water for long periods at these levels should be discouraged.

When looking at the Drinking-water Standards for New Zealand 2005 (Revised 2018) we find Table 2.2: Maximum Acceptable Values for inorganic determinants of health significance

Chlorine should have a MAV of 5 mg/L – Free available chlorine expressed in mg/L as CL_2. ATO. Disinfection must never be compromised.

The maximum value of 5 mg/L or 5PPM is the maximum normal value of chlorine in our water outside of maintenance periods.

Hoop Stress, Pressure vs Temperature

The relationship between pressure and temperature states that as the temperature increases then the allowable pressure must decrease. Therefore, when installing hot water systems knowing the incoming pressure is critical to ensuring the integrity of the system being designed and installed.

This relates to HOOP STRESS as shown in the below table taken from AS/NZS 2642.2

Pipe material temperature °C	Extrapolated 50-year long term Hydrostatic Strength MPa	Hydrostatic design test
20	13.6	7.6
40	11.5	6.4
60	9.0	5.0
70	7.6	4.2
80	6.3 (25 y)	3.5
95	4.2 (10y)	2.3

Notes:

1. The hydrostatic design stress has been based upon an extrapolated 50-year long-term hydrostatic strength, but 50 years should not be taken as the life of the material under service conditions at elevated temperatures. The expected accelerated polybutene strength deterioration at 80°C and 95°C precludes extrapolation for estimates of 50-year design stress levels.
2. The life expectancy of polybutene pipe is dependent on use/temperature profiles. The manufacturer's recommendations should be sought for applications involving continuous use at temperatures above 60°C.

In AS/NZS 2642.2 we also find the below table, note I have added two additions showing kPa and PSI conversions as a reference:

Working Pressure Rating of Polybutene-1 Pipe						
Class	Working Pressure MPa					
	20˚C	40˚C	60˚C	72˚C	80˚C (25y)	95˚C (10y)
16	1.6	1.37	1.05	0.88	0.74	0.49
kPa	1600	1370	1050	880	740	490
PSI	232	198	152	127	108	71

NOTE: Manufacturer's recommendations should be sought for appliances involving continuous use at temperatures above 60˚C

Straight Coils

The 25m straight coils are an excellent example of innovation, first started by Dux in the early 2000's using the principle that when polybutene is left to cure the molecular memory of the material will remember the state that the pipe was in during the curing period.

During manufacture of the 25m Lay Straight coils at our Auckland facility the extruded pipe leaves the line and is dropped into 25m long beds, these are then left for the required curing time before being coiled. The coils are wrapped around the outside to facilitate easy removal of the pipe via the centre of the coil.

While there may be some slight turning at the start and ends of the pipe the general length of coil should fall out relatively straight, unlike a traditional coil which acts more like a spring and is more difficult to manage.

This simple process gives the plumber a coiled product that behaves like a 25m straight length.

DUX INNOVATION

Unlike others who join a series of 5m lengths to achieve the 25m Lay Straight Coil the Dux 25m coil is a seamless 25m length of pipe ready for installation.



Using Lay Straight coils allows for easier storage, handling and installation while helping to reduce waste. 25m Lay Straight Coils are available in 12mm, 15mm and 20mm and 28mm.



Storage & Handling

Ensuring that the pipe is in the best possible condition prior to installation is essential to an installation. Polybutene is a very durable and tough material but it is susceptible to damage if handled carelessly, it can be squashed, scratched and/or cut accidently so always take care when storing or handling the pipe.

Storage & Handling
When storing bags or individual lengths of 5m straights for any length of time, lay them flat and out of direct sunlight
Coils should be stacked on a pallet with a sheet of cardboard between the wood and the pipe coil
Coils should not be hung unless a purpose-built hangar has been manufactured that avoids point damage to the pipe is available
Avoid placing heavy or sharp objects on the pipe
Avoid storing coils or lengths in areas where there is the possibility of a heat source or naked flame coming into contact with the pipe
Do not drag bags of 5m straights across tarmac, concrete, or rough surfaces
Do not roll coils across tarmac, concrete, or rough surfaces
Plastic pipes including polybutene are not UV resistant and should be stored away from direct sunlight. UV rays will degrade the molecular composition of the material and will impact on the serviceable life of the pipe and could result in premature failure



WARNING – poor storage can be the cause of damage, a scratch or cut to the pipe affecting more than 10% of the wall thickness will result in a premature failure when under long term pressure.

Section 2 – SecuraGold™

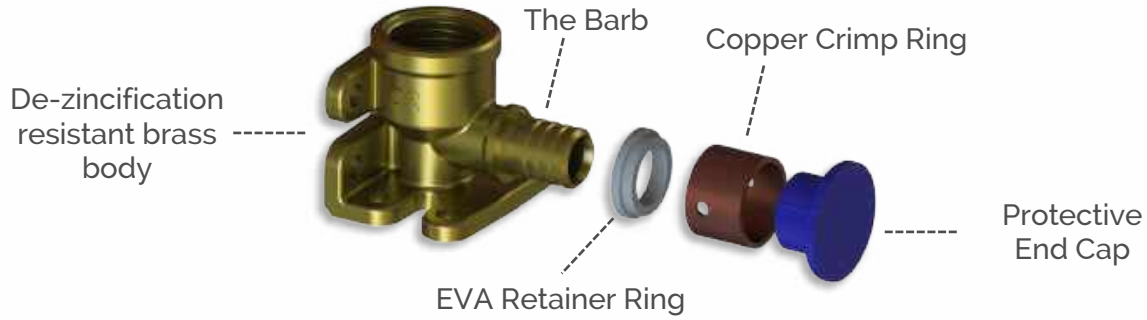
The full range of the SecuraGold™ system includes four pipe sizes, 12mm, 15mm, 20mm and 28mm all available in the standard grey with varying lengths in both straights and coils.

Apart from the grey PB-1 there is also available Lilac (grey water – non-potable), and Green (rainwater).

With over 80 fully DZR compliant brass fittings, 10 standard tools, 1 power tool, 1 pipe cutter, four sizes of pipe clips and a range of accessories, SecuraGold™ is a comprehensive system that will provide a solution for the professional plumber in most residential situations.

All SecuraGold™ fittings are engineered and manufactured to exacting tolerances and standards with all fittings except for the brazing tails (SBT3 & SBT4) comprised of the following four basic components:

- De-zincification resistant brass body
- Copper crimp ring
- EVA retaining ring (Not supplied with the brazing tails due to the nature of connection to copper)
- LDPE protective end cap



De-zincification Resistant Brass

Brass fittings manufactured for SecuraGold™ are all WaterMark certified under license WMKA 1289, WaterMark certification requires a set standard to be maintained, an annual audit is carried out at manufacturing sites as well as a 5-year full re-certification process to ensure SecuraGold™ fittings continue to meet the required standards.

To ensure that SecuraGold™ fittings meet the dezincification standards they undergo the stringent test requirements of AS2345 Dezincification Resistance of Copper Alloys. Each batch of brass is checked prior to the fittings being manufactured, followed by samples being taken after production for testing, and when they arrive at Dux QC additional samples are taken for verification through an independent and certified laboratory to triple check they meet standards.

Material

The makeup of dezincification resistant brass is primarily copper and zinc, trace elements of a number of other chemicals are added for stability. The exact proportions of each component are detailed in AS/NZS 1567 and AS 2345, DZR brass is recognised and adopted worldwide as a premium alloy suitable for water fittings. This standard sets out a number of test requirements that all have to pass, a failure in any of the tests would mean that the products would not be certified.

Mechanical

Dezincification Resistant (DZR) brass is a tough and very durable material that has exceptional forging and machining properties and can withstand very high temperatures and pressure as well as impact damage. These properties allow DZR brass to withstand the rigors of installation and deliver decades of uninterrupted service under a variety of operating conditions.

Corrosion

DZR brass is ideally suited to a hot and cold potable water system and under normal conditions will not corrode and/or be affected by erosion corrosion. However, if the connection between two fittings is not made secure, water at high pressure if allowed to bypass a seal will cut through any material.

Dezincification

Dezincification or de-alloying is a process whereby zinc is leeched from a brass alloy, this occurs especially in stagnant conditions. Dezincification selectively removes zinc from the alloy, leaving behind a porous copper rich material without any structural strength.

There are two forms of dezincification, plug and uniform. Plug-type affects localised areas of a fitting and penetrates deeply into the wall of the fitting, resulting in weeping or seepage in isolated areas. Uniform as shown in the photo of the valve is a general dezincification effect that covers the full body of a fitting causing the walls to thin and break down.



Photo 1

Photo 1: The valve has been severely affected by dezincification and shows all the classic signs – the white powder is zinc oxide while the brass alloy (red area) is now a copper rich material. It has crumbled away due to there being no structural strength.

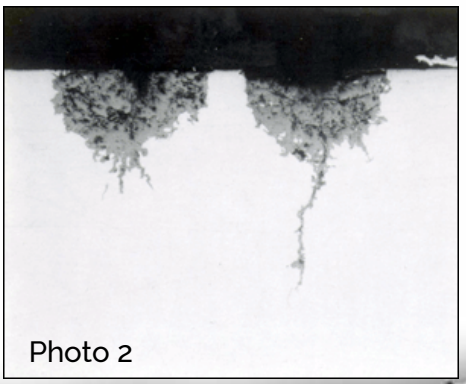


Photo 2

Photo 2: Shows an example of plug-type de-zincification, the photo shows the internal structure of the Plug Type within a body of brass. This type is more difficult to identify as it attacks mainly below the surface and only starts showing as small specs of white powder initially.

Dezincification requires a complex set of conditions for dezincification to occur including:

- Water with high levels of oxygen and carbon dioxide (Uniform attack)
- Stagnant or slow-moving water (Uniform attack)
- Slightly acidic water, low in salt content and at room temperature (Uniform attack)
- Soft, low pH and low mineral water combined with oxygen, which forms zinc oxide (Uniform attack)
- Waters with high chloride ion content (Uniform attack)
- Neutral or alkaline waters, high in salt content and at or above room temperature (Plug-type attack)

Environmental

SecuraGold™ DZR brass fittings are 100% recyclable.

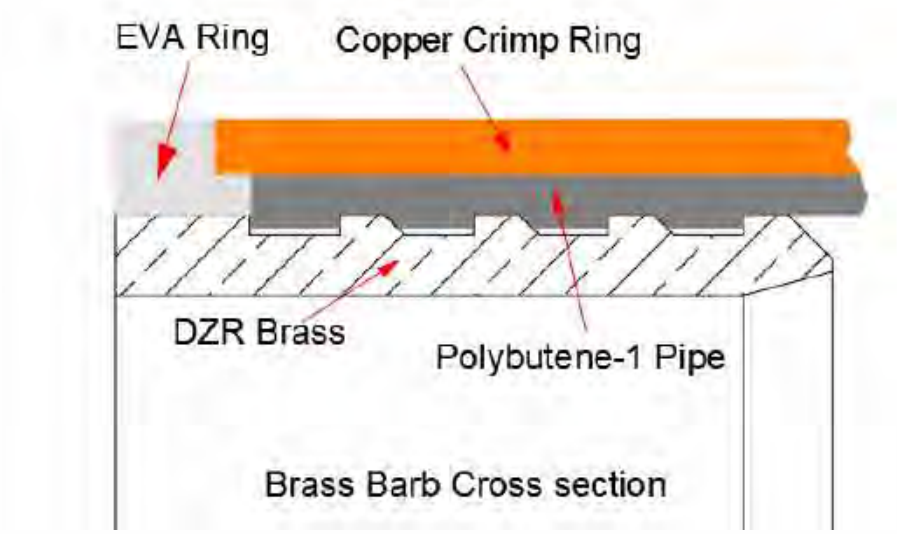
Electrical

IMPORTANT – DZR brass fittings will conduct electrical energy, however as the fittings are installed as part of a non-conductive plastic pipe system SecuraGold™ fittings must never be used for earthing purposes.

Crimping

Crimping technology has been around for a very long time and has proven to be one of the most secure, and faster, methods of sealing a pipe onto a fitting. SecuraGold™ fittings rely on this 'simple' technology to ensure a watertight connection and while it may seem simple there is a lot of engineering behind the parts that all have to interact correctly under the right tolerances to achieve a solid, secure result.

What we can see in the sketch below is the stylised interaction between the components of the fitting and the pipe.



As the copper crimp ring is crimped pressure is applied to the pipe wall which in turn forces the pipe material to close around the barbs creating the seal. The shape of the barbs also acts as a drag on the material preventing pull out under pressure.

If once the fitting has been crimped it is then cut open what you will see on the internal bore of the pipe is a set of witness marks that are a perfect negative image of the barb profile.



If the witness marks are well defined and unbroken it is a sure sign that the crimp was well made, if there are any 'soft' areas where the witness marks fade then this would indicate that there has been a fault either with the components, the tooling, or simply the method of crimping.

The action of making a crimp is carried out in the same manner whether or not it is a power or hand tool. The crimper has a set size and when the two jaws meet the compression of the copper ring should have compressed the copper ring firmly down onto the pipe. With each tool an accompanying gauge tool is provided, this gauge tool gives the plumber the ability to quickly confirm if the crimp has been made correctly.

After the fitting has been crimped the gauge tool suitable for the size of fitting should be able to slip over the copper crimp ring with no force, and freely moved around the circumference of the ring without 'sticking'. Checking crimps with the gauge tool would ideally be carried out after each crimp but should be done at regular intervals throughout an installation.

Magnum Crimp Gauges



Iwiss Crimp Gauge



When the gauge tool is prevented from passing over the crimp ring smoothly or sticks when being moved around the circumference of the crimp ring there is a likelihood that the tool being used needs calibration.

Making a crimp – a four step process

Step 1 – Check that the pipe being used is free from damage, cuts, and score marks as these will lead to premature failure if ignored. Cut the pipe with the correct pipe cutting tool, cutting with a knife or hacksaw will not give a clean straight cut.



Step 2 – Select the appropriate fitting required, remove the protective end cap, and insert the pipe fully into the fitting. The copper crimp ring has two pre-punched eye spy holes that will show the position of the pipe against the retaining ring, if the grey pipe material is visible in these holes then the pipe is correctly inserted



Step 3 – Position the jaws of the crimp tool being used midway on the copper crimp ring and close the handles fully on the tool. When the handles are fully closed it is best practise to hold at this point for a second or two, this ensures that the full compression has been applied to the fitting.



Step 4 – Check the crimp with the gauge tool as previously discussed ensuring that the gauge tool slips easily over the copper crimp ring and can then rotate freely around the circumference of the ring without 'sticking'



If the gauge of the copper crimp ring passes the gauge test, then the fitting is good to go. However, if the gauge tool does not pass over the copper crimp ring freely it is advisable to remove and replace the fitting before you carry on with the installation check that the tool is calibrated correctly.

Note: Under-crimped joints may fail under the long-term pressures of an installation and need to be replaced. If a joint has been found to weep during a hydrostatic test do not re-crimp the fitting cut it out and replace as the pressure of a hydrostatic test can move the pipe under the fitting and break the watertight seal.

The sample photo below shows the damage to the witness marks that can occur.



Tool Maintenance

It is important to ensure that the tools are correctly calibrated and serviced regularly, Dux Industries Territory Managers provide this service free of charge. You can however service and/or calibrate your own tool with a little care.

Servicing

The Magnum and Iwiss tools are susceptible to dirt and grime getting into the internal components that operate the tool, this can cause binding and will prematurely wear out the components and pins. Always ensure the tools are cleaned at the end of the day or when you get back to the workshop. A quick blow out with compressed air will clear the tool of most particles but may need a good cleanout dependent on the environment the tool was used in.

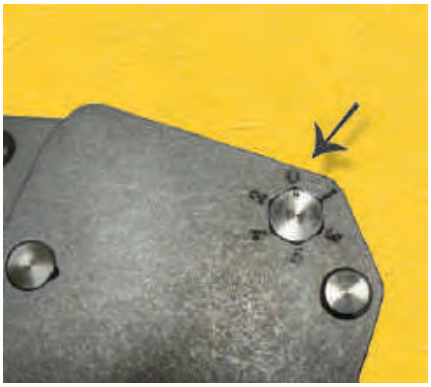
A general 3 in 1 oil can be used to re-lubricate the tools, light lubricants such as CRC are not recommended as the oil does not stay on the pins for any length of time.

Calibration

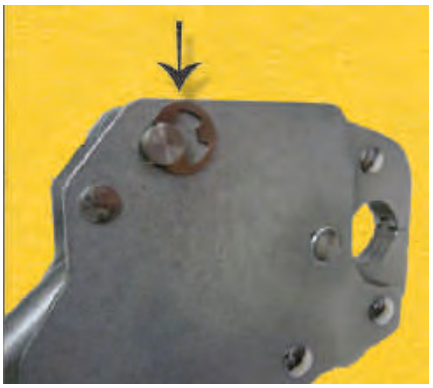
Tool calibration is a relatively simple process for all the manual tools however, care should be exercised when releasing the adjustment clip/bolt on the Magnum and Iwiss tools.

Magnum & Iwiss Crimp tools

Step 1 – Identify the position of the small dot



Step 2 – Remove the E type circlip



Step 3 – Tap out the adjustment bolt until the head is clear of the body. Reposition the dot to the next number, one graduation at a time. Tap in the adjustment bolt until it is flush with the body



Step 4 – Reposition the E type circlip.



Once you have adjusted the tool check it by crimping another fitting, if the fitting does not gauge repeat the above steps or call your local Dux Territory Manger for assistance.

Alba Crimp tools

Step 1 – Identify the position of the small dot



Step 2 – Loosen the Nylock nut



Step 3 – Re-position the dot in the direction of the + arrow, one graduation at a time



Step 4 – Tighten the Nylock nut.



Once you have adjusted the tool check it by crimping another fitting, if the fitting does not gauge repeat the above steps or call your local Dux Territory Manger for assistance.

Section 3 – Installing SecuraGold™

Frequently Asked Questions		
1	What temperature (upper and lower) can Polybutene withstand?	Polybutene can withstand a wide range of working temperatures from -50˚C up to 95˚C however, certain restrictions need to be adhered to, reference P.14 for the Pressure/temperature relationship.
2	What is the maximum pressure that Polybutene pipe can safely withstand?	The rating for Polybutene according to AS/NZS 2642 at 20˚C is 1600kPa however, the temperature and pressure relationship must be considered. The Working Pressure chart on P.14 details the maximum pressure allowed at a given temperature.
3	When installing a 12mm hot line what is the maximum distance it can be run?	To maintain efficiency and speed of delivery it is beneficial to maintain a volume of less than 2 litres of water in your pipeline. 12mm Polybutene pipe holds only 0.073 L/m, that equates to 1.46 litres in a 20m length. 12mm Polybutene pipe will give you maximum efficiency of heat transfer to the outlet.
4	What type of silicone can I use with Polybutene pipe?	Always use a neutral cure silicone with Polybutene pipe as this will not leach any chemicals or affect the taste of the water.
5	When bending Polybutene what are the restrictions?	Polybutene pipe is very flexible and can be repeatedly bent into a tight radius. A radius of 8 x the outside diameter is possible however, to be safe 10 x Diameter is recommended as there is the risk of kinking the pipe if the bend is too tight.
6	When installing Polybutene through polystyrene is protection required?	No, polystyrene is an inert material and will not affect or leach chemicals into the pipe.
7	When tightening a crox nut how many turns of the nut are required to create a seal?	When connecting a crox nut hand tighten until you feel the two sealing surfaces meet and then complete one full turn of the nut.
8	How do I check the gauge of a copper crimp ring correctly?	The gauge tool must be able to slip over the copper ring smoothly and then be able to freely rotate around the circumference without sticking.
9	How many times can a copper crimp ring be crimped?	Only once, additional crimping of the same fitting can be detrimental to the copper.
10	Does the 'seeing eye' on the copper crimp ring compromise its integrity?	No, independent laboratory tests have found there is no basis to this claim. Additionally, there are no recorded failures of SecuraGold™ fittings due to the copper crimp ring.

11	Can Polybutene pipe be installed underground?	Polybutene pipe can be installed underground when care is taken to protect the pipe from damage. If fittings are to be installed underground, they must be well protected and should be wrapped in a Denso style tape with a further protective layer of Mastic to ensure that the fitting is watertight and protected from the surrounding ground conditions.
12	Can Polybutene pipe be installed in direct sunlight?	No, the UV rays are detrimental and will over time break down the material. If pipe is to be installed in an area where there is a potential for direct sunlight, the pipe must be fully protected either with a protective conduit or by painting the pipe with an acrylic paint.

Site and Installation Preparation

Taking the time to work out the route that a pipe out will take within the framework of a new build will allow you to plan the most efficient path for your pipes, specifically the hot water lines. Checking the flow rates and/or pressure losses expected will identify the ideal pipe size to run and the most efficient routes to give the quickest heat transfer to each outlet.

Using 12mm pipe, where possible, has major benefits in terms of heat transfer and overall efficiency to bathroom or kitchen taps allowing the hot water to arrive sooner due to the low volume held within the pipe length. Calculators are available on the Dux website to assist with planning plumbing projects.

Always pre-check your tools are in good condition, if able check that their calibration is correct and that you have enough pipe and fittings to complete the required installation. Always ensure you have a few red pipe clips on hand ready for use when laying the hot lines. Using these at the start and intermittently along the run will ensure the hot and cold pipes are not accidently crossed over.

Check the condition of the pipe prior to installation for transport damage such as cuts, kinks or crush damage, check the ends haven't been damaged from being dragged across rough surfaces, typically this type of damage is a result of poor handling and can be avoided by taking a little extra care when picking up from a merchant. The 25m lay straight coil is an excellent example, these coils are relatively compact and easy to transport and with the pipe 'remembering' its original condition of being straight it can be uncoiled almost as well as a full 25m straight length.

Code of Practice and Local Authority Approvals

Dux SecuraGold™ is fully certified under the WaterMark licence WMKA 1289 and complies with all necessary standards for use as a potable hot and cold water system in New Zealand. If there are special conditions that a council requires please discuss these with your local Territory Manager who will pass any queries onto the technical team for a response and/or clarification where needed.

System Identification

All pipes are marked with various amounts of information, each metre of pipe has the following:



The information shown from left to right, brand – Dux, size of pipe – 20mm, pressure rating – 16 Bar, material – PB (Polybutene), extrusion line – Line 2, WaterMark logo, standard the pipe is manufactured to – AS/NZS 2642.2, WaterMark licence – 1289, date of manufacture – 1st June 2011 (for this section of pipe) and the time of manufacture 1:30pm. As well as this detail 5mm graduation lines are printed along the full length of the pipe.

Fittings are marked on the copper crimp ring.



DUX.DR.AS/NZS2642-3 W LN1289-1.PN16.DN22

As with the pipe the information shown includes the brand – Dux, DR symbolising the De-zincification resistance, AS/NZS 2642.3 – the standard, W representing the WaterMark logo, licence number 1289, pressure rating – 16 Bar and the size of the pipe in DN22 (Diameter Nominal) – 20mm

SecuraGold™ brass fittings are available in four sizes – 12mm, 15mm, 20mm & 28mm and feature coloured end caps that protect the integrity of the fitting, allow for quick size identification and match the handle colours of the Magnum and Iwiss tools.



Pipe Fixing

Polybutene pipe the same as all other pipe material variants requires fixing and support in an installation, AS/NZS3500.1 in 5.6 Support and Fixing Above Ground specifies the positioning of these supports in a vertical and horizontal plane. Below has been extracted from this standard verbatim for absolute clarity:

5.6.1 General

	Horizontal Clip		Vertical Clip
	HOT	COLD	
12 mm	500 mm	600 mm	1200 mm
15 mm	500 mm	600 mm	1200 mm
20 mm	600 mm	700 mm	1400 mm
28 mm	600 mm	750 mm	1500 mm
Continuous support tray	2.5 m		

Water services installed above ground shall be retained in position by brackets, clips, or hangars.

5.6.2 Brackets, clips, and hangars

Brackets, clips, and hangars shall be-

a) Formed of material compatible with pipe;
b) Securely attached to the building structure and not to any other service;
c) Designed to withstand the applied loads;
d) Where exposed to a corrosive environment, protected against corrosion;
e) Of like material or lined with a non-abrasive, inert material for that section where contact with the piping may occur;
f) Clamped securely to prevent movement, unless designed to allow for thermal movement;
g) Restrained to prevent lateral movement; and
h) Installed so that no movement can occur while a valve is being operated and so that the weight of the valve is not transferred to the pipe.

5.6.3 Limitations of pipe supports

The following applies:

a) Pipes shall not be supported by brazing or welding short sections of any material to the pipe surface, nor by clamping, brazing, or welding to adjacent pipes.
b) Brackets, clips, and hangars incorporating PVC shall not be used in contact with stainless steel pipes.

5.6.4 Spacing

Water services shall be supported and fixed at the intervals specified in Table 5.6.4.

5.6.5 Securing of pipes and fittings

Any pipe or fitting that may be subjected to strain or torsion shall be positively fastened against twisting or any other movement.

Installation of Heated Water Systems

When installing a heated water system there are several key factors that need to be considered:

a) Reduce, to a minimum, the amount of cold water in a line before hot water flows from a tap
b) Sufficient flow from all outlets to meet the requirements of G12/AS1
c) Be by the shortest practicable route for the main flow heated water pipes and branches to the heated water outlets; and
d) Be the minimum necessary diameter required to supply the outlet draw off

Water flow velocities in heated water piping up to 65˚C shall be in accordance with AS/NZS 3500.4 Clause 1.8. Velocity Requirements, the below table shows these values:

Maximum Allowable Velocities		
Piping	Maximum Allowable Velocities (m/s)	
	Copper Pipe	Other materials
Circulatory (flow)	1.2	2.0
Circulatory return line	1.0	1.0
Non-circulatory (flow)	3.0	3.0

Notes:

1. Circulatory piping means piping where there is a forced circulation of heated water
2. Circulatory piping does not include:
    a) Systems where the circulatory flow only occurs in response to activation by a user; and
    b) Primary circulation in a solar water heater
3. In circulatory piping, the maximum flow velocity is derived from the sum of forced circulation and probable simultaneous demand flow in the relevant section of piping
4. Pipe work should be designed for velocities lower than the above maximums to allow for variations in flow

Re-circulated Hot Water Systems

IMPORTANT – Dux Industries does not recommend using a re-circulating hot water pressure system with polybutene pipe, the consistent high temperatures and pressures will reduce the service life of the pipe and may cause premature failure.

Safe Water Temperatures

As per the requirements of G12/AS1; Clause 6.14 Safe water temperatures

6.14.1 Maximum temperatures

The delivered hot water temperature at any sanitary fixture used for personal hygiene shall not exceed:

a) 45˚C for early childhood centres, schools, old people's homes, institutions for people with psychiatric or physical disabilities, hospitals, and
b) 55˚C for all other buildings

COMMENT:

1. At greatest risk from scalding are children, the elderly, and people with physical or intellectual disabilities, particularly those in institutional care.
2. ***Sanitary fixtures*** used for personal hygiene includes showers, baths, hand basins and bidets.

The Temperature/Pressure Relationship

What does this mean and why is it so important for an installation?

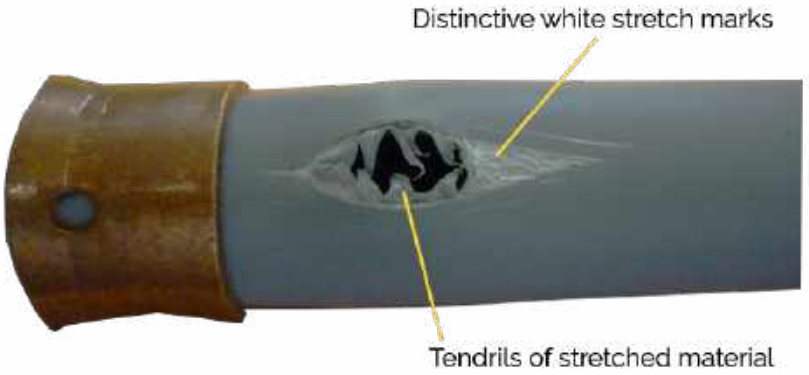
There are limitations placed on all plastic pipes that need to be adhered to, especially when dealing with temperature and pressure. This relationship determines that at varying temperatures maximum set pressures must not be exceeded, the chart on Page 14s details these requirements as set down in the standard AS/NZS 2642.

Exceeding these maximum temperature/pressure combinations can lead to a shortened service life and/or failure of the pipe wall.

In extreme circumstances the wall of the pipe will burst in a very distinctive way, examples of both a hot and cold water burst are covered below. As per normal quality control procedures Dux tests the pipe manufactured with a full "to burst" pressure test using both hot and cold water and have found that the burst patterns are consistent for each type of burst.

Hot Water Burst

When a pipe bursts under a high temperature pressure situation typically you will see a localised stretching of the pipe, almost like a balloon inflating, this will create the distinctive white stretch marks that surround the area. Once burst fine tendrils of thinned material are left bridging around the burst hole.



Cold Water Burst

In contrast a cold-water burst is much rarer due to the higher pressures needed to burst the pipe and will typically fracture in a short-jagged line as shown below. The area around the split will flower out slightly but as you can see the distinction between the hot and cold patterns is quite dramatic.



While these examples are at the extreme ends of the pipe's capabilities there have been occasions where installations have been documented and logged as non-conformance issues by plumbers. It can be plainly seen the distinctive nature of these bursts and the extreme pressure/temperatures needed to cause these types of bursts point to an installation issue rather than a pipe manufacturing issue.

Installation Testing (Hydrostatic Pressure Test)

In accordance with AS/NZS 3500 all installations must be hydrostatically tested after installation, in both new builds and renovations. The hydrostatic pressure should be no less than 1500kPa for a period no less than 30 minutes using cold water only. Pressure testing before wall lining is good trade practice and is strongly recommended.

Note:

1. When pressure testing additions/renovations to an existing installation it is advisable to cap the addition and test independently as the existing pipe work and fixtures may be damaged by the high test pressure.
2. Fire services are subject to individual testing by some network utility operators at a higher pressure and for varied amounts of time.

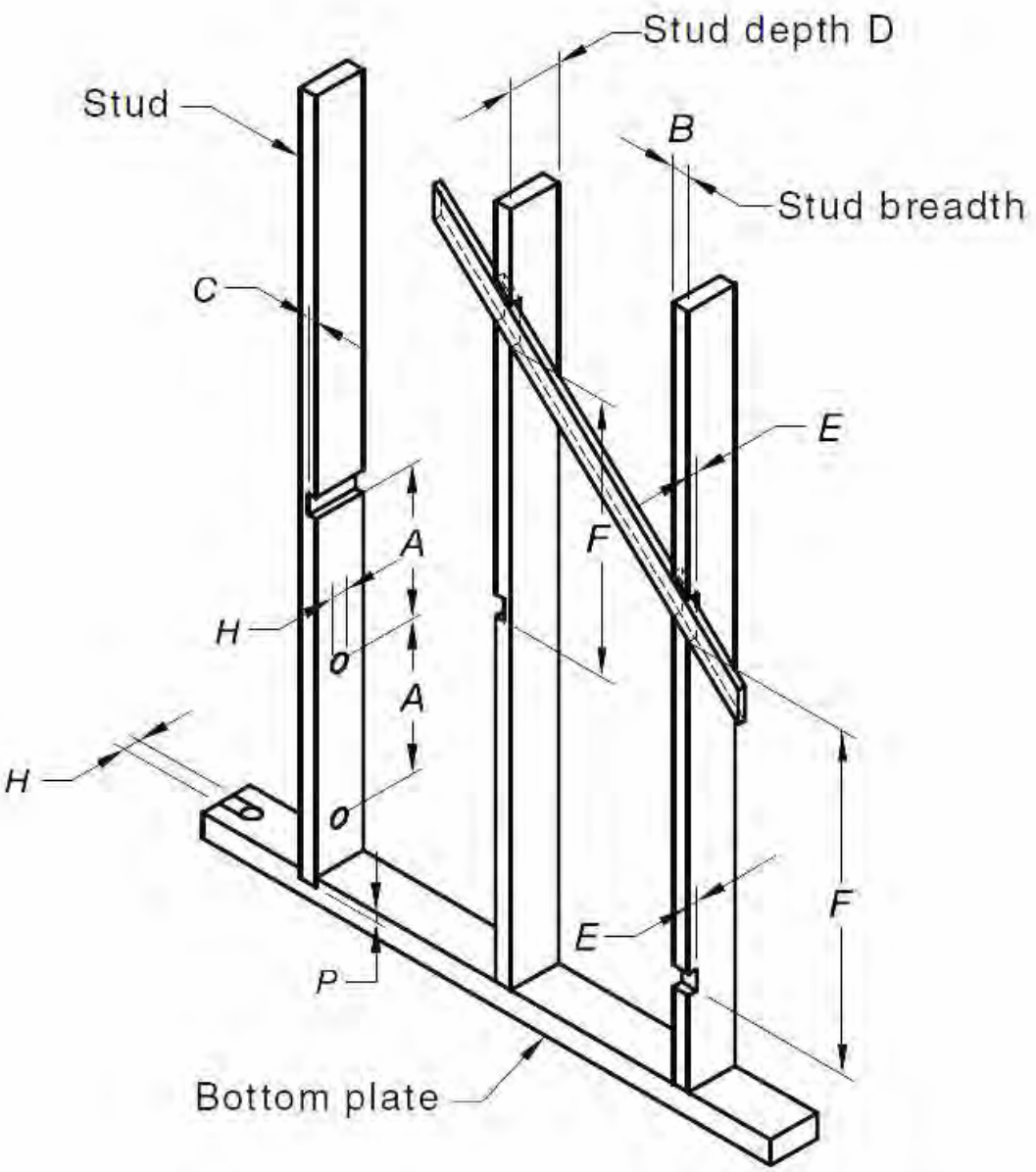
Timber Framework

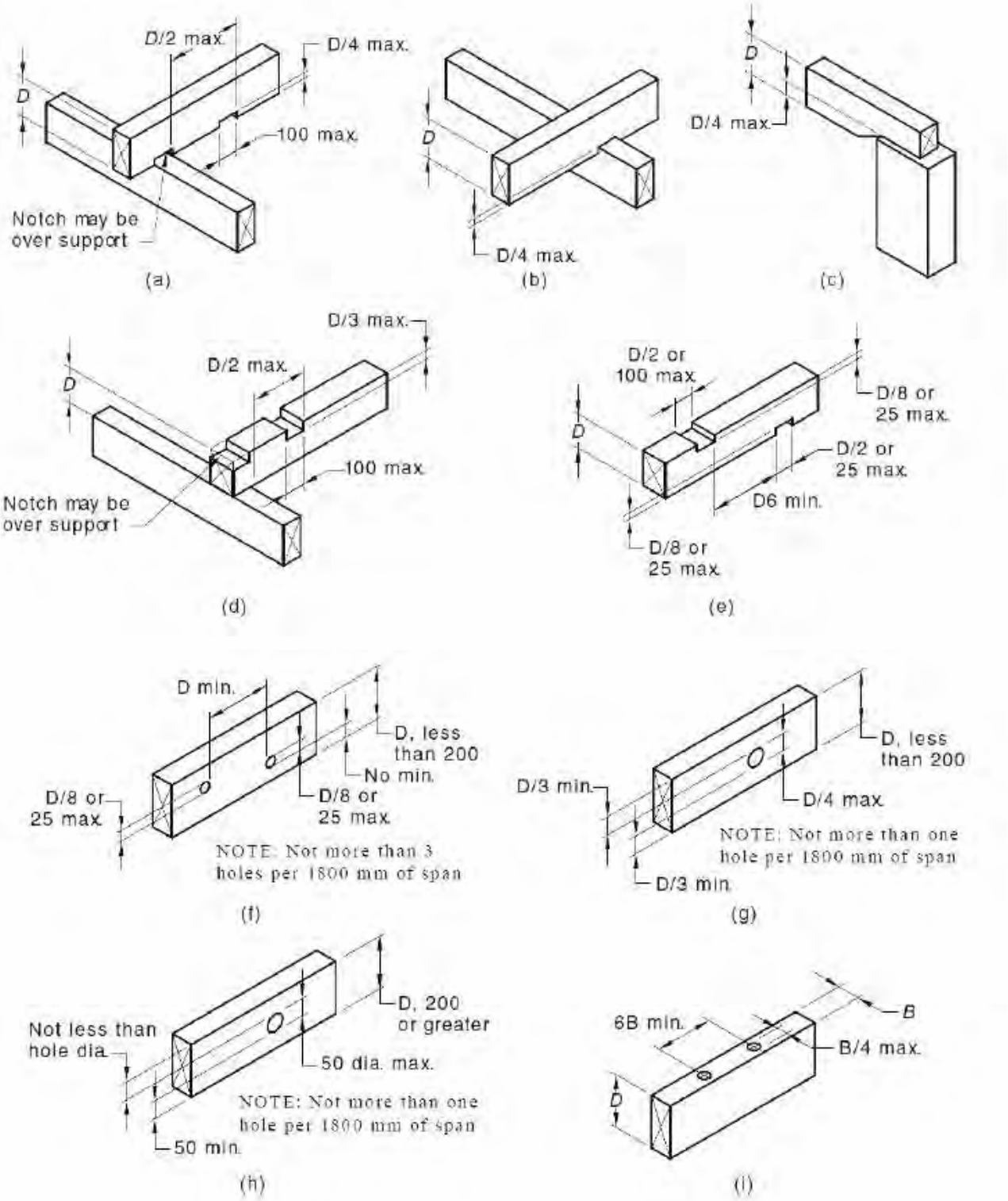
PB-1 is extensively used in timber framed houses throughout New Zealand in the traditional manner by running through notches or chases, or by surface mounting. In many instances they also run through holes drilled through the noggins. This should be done in a manner that is compliant with AS/NZS 3500.1:2003 which includes the requirement to fill the annular space between the pipe and timber with a neutral cure silicone.

Services located in timber framed walls of brick veneer construction shall be installed as follows:

Holes or notches made in timber studs and plates in walls shall be in accordance with the below figure and table:

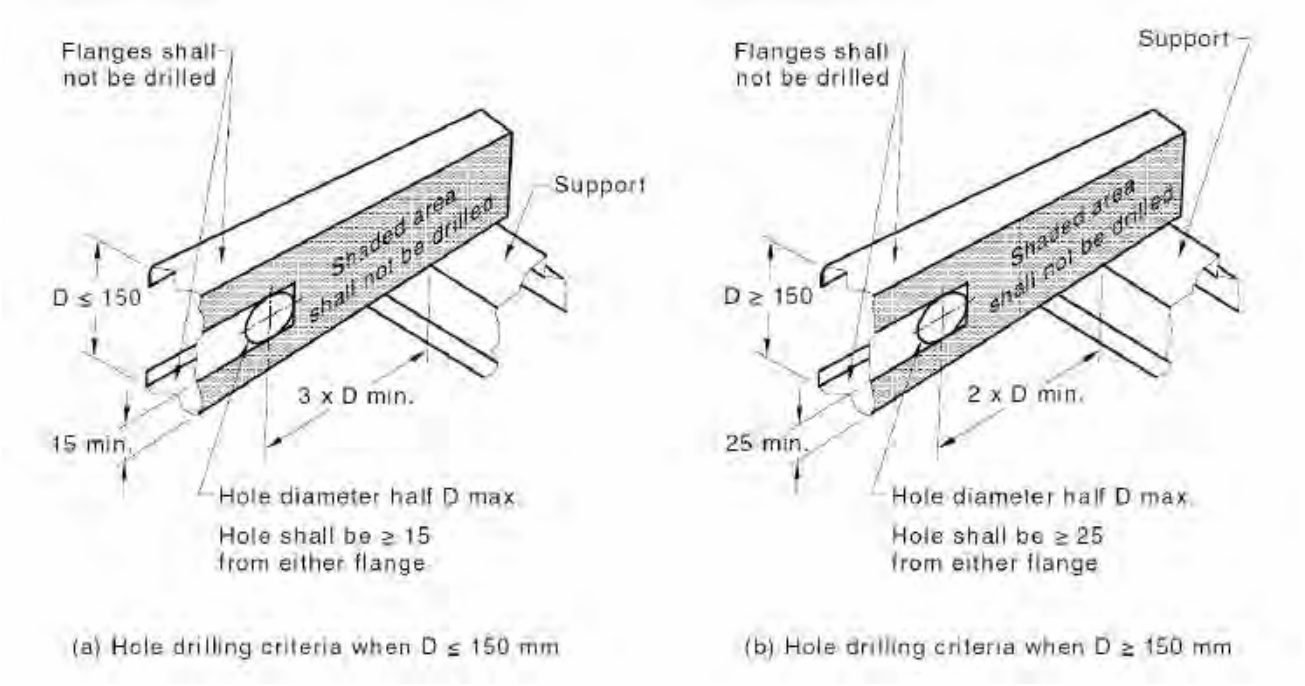
		Limits	
Symbol	Description	Notched	Not Notched
A	Distance between holes and/or notches in stud breadth	Min. 3D	Min. 3D
H	Hole diameter (studs & plates)	Max. 25mm (wide face only)	Max. 25mm (wide face only)
C	Notch into stud breadth	Max. 10mm	Max. 10mm
E	Notch into stud depth	Max. 20mm (for diagonal cut in bracing only) (see note)	Not permitted (see note)
F	Distance between notches in stud depth	Min. 12B	N/A
P	Trenches in plates	3mm max.	
Note: A horizontal line of notches up to 25mm may be provided for the installation of baths			


Stud depth D
Stud
B
Stud breadth
C
E
A
F
H
A
H
E
F
P
Bottom plate


D/2 max.
D/4 max.
D
100 max.
Notch may be over support
(a)
D
D/4 max.
(b)
D
D/4 max.
(c)
D/3 max.
D/2 max.
D
100 max.
Notch may be over support
(d)
D/2 or 100 max.
D/8 or 25 max.
D
D/2 or 25 max.
D6 min.
D/8 or 25 max.
(e)
D min.
D, less than 200
No min.
D/8 or 25 max.
D/8 or 25 max.
NOTE: Not more than 3 holes per 1800 mm of span
(f)
D, less than 200
D/3 min.
D/4 max.
NOTE: Not more than one hole per 1800 mm of span
D/3 min.
(g)
D, 200 or greater
Not less than hole dia.
50 dia. max.
NOTE: Not more than one hole per 1800 mm of span
50 min.
(h)
B
6B min.
B/4 max.
D
(i)

Metal Framework

Holes drilled or formed in metal studs or plates shall be sized to enable suitable rubber grommets, insulation, or a short sleeve of oversize pipe to be firmly secured in the framework and wrap around the pipe. To ensure no direct contact between the pipe and framework but to allow free longitudinal movement of the pipe through the grommet, lagging or sleeve as shown below.



(a) Hole drilling criteria when D ≤ 150 mm

(b) Hole drilling criteria when D ≥ 150 mm

Acceptable Penetrations to steel floor joists

Care should be taken to ensure that the air cavity moisture barrier within an external wall of any building is not bridged with pipe or pipe duct penetrations and porous pipe insulation materials. A clear air gap is required between the external wall and the pipe insulation material.

Pipes located in cavities shall be installed to prevent the transfer of moisture from the outer to inner wall.

Chases, Ducts or Conduits

Pipes located in chases, ducts or conduits within walls or floors of masonry or concrete construction shall be installed in accordance with the following:

a) Pipes in chases shall be continuously wrapped with an impermeable flexible material

b) Ducts shall be fitted with removable covers

c) Conduits embedded in walls or floors shall comply with the requirements of the New Zealand Building Code as applicable

d) Service pipes shall not be embedded or cast into concrete structures

Under Concrete Slabs

Water service pipes located beneath concrete slabs on ground shall comply with the following:

a) Pipes shall be laid in a narrow trench on a bed of sand or fine-grained soil placed and compacted in a manner that will not damage the piping. There shall be a minimum distance of 75mm between the top of the pipe and the underside of the slab or slab stiffening beam

b) The ends shall be crimped or capped prior to pouring of the concrete and measures shall be taken to protect the exposed pipe from damage

c) Any pipework that penetrates the slab shall be at right angles to the surface of the slab and shall be lagged for the full depth of the slab penetration with:

   i. An impermeable flexible material of not less than 6mm thickness; or

   ii. Impermeable plastic sleeve or conduit providing an equivalent protection

   Note: where termite protection is required, the integrity of the chosen termite protection method should not be compromised.

d) Metal pipes shall be continuously lagged with an impermeable material

e) Soft soldered joints shall not be permitted

f) The number of joints shall be kept to a minimum

Underground

The SecuraGold™ PB-1 pipe can be installed below ground in trenches at depths in accordance with AS/NZS 3500 but must also be in accordance with the local authority guidelines.

The NZBC states in G12/AS1 7.3.2 – an acceptable method of protecting water supply pipes is to provide the minimum covers given below:

a. 600mm – Residential driveways and similar areas subjected to occasional heavy traffic
b. 450mm – Gardens, lawns or other areas not subjected to traffic

Conditions for underground installation

- The trench should be free from sharp objects and large stones preferably a fine compacted sand should line the bottom of the trench
- Snake the pipe slightly the entire length underground to allow for expansion and contraction
- Ensure the backfill is clean, free running and void of debris, sharp objects, and large stones
- Alternatively, the PB-1 pipe can be fed through a conduit but at the entry and exit the conduit must be closed to prevent influx of any backfill
- Joints should be avoided underground
- Before the trench is backfilled the installation should be pressure tested as per the requirements of AS/NZS 3500.1

Masonry Walls

PB-1 pipe should be protected by a conduit when run through a masonry wall and every effort should be made to avoid contact with brick or concrete.

When run through a concrete or brick wall use a conduit, the conduit entry and exit points should extend beyond the wall by approximately 100 – 150mm and the ends taped with an impermeable material to prevent ingress of concrete or brick particles.

Direct Heat

- Avoid installing PB-1 near a direct heat source
- All PB-1 pipes must be kept at least 500mm away from extreme heat sources such as flues or wet back circulation pipes
- Never expose PB-1 to naked flames or hot air guns, if it is necessary to braze or solder near a PB-1 pipe it is strongly advised to try at first to move the pipe the required distance or place a thermal guard between the heat source and the pipe.

Appendix

Appendix 1 - The SecuraGold™ Range

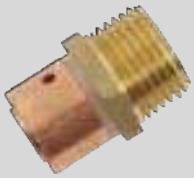
The SecuraGold™ range of pipe and fittings has been developed to meet the demands of most scenarios that a plumber will face when installing a residential hot and cold potable water system.

Straight Pipe	Code	Description	Pack size
	N2PS5	12mm x 5m Straight	20
	N3PS5	15mm x 5m Straight	20
	N4PS5	20mm x 5m Straight	10
	N5PS5	28mm x 5m Straight	5

Pipe Coils	Code	Description	Pack size
	N2PC25	12mm x 25m Lay Straight Coil	1
	N3PC25	15mm x 25m Lay Straight Coil	1
	N4PC25	20mm x 25m Lay Straight Coil	1
	N5PC25	28mm x 25m Lay Straight Coil	1
	N2PC50	12mm x 50m Coil	1
	N3PC50	15mm x 50m Coil	1
	N4PC50	20mm x 50m Coil	1
	N2PC100	12mm x 100m Coil	1
	N3PC100	15mm x 100m Coil	1
	N3PC280	15mm x 280m Coil	1

Coloured Pipe	Code	Description	Pack size
	N3PS5L	15mm x 5m Straight (Lilac)	20
	N3PC25L	15mm x 25m Coil (Lilac)	1
	N3PC50L	15mm x 50m Coil (Lilac)	1
	N4PS5L	20mm x 5m Straight (Lilac)	10
	N4PC25L	20mm x 25m Coil (Lilac)	1
	N4PC50L	20mm x 50m Coil (Lilac)	1
	N3PS5G	15mm x 5m Straight (Green)	20
	N3PC25G	15mm x 25m Coil (Green)	1
	N4PS5G	20mm x 5m Straight (Green)	10
	N4PC25G	20mm x 25m Coil (Green)	1

Couplings	Code	Description	Pack size
	SC2	12mm (equal)	10
	SC3	15mm (equal)	10
	SC4	20mm (equal)	10
	SC5	28mm (equal)	10
	SC24	12mm x 20mm (reducing)	10
	SC32	15mm x 12mm (reducing)	10
	SC43	20mm x 15mm (reducing)	10
	SC54	28mm x 20mm (reducing)	10

Brass Male Adaptors	Code	Description	Pack size
	SAM3	15mm x ½" BSP	10
	SAM4	20mm x ¾" BSP	10
	SAM5	28mm x 1" BSP	10
	SAM23	12mm x ½" BSP	10
	SAM43	20mm x ½" BSP	10

Female Lugged Tee	Code	Description	Pack size
	SWT3	15mm x ½" BSP	10

Tees	Code	Description	Pack size
	ST2	12mm	10
	ST3	15mm	10
	ST4	20mm	10
	ST5	28mm	10

Reducing Tees	Code	Description	Pack size
	ST223	12mm x 12mm x 15mm	10
	ST224	12mm x 12mm x 20mm	10
	ST332	15mm x 15mm x 12mm	10
	ST334	15mm x 15mm x 20mm	10
	ST433	20mm x 15mm x15mm	10
	ST434	20mm x 15mm x 20mm	10
	ST442	20mm x 20mm x 12mm	10
	ST443	20mm x 20mm x 15mm	10
	ST553	28mm x 28mm x 15mm	10
	ST554	28mm x 28mm x 20mm	10

Crox Tee Adaptor	Code	Description	Pack size
	SXT3	½" BSP x 15mm	10

Elbows 90˚	Code	Description	Pack size
	SE2	12mm	10
	SE3	15mm	10
	SE4	20mm	10
	SE5	28mm	10
	SE43	20mm x 15mm (reducing)	10
	SE54	28mm x 20mm (reducing)	10

Elbows 45˚	Code	Description	Pack size
	SE3045	15mm	10
	SE4045	20mm	10
	SE5045	28mm	10

Wingback Elbows (Male)	Code	Description	Pack size
	SWM2100	12mm x ½" BSP (100mm L)	10
	SWM3	15mm x ½" BSP (65mm L)	10
	SWM3100	15mm x ½" BSP (100mm L)	10
	SWM4100	20mm x ¾" BSP (100mm L)	10

Threaded Elbows Male	Code	Description	Pack size
	SEM3	15mm x ½" BSP	10
	SEM4	20mm x ¾" BSP	10

Wingback Elbows (Female)	Code	Description	Pack size
	SW23	12mm x ½" BSP	10
	SW3	15mm x ½" BSP	10
	SW34	15mm x ¾" BSP	10
	SW4	20mm x ¾" BSP	10
	SW43	20mm x ½" BSP	10

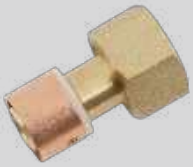
Double Fix Wingback (Male)	Code	Description	Pack size
	SDWM3100	15mm x 100mm x ½" BSP	10
	SDWM3200	15mm x 200mm x ½" BSP	10
	SDWM4100	20mm x 100mm x ¾" BSP	10

Double Fix Wingback (Female)	Code	Description	Pack size
	SDW3	15mm x ½" BSP	10
	SDW4	20mm x ¾" BSP	10
	SDW5	28mm x 1" BSP	10

Hose Plate Female	Code	Description	Pack size
	SH3	15mm x ½" BSP	10
	SH4	20mm x ¾" BSP	10

Manifolds	Code	Description	Pack size
	SMF4203	20mm x 3 (12mm x 3 Outlets)	10
	SMF4303	20mm x 3 (15mm x 3 Outlets)	10
	SMF4204	20mm x 4 (12mm x 4 Outlets)	10
	SMF4304	20mm x 4 (15mm x 4 Outlets)	10

BSP Swivel Elbows	Code	Description	Pack size
	SXE3	15mm x ½" BSP	10
	SXE4	20mm x ¾" BSP	10
	SXE5	28mm x 1" BSP	10
	SXE23	12mm x ½" BSP	10
	SXE24	12mm x ¾" BSP	10
	SXE34	15mm x ¾" BSP	10
	SXE43	20mm x ½" BSP	10

BSP Swivel Connectors	Code	Description	Pack size
	SXC3	15mm x ½" BSP	10
	SXC4	20mm x ¾" BSP	10
	SXC5	28mm x 1" BSP	10
	SXC23	12mm x ½" BSP	10
	SXC43	15mm x ¾" BSP	10
	SXC54	28mm x ¾" BSP	10

Blank Plugs (Brass)	Code	Description	Pack size
	SBP2	12mm	10
	SBP3	15mm	10
	SBP4	20mm	10
	SBP5	28mm	10

Brazing Tails	Code	Description	Pack size
	SBT3	15mm	10
	SBT4	20mm	10

Sealed/Threaded End Caps	Code	Description	Pack size
	STCF3	Female 15mm	10
	STCF4	Female 20mm	10

Plugged Nipples	Code	Description	Pack size
	NPN3	½" BSP	10
	NPN4	¾" BSP	10

IWISS Tools	Code	Description	Pack size
	DCT2	12mm	1
	DCT3	15mm	1
	DCT4	20mm	1
	DCT5	28mm	1

Dux Magnum Crimp Tools	Code	Description	Pack size
	CCT2	12mm	1
	CCT3	15mm	1
	CCT4	20mm	1

Alba Crimp Tools	Code	Description	Pack size
	SCT3	15mm (Long Handle)	1
	SCT4	20mm (Long Handle)	1
	SCT5	28mm (Long Handle)	1

Blucher Crimp Tools	Code	Description	Pack size
	DSPMKIT	Power Crimp Tool with 3 Jaws	1
	DSPM15	15mm Head for SPM24	1
	DSPM20	20mm Head for SPM24	1
	DSPM28	28mm Head for SPM24	1

Pipe Cutter & Accessories	Code	Description	Pack size
	SGPC0V2	Dux Pipe Cutter Ex-Tec	1
	DHB01	Dux Handi-fix Bracket	10

Pipe Clips	Code	Description	Pack size
	PS2	12mm	100
	PS3	15mm*	100
	PS4	20mm*	50
	PS5	28mm	50

*20% Red per box

Appendix 2 - Chemical Resistance Charts

KEY – E = Excellent, G = Good, L = Limited, U = Unsuitable

Chemical	22˚C	66˚C
Acetadehyde	L	U
Acetate Solvents - Crude	E	L
Acetate Solvents - Pure	E	L
Acetic Acid 0 – 10%	E	E
Acetic Acid 10 – 20%	E	E
Acetic Acid 20 – 30%	E	G
Acetic Acid 30 – 60%	E	L
Acetic Acid 80%	E	E
Acetic Acid - Glacial	U	U
Acetic Acid - Vapours	E	L
Acetic Anhydride	U	U
Acetone	E	G
Acetylene	L	U
Adipic Acid	E	L
Allyl Alcohol 96%	E	G
Allyl Chloride	E	G
Alum	L	U
Aluminum Chloride	E	E
Aluminum Floride	E	E
Aluminum Hydroxide	E	E
Aluminum Oxychloride	E	E
Aluminum Nitrate	E	E
Aluminum Sulfate	L	U
Ammonia – Dry Gas	E	E
Ammonia - Liquid	G	L
Ammonium Biflouride	E	E
Ammonium Carbonate	E	E
Ammonium Chloride	E	E
Ammonium Flouride 25%	E	L
Ammonium Hydroxide 28%	E	E

Chemical	22˚C	66˚C
Breeder Pellets – Deriv. Fish	E	E
Brine	E	E
Bromic Acid	E	E
Bromine - Liquid	U	U
Bromine - Water	L	U
Butane	U	U
Butanol - Primary	E	-
Butanol - Secondary	E	-
Butyl Acetate	L	U
Butyl Alcohol	E	E
Butyric Acid 20%	E	L
Calcium Bisulfite	E	E
Calcium Carbonate	E	E
Calcium Chlorate	E	E
Calcium Chloride	E	E
Calcium Hydroxide	E	E
Calcium Nitrate	E	E
Calcium Sulfate	E	E
Cane Sugar Liquors	E	E
Carbon Bisulfide	U	U
Carbon Dioxide (Aqueous Solution)	E	E
Carbon Dioxide Gas (Wet)	E	E
Carbon Monoxide	E	E
Carbon Tetrachloride	U	U
Carbonic Acid	E	E
Casein	E	E
Castor Oil	E	E
Caustic Potash	G	L
Caustic Soda	G	L
Cellosolve	E	G

Ammonium Metaphosphate	E	E
Ammonium Nitrate	E	E
Ammonium Persulfate	E	E
Boron Triflouride	E	E
Chlorine Water	E	G
Chlorobenzene	U	U
Chloroform	L	U
Chlorosulfonic Acid	-	U
Chrome Alum	E	E
Chromic Acid 10%	E	E
Chromic Acid 25%	E	E
Chromic Acid 30%	E	E
Chromic Acid 40%	E	-
Chromic Acid 50%	E	-
Citric acid	E	E
Coconut Oil	G	G
Copper Chloride	E	E
Copper Cyanide	E	E
Copper Fluoride 2%	E	E
Copper Nitrate	E	E
Copper Sulfate	E	E
Core Oils	E	E
Cottonseed Oil	E	E
Cresol	U	U
Cresylic Acid 50%	U	U
Crude Oil - Sour	L	U
Crude Oil - Sweet	L	U
Cyclohexanol	G	L
Cyclohexanon	U	U
Demineralised Water	E	E
Dextrin	E	E
Dextrose	E	E
Diazo Salts	E	E

Chloracetic Acid	U	U
Chloral Hydrate	U	U
Chlorine Gas (Dry)	U	U
Chlorine Gas (Moist)	U	U
Ethyl Alcohol 50 – 98%	E	E
Ethyl Ether	L	U
Ethylene Bromide	U	U
Ethylene Chlorohydrin	U	U
Ethylene Dichloride	G	G
Ethylene Glycol	E	E
Fatty Acids	E	G
Ferric Chloride	E	E
Ferric Nitrate	E	E
Ferric Sulfate	E	E
Ferrous Chloride	E	E
Ferrous Sulfate	E	E
Fish Solubles	E	E
Fluorine Gas - Dry	L	U
Fluorine Gas - Wet	L	U
Fluoroboric Acid	E	E
Fluorosilicic Acid	E	E
Food Products (Such as Milk, Buttermilk, Molasses, Salad Oils, Fruit	E	E
Formaldehyde	E	E
Formic Acid	E	E
Freon – 1 2	E	G
Fructose	E	E
Fruit Pulps and Juices	E	E
Fuel Oil (Containing H_2SO_4)	U	U
Gallic Acid	E	E
Gas – Coke Oven	E	L
Gas - Manufactured	E	L
Gas – Natural (Dry)	E	L
Gas Natural (Wet)	E	L

Diglycolic Acid	E	E
Dimethylamine	U	U
Dioctylphthalate	L	U
Disodium Phosphate	E	E
Distilled Water	E	E
Ethers	U	U
Ethyl Acetate	L	U
Ethyl Alcohol 0 – 50%	E	E
Heptane	U	U
Hexme	E	G
Hexanol, Tertiary	E	E
Hydrobromic Acid 20%	E	E
Hydrochloric Acid 0 – 25%	E	E
Hydrochloric Acid 25 – 40%	E	E
Hydrocyanic Acid (Hydrogeo Cyanide)	E	E
Hydrofluoric Acid 10%	E	E
Hydrofluoric Acid 48%	E	E
Hydrofluoric Acid 60%	E	E
Hydrogen	E	E
Hydrogen Peroxide 30%	E	G
Hydrogen Peroxide 50%	U	U
Hydrogen Peroxide 90%	U	U
Hydrogen Phosphide	E	E
Hydrogen Sulfide Aqueous Solution	E	E
Hydrogen Sulfide - Dry	E	E
Hydroquinone	E	E
Hypochlorous Acid	E	E
Iodine (In Alcohol)	U	U
Isopropylalcohol	E	E
Kerosene	L	U
Kraft Liquor (Paper Industry)	E	E
Lactic Acid 28%	E	E
Lard Oil	G	L
Lauryl Chloride	G	L
Lead Acetate	E	E
Lime Sulfur	E	E

Gasoline - Refined	U	U
Gasoline - Sour	U	U
Gelatine	E	E
Glucose	E	E
Glycerine (Glycerol)	E	E
Glycol	E	E
Glycolic Acid 30%	E	E
Green Liquor (Paper Industry)	U	U
Maleic Acid	E	E
Malic Acid	E	E
Mercuric Chloride	E	E
Mercuric Cyanide	E	E
Mercurous Nitrate	E	E
Mercury	E	E
Methyl Alcohol	E	E
Methyl Chloride	U	U
Methyl Ethyl Ketone	E	L
Methyl Sulfuric Acid	E	E
Methylene Chloride	G	L
Milk	E	E
Mineral Oils	L	U
Molasses	E	E
Napthalene	G	U
Nickel Acetate	E	E
Nickel Chloride	E	E
Nickel Nitrate	E	E
Nickel Sulfate	E	E
Nicotine	E	E
Nicotine Acid	E	E
Nitric Acid 10%	L	U
Nitric Acid 20%	U	U
Nitric Acid 35%	U	U
Nitric Acid 40%	U	U
Nitric Acid 60%	U	U
Nitric Acid 68%	U	U
Oils and Fats	E	E

Linoleic Acid	E	E
Linseed Oil	E	E
Liquors	E	E
Lubricating Oils	E	E
Magnesium Carbonate	E	E
Magnesium Chloride	E	E
Magnesium Hydroxide	E	E
Magnesium Nitrate	E	E
Magnesium Sulfate	E	E
Picric Acid	E	E
Potassium Acid Sulfate	E	E
Potassium Bicarbonate	E	E
Potassium Bichromate	L	U
Potassium Borate 1%	E	E
Potassium Bromate 10%	E	E
Potassium Bromide	E	E
Potassium Carbonate	E	E
Potassium Chlorate	E	E
Potassium Chloride	E	E
Potassium Chromate 40%	E	E
Potassium Cuprocyanide	E	E
Potassium Cyanide	E	E
Potassium Dichromate 40%	E	E
Potassium Ferricyanide	E	E
Potassium Fluoride	E	E
Potassium Hydroxide 10%	E	E
Potassium Hydroxide 20%	E	E
Potassium Nitrate	E	E
Potassium Perborate	E	E
Potassium Perchlorite	E	E
Potassium Permanganate 10%	E	E
Potassium Persulfate	E	E
Potassium Sulfate	E	E
Potassium Sulfide	E	E
Potassium Thiosulfate	E	E
Propane	E	-
Propyl Alcohol	E	E
Rayon Coagulating Bath	E	E

Oleum	U	U
Oxalic Acid	E	G
Perchloric Acid 10%	L	U
Perchloric Acid 70%	U	U
Phenol	E	L
Phosphoric Acid 0 – 25%	E	E
Phosphoric Acid 25 – 50%	E	G
Phosphoric Acid 50 – 75%	G	L
Photographic Chemicals	E	E
Sodium Acid Sulfate	E	E
Sodium Antimonate	E	E
Sodium Arsenite	E	E
Sodium Benzoate	E	E
Sodium Bicarbonate	E	E
Sodium Bisulfate	E	E
Sodium Bisulfite	E	E
Sodium Bromide	E	E
Sodium Carbonate (Soda Ash)	E	E
Sodium Chlorate	E	E
Sodium Chloride	E	E
Sodium Cyanide	E	E
Sodium Dichromate	E	E
Sodium Ferricyanide	E	E
Sodium Ferrocyanide	E	E
Sodium Fluoride	E	E
Sodium Hydroxide 10%	E	E
Sodium Hydroxide 35%	E	E
Sodium Hydroxide Saturated	E	E
Sodium Hypochlorite	E	E
Sodium Nitrate	E	E
Sodium Nitrite	E	E
Sodium Phosphate - Acid	E	E
Sodium Silicate	E	E
Sodium Sulfate	E	E
Sodium Sulfide	E	E
Sodium Sulfite	E	E
Sodium Thiosulfate (Hypo)	E	E
Stannic Chloride	E	E

Salt Water	E	E
Selenic Acid	E	G
Silicic Acid	E	E
Silver Cyanide	E	E
Silver Nitrate	L	U
Silver Plating Solutions	E	G
Soaps	E	E
Sodium Acetate	E	E
Sulfuric Acid 50 – 75%	L	U
Sulfuric Acid 75 – 90%	U	U
Sulfuric Acid 95%	U	U
Sulfurous Acid	E	E
Sulphur Trioxide	L	U
Tannic Acid	E	E
Tanning Liquors	E	G
Tattaric Acid	E	E
Tetrahydrofurane	L	U
Thionyl Chloride	E	E
Toluol or Toluene	U	U
Trichloroethylene	U	U
Triethanolamine	E	L
Trisodium Phosphate	E	E
Turpentine	U	U

Stannous Chloride	E	E
Stoddards Solvent	E	E
Stearic Acid	E	E
Sulfur	E	E
Sulfur Dioxide Gas - Wet	E	L
Sulfuric Acid 0 – 10%	E	E
Sulfuric Acid 10 – 30%	E	E
Sulfuric Acid 30 – 50%	E	E
Urea	E	E
Urine	E	E
Vinegar	E	E
Water – Acid Mine Water	E	E
Water - Distilled	E	E
Water - Fresh	E	E
Water - Salt	E	E
Whiskey	E	E
White Gasoline	U	U
Wines (Still)	E	E
Xylene or Xylol	U	U
Zinc Chromate	E	E
Zinc Cyanide	E	E
Zinc Nitrate	E	E
Zinc Sulfate	E	E

Key: E = Excellent, G = Good, L = Limited, U = Unsuitable

DISCLAIMER: The Polybutene Chemical Resistance Chart is supplied as a guide only, due to variable strengths, applications, and combinations of chemicals no warranty can be expressed or implied. The onus must be on the end user to carry out their own tests to determine suitability for their particular purpose and/or application.

Appendix 3 – Flow Rates & Pressure Loss

All pipes are affected by pressure loss and this needs to be considered when designing a Hot & Cold water reticulation system. This will allow the installer to maintain the correct flow rates prescribed by the New Zealand Building Code. For the acceptable flow rates to outlets reference Table 3 from G12/AS1.

Table 3: Acceptable Flow Rates to Sanitary Fixtures
Paragraph 3.3.1

Sanitary fixture	Flow rate and temperature l/s and °C	How measured
Bath	0.3 at 45°C	Mix hot and cold water to achieve 45°C
Sink	0.2 at 60°C* (hot) and 0.2 (cold)	Flow rates required at both hot and cold taps but not simultaneously
Laundry tub	0.2 at 60°C* (hot) and 0.2 (cold)	Flow rates required at both hot and cold taps but not simultaneously
Basin	0.1 at 45°C	Mix hot and cold water to achieve 45°C
Shower	0.1 at 42°C	Mix hot and cold water to achieve 42°C

* The temperatures in this table relate to the temperature of the water used by people in the daily use of the *fixture*.

Note:

The flow rates required by Table 3 shall be capable of being delivered simultaneously to the kitchen sink and one other *fixture*.

FLOW RATE CALCULATIONS

There are several factors involved with the calculation of friction loss through pipes and fittings that need to be considered:

a. Velocity
b. Reynolds number (roughness of the pipe bore)
c. Flow Type (Laminar or Turbulent)
d. Temperature - Kinematic Velocity (measured in Centistokes (cST)
e. Density of the water (kg/m^3)
f. Length of pipe (m)
g. Head Pressure where required.

Below is an example of the calculations required to determine the pressure drop in a 15mm PB-1 pipe, 20m in length.

Velocity

To calculate the velocity of water through a 15mm PB pipe the following calculation is used:

$V = Q \times 21.22/D^2$

Pipe Ø	Flow Rate l/min (Q)	Constant	D^2	m/sec.
15mm	12	21.22	161.29	1.58

Note: mean pipe internal diameter used

At a flow rate of 12 l/min. the velocity of the water would be 1.58 m/sec

Reynolds Number

To calculate the Reynolds number (Re): $Re = 1000 \times v \times D/Kv$

Pipe Ø	Constant	Velocity (m/sec)	Bore (mm)	Kinematic Velocity (kv)	Reynold number (Re)
15mm	1000	V = 1.58	D = 12.70	Kv = 1.004 (@20˚C)	Re = 19970.51

The Reynolds number is 19970.51, this number determines the type of flow characteristic passing through the pipe. Flow can be either Laminar or Turbulent when passing through a pipe and this, during the calculations, can be determined if the Reynolds number is less or greater than 2300. A number <2300 is Laminar while >2300 the flow is deemed to be Turbulent. Flows through average household plumbing systems would be deemed Turbulent.

Flow Type

The calculation for the type of flow is:

$F = 0.3164 \times Re^{-0.25}$

0.3164	Constant number
0.084120666	0.3164 x 19970.51
0.026615779	Total friction factor
Turbulent	Flow type

This number is the friction factor in relation to the flow, the Reynolds number, and the Kinematic Velocity @ 20˚C

Temperature – Kinematic Velocity

The temperature (˚C) is given a value in kinematic Velocity that is measured in a unit called Centistokes (cST)

Temperature – kinematic Velocity @ ˚C			
˚C	cST Value	˚C	cST Value
20	1.004	70	0.413
30	0.801	80	0.365
40	0.658	90	0.326
50	0.553	100	0.294
60	0.475		

Pipe Size and Volume per Metre				
Pipe	Mean Outside Ø (mm)	Mean Bore Ø (mm)	D^2	Volume (L/m)
12mm	12.70	9.40	88.36	0.069
15mm	16.00	12.70	161.29	0.126
20mm	22.20	17.83	317.91	0.249
28mm	28.00	22.25	495.06	0.392

To give an understanding of the volumes held in the SecuraGold™ range of Polybutene pipes the following table has been calculated at set lengths.

Polybutene Pipe Volumes in L/Metre				
Metre	12mm	15mm	20mm	28mm
1	0.069	0.126	0.249	0.392
5	0.345	0.630	1.245	1.960
10	0.690	1.260	2.490	3.920
15	1.035	1.890	3.735	5.880
20	1.380	2.520	4.980	7.840
25	1.725	3.150	6.225	9.800

Using the information above we can now start determining the expected flow rates and pressure loss through a given pipe.

12mm PB-1 Pipe Nominal Bore = 9.40mm

Expected Flow Rate - Litres/Second at 20° C

Metre	100 kPa	200 kPa	300 kPa	400 kPa	500 kPa	600 kPa	700 kPa	800 kPa	900 kPa	1000 kPa
1	0.69	1.00	1.23	1.43	1.61	1.77	1.91	2.05	2.18	2.30
2	0.48	0.69	0.86	1.00	1.12	1.23	1.34	1.43	1.52	1.61
3	0.38	0.56	0.69	0.80	0.91	1.00	1.08	1.16	1.23	1.30
4	0.33	0.48	0.59	0.69	0.78	0.86	0.93	1.00	1.06	1.12
5	0.29	0.42	0.53	0.61	0.69	0.76	0.83	0.89	0.94	1.00
6	0.26	0.38	0.48	0.56	0.63	0.69	0.75	0.81	0.85	0.91
7	0.24	0.35	0.44	0.51	0.58	0.64	0.69	0.74	0.79	0.84
8	0.22	0.33	0.41	0.48	0.54	0.59	0.64	0.69	0.74	0.78
9	0.21	0.31	0.38	0.45	0.50	0.56	0.61	0.65	0.69	0.73
10	0.20	0.29	0.36	0.42	0.48	0.53	0.57	0.61	0.65	0.69
11	0.19	0.28	0.34	0.40	0.45	0.50	0.54	0.58	0.62	0.66
12	0.18	0.26	0.33	0.38	0.43	0.48	0.52	0.56	0.59	0.63
13	0.17	0.25	0.31	0.37	0.41	0.46	0.50	0.53	0.57	0.60
14	0.17	0.24	0.30	0.35	0.40	0.44	0.48	0.51	0.55	0.58
15	0.16	0.23	0.29	0.34	0.38	0.42	0.46	0.49	0.53	0.56
16	0.15	0.22	0.28	0.33	0.37	0.41	0.44	0.48	0.51	0.54
17	0.15	0.22	0.27	0.32	0.36	0.40	0.43	0.46	0.49	0.52
18	0.14	0.21	0.26	0.31	0.35	0.38	0.42	0.45	0.48	0.51
19	0.14	0.20	0.26	0.30	0.34	0.37	0.41	0.44	0.46	0.49
20	0.14	0.20	0.25	0.29	0.33	0.36	0.39	0.42	0.45	0.48
21	0.13	0.19	0.24	0.28	0.32	0.36	0.38	0.41	0.44	0.47
22	0.13	0.19	0.24	0.28	0.31	0.34	0.37	0.40	0.43	0.45
23	0.13	0.18	0.23	0.27	0.30	0.34	0.37	0.39	0.42	0.44
24	0.12	0.18	0.22	0.26	0.30	0.33	0.36	0.38	0.41	0.43
25	0.12	0.18	0.22	0.26	0.29	0.32	0.35	0.38	0.40	0.42
26	0.12	0.17	0.22	0.25	0.28	0.31	0.34	0.37	0.39	0.41
27	0.11	0.17	0.21	0.25	0.28	0.31	0.33	0.36	0.38	0.41
28	0.11	0.16	0.21	0.24	0.27	0.30	0.33	0.35	0.38	0.40
29	0.11	0.16	0.20	0.24	0.27	0.30	0.32	0.35	0.37	0.39
30	0.11	0.16	0.20	0.23	0.26	0.29	0.32	0.34	0.36	0.38

Note: [illegible]

Expected Flow Rate - Litres/Second at 60° C

Metre	100 kPa	200 kPa	300 kPa	400 kPa	500 kPa	600 kPa	700 kPa	800 kPa	900 kPa	1000 kPa
1	0.99	1.03	1.27	1.48	1.65	1.82	1.96	2.10	2.23	2.35
2	0.50	0.72	0.89	1.03	1.16	1.27	1.38	1.48	1.57	1.65
3	0.41	0.59	0.72	0.84	0.94	1.03	1.12	1.20	1.27	1.34
4	0.36	0.50	0.62	0.72	0.81	0.89	0.97	1.03	1.10	1.16
5	0.31	0.45	0.55	0.64	0.72	0.79	0.86	0.92	0.98	1.03
6	0.28	0.41	0.50	0.59	0.66	0.72	0.78	0.84	0.89	0.94
7	0.26	0.38	0.46	0.54	0.61	0.67	0.72	0.78	0.82	0.87
8	0.24	0.35	0.43	0.50	0.57	0.62	0.67	0.72	0.77	0.81
9	0.23	0.33	0.41	0.47	0.53	0.59	0.63	0.68	0.71	0.76
10	0.21	0.31	0.39	0.45	0.50	0.55	0.60	0.64	0.68	0.72
11	0.20	0.30	0.37	0.43	0.48	0.53	0.57	0.61	0.65	0.69
12	0.19	0.28	0.35	0.41	0.46	0.50	0.55	0.59	0.62	0.66
13	0.19	0.27	0.34	0.39	0.44	0.48	0.52	0.56	0.60	0.63
14	0.18	0.26	0.32	0.38	0.42	0.46	0.50	0.54	0.57	0.61
15	0.17	0.25	0.31	0.36	0.41	0.45	0.49	0.52	0.55	0.59
16	0.17	0.24	0.30	0.35	0.39	0.43	0.47	0.50	0.54	0.57
17	0.16	0.23	0.29	0.34	0.38	0.42	0.46	0.49	0.52	0.55
18	0.16	0.23	0.28	0.33	0.37	0.41	0.44	0.47	0.50	0.53
19	0.15	0.22	0.27	0.32	0.36	0.40	0.43	0.46	0.49	0.52
20	0.15	0.21	0.27	0.31	0.35	0.39	0.42	0.45	0.48	0.50
21	0.14	0.21	0.26	0.30	0.34	0.38	0.41	0.44	0.46	0.49
22	0.14	0.20	0.25	0.30	0.33	0.37	0.40	0.43	0.46	0.48
23	0.14	0.20	0.25	0.29	0.33	0.36	0.39	0.42	0.44	0.46
24	0.13	0.19	0.24	0.28	0.32	0.35	0.38	0.41	0.43	0.45
25	0.13	0.19	0.24	0.28	0.31	0.34	0.37	0.40	0.42	0.44
26	0.13	0.19	0.23	0.27	0.30	0.34	0.36	0.39	0.42	0.44
27	0.13	0.18	0.23	0.26	0.30	0.33	0.36	0.38	0.41	0.43
28	0.12	0.18	0.22	0.26	0.29	0.32	0.35	0.38	0.40	0.42
29	0.12	0.18	0.22	0.26	0.29	0.32	0.34	0.37	0.39	0.41
30	0.12	0.17	0.21	0.25	0.28	0.31	0.34	0.36	0.39	0.41

Note: [illegible]

15mm PB-1 Pipe Nominal Bore = 12.70mm

Expected Flow Rate - Litres/Second at 20° C

Metre	100 kPa	200 kPa	300 kPa	400 kPa	500 kPa	600 kPa	700 kPa	800 kPa	900 kPa	1000 kPa
1	1.54	2.21	2.73	3.17	3.55	3.90	4.22	4.52	4.81	5.07
2	1.06	1.54	1.90	2.21	2.48	2.73	2.95	3.17	3.36	3.55
3	0.86	1.24	1.54	1.79	2.01	2.21	2.39	2.57	2.73	2.88
4	0.73	1.06	1.32	1.54	1.73	1.90	2.06	2.21	2.36	2.48
5	0.65	0.94	1.17	1.36	1.54	1.69	1.83	1.97	2.09	2.21
6	0.59	0.86	1.06	1.24	1.39	1.54	1.67	1.79	1.90	2.01
7	0.54	0.79	0.98	1.14	1.29	1.42	1.54	1.65	1.75	1.85
8	0.50	0.73	0.91	1.06	1.20	1.32	1.43	1.54	1.63	1.73
9	0.47	0.69	0.86	1.00	1.12	1.24	1.34	1.44	1.54	1.62
10	0.44	0.65	0.81	0.94	1.06	1.17	1.27	1.36	1.45	1.54
11	0.42	0.62	0.77	0.90	1.01	1.11	1.21	1.30	1.38	1.46
12	0.40	0.59	0.73	0.86	0.96	1.06	1.15	1.24	1.32	1.39
13	0.39	0.56	0.70	0.82	0.92	1.02	1.11	1.19	1.26	1.34
14	0.37	0.54	0.67	0.79	0.89	0.98	1.06	1.14	1.22	1.29
15	0.36	0.52	0.65	0.76	0.86	0.94	1.02	1.10	1.17	1.24
16	0.34	0.50	0.63	0.73	0.83	0.91	0.99	1.06	1.13	1.20
17	0.33	0.49	0.61	0.71	0.80	0.88	0.96	1.03	1.10	1.16
18	0.32	0.47	0.59	0.69	0.78	0.86	0.93	1.00	1.06	1.12
19	0.31	0.46	0.57	0.67	0.75	0.83	0.90	0.97	1.03	1.09
20	0.30	0.45	0.56	0.65	0.73	0.81	0.88	0.94	1.01	1.06
21	0.30	0.43	0.54	0.63	0.71	0.79	0.86	0.92	0.98	1.04
22	0.29	0.42	0.53	0.62	0.71	0.77	0.85	0.90	0.96	1.01
23	0.28	0.41	0.52	0.60	0.68	0.75	0.82	0.88	0.93	0.99
24	0.28	0.40	0.50	0.59	0.66	0.73	0.80	0.86	0.91	0.96
25	0.27	0.39	0.49	0.58	0.65	0.72	0.78	0.84	0.89	0.94
26	0.26	0.39	0.48	0.56	0.64	0.70	0.76	0.82	0.87	0.92
27	0.26	0.38	0.47	0.55	0.62	0.69	0.75	0.80	0.86	0.91
28	0.25	0.37	0.46	0.54	0.61	0.67	0.73	0.79	0.84	0.89
29	0.25	0.36	0.45	0.53	0.60	0.66	0.72	0.77	0.82	0.87
30	0.24	0.36	0.45	0.52	0.59	0.65	0.71	0.76	0.81	0.86

Note: [illegible]

Expected Flow Rate - Litres/Second at 60° C

Metre	100 kPa	200 kPa	300 kPa	400 kPa	500 kPa	600 kPa	700 kPa	800 kPa	900 kPa	1000 kPa
1	1.60	2.28	2.81	3.25	3.64	4.00	4.32	4.63	4.91	5.18
2	1.12	1.60	1.97	2.28	2.56	2.81	3.04	3.25	3.45	3.64
3	0.90	1.30	1.60	1.85	2.08	2.28	2.47	2.65	2.81	2.96
4	0.78	1.12	1.40	1.60	1.79	1.97	2.13	2.28	2.43	2.56
5	0.69	0.99	1.23	1.42	1.60	1.76	1.90	2.04	2.16	2.28
6	0.63	0.90	1.12	1.30	1.46	1.60	1.73	1.85	1.97	2.08
7	0.58	0.83	1.03	1.20	1.34	1.48	1.60	1.71	1.82	1.92
8	0.54	0.78	0.96	1.12	1.26	1.38	1.49	1.60	1.70	1.80
9	0.51	0.73	0.90	1.05	1.18	1.30	1.40	1.50	1.60	1.69
10	0.48	0.69	0.85	0.99	1.12	1.23	1.33	1.42	1.51	1.60
11	0.45	0.66	0.81	0.95	1.06	1.17	1.27	1.36	1.44	1.52
12	0.43	0.63	0.78	0.90	1.01	1.12	1.21	1.30	1.38	1.45
13	0.42	0.60	0.74	0.87	0.97	1.07	1.16	1.24	1.32	1.40
14	0.40	0.58	0.72	0.83	0.94	1.03	1.12	1.20	1.27	1.34
15	0.38	0.56	0.69	0.80	0.90	0.99	1.08	1.15	1.23	1.30
16	0.37	0.54	0.67	0.78	0.87	0.96	1.04	1.12	1.19	1.25
17	0.36	0.52	0.65	0.75	0.85	0.93	1.01	1.08	1.15	1.21
18	0.35	0.51	0.63	0.73	0.82	0.90	0.98	1.05	1.12	1.18
19	0.34	0.49	0.61	0.71	0.80	0.88	0.95	1.02	1.08	1.15
20	0.33	0.48	0.59	0.69	0.78	0.85	0.93	0.99	1.06	1.12
21	0.32	0.47	0.58	0.67	0.75	0.83	0.90	0.97	1.03	1.09
22	0.31	0.45	0.56	0.66	0.74	0.81	0.88	0.95	1.01	1.06
23	0.31	0.44	0.55	0.64	0.72	0.79	0.86	0.92	0.98	1.04
24	0.30	0.43	0.54	0.63	0.71	0.78	0.84	0.90	0.96	1.01
25	0.29	0.42	0.53	0.61	0.69	0.76	0.82	0.88	0.94	0.99
26	0.29	0.42	0.52	0.60	0.68	0.74	0.81	0.87	0.92	0.97
27	0.28	0.41	0.51	0.59	0.66	0.73	0.79	0.85	0.90	0.95
28	0.27	0.40	0.50	0.58	0.65	0.72	0.78	0.83	0.89	0.94
29	0.27	0.39	0.49	0.57	0.64	0.70	0.76	0.82	0.87	0.92
30	0.26	0.38	0.48	0.56	0.63	0.69	0.75	0.80	0.85	0.90

Note: [illegible]

20mm PB-1 Pipe Nominal Bore = 17.83mm

Expected Flow Rate - Litres/Second at 20° C

Metre	100 kPa	200 kPa	300 kPa	400 kPa	500 kPa	600 kPa	700 kPa	800 kPa	900 kPa	1000 kPa
1	3.88	5.56	6.80	7.96	8.93	9.80	10.61	11.36	12.06	12.73
2	2.69	3.88	4.79	5.56	6.25	6.86	7.43	7.96	8.46	8.93
3	2.17	3.13	3.88	4.51	5.06	5.56	6.03	6.46	6.86	7.25
4	1.86	2.69	3.33	3.88	4.36	4.79	5.19	5.56	5.91	6.25
5	1.65	2.40	2.96	3.45	3.88	4.26	4.62	4.95	5.27	5.56
6	1.50	2.17	2.69	3.13	3.52	3.88	4.20	4.51	4.79	5.06
7	1.38	2.00	2.48	2.89	3.25	3.58	3.88	4.16	4.42	4.67
8	1.28	1.86	2.31	2.69	3.03	3.33	3.61	3.88	4.12	4.36
9	1.20	1.75	2.17	2.53	2.85	3.13	3.40	3.64	3.88	4.10
10	1.14	1.65	2.05	2.39	2.69	2.96	3.21	3.48	3.67	3.88
11	1.08	1.57	1.95	2.27	2.56	2.82	3.06	3.28	3.49	3.69
12	1.03	1.50	1.86	2.17	2.44	2.69	2.92	3.13	3.33	3.52
13	0.99	1.43	1.78	2.08	2.34	2.58	2.80	3.00	3.20	3.38
14	0.95	1.38	1.71	2.00	2.25	2.48	2.69	2.89	3.07	3.25
15	0.91	1.33	1.65	1.93	2.17	2.39	2.59	2.79	2.96	3.13
16	0.88	1.28	1.60	1.86	2.10	2.31	2.51	2.69	2.86	3.03
17	0.85	1.24	1.54	1.80	2.03	2.24	2.43	2.61	2.77	2.93
18	0.83	1.20	1.50	1.75	1.97	2.17	2.36	2.53	2.69	2.85
19	0.80	1.17	1.46	1.70	1.91	2.11	2.29	2.46	2.62	2.77
20	0.78	1.14	1.42	1.65	1.86	2.05	2.23	2.39	2.55	2.69
21	0.76	1.11	1.38	1.61	1.81	2.00	2.17	2.33	2.48	2.62
22	0.74	1.08	1.34	1.57	1.77	1.95	2.12	2.27	2.42	2.56
23	0.72	1.05	1.31	1.53	1.73	1.90	2.07	2.22	2.36	2.50
24	0.70	1.03	1.28	1.50	1.69	1.86	2.02	2.17	2.31	2.44
25	0.70	1.01	1.25	1.47	1.65	1.82	1.98	2.12	2.26	2.39
26	0.67	0.99	1.23	1.43	1.62	1.78	1.94	2.08	2.21	2.34
27	0.66	0.97	1.20	1.41	1.59	1.75	1.90	2.04	2.17	2.30
28	0.65	0.95	1.18	1.38	1.55	1.71	1.86	2.00	2.13	2.25
29	0.63	0.93	1.16	1.35	1.53	1.68	1.83	1.96	2.09	2.21
30	0.62	0.91	1.14	1.33	1.50	1.65	1.79	1.93	2.05	2.17

kPa

Note: the above flow rates pertain to an unrestricted pipe length.

Expected Flow Rate - Litres/Second at 60° C

Metre	100 kPa	200 kPa	300 kPa	400 kPa	500 kPa	600 kPa	700 kPa	800 kPa	900 kPa	1000 kPa
1	4.02	5.73	7.04	8.15	9.13	10.01	10.83	11.58	12.29	12.97
2	2.81	4.02	4.95	5.73	6.42	7.04	7.62	8.15	8.66	9.13
3	2.28	3.26	4.02	4.66	5.22	5.73	6.20	6.63	7.04	7.43
4	1.96	2.81	3.46	4.02	4.50	4.95	5.36	5.73	6.08	6.42
5	1.74	2.50	3.09	3.58	4.02	4.41	4.77	5.11	5.43	5.73
6	1.58	2.28	2.81	3.26	3.66	4.02	4.35	4.66	4.95	5.22
7	1.46	2.01	2.59	3.01	3.38	3.71	4.02	4.30	4.57	4.82
8	1.36	1.96	2.42	2.81	3.15	3.46	3.75	4.02	4.27	4.50
9	1.28	1.84	2.28	2.64	2.97	3.26	3.53	3.78	4.02	4.24
10	1.21	1.74	2.15	2.50	2.81	3.09	3.34	3.58	3.81	4.02
11	1.15	1.66	2.05	2.38	2.67	2.94	3.18	3.41	3.62	3.83
12	1.10	1.58	1.96	2.28	2.56	2.81	3.04	3.26	3.46	3.66
13	1.05	1.52	1.88	2.18	2.45	2.70	2.92	3.13	3.32	3.51
14	1.01	1.46	1.81	2.10	2.36	2.59	2.81	3.01	3.20	3.38
15	0.98	1.41	1.74	2.03	2.28	2.50	2.71	2.90	3.09	3.26
16	0.94	1.36	1.68	1.96	2.20	2.42	2.62	2.81	2.99	3.15
17	0.91	1.32	1.63	1.90	2.13	2.34	2.54	2.72	2.89	3.06
18	0.88	1.28	1.58	1.84	2.07	2.28	2.47	2.64	2.81	2.97
19	0.86	1.24	1.54	1.79	2.01	2.21	2.40	2.57	2.73	2.89
20	0.84	1.21	1.50	1.74	1.96	2.15	2.33	2.50	2.66	2.81
21	0.81	1.18	1.46	1.70	1.91	2.10	2.28	2.44	2.59	2.74
22	0.79	1.15	1.43	1.66	1.86	2.05	2.22	2.38	2.53	2.67
23	0.78	1.12	1.39	1.62	1.82	2.00	2.17	2.33	2.47	2.61
24	0.76	1.10	1.36	1.58	1.78	1.96	2.12	2.28	2.42	2.56
25	0.74	1.07	1.33	1.55	1.74	1.92	2.08	2.23	2.37	2.50
26	0.73	1.05	1.30	1.52	1.71	1.88	2.04	2.18	2.32	2.45
27	0.71	1.03	1.28	1.49	1.67	1.84	2.00	2.14	2.28	2.40
28	0.70	1.01	1.25	1.46	1.64	1.81	1.96	2.10	2.23	2.36
29	0.69	0.99	1.23	1.43	1.61	1.77	1.92	2.06	2.19	2.32
30	0.67	0.98	1.21	1.41	1.58	1.74	1.89	2.03	2.16	2.28

kPa

Note: the above flow rates pertain to an unrestricted pipe length.

28mm PB-1 Pipe Nominal Bore = 22.25mm

Expected Flow Rate - Litres/Second at 20° C

Metre	100 kPa	200 kPa	300 kPa	400 kPa	500 kPa	600 kPa	700 kPa	800 kPa	900 kPa	1000 kPa
1	6.72	9.63	11.88	13.75	15.42	16.93	18.32	19.61	20.82	21.97
2	4.87	6.72	8.30	9.62	10.80	11.80	12.84	13.75	14.61	15.42
3	3.77	5.44	6.72	7.80	8.76	9.62	10.42	11.17	11.86	12.52
4	3.21	4.67	5.78	6.72	7.54	8.29	8.98	9.62	10.23	10.80
5	2.87	4.15	5.14	5.98	6.72	7.38	8.00	8.57	9.11	9.62
6	2.61	3.77	4.67	5.43	6.11	6.72	7.28	7.80	8.29	8.76
7	2.40	3.48	4.31	5.01	5.63	6.20	6.72	7.20	7.65	8.08
8	2.23	3.24	4.02	4.67	5.25	5.78	6.26	6.72	7.14	7.54
9	2.10	3.04	3.77	4.39	4.94	5.43	5.89	6.31	6.72	7.09
10	1.98	2.87	3.57	4.15	4.67	5.14	5.57	5.98	6.36	6.72
11	1.88	2.73	3.39	3.95	4.44	4.89	5.30	5.69	6.05	6.39
12	1.80	2.61	3.24	3.77	4.24	4.67	5.06	5.43	5.78	6.11
13	1.72	2.50	3.10	3.61	4.07	4.48	4.85	5.21	5.54	5.85
14	1.65	2.40	2.98	3.47	3.91	4.30	4.67	5.01	5.33	5.63
15	1.59	2.31	2.87	3.35	3.77	4.15	4.50	4.83	5.14	5.43
16	1.54	2.23	2.78	3.23	3.64	4.01	4.35	4.67	4.97	5.25
17	1.49	2.16	2.69	3.13	3.53	3.88	4.21	4.52	4.81	5.09
18	1.44	2.10	2.61	3.04	3.42	3.77	4.09	4.39	4.67	4.94
19	1.40	2.04	2.53	2.95	3.32	3.66	3.97	4.26	4.54	4.80
20	1.36	1.98	2.46	2.87	3.23	3.56	3.87	4.15	4.42	4.67
21	1.32	1.93	2.40	2.80	3.15	3.47	3.77	4.04	4.30	4.55
22	1.29	1.88	2.34	2.73	3.07	3.39	3.68	3.95	4.20	4.44
23	1.26	1.84	2.29	2.67	3.00	3.31	3.59	3.85	4.10	4.34
24	1.23	1.80	2.23	2.60	2.94	3.23	3.51	3.77	4.01	4.24
25	1.20	1.76	2.19	2.55	2.87	3.17	3.44	3.69	3.93	4.15
26	1.18	1.72	2.14	2.50	2.81	3.10	3.36	3.61	3.84	4.07
27	1.15	1.68	2.10	2.45	2.76	3.04	3.30	3.54	3.77	3.98
28	1.13	1.65	2.06	2.40	2.70	2.98	3.23	3.47	3.70	3.91
29	1.11	1.62	2.02	2.35	2.65	2.92	3.17	3.41	3.63	3.84
30	1.09	1.59	1.98	2.31	2.61	2.87	3.12	3.35	3.56	3.77

kPa

Note: the above flow rates pertain to an unrestricted pipe length.

Expected Flow Rate - Litres/Second at 60° C

Metre	100 kPa	200 kPa	300 kPa	400 kPa	500 kPa	600 kPa	700 kPa	800 kPa	900 kPa	1000 kPa
1	8.94	9.89	12.15	14.07	15.75	17.27	18.67	19.97	21.20	22.36
2	4.86	6.94	8.54	9.89	11.08	12.15	13.14	14.07	14.93	15.75
3	3.94	5.64	6.94	8.04	9.01	9.89	10.70	11.45	12.16	12.82
4	3.39	4.86	5.99	6.94	7.78	8.54	9.24	9.89	12.50	11.08
5	3.02	4.33	5.34	6.19	6.94	7.62	8.24	8.83	9.37	9.89
6	2.75	3.94	4.86	5.64	6.32	6.94	7.51	8.04	8.54	9.01
7	2.53	3.64	4.49	5.21	5.84	6.41	6.94	7.43	7.89	8.33
8	2.36	3.39	4.19	4.86	5.45	5.99	6.48	6.94	7.37	7.78
9	2.22	3.19	3.94	4.57	5.13	5.64	6.10	6.53	6.94	7.33
10	2.10	3.02	3.73	4.33	4.86	5.34	5.78	6.19	6.58	6.94
11	2.00	2.87	3.55	4.12	4.63	5.08	5.50	5.89	6.26	6.61
12	1.91	2.74	3.39	3.94	4.42	4.86	5.26	5.64	5.99	6.32
13	1.83	2.63	3.25	3.78	4.24	4.66	5.05	5.41	5.75	6.07
14	1.76	2.53	3.13	3.64	4.08	4.49	4.86	5.21	5.53	5.84
15	1.69	2.44	3.02	3.51	3.94	4.33	4.69	5.02	5.34	5.64
16	1.64	2.36	2.92	3.39	3.81	4.19	4.54	4.86	5.16	5.45
17	1.58	2.29	2.83	3.29	3.69	4.06	4.40	4.71	5.00	5.28
18	1.54	2.22	2.75	3.19	3.58	3.94	4.27	4.57	4.86	5.13
19	1.49	2.16	2.67	3.10	3.48	3.83	4.15	4.45	4.73	4.99
20	1.45	2.10	2.60	3.02	3.39	3.73	4.04	4.33	4.60	4.86
21	1.42	2.05	2.53	2.94	3.31	3.64	3.94	4.22	4.49	4.74
22	1.38	2.00	2.47	2.87	3.23	3.55	3.85	4.12	4.38	4.63
23	1.35	1.95	2.41	2.81	3.16	3.47	3.76	4.03	4.28	4.52
24	1.32	1.91	2.36	2.75	3.08	3.39	3.68	3.94	4.19	4.42
25	1.29	1.87	2.31	2.69	3.02	3.32	3.60	3.86	4.10	4.33
26	1.26	1.83	2.26	2.63	2.96	3.25	3.53	3.78	4.02	4.24
27	1.24	1.79	2.22	2.58	2.90	3.19	3.46	3.71	3.94	4.16
28	1.21	1.76	2.18	2.53	2.85	3.13	3.39	3.64	3.87	4.08
29	1.19	1.72	2.14	2.49	2.79	3.07	3.33	3.57	3.80	4.01
30	1.17	1.69	2.10	2.44	2.76	3.02	3.27	3.51	3.73	3.94

kPa

Note: the above flow rates pertain to an unrestricted pipe length.

The following Pressure Drop Tables have been calculated using the NZBC Acceptable flow rates to an appliance and converted to litres per minute. The calculations are an expected loss on an uninterrupted pipe length. An average of 1m can be allowed for each individual fitting that is installed into the line.

Acceptable flow rates to sanitary fixtures – NZBC G12/AS1			
Sanitary Fixture	Flow rate and temperature l/s and ˚C	How Measured	l/min
Bath	0.3 at 45˚C	Mix hot and cold water to achieve 45˚C	18
Sink	0.2 at 60˚C* (hot) 0.2 (cold)	Flow rates required at both hot and cold taps but not simultaneously	12
Laundry Tub	0.2 at 60˚C* (hot) 0.2 (cold)	Flow rates required at both hot and cold taps but not simultaneously	12
Basin	0.1 at 45˚C	Mix hot and cold water to achieve 45˚C	6
Shower	0.1 at 42˚C	Mix hot and cold water to achieve 42˚C	6
*The temperatures in this table relate to the temperature of the water used by people in the daily use of the fixture			
Note: The flow rates required by this table shall be capable of being delivered simultaneously to the kitchen sink and one other fixture			

(Please note that the following tables are a guide only)

The below table has been calculated from an independently verified formula by: Professor Bruce Melville, FRSNZ, FIPENZ
Professor and Head of Department, Department of Civil and Environmental Engineering, The University of Auckland

12mm Pipe Pressure Drop (kPa)

Acceptable flow rates to sanitary fixtures in NZBG G12/AS1

Bath	0.3 l/s at 45°C	18 l/min
Sink	0.2 l/s at 60°C	12 l/min
Laur	0.2 l/s at 60°C	12 l/min
Basi	0.1 l/s at 45°C	6 l/min
Sho	0.1 l/s at 45°C	6 l/min

Length (m)	kPa Pressure drop at required **6** l/min							
	20°C	30°C	40°C	50°C	60°C	70°C	80°C	90°C
0.5	1.58	1.49	1.41	1.35	1.29	1.24	1.19	1.15
1	3.16	2.98	2.83	2.69	2.58	2.48	2.39	2.31
1.5	4.74	4.47	4.24	4.04	3.87	3.72	3.58	3.46
2	6.32	5.96	5.65	5.39	5.16	4.96	4.78	4.61
2.5	7.90	7.45	7.06	6.74	6.45	6.20	5.97	5.77
3	9.48	8.93	8.48	8.08	7.74	7.44	7.17	6.92
3.5	11.06	10.42	9.89	9.43	9.03	8.67	8.36	8.07
4	12.64	11.91	11.30	10.78	10.32	9.91	9.55	9.23
4.5	14.22	13.40	12.71	12.12	11.61	11.15	10.75	10.38
5	15.80	14.89	14.13	13.47	12.90	12.39	11.94	11.53
10	31.59	29.78	28.25	26.94	25.81	24.78	23.88	23.06
15	47.39	44.67	42.38	40.41	38.71	37.17	35.82	34.59
20	63.18	59.56	56.51	53.88	51.61	49.57	47.76	46.12
25	78.98	74.45	70.64	67.35	64.52	61.96	59.71	57.66
30	94.78	89.34	84.76	80.82	77.42	74.35	71.65	69.19
35	110.57	104.23	98.89	94.29	90.32	86.74	83.59	80.72
40	126.37	119.12	113.02	107.76	103.23	99.13	95.53	92.25
45	142.16	134.01	127.14	121.22	116.13	111.52	107.47	103.78
50	157.96	148.90	141.27	134.69	129.03	123.91	119.41	115.31

Length (m)	kPa Pressure drop at required **12** l/min							
	20°C	30°C	40°C	50°C	60°C	70°C	80°C	90°C
0.5	5.31	5.01	4.75	4.53	4.34	4.17	4.02	3.88
1	10.63	10.02	9.50	9.06	8.68	8.34	8.03	7.56
1.5	15.94	15.03	14.26	13.59	13.02	12.50	12.05	11.64
2	21.25	20.03	19.01	18.12	17.36	16.67	16.07	15.51
2.5	26.57	25.04	23.76	22.65	21.70	20.84	20.08	19.39
3	31.88	30.05	28.51	27.18	26.04	25.01	24.10	23.27
3.5	37.19	35.06	33.26	31.71	30.38	29.18	28.12	27.15
4	42.51	40.07	38.01	36.24	34.72	33.34	32.13	31.03
4.5	47.82	45.08	42.77	40.78	39.06	37.51	36.15	34.91
5	53.13	50.09	47.52	45.31	43.40	41.68	40.17	38.79
10	106.26	100.17	95.04	90.61	86.80	83.36	80.33	77.57
15	159.39	150.26	142.55	135.92	130.21	125.04	120.49	116.36
20	212.52	200.34	190.07	181.22	173.61	166.72	160.66	155.14
25	265.66	250.43	237.59	226.53	217.01	208.40	200.82	193.93
30	318.79	300.51	285.11	271.83	260.41	250.07	240.99	232.71
35	371.92	350.60	332.63	317.14	303.81	291.75	281.15	271.50
40	425.05	400.68	380.14	362.44	347.21	333.43	321.32	310.28
45	478.18	450.76	427.66	407.75	390.62	375.11	361.48	349.07
50	531.31	500.85	475.18	453.05	434.02	416.79	401.65	387.85

Length (m)	kPa Pressure drop at required **18** l/min							
	20°C	30°C	40°C	50°C	60°C	70°C	80°C	90°C
0.5	10.80	10.18	9.66	9.21	8.82	8.47	8.17	7.89
1	21.60	20.37	19.32	18.42	17.65	16.95	16.33	15.77
1.5	32.41	30.55	28.98	27.63	26.47	25.42	24.50	23.66
2	43.21	40.73	38.64	36.84	35.30	33.90	32.66	31.54
2.5	54.01	50.91	48.30	46.06	44.12	42.37	40.83	39.43
3	64.81	61.10	57.97	55.27	52.94	50.84	49.00	47.31
3.5	75.62	71.28	67.63	64.48	61.77	59.32	57.16	55.20
4	86.42	81.46	77.29	73.69	70.59	67.79	65.33	63.08
4.5	97.22	91.65	86.95	82.90	79.42	76.26	73.49	70.97
5	108.02	101.83	96.61	92.11	88.24	84.74	81.66	78.86
10	216.04	203.66	193.22	184.22	176.48	169.48	163.32	157.71
15	324.06	305.48	289.83	276.33	264.72	254.21	244.98	236.56
20	432.08	407.31	386.44	368.44	352.96	338.95	326.64	315.42
25	540.10	509.14	483.04	460.55	441.20	423.69	408.29	394.27
30	648.13	610.97	579.65	552.66	529.44	508.43	489.95	473.13
35	756.15	712.80	676.26	644.77	617.68	593.16	571.61	551.98
40	864.17	814.62	772.87	736.88	705.92	677.90	653.27	630.84
45	972.18	916.45	869.48	828.99	794.16	762.64	734.93	709.69
50	1080.21	1018.28	966.09	921.10	882.40	847.38	816.59	788.55

The below table has been calculated from an independently verified formula by: Professor Bruce Melville, FRSNZ, FIPENZ
Professor and Head of Department, Department of Civil and Environmental Engineering, The University of Auckland

15mm Pipe Pressure Drop in kPa

Acceptable flow rates to sanitary fixtures in NZBG G12/AS1

Bath	0.3 l/s at 45°C	18 l/min
Sink	0.2 l/s at 60°C	12 l/min
Laur	0.2 l/s at 60°C	12 l/min
Basi	0.1 l/s at 45°C	6 l/min
Shov	0.1 l/s at 45°C	6 l/min

Length (m)	kPa Pressure drop at required **6** l/min							
	20°C	30°C	40°C	50°C	60°C	70°C	80°C	90°C
0.5	0.38	0.36	0.34	0.32	0.31	0.30	0.29	0.28
1	0.76	0.71	0.68	0.65	0.62	0.59	0.57	0.55
1.5	1.14	1.07	1.02	0.97	0.93	0.89	0.86	0.83
2	1.51	1.43	1.35	1.29	1.24	1.19	1.14	1.11
2.5	1.89	1.78	1.69	1.61	1.55	1.48	1.43	1.38
3	2.27	2.14	2.03	1.94	1.85	1.78	1.72	1.66
3.5	2.65	2.50	2.37	2.26	2.16	2.08	2.00	1.93
4	3.03	2.85	2.71	2.58	2.47	2.37	2.29	2.21
4.5	3.41	3.21	3.05	2.90	2.78	2.67	2.57	2.49
5	3.78	3.57	3.38	3.23	3.09	2.97	2.86	2.76
10	7.57	7.13	6.77	6.45	6.18	5.94	5.72	5.52
15	11.35	10.70	10.15	9.68	9.27	8.90	8.58	8.29
20	15.13	14.27	13.53	12.90	12.36	11.87	11.44	11.05
25	18.92	17.83	16.92	16.13	15.45	14.84	14.30	13.81
30	22.70	21.40	20.30	19.36	18.54	17.81	17.16	16.57
35	26.48	24.96	23.69	22.58	21.63	20.77	20.02	19.33
40	30.27	28.53	27.07	25.81	24.72	23.74	22.88	22.09
45	34.05	32.10	30.45	29.03	27.81	26.71	25.74	24.86
50	37.83	35.66	33.84	32.26	30.90	29.68	28.60	27.62

Length (m)	kPa Pressure drop at required **12** l/min							
	20°C	30°C	40°C	50°C	60°C	70°C	80°C	90°C
0.5	1.27	1.20	1.14	1.09	1.04	1.00	0.96	0.93
1	2.55	2.40	2.28	2.17	2.08	2.00	1.92	1.86
1.5	3.82	3.60	3.41	3.26	3.12	3.00	2.89	2.79
2	5.09	4.80	4.55	4.34	4.16	3.99	3.85	3.72
2.5	6.36	6.00	5.69	5.43	5.20	4.99	4.81	4.65
3	7.64	7.20	6.83	6.51	6.24	5.99	5.77	5.57
3.5	8.91	8.40	7.97	7.60	7.28	6.99	6.73	6.50
4	10.18	9.60	9.11	8.68	8.32	7.99	7.70	7.43
4.5	11.45	10.80	10.24	9.77	9.36	8.98	8.66	8.36
5	12.73	12.00	11.38	10.85	10.40	9.98	9.62	9.29
10	25.45	23.99	22.76	21.70	20.79	19.97	19.24	18.58
15	38.18	35.99	34.14	32.55	31.19	29.95	28.86	27.87
20	50.90	47.98	45.52	43.40	41.58	39.93	38.48	37.16
25	63.63	59.98	56.90	54.25	51.98	49.91	48.10	46.45
30	76.35	71.97	68.29	65.11	62.37	59.89	57.72	55.74
35	89.08	83.97	79.67	75.96	72.77	69.88	67.34	65.03
40	101.80	95.97	91.05	86.81	83.16	79.86	76.96	74.31
45	114.53	107.96	102.43	97.66	93.55	89.84	86.58	83.60
50	127.25	119.96	113.81	108.51	103.95	99.82	96.20	92.89

Length (m)	kPa Pressure drop at required **18** l/min							
	20°C	30°C	40°C	50°C	60°C	70°C	80°C	90°C
0.5	2.59	2.44	2.31	2.21	2.11	2.03	1.96	1.89
1	5.17	4.88	4.63	4.41	4.23	4.06	3.91	3.78
1.5	7.76	7.32	6.94	6.62	6.34	6.09	5.87	5.67
2	10.35	9.76	9.26	8.82	8.45	8.12	7.82	7.55
2.5	12.94	12.19	11.57	11.03	10.57	10.15	9.78	9.44
3	15.52	14.63	13.88	13.24	12.68	12.18	11.74	11.33
3.5	18.11	17.07	16.20	15.44	14.79	14.21	13.69	13.22
4	20.70	19.51	18.51	17.65	16.91	16.24	15.65	15.11
4.5	23.28	21.95	20.82	19.86	19.02	18.27	17.60	17.00
5	25.87	24.39	23.14	22.06	21.13	20.30	19.56	18.89
10	51.74	48.78	46.28	44.12	42.27	40.59	39.12	37.77
15	77.62	73.17	69.42	66.18	63.40	60.89	58.67	56.66
20	103.49	97.55	92.55	88.24	84.54	81.18	78.23	75.54
25	129.36	121.94	115.69	110.30	105.67	101.48	97.79	94.43
30	155.23	146.33	138.83	132.37	126.80	121.77	117.35	113.32
35	181.10	170.72	161.97	154.43	147.94	142.07	136.90	132.20
40	206.97	195.11	185.11	176.49	169.07	162.36	156.46	151.09
45	232.84	219.50	208.24	198.55	190.21	182.66	176.02	169.98
50	258.72	243.88	231.38	220.61	211.34	202.95	195.58	188.86

The below table has been calculated from an independently verified formula by: Professor Bruce Melville, FRSNZ, FIPENZ
Professor and Head of Department, Department of Civil and Environmental Engineering, The University of Auckland

20mm Pipe Pressure Drop in kPa

Acceptable flow rates to sanitary fixtures in NZBG G12/AS1

Bath	0.3 l/s at 45°C	18 l/min
Sink	0.2 l/s at 60°C	12 l/min
Laur	0.2 l/s at 60°C	12 l/min
Basi	0.1 l/s at 45°C	6 l/min
Shov	0.1 l/s at 45°C	6 l/min

Length (m)	kPa Pressure drop at required **6** l/min							
	20°C	30°C	40°C	50°C	60°C	70°C	80°C	90°C
0.5	0.08	0.07	0.07	0.06	0.06	0.06	0.06	0.06
1	0.15	0.14	0.13	0.13	0.12	0.12	0.11	0.11
1.5	0.22	0.21	0.20	0.19	0.18	0.18	0.17	0.16
2	0.30	0.28	0.27	0.26	0.24	0.23	0.23	0.22
2.5	0.37	0.35	0.33	0.32	0.31	0.29	0.28	0.27
3	0.45	0.42	0.40	0.38	0.37	0.35	0.34	0.33
3.5	0.52	0.49	0.47	0.45	0.43	0.41	0.40	0.38
4	0.60	0.56	0.53	0.51	0.49	0.47	0.45	0.44
4.5	0.67	0.63	0.60	0.57	0.55	0.53	0.51	0.49
5	0.75	0.70	0.67	0.64	0.61	0.59	0.56	0.55
10	1.49	1.41	1.34	1.27	1.22	1.17	1.13	1.09
15	2.24	2.11	2.00	1.91	1.83	1.76	1.69	1.64
20	2.99	2.82	2.67	2.55	2.44	2.34	2.26	2.18
25	3.73	3.52	3.34	3.18	3.05	2.93	2.82	2.73
30	4.48	4.22	4.01	3.82	3.66	3.51	3.39	3.27
35	5.23	4.93	4.67	4.46	4.27	4.10	3.95	3.82
40	5.97	5.63	5.34	5.09	4.88	4.69	4.52	4.36
45	6.72	6.34	6.01	5.73	5.49	5.27	5.08	4.91
50	7.47	7.04	6.68	6.37	6.10	5.86	5.64	5.45

Length (m)	kPa Pressure drop at required **12** l/min							
	20°C	30°C	40°C	50°C	60°C	70°C	80°C	90°C
0.5	0.25	0.24	0.23	0.21	0.21	0.20	0.19	0.18
1	0.50	0.47	0.45	0.43	0.41	0.39	0.38	0.37
1.5	0.75	0.71	0.67	0.64	0.62	0.59	0.57	0.55
2	1.01	0.95	0.90	0.86	0.82	0.79	0.76	0.73
2.5	1.26	1.18	1.12	1.07	1.03	0.99	0.95	0.92
3	1.51	1.42	1.35	1.29	1.23	1.18	1.14	1.10
3.5	1.76	1.66	1.57	1.50	1.44	1.38	1.33	1.28
4	2.01	1.89	1.80	1.71	1.64	1.58	1.52	1.47
4.5	2.26	2.13	2.02	1.93	1.85	1.77	1.71	1.65
5	2.51	2.37	2.25	2.14	2.05	1.97	1.90	1.83
10	5.02	4.74	4.49	4.28	4.10	3.94	3.80	3.67
15	7.53	7.10	6.74	6.42	6.16	5.91	5.70	5.50
20	10.05	9.47	8.98	8.57	8.21	7.88	7.59	7.33
25	12.56	11.84	11.23	10.71	10.26	9.85	9.49	9.17
30	15.07	14.21	13.48	12.85	12.31	11.82	11.39	11.00
35	17.58	16.57	15.72	14.99	14.36	13.79	13.29	12.83
40	20.09	18.94	17.97	17.13	16.41	15.76	15.19	14.67
45	22.60	21.31	20.22	19.27	18.46	17.73	17.09	16.50
50	25.11	23.67	22.46	21.42	20.52	19.70	18.99	18.33

Length (m)	kPa Pressure drop at required **18** l/min							
	20°C	30°C	40°C	50°C	60°C	70°C	80°C	90°C
0.5	0.51	0.48	0.46	0.44	0.42	0.40	0.39	0.37
1	1.02	0.96	0.91	0.87	0.83	0.80	0.77	0.75
1.5	1.53	1.44	1.37	1.31	1.25	1.20	1.16	1.12
2	2.04	1.93	1.83	1.74	1.67	1.60	1.54	1.49
2.5	2.55	2.41	2.28	2.18	2.09	2.00	1.93	1.86
3	3.06	2.89	2.74	2.61	2.50	2.40	2.32	2.24
3.5	3.57	3.37	3.20	3.05	2.92	2.80	2.70	2.61
4	4.09	3.85	3.65	3.48	3.34	3.20	3.09	2.98
4.5	4.60	4.33	4.11	3.92	3.75	3.61	3.47	3.36
5	5.11	4.81	4.57	4.35	4.17	4.01	3.86	3.73
10	10.21	9.63	9.13	8.71	8.34	8.01	7.72	7.46
15	15.32	14.44	13.70	13.06	12.51	12.02	11.58	11.18
20	20.42	19.25	18.27	17.42	16.68	16.02	15.44	14.91
25	25.53	24.07	22.83	21.77	20.86	20.03	19.30	18.64
30	30.64	28.88	27.40	26.12	25.03	24.03	23.16	22.36
35	35.74	33.69	31.97	30.48	29.20	28.04	27.02	26.09
40	40.85	38.51	36.53	34.83	33.37	32.04	30.88	29.82
45	45.95	43.32	41.10	39.19	37.54	36.05	34.74	33.55
50	51.06	48.13	45.67	43.54	41.71	40.05	38.60	37.27

The below table has been calculated from an independently verified formula by: Professor Bruce Melville, FRSNZ, FIPENZ
Professor and Head of Department, Department of Civil and Environmental Engineering, The University of Auckland

28mm Pipe Pressure Drop in kPa

Acceptable flow rates to sanitary fixtures in NZBG G12/AS1

Bath	0.3 l/s at 45°C	18 l/min
Sink	0.2 l/s at 60°C	12 l/min
Laur	0.2 l/s at 60°C	12 l/min
Basi	0.1 l/s at 45°C	6 l/min
Shov	0.1 l/s at 45°C	6 l/min

Length (m)	kPa Pressure drop at required **6** l/min							
	20°C	30°C	40°C	50°C	60°C	70°C	80°C	90°C
0.5	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.02
1	0.05	0.05	0.05	0.05	0.04	0.04	0.04	0.04
1.5	0.08	0.08	0.07	0.07	0.07	0.06	0.06	0.06
2	0.11	0.10	0.10	0.09	0.09	0.08	0.08	0.08
2.5	0.13	0.13	0.12	0.11	0.11	0.10	0.10	0.10
3	0.16	0.15	0.14	0.14	0.13	0.12	0.12	0.12
3.5	0.19	0.17	0.17	0.16	0.15	0.15	0.14	0.14
4	0.21	0.20	0.19	0.18	0.17	0.17	0.16	0.15
4.5	0.24	0.22	0.21	0.20	0.19	0.19	0.18	0.17
5	0.26	0.25	0.24	0.23	0.22	0.21	0.20	0.19
10	0.53	0.50	0.47	0.45	0.43	0.42	0.40	0.39
15	0.79	0.75	0.71	0.68	0.65	0.62	0.60	0.58
20	1.06	1.00	0.95	0.90	0.86	0.83	0.80	0.77
25	1.32	1.25	1.18	1.13	1.08	1.04	1.00	0.96
30	1.59	1.49	1.42	1.35	1.30	1.24	1.20	1.16
35	1.85	1.74	1.65	1.58	1.51	1.45	1.40	1.35
40	2.11	1.99	1.89	1.80	1.73	1.66	1.60	1.54
45	2.38	2.24	2.13	2.03	1.94	1.87	1.80	1.74
50	2.64	2.49	2.36	2.25	2.16	2.07	2.00	1.93

Length (m)	kPa Pressure drop at required **12** l/min							
	20°C	30°C	40°C	50°C	60°C	70°C	80°C	90°C
0.5	0.09	0.08	0.08	0.08	0.07	0.07	0.07	0.07
1	0.18	0.17	0.16	0.15	0.15	0.14	0.13	0.13
1.5	0.27	0.25	0.24	0.23	0.22	0.21	0.20	0.20
2	0.36	0.34	0.32	0.30	0.29	0.28	0.27	0.26
2.5	0.44	0.42	0.40	0.38	0.36	0.35	0.34	0.32
3	0.53	0.50	0.48	0.46	0.44	0.42	0.40	0.39
3.5	0.62	0.59	0.56	0.53	0.51	0.49	0.47	0.45
4	0.71	0.67	0.64	0.61	0.58	0.56	0.54	0.52
4.5	0.80	0.75	0.72	0.68	0.65	0.63	0.61	0.58
5	0.89	0.84	0.80	0.76	0.73	0.70	0.67	0.65
10	1.78	1.68	1.59	1.52	1.45	1.39	1.34	1.30
15	2.67	2.51	2.38	2.27	2.18	2.09	2.02	1.95
20	3.56	3.35	3.18	3.03	2.90	2.79	2.69	2.60
25	4.44	4.19	3.97	3.79	3.63	3.49	3.36	3.24
30	5.33	5.03	4.77	4.55	4.36	4.18	4.03	3.89
35	6.22	5.86	5.56	5.30	5.08	4.88	4.70	4.54
40	7.11	6.70	6.36	6.06	5.81	5.58	5.37	5.19
45	8.00	7.54	7.15	6.82	6.53	6.27	6.05	5.84
50	8.89	8.38	7.95	7.58	7.26	6.97	6.72	6.49

Length (m)	kPa Pressure drop at required **18** l/min							
	20°C	30°C	40°C	50°C	60°C	70°C	80°C	90°C
0.5	0.18	0.17	0.16	0.15	0.15	0.14	0.14	0.13
1	0.36	0.34	0.32	0.31	0.30	0.28	0.27	0.26
1.5	0.54	0.51	0.49	0.46	0.44	0.43	0.41	0.40
2	0.72	0.68	0.65	0.62	0.59	0.57	0.55	0.53
2.5	0.90	0.85	0.81	0.77	0.74	0.71	0.68	0.66
3	1.08	1.02	0.97	0.92	0.89	0.85	0.82	0.79
3.5	1.27	1.19	1.13	1.08	1.03	0.99	0.96	0.92
4	1.45	1.36	1.29	1.23	1.18	1.13	1.09	1.06
4.5	1.63	1.53	1.45	1.39	1.33	1.28	1.23	1.19
5	1.81	1.70	1.62	1.54	1.48	1.42	1.37	1.32
10	3.61	3.41	3.23	3.08	2.95	2.84	2.73	2.64
15	5.42	5.11	4.85	4.62	4.43	4.25	4.10	3.96
20	7.23	6.81	6.46	6.16	5.90	5.67	5.46	5.28
25	9.03	8.52	8.08	7.70	7.38	7.09	6.83	6.60
30	10.84	10.22	9.70	9.24	8.86	8.50	8.20	7.91
35	12.65	11.92	11.31	10.78	10.33	9.92	9.56	9.23
40	14.45	13.63	12.93	12.33	11.81	11.34	10.93	10.55
45	16.26	15.33	14.54	13.87	13.28	12.76	12.29	11.87
50	18.07	17.03	16.16	15.41	14.76	14.17	13.66	13.19

Pressure Conversion

kPa	Bar	PSI	MPa
1	0.01	0.1450	0.001
100	1.00	14.40	0.1
200	2.00	29.01	0.2
300	3.00	43.51	0.3
400	4.00	58.02	0.4
500	5.00	72.52	0.5
600	6.00	87.02	0.6
700	7.00	101.53	0.7
800	8.00	116.03	0.8
900	9.00	130.53	0.9
1000	10.00	145.04	1

Definition of Terms

Term	Definition
Dezincification	Dezincification of brass is a form of selective corrosion that happens when Zinc is leached out of the alloy leaving a porous copper fitting
Dezincification Resistant (DZR/DR)	Dezincification Resistant brass is a specifically modified brass alloy purposefully made to be suitable for potable water reticulation.
Elastic Modulus	Elastic Modulus or Modulus of Elasticity is the mathematical description of an object or substance's tendency to be deformed elastically (i.e. non-permanently) when a force is applied to it.
EVA	Ethylene Vinyl Acetate is the co-polymer of Ethylene and Vinyl Acetate. It is a polymer that approaches elastomeric materials in softness and flexibility but can be processed like other thermoplastics.
Hydrostatic Pressure	The pressure exerted by a fluid at equilibrium at a given point within the fluid, due to the force of gravity. Hydrostatic pressure increases in proportion to depth measured from the surface because of the increasing weight of fluid exerting downward force from above.
Isotactic	A type of polymeric molecular structure containing a sequence of regularly spaced, asymmetric atoms arranged in like configuration in a polymer chain.
Kinematic Velocity	A measure of the resistance to flow of a fluid, equal to its absolute viscosity divided by its density, usually measured in stokes.
Laminar flow	Sometimes known as streamline flow, occurs when a fluid flows in parallel layers, with no disruption between the layers. At low velocities the fluid tends to flow without lateral mixing and adjacent layers slide past one another like playing cards.
LDPE	Low Density Polyethylene is a thermoplastic made from petroleum and has the distinction of being the first grade of polyethylene produced in 1933.
Potable	Drinking water or potable water is water pure enough to be consumed or used with low risk of immediate or long term harm.
Thermal Conductivity	The property of a material to conduct heat, materials with a high level of thermal conductivity allows heat to transfer at a faster rate than those with a low thermal conductivity.

Thermoplastic	Also known as thermo-softening plastic is a polymer that turns to a liquid when heated and freezes to a very glassy state when cooled sufficiently. Most thermoplastics are high molecular weight polymers.
Turbulent Flow	Movement of a fluid in which subcurrents in the fluid display turbulence, moving in irregular patterns, while the overall flow is in one direction. Turbulent flow is common in non-viscous fluids moving at high velocities.
Viscosity	Viscosity is a measure of the resistance of a fluid which is being deformed by either shear stress or tensile stress.
Volatile Organic Compounds (VOC)	Volatile Organic Compounds are emitted as gases from certain solids or liquids. VOC's include a variety of chemicals, some of which may have short or long term adverse health risks.

Compatibility of PB-1 Systems

Dux SecuraGold™ fittings and pipes are manufactured to AS/NZS 2642.1, 2 and 3 standards and as such compatible PB-1 pipe which has been manufactured to the same standard would be suitable for use with SecuraGold™ fittings specifically for maintenance situations and not full new installations. If the pipe specifications are correct to the AS/NZS 2642.2 standard and the crimped fitting/s gauge appropriately Dux will guarantee the connection.
(Note: This statement excludes all PB-1 pipe and fittings manufactured/supplied by LEAP)

DISCLAIMER: All information contained within this Technical Manual is supplied in good faith and whilst all reasonable care has been taken to ensure the accuracy of the information this manual should not be used as the sole source of information by the reader/user. Reference material such as standards are 'live' documents and are amended at times and may change aspects or specifications for installations contained within this manual. In case of uncertainty, the reader/user should contact Dux Industries Ltd or the local government body for clarification. Dux Industries Ltd has a policy of continual research and development and reserves the right to amend without notice the specification and design of all products illustrated in this Technical Manual. No responsibility can be accepted by Dux Industries Ltd for any error, omissions, or incorrect assumptions.

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Owner's Guide and Installation Instructions



Solar Thermosiphon Water Heater Stainless Steel Tanks

Distributed in New Zealand by Solar Group Limited: solargroup.co.nz **0800 769 377**

Solahart®
hot water free from the sun®

WARNING: Plumber – Be Aware
Use copper pipe ONLY. Plastic pipe MUST NOT be used.
It is a requirement of a solar water heater installation that all pipe work be in copper and not plastic, due to the effects of high water temperatures.

This water heater must be installed and serviced by a qualified person.
Please leave this gutde with the householder or responsible officer.



WARNING: Plumber – Be Aware

- The solar hot and solar cold pipe work between the thermosiphon solar storage tank and the solar collectors are supplied in the pipe kit. The supplied copper solar hot and solar cold pipes **MUST BE** used.

- If the solar water heater is installed either on a metal roof or in a trafficable area, such as on an accessible roof, then the solar hot and solar cold pipes must be insulated. The solar hot and solar cold pipes may be required to be insulated to comply with local regulations.

If insulation is required, the full length of the solar hot and solar cold pipes **MUST BE** insulated.

The insulation must:

- be of a closed cell type or equivalent, suitable for a solar water heating application and capable of withstanding the temperature of the water or closed circuit fluid generated by the solar collectors under stagnation conditions

The specification of the chosen insulation material should be checked with the insulation manufacturer prior to installation as different materials may vary in temperature tolerance.

- be at least 13 mm thick, however thicker insulation may be required to comply with the requirements of AS/NZS 3500.4

- be weatherproof and UV resistant

- be fitted up to and cover the connections on both the solar storage tank and the solar collectors.

The insulation will offer corrosion protection to a metal roof against water runoff over the copper pipe, assist in avoiding accidental contact with the solar pipe work as high temperature water or closed circuit fluid can flow from the solar collectors to the solar storage tank and also reduce pipe heat losses.

- Plastic pipe **MUST NOT** be used, as it will not withstand the temperature and pressure of the closed circuit fluid (indirect system) and water (direct system) generated by the solar collectors under stagnation conditions. The solar collectors can generate extremely high water or closed circuit fluid temperatures up to 150°C and high water pressure of 850 kPa. Plastic pipe cannot withstand these temperatures and pressures and **MUST NOT** be used. Failure of plastic pipe can lead to the release of high temperature closed circuit fluid and water and cause severe water damage and flooding.

- There **must be a continuous fall of a minimum 10°** in the pipe work from the thermosiphon solar storage tank to the solar collectors. The highest point of the solar cold pipe and solar hot pipe must be where they connect to the thermosiphon solar storage tank, otherwise thermosiphoning will not occur.

- The solar water heater is to be isolated during the testing and commissioning of the heated water reticulation system in a building, in accordance with Clause 11.1 and 11.3 (a) of AS/NZS 3500.4.

PATENTS

This water heater may be protected by one or more patents or registered designs in the name of Rheem Australia Pty Ltd.

TRADE MARKS

® Registered trademark of Rheem Australia Pty Ltd.
™ Trademark of Rheem Australia Pty Ltd.

Note: Every care has been taken to ensure accuracy in preparation of this publication. No liability can be accepted for any consequences, which may arise as a result of its application.

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The other pages are intended for the installer but may be of interest.

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ABOUT YOUR WATER HEATER

WATER HEATER APPLICATION

This water heater is designed for use in a single family domestic dwelling for the purpose of heating potable water. Its use in an application other than this may shorten its life.

MODEL TYPE

Your Solahart Stainless Steel thermosiphon solar water heater is designed for both the solar collectors and the solar storage tank to be roof mounted. The solar storage tank has a Colorbond jacket. The 52L tank (direct system) is suitable for installation with Solahart Stainless Steel Australis or Titan solar collectors (RL series) and the 52H tank (indirect system) is suitable for installation with Solahart Stainless Steel S200 (52H series), Australis or Titan solar collectors (RLX series).

The 52L and RL series systems do not have freeze protection. These systems are not suitable for installation in areas subject to frost or freeze conditions. Freeze conditions occur below 6°C. These systems have NO WARRANTY for freeze damage (refer to "Terms of the Solarhart Stainless Steel Warranty" on page 66).

The 52H and RLX series systems are suitable for installation in areas subject to frost or freeze conditions. Freeze conditions occur below 6°C. These systems have NO WARRANTY for freeze damage if non Solahart Stainless Steel approved closed circuit fluid has been used or if the closed circuit fluid has been incorrectly mixed (refer to "Terms of the Solarhart Stainless Steel Warranty" on page 66).

This water heater is designed to be installed as an electric boosted solar water heater with its booster heating unit connected to a power supply, however it may be installed with an in-series continuous flow or storage booster. If this water heater is installed with an in-series booster, then the electric booster heating unit will not be connected to a power supply and the references to the electric booster heating unit, thermostat and boosting controls in this Guide will not be applicable to the installation. For information relating to the function and operation of the in-series booster, refer to the Owners Guide and Installation Instructions supplied with the booster water heater.

SOLAR OPERATION

The Solahart Stainless Steel solar thermosiphon system has its stainless steel solar storage tank installed on the roof directly coupled to the solar collectors. The 52L and RL series are direct solar hot water systems and the 52H and RLX series are indirect solar hot water systems with a heat exchanger in the solar storage tank.

52L, RL series: The solar storage tank and solar collectors are connected by copper pipe work and form an open circuit which is filled with potable water.

52H, RLX series: The heat exchanger and solar collectors are connected by copper pipe work and form a closed circuit which is filled with closed circuit fluid. The closed circuit fluid is a solution of a blue, non-toxic food grade propylene glycol concentrate mixed with water. The closed circuit concentrate is used to lower the freezing temperature of the closed circuit fluid and provides protection against freezing. The closed circuit also provides protection to the solar collectors and solar pipe work against harsh water chemistry.



The solar water heater works on the simple scientific fact that hot fluid rises. As the sun heats the water or closed circuit fluid in the solar collectors, the increase in temperature causes the fluid to rise through a copper pipe into the storage tank (52L, RL series) or heat exchanger (52H, RLX series) where it transfers its heat into the water in the solar storage tank. This allows cooler fluid from the storage tank or heat exchanger to flow into the solar collectors to be heated by the sun's energy. This process continues while solar energy is available.

Automatic safety controls are fitted to the water heater to provide safe and efficient operation.

ELECTRIC BOOSTING

Water stored in the solar storage tank can be heated by an electric booster heating unit. The booster heating unit is for heating the water at times of low solar energy gain, such as during very cloudy or rainy weather, or during the colder months.

The amount of water heated by the raised booster heating unit of the thermosiphon solar storage tank is 90 litres (180 tank) or 150 litres (300 tank).

The thermosiphon solar water heater is most suited for the booster heating unit to be connected to either a continuous, or a time of use, or an extended Off-Peak (overnight and day) electricity supply. A timer can also be used to control the boosting periods and help maximise solar savings. Refer to "Booster Control" on page 7.

The booster heating unit may be connected to an Off-Peak (overnight) electricity supply; however this will only allow the booster to heat the water overnight. If this type of connection is considered, care must be taken to ensure there is sufficient boost capacity to meet the household's full day and night's hot water supply during periods of no or low solar gain, particularly in cold weather. There is also an increased risk of temperature run down occurring, particularly in cooler weather (refer to "Temperature Run Down" on page 7).

The booster heating unit is controlled by an electric thermostat. The thermostat and its over temperature energy cut out are mounted on the solar storage tank behind the front cover. The water temperature is automatically controlled to the thermostat setting when the booster heating unit is energised.

MAINS PRESSURE

The water heater is designed to operate at mains pressure by connecting directly to the mains water supply. If the mains supply pressure in your area exceeds that shown on page 21, a pressure limiting valve must be fitted. The supply pressure should be greater than 350 kPa for true mains pressure operation to be achieved.

HOW HOT SHOULD THE WATER BE?

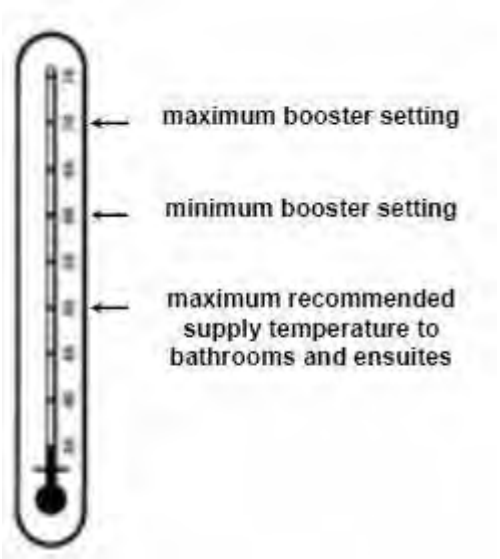
The temperature the system will operate at under solar radiation will depend upon the level of solar radiation available, orientation and inclination of the solar collectors, incoming cold water temperature and volume of hot water used.

Under normal household use and average operating conditions, the system may achieve a water temperature of approximately twice the maximum daily outside air temperature. During periods high solar radiation conditions and low hot water consumption, a system fitted with an over temperature protection (OTP) system may heat the water up to 85°C, whilst the water temperature could exceed 85°C for a system without OTP.

During periods of low solar energy gain, the water temperature can be boosted by the thermostatically controlled electric booster heating unit. Refer to "Booster Control" on page 7.

Solahart Stainless Steel recommends the thermostat is set at 60°C to maximise solar contribution.

Note: AS 3498 requires that a water heater provides the means to inhibit the growth of Legionella bacteria in potable water. This water heater can satisfy this AS 3498 requirement provided the electric booster is energised for a sufficient period each day and the electric booster thermostat setting is 60°C or higher.



If this water heater is installed with an in-series continuous flow gas booster, then this requirement of AS 3498 can be satisfied provided the booster is energised, its preset outlet temperature setting is 70°C or higher and a remote temperature controller is not used.

If this water heater is installed with an in-series storage booster, then this requirement of AS 3498 can be satisfied provided the storage booster is energised and its thermostat setting is 60°C or higher.

HOTTER WATER INCREASES THE RISK OF SCALD INJURY

This water heater can deliver water at temperatures which can cause scalding. Check the water temperature before use, such as when entering a shower or filling a bath or basin, to ensure it is suitable for the application and will not cause scald injury.

We recommend and it may also be required by regulations that an approved temperature limiting device be fitted into the hot water pipe work to the bathroom and ensuite when this water heater is installed. This will keep the water temperature below 50°C at the bathroom and ensuite. The risk of scald injury will be reduced and still allow hotter water to the kitchen and laundry.

TEMPERATURE ADJUSTMENT

The water heater features a tradesperson adjustable thermostat. This requires a licensed tradesperson to make any temperature adjustments. The thermostat has a maximum temperature setting of 70°C and a minimum temperature setting of 60°C.

We advise you have your electrician adjust the thermostat to the lowest setting which meets your needs, especially if there are young children or elderly people in the home. Refer to "Hotter Water Increases the Risk of Scald Injury" on page 6.

WARNING

This water heater is only intended to be operated by persons who have the experience or the knowledge and the capabilities to do so. This water heater is not intended to be operated by persons with reduced physical, sensory or mental capabilities i.e. the infirm, or by children. Children should be supervised to ensure they do not interfere with the water heater.

This water heater uses 240 V AC power for the electrically operated components. The removal of the side cover will expose 240 V wiring. It must only be removed by a qualified person.

Care should be taken not to touch any exposed pipe work or fittings connecting the solar storage tank and the solar collectors, as this may result in a burn injury. Very high temperature closed circuit fluid or hot water and in some circumstances high temperature steam can be generated by the solar collectors under certain conditions and flow through the pipe work from the solar collectors to the solar storage tank.

Note: Any exposed pipe work or fittings in the solar circuit should be attended to and covered with insulation. Phone Solahart Stainless Steel Service or their nearest Accredited Service Agent to arrange for an inspection.

Should the water from a 52H or RLX series water heater appear blue or if blue closed circuit fluid is noticed around the base of the water heater or solar collectors, this indicates a leak of the closed circuit fluid from the heat exchanger or the solar collectors. The closed circuit fluid is non-toxic and not hazardous to health. Phone Solahart Stainless Steel Service or their nearest Accredited Service Agent to arrange for an inspection.

SAFETY

This water heater is supplied with a thermostat, an over-temperature cut-out, and a combination temperature pressure relief valve. These devices must not be tampered with or removed. The water heater must not be operated unless each of these devices is fitted and is in working order.

The operation of the over-temperature cut-out on the thermostat indicates a possibly dangerous situation. If the over-temperature cut-out operates, it must not be reset and the water heater must be serviced by a qualified person.

If the electrical conduit to the solar storage tank is damaged, it must be replaced by a qualified person in order to avoid a hazard. Phone Solahart Stainless Steel Service or their nearest Accredited Service Agent to arrange for an inspection.



Warning: For continued safety of this water heater it must be installed, operated and maintained in accordance with the Owner‟s Guide and Installation Instructions.

The Solahart Stainless Steel warranty may not cover faults if relief valves or other safety devices are tampered with or if the installation is not in accordance with these instructions.

PRECAUTIONS

Where damage to property can occur in the event of the water heater leaking, the water heater must be installed in a safe tray. Construction, installation and draining of a safe tray must comply with AS/NZS 3500.4 and all local codes and regulatory authority requirements.

The water heater must be maintained in accordance with the Owner's Guide and Installation Instructions.
Refer to "Regular Care" on page 11.

If this water heater is to be used where an uninterrupted hot water supply is necessary for your application or business you should ensure that you have back up redundancy within the hot water system design. This should ensure the continuity of hot water supply in the event that this water heater was to become inoperable for any reason. We recommend you seek advice from your plumber or specifier about your needs and building back up redundancy into your hot water supply system.

TEMPERATURE RUN DOWN

Temperature run down is the reduction in water temperature as the hotter water at the top of the storage cylinder transfers some of its heat to the cooler water in the lower section of the cylinder.

This effect is often perceived as heat loss, but is actually the redistribution of stored heat more evenly over the entire contents of the storage tank. This heat is not lost to the system. This may make it necessary to use the booster to raise the water in the top section of the cylinder back to an acceptable temperature.

Over-night temperature run down is most evident in the morning if the booster switch or time clock is left OFF over-night. It is more prevalent the more hot water is used the night before and also in the cooler months.
Day time temperature run down is quite evident on days of lower solar radiation particularly during the cooler months if the power to the booster heating element is not available, or the booster switch or time clock is left OFF.

If higher temperature water is required, particularly in the morning, then use of the booster heating unit is necessary to raise the temperature of the water in the top section of the cylinder. Refer to "Booster Control" on page 7.

BOOSTER CONTROL

An isolating switch is installed in the electrical meter box for the solar storage tank. This should be left switched on to allow the booster heating unit to operate if required. The booster heating unit is for heating the water at times of low solar energy gain, such as during very cloudy or rainy weather, or during the colder months.

The booster heating unit will only activate if heating is required and power is available from the switchboard.
When the water is below the thermostat setting, the booster heating unit will turn on and heat the water. The booster heating unit will automatically turn off when the temperature of the water reaches the thermostat setting.

Leaving the isolating switch switched on will also provide a sufficient period of time each day for the booster heating unit to operate, if required, to satisfy the requirements of AS 3498.

The amount of water heated by the raised booster heating unit of the thermosiphon solar storage tank will be 90 litres (180 tank) or 150 litres (300 tank).

Timer Control Switch

A suitably rated timer control switch can be installed and will help maximise energy savings with an electrically boosted solar water heater connected to a **continuous, time of use or extended Off-Peak (overnight and day)** electricity supply.

If used with an extended Off-Peak (overnight and day) electricity supply, the timer switch should:

- be operated by a continuous power supply on its own circuit from the switchboard with the booster heating unit operated by the Off-Peak power supply. A double pole isolating switch is required to be installed at the switchboard to simultaneously isolate both circuits.

Or

- be of a type which has an internal rechargeable battery to keep time when the power supply is not available to the timer.

Programming the Timer

Power must be available to the timer control switch before the booster heating unit can be activated.

The timer should be programmed:

- to suit the hot water consumption pattern of the household,
- with the end of the period to coincide with the commencement of the evening hot water usage, (a second period, such as prior to the morning hot water usage, may be necessary)
- to enable a boosting period of not less than the recommended continuous length of time for boosting,and
- for a period when power will be available for the booster heating unit to operate.

Note: When daylight saving time applies, you may consider resetting the timer accordingly.

The recommended continuous length of time for boosting is:

				Booster heating unit size		
Model	Minimum winter cold water temperature		Temperature rise	2.4 kW	3.6 kW	4.8 kW
180	Cool / temperate climate	10°C	50°C	2 ¼ hours	1 ½ hours	1 ¼ hours
	Temperate / sub tropical climate	15°C	45°C	2 hours	1 ½ hours	1 hour
	Tropical climate	20°C	40°C	1 ¾ hours	1 ¼ hours	1 hour
300	Cool / temperate climate	10°C	50°C	3 ¾ hours	2 ½ hours	2 hours
	Temperate / sub tropical climate	15°C	45°C	3 ½ hours	2 ¼ hours	1 ¾ hours
	Tropical climate	20°C	40°C	3 hours	2 hours	1 ½ hours

The recommended boosting periods are sufficient to allow the booster heating unit to heat up the boost volume of the solar storage tank to 60°C where the winter cold water temperatures do not fall below those shown. This may be necessary during periods of very low solar energy gain through the solar collectors, such as during constant rain or extremely cloudy weather, particularly in winter when the incoming cold water temperature is lower. The period will also provide a sufficient heat up time for the electric booster to operate, if required, to satisfy the requirements of AS 3498.

The booster heating unit will only activate if heating is required and power is available from the timer. When the water is below the thermostat setting, the booster heating unit will turn on and heat the water. The booster heating unit will automatically turn off either when the temperature of the water reaches the thermostat setting or at the end of the timer period, whichever comes first.

RAIN WATER TANK

If the 52H or RLX series solar water heater is installed on a section of roof which is part of a rain water runoff collection system, then it is recommended this section of roof and its gutter be isolated from the rain water collection system. The gutter should be isolated to a width greater than the solar water heater and pipe work and must have suitable drainage. This is to ensure in the event of a leak from the closed circuit, a rainwater tank cannot be contaminated with closed circuit fluid.

The closed circuit fluid contains food grade additives (rust inhibitor and anti-freeze agent), is non-toxic and is harmless to the environment. However, if it enters a rain water tank it can cause an unpleasant odour to develop and result in the rain water tank having to be drained and cleaned.

FREEZE PROTECTION

The 52H and RLX series solar water heaters are an indirect closed circuit solar hot water system with a heat exchanger in the solar storage tank. The heat exchanger and solar collectors form a closed circuit and are filled with closed circuit fluid. The closed circuit fluid is a solution of a blue, non-toxic food grade propylene glycol concentrate mixed with water. The closed circuit concentrate is used to lower the freezing temperature of the closed circuit fluid and provides protection against freezing.

During installation, the closed circuit concentrate is blended with water. The amount of closed circuit concentrate supplied with this water heater provides protection in frost prone areas to a temperature of -8°C.

If lower temperatures are anticipated, a greater concentration of closed circuit fluid will be required.
The system has NO WARRANTY for freeze damage if non Rheem approved closed circuit fluid has been used or if the closed circuit fluid has been incorrectly mixed (refer to "Terms of the Solarhart Stainless Steel Warranty" on page 66).

The 52L and RL series systems do not have freeze protection. The system is not suitable for installation in areas subject to frost or freeze conditions. Freeze conditions occur below 6°C. The system has NO WARRANTY for freeze damage (refer to "Terms of the Solarhart Stainless Steel Warranty" on page 66).

PIPE WORK AND INSULATION

The solar hot and solar cold pipe work between the thermosiphon solar storage tank and the solar collectors are supplied in the pipe kit. The supplied copper solar hot and solar cold pipes **MUST BE** used.

If the solar water heater is installed either on a metal roof or in a trafficable area, such as on an accessible roof, then the solar hot and solar cold pipes must be insulated. The solar hot and solar cold pipes may be required to be insulated to comply with local regulations.

If insulation is required, the full length of the solar hot and solar cold pipes **MUST BE** insulated.

Note: Any exposed pipe work or fittings in the solar circuit should be attended to and covered with insulation. Phone Solahart Stainless Steel Service or their nearest Accredited Service Agent to arrange for an inspection.

The insulation must:

- be of a closed cell type or equivalent, suitable for a solar water heating application and capable of withstanding the temperature of the water or closed circuit fluid generated by the solar collectors under stagnation conditions

  The specification of the chosen insulation material should be checked with the insulation manufacturer prior to installation as different materials may vary in temperature tolerance.

- be at least 13 mm thick, however thicker insulation may be required to comply with the requirements of AS/NZS 3500.4

- be weatherproof and UV resistant.

-
- be fitted up to and cover the connections on both the solar storage tank and the solar collectors

The insulation will offer corrosion protection to a metal roof against water runoff over the copper pipe, assist in avoiding accidental contact with the solar pipe work as high temperature water or closed circuit fluid can flow from the solar collectors to the solar storage tank and also reduce pipe heat losses.

Plastic pipe **MUST NOT** be used, as it will not withstand the temperature and pressure of the closed circuit fluid generated by the solar collectors under certain conditions (refer to Warning on page 36).

The pipe work between the solar storage tank and in-series booster (if one is installed) **MUST BE** of copper and fully insulated with a closed cell type insulation or equivalent (minimum thickness 13 mm).

TO TURN OFF THE WATER HEATER

If you plan to be away from home for a few nights, we suggest you leave the water heater switched on.

If it is necessary to turn off the water heater:

- Switch off the electrical supply at the isolating switch to the solar storage tank.
- Close the cold water isolation valve at the inlet to the water heater.

TO TURN ON THE WATER HEATER

- Open the cold water isolation valve fully at the inlet to the water heater.
- Switch on the electrical supply at the isolating switch to the solar storage tank.
- Check and if required reset the timer, if one is installed.

GOING ON HOLIDAYS

If you plan to be away from home, conserve energy by switching the booster switch "OFF". Refer to "To Turn off the Water Heater" on page 10. Also if the system is not used for a period in excess of 2 weeks it is recommended the solar collectors be covered.

Care should be taken when returning from holidays and the collectors have not been covered. The water in the storage tank can be very hot.

HOW DO I KNOW IF THE WATER HEATER IS INSTALLED CORRECTLY?

The water heater must be installed:

- by a qualified person, and
- in accordance with the installation instructions, and
- in compliance with Standards AS/NZS 3500.4, AS/NZS 3000 and all local codes and regulatory authority requirements.

In New Zealand, the installation must also conform with Clause G12 of the New Zealand Building Code.

VICTORIAN CUSTOMERS

Notice to Victorian Customers from the Victorian Plumbing Industry Commission. This water heater must be installed by a licensed person as required by the Victorian Building Act 1993.

Only a licensed person will give you a Compliance Certificate, showing that the work complies with all the relevant Standards. Only a licensed person will have insurance protecting their workmanship for 6 years.
Make sure you use a licensed person to install this water heater and ask for your Compliance Certificate.

DOES THE WATER CHEMISTRY AFFECT THE WATER HEATER?

The water heater is suitable for most public water supplies, however some water chemistries may have detrimental effects on the water heater, its components and fittings. Refer to "Water Supplies" on page 13.

If you are in a known harsh water area or you are not sure of your water chemistry, have your water checked against the conditions described on pages 13 to 15.

HOW LONG WILL THE WATER HEATER LAST?

The water heater is supported by a manufacturer's warranty (refer to page 66). There are a number of factors that will affect the length of service the water heater will provide. These include but are not limited to the water chemistry, the water pressure, the water temperature (inlet and outlet) and the water usage pattern. Refer to "Precautions" on page 7.

REGULAR CARE

MINOR SIX MONTH MAINTENANCE

It is recommended minor maintenance be performed every six months by the dwelling occupant.

The minor maintenance includes:

- Operate the easing lever on the temperature pressure relief valve (if accessible). It is very important you raise and lower the lever gently. Refer to "Temperature Pressure Relief Valve" on page 12.
- If the relief valve lever is not readily and safely accessible, contact Solahart Stainless Steel Service or their nearest Accredited Service Agent. Do not attempt to climb onto a non-trafficable roof to operate the relief valve lever.



Warning: Exercise care to avoid any splashing of water, as water discharged from the drain line will be hot. Stand clear of the drain line's point of discharge when operating the valve's lever.

- Operate the easing lever on the expansion control valve (if fitted). It is very important you raise and lower the lever gently. Refer to "Expansion Control Valve" on page 12.
- Check the drain line from the safe tray (if one is installed) is not blocked.

MAJOR FIVE YEAR SERVICE

It is recommended a major five year service be conducted on the water heater.



Warning: Servicing of a water heater must only be carried out by a qualified person. Phone Solahart Stainless Steel Service or their nearest Accredited Service Agent.

Note: The five year service and routine replacement of any components, such as the relief valves, are not included in the Solahart Stainless Steel warranty. A charge will be made for this work. Only genuine replacement parts should be used on this water heater.

The major service includes the following actions:

- Replace the temperature pressure relief valve.
- Inspect and flush the expansion control valve (if fitted). If required, replace the valve.
- Check the booster heating unit for excessive calcium build up or corrosion and replace if necessary.
- Check the closed circuit fluid level (52H / RLX series).
- Flush and bleed the solar collectors (52L / RL series).
- Clean the collector glass.
- Visually check the unit for any potential problems.
- Inspect all connections.
- Check the drain line from the safe tray (if one is installed) is not blocked.

Note: The solar storage tank may need to be drained during this service. After the completion of the service, the solar storage tank will take some time to reheat the water by solar gain. Depending upon the power supply connection to the booster heating unit, hot water may not be available until the next day.

TEMPERATURE PRESSURE RELIEF VALVE

This valve is near the top of the water heater and is essential for its safe operation. It is possible for the valve to release a little water through the drain line during each heating period. This occurs as the water is heated and expands by approximately 1/50 of its volume.

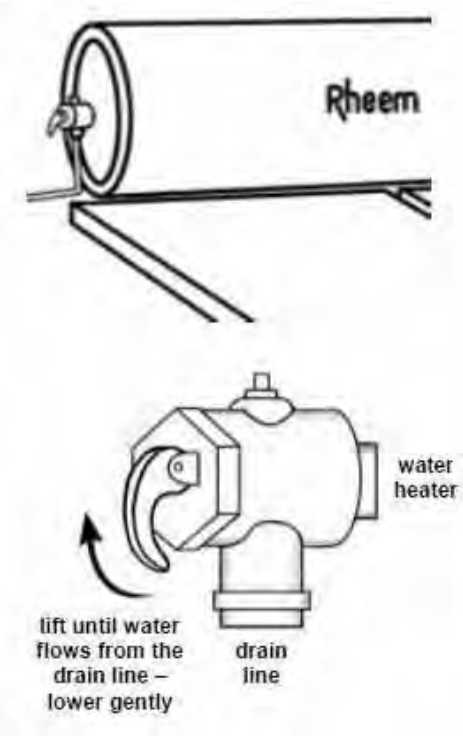
Continuous leakage of water from the valve and its drain line may indicate a problem with the water heater (refer to "Temperature Pressure Relief Valve Running" on page 17).

Warning: Never block the outlet of this valve or its drain line for any reason.

Operate the easing lever on the temperature pressure relief valve once every six months. **It is very important you raise and lower the lever gently.**

DANGER: Failure to do this may result in the water heater cylinder failing, or under certain circumstances, exploding.

Warning: Exercise care to avoid any splashing of water, as water discharged from the drain line will be hot. Stand clear of the drain line's point of discharge when operating the valve's lever.



If water does not flow freely from the drain line when the lever is lifted, then the water heater must be checked. Phone Solahart Stainless Steel Service or their nearest Accredited Service Agent to arrange for an inspection.

If the relief valve lever is not readily and safely accessible, contact Solahart Stainless Steel Service or their nearest Accredited Service Agent. Do not attempt to climb onto a non-trafficable roof to operate the relief valve lever.

The temperature pressure relief valve should be replaced at intervals not exceeding 5 years, or more frequently in areas where there is a high incidence of water deposits (refer to "Water Supplies" on page 13).

EXPANSION CONTROL VALVE

In many areas, including Queensland, South Australia, Western Australia and scaling water areas, an expansion control valve is fitted to the cold water line to the water heater. The expansion control valve may discharge a small quantity of water from its drain line during the heating period instead of the temperature pressure relief valve on the water heater.

Operate the easing lever on the expansion control valve once every six months. **It is very important you raise and lower the lever gently.** The expansion control valve should be checked for performance or replaced at intervals not exceeding 5 years, or more frequently in areas where there is a high incidence of water deposits.

COLLECTOR GLASS

Ensure the glass on your solar collectors is free of dust, salt spray or any other matter, which may reduce the effectiveness of the solar collectors. If the collector glass becomes dirty, hose down or if the solar collectors are accessible, wash the collector glass with water and a soft brush when the solar collectors are cool.

Have any trees trimmed which may shade the solar collectors.

Solahart Stainless Steel solar collectors have passed the AS/NZS 2712 requirements for resistance to hailstone damage, so it is not normally necessary to fit a guard to a collector. Stone Guards are available to provide a level of protection to the collectors against vandalism or accidental damage. Refer to your local Solar Distributor for details.

WATER SUPPLIES

This water heater must be installed in accordance with this advice to be covered by the Solahart Stainless Steel warranty.

This water heater is manufactured to suit the water conditions of most public reticulated water supplies. However, there are some known water chemistries which can have detrimental effects on the water heater and its operation and/or life expectancy. If you are unsure of your water chemistry, you may be able to obtain information from your local water supply authority. This water heater should only be connected to a water supply which complies with these guidelines for the Solahart Stainless Steel warranty to apply.

CHANGE OF WATER SUPPLY

The changing or alternating from one water supply to another can have a detrimental effect on the operation and / or life expectation of a water heater cylinder, a heat exchanger in an indirect solar water heater system, a temperature pressure relief valve, a heating unit and a solar collector in a direct solar water heater system.

Where there is a changeover from one water supply to another, e.g. a rainwater tank supply, bore water supply, desalinated water supply, public reticulated water supply or water brought in from another supply, then water chemistry information should be sought from the supplier or it should be tested to ensure the water supply meets the requirements given in these guidelines for the Solahart Stainless Steel warranty to apply.

CHLORIDE AND PH

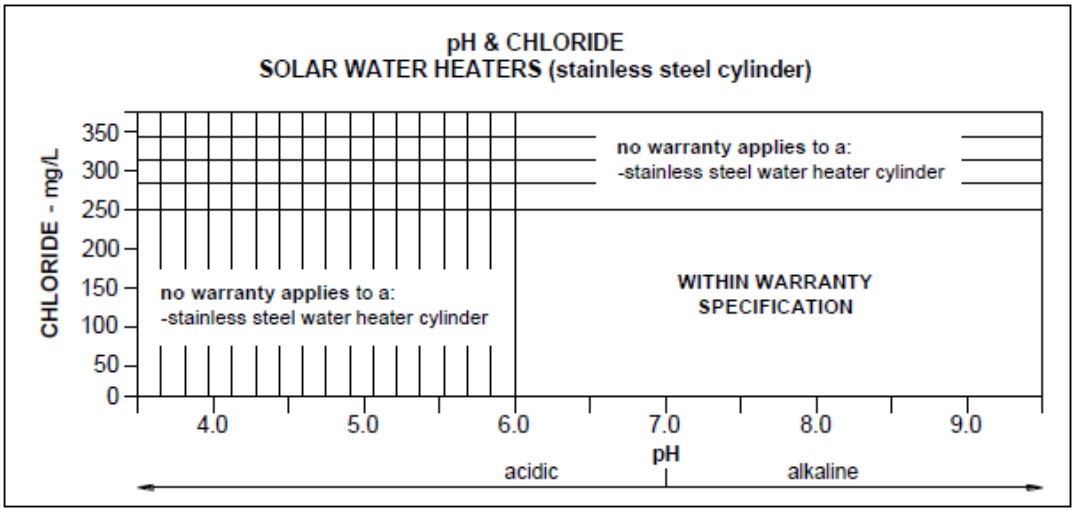
In a high chloride water supply, the water can corrode stainless steel parts and cause them to fail.
Where the chloride level exceeds 250 mg/L the Solahart Stainless Steel warranty does not apply to a stainless steel cylinder or a heat exchanger in a 52H cylinder.

pH is a measure of whether the water is alkaline or acid. In an acidic water supply, the water can attack stainless steel parts and cause them to fail.

Where the pH is less than 6.0 the Solahart Stainless Steel warranty does not apply to a stainless steel cylinder or a heat exchanger in a 52H cylinder. Water with a pH less than 6.0 may be treated to raise the pH.

The water supply from a rainwater tank in a metropolitan area is likely to be corrosive due to the dissolution of atmospheric contaminants. This may result in pH of less than 6.0. It is recommended an analysis on the water from a rainwater tank be conducted prior to connecting this type of water supply to a water heater with a stainless steel cylinder.

Refer to the pH and Chloride chart on page 13.



SATURATION INDEX

The saturation index is used as a measure of the water‟s corrosive or scaling properties.

In a corrosive water supply, the water can attack copper parts and cause them to fail. Where the saturation index is less than –1.0, the water is very corrosive and the Solahart Stainless Steel warranty does not apply to a copper sheathed heating unit or a solar collector in a direct solar water heater system. A corrosion resistant heating and an indirect solar water heater must be used unit must be used for the Solahart Stainless Steel warranty to apply to the heating unit and solar collector. This water heater is supplied fitted with a corrosion resistant heating unit.

In a scaling water supply calcium carbonate is deposited out of the water onto any hot metallic surface.

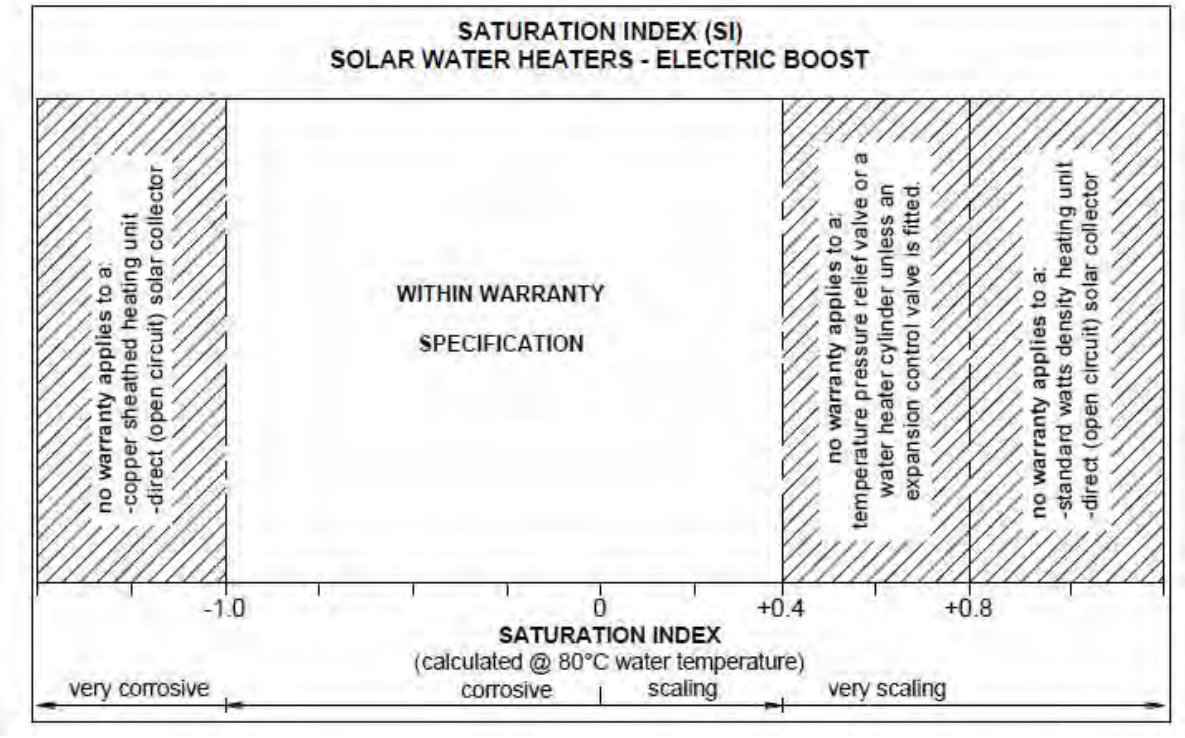
Where the saturation index exceeds +0.40, the water is very scaling. An expansion control valve must be fitted on the cold water line after the non-return valve to protect and for the Solahart Stainless Steel warranty to apply to the temperature pressure relief valve and water heater cylinder. Solar collectors in a direct solar water heater system should be covered when the water heater is not intended to be used for more than two weeks.

Where the saturation index exceeds +0.80, the Solahart Stainless Steel warranty does not apply to a standard watts density heating unit or a solar collector in a direct solar water heater system. A low watts density heating unit or an indirect solar water heater must be used for the Solahart Stainless Steel warranty to apply to the heating unit or solar collector.

Water which is scaling may be treated with a water softening device to reduce the saturation index of the water.

Refer to the Saturation Index chart on page 14. Refer to the cold water connection detail on page 51 for the position of the expansion control valve.

Contact Solahart Stainless Steel Service or their nearest Accredited Service Agent if a replacement heating unit is required.



SUMMARY OF WATER CHEMISTRY ADVICE AFFECTING WARRANTY

The water heater and its components are not suitable for certain water chemistries. Those chemistries are listed below. If the water heater is connected at any time to a water supply with the following water chemistry, the Solahart Stainless Steel warranty will not cover any resultant faults on the components listed below:

Water Chemistry	Component
Chloride > 250 mg/L	water heater cylinder and heat exchanger
pH < 6.0	water heater cylinder and heat exchanger
Saturation Index (SI) < -1.0	solar collector in a direct system copper sheathed heating unit
Saturation Index (SI) > +0.4 (if an expansion control valve is not fitted)	water heater cylinder and heat exchanger temperature pressure relief valve
Saturation Index (SI) > +0.8	solar collector in a direct system standard watts density heating unit

SAVE A SERVICE CALL

Check the items below before making a service call. You will be charged for attending to any condition or fault that is not related to manufacture or failure of a part.

NOT ENOUGH HOT WATER (OR NO HOT WATER)

This can occur with new installations and is normally related to some misunderstandings as to the use of the booster heating unit.



- **Insufficient sunlight**
  - Insufficient sunlight due to cloudy weather during hotter months or low solar energy contribution in colder months may mean the booster heating unit is required to boost more often.
  - Ensure the booster heating unit is being used as advised. Refer to "Booster Control" on page 7.
- **Booster heating unit not operating**
  - Inspect the isolating switch marked "HOT WATER" or "WATER HEATER" at the switchboard and ensure it is turned "ON".
  - Check the timer (if one is installed) and its settings to ensure power is available to the booster heating unit.
  - **Note:** Check the electricity supply to which the unit is connected. If on an Off-Peak or time controlled electricity supply remember heating hours are restricted.
  - Check the fuse marked "HOT WATER" or "WATER HEATER" at the switchboard.
- **Collectors shaded**
  - If trees or other objects shade the solar collectors or if the glass is dirty, the effectiveness of the solar collectors will be greatly reduced. Have the trees trimmed or the solar collectors relocated if the obstruction is permanent or clean the collector glass (refer to "Collector Glass" on page 12).
- **Are you using more hot water than you think?**
  - Is one outlet (especially the shower) using more hot water than you think?
  - Very often it is not realised the amount of hot water used, particularly when showering. Carefully review the family's hot water usage. As you have installed an energy saving appliance, energy saving should also be practised in the home. Adjust your water usage pattern to take advantage of maximum solar gains.
  - Have your plumber install a flow control valve to each shower outlet to reduce water usage.
- **Temperature pressure relief valve running**
  - Is the relief valve discharging too much water?
  - Refer to "Temperature Pressure Relief Valve Running" on page 17.
- **Thermostat setting**
  - Ensure the thermostat setting is appropriate. You may choose to have your electrician adjust the thermostat upwards to gain additional hot water capacity when boosting.
  - Refer to "Temperature Adjustment" on page 6.

⚠ **Warning:** Hotter water increases the risk of scald injury.

- **Water heater size**
  - Do you have the correct size water heater for your requirements?
  - The sizing guides in the sales literature and on the Solahart Stainless Steel website (www.rheem.com.au) suggest average sizes that may be needed.

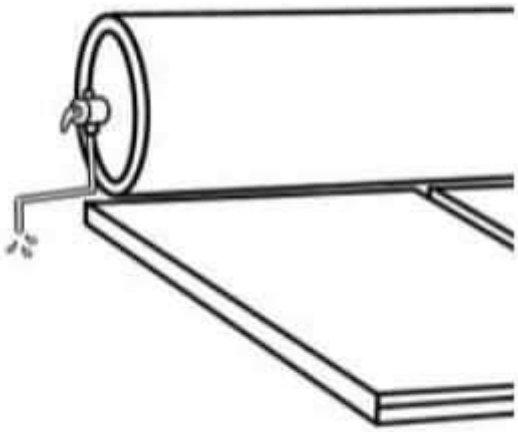
WATER NOT HOT ENOUGH

You may find that due to heavy hot water usage or low solar energy gain the water temperature may be lower than normally expected. Ensure the booster is being used as advised. If a timer is installed, you will need to carefully plan your use of the booster heating unit to boost the water temperature on such occasions. Refer to "Booster Control" on page 7.

A lower water temperature may also be noticed in the morning when the booster heating unit has not been energised overnight. This in particular may be experienced during periods of low solar energy gain and can be caused by the transfer of heat energy overnight to the cold water in the lower portion of the solar storage tank, or if there has been heavy hot water usage the previous night. Refer to "Temperature Run Down" on page 7.

TEMPERATURE PRESSURE RELIEF VALVE RUNNING

- **Normal Operation**
  - It is normal and desirable this valve allows a small quantity of water to escape during the heating cycle. However, if it discharges more than a bucket full of water in 24 hours, there may be another problem.



- **Continuous dribble**
  - Try gently raising the easing lever on the relief valve for a few seconds (if accessible) (refer to "Temperature Pressure Relief Valve" on page 12). This may dislodge a small particle of foreign matter and clear the fault. Release the lever gently.

- If the relief valve lever is not readily and safely accessible, contact Solahart Stainless Steel Service or their nearest Accredited Service Agent. Do not attempt to climb onto a non-trafficable roof to operate the relief valve lever.

- **Steady flows for long period (often at night)**
  - This may indicate the mains water pressure sometimes rises above the designed pressure of the water heater. Ask your installing plumber to fit a pressure limiting valve.

⚠ **Warning:** Never replace the relief valve with one of a higher pressure rating
.

- **Heavy flows of hot water until the water heater is cold - then stops until water reheats**
  If this occurs when the water heater is being boosted by the electric booster heating unit, then the water heater **must** be switched off at the isolating switch or switchboard. Phone Solahart Stainless Steel Service or their nearest Accredited Service Agent to arrange for an inspection.

- This may also occur on a water heater without an over temperature protection (OTP) system during periods of increased solar gain in the hotter months and particularly if there is a reduced level of hot water consumption. It is most likely to happen during the daytime.

- One of the functions of the temperature pressure relief valve is to relieve the tank of excess energy, i.e. when water temperature increases to a high level. This higher temperature water is replaced with incoming cold water to reduce the energy level inside of the tank. The valve will close when cooler water surrounds the temperature probe of the valve. As this is a function of the temperature pressure relief valve under these conditions, it is not necessary to make a service call.

EXPANSION CONTROL VALVE RUNNING

An expansion control valve fitted in the cold water line to the water heater (refer to page 51) may discharge a small quantity of water instead of the temperature pressure relief valve on the water heater. The benefit is that energy is conserved as the discharged water is cooler.

COLLECTOR GLASS

The Solahart Stainless Steel warranty **DOES NOT** cover breakage of solar collector glass. Check your household insurance policy covers collector glass breakage.

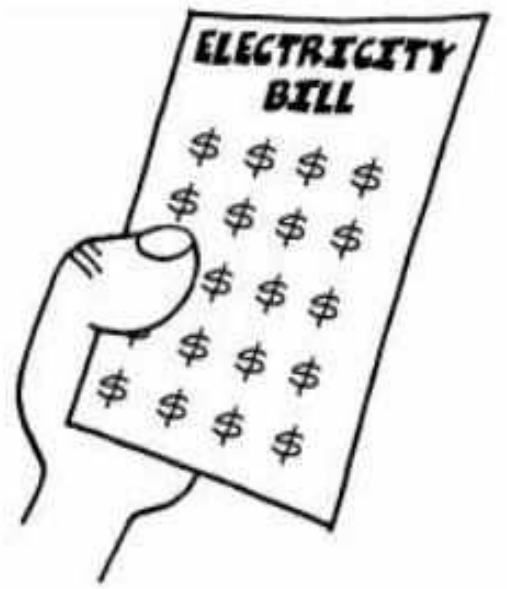
Warning: No attempt should be made to remove or replace broken collector glass.

The collector glass is not offered as a replacement part. Should the solar collector require replacement, contact Solahart Stainless Steel Service or their nearest Accredited Service Agent.

HIGHER THAN EXPECTED ELECTRICITY BILLS

With the installation of your new solar hot water system, maximum electrical energy savings can be achieved with careful planning of hot water usage. Should you at any time feel your electricity bill is higher than expected, we suggest you check the following points:

- Is the relief valve running excessively?
    - Refer to "Temperature Pressure Relief Valve Running" on page 17.
- Is one outlet (especially the shower) using more hot water than you think?
    - Refer to "Not Enough Hot Water" on page 16.
- Is there a leaking hot water pipe, dripping hot water tap, etc.?
    - Even a small leak will waste a surprising quantity of hot water and energy. Replace faulty tap washers, and have your plumber rectify any leaking pipe work.
- Are you using the booster heating unit properly?
    - Refer to "Booster Control" on page 7.
- Has there been an increase in hot water usage?
    - An increase in hot water usage may result in an increase in booster operation.
- Has your water heating tariff rate been increased by your electricity retailer since your previous bill?



ELECTRICITY TARIFFS

The electricity tariff to which your solar water heater is connected will play an important role in the overall effectiveness of the system. It is important you are aware of this tariff to enable you to take full advantage of the boosting period, i.e. Domestic / Continuous or Time of Use, Extended Off-Peak (overnight and day) or extended time controlled, or Off-Peak (overnight) or time controlled.

IF YOU HAVE CHECKED ALL THE FOREGOING AND STILL BELIEVE YOU NEED ASSISTANCE, PHONE SOLAR GROUP OR THEIR NEAREST ACCREDITED SERVICE AGENT.

INSTALLATION

THIS WATER HEATER IS NOT SUITABLE FOR POOL HEATING.

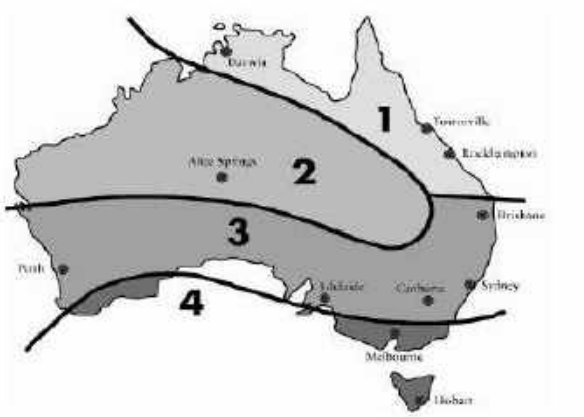
SOLAR COLLECTORS

The 52L tank is suitable for installation with Solahart Stainless Steel Australis or Titan solar collectors and the 52H tank is suitable for installation with Solahart Stainless Steel S200, Australis or Titan solar collectors.

In Australia, systems with Australis or S200 collectors are suitable for installation in all climate zones.

In Australia for climate zones 1, 2, and 3 there is a risk that systems with Titan collectors may over perform. We recommend that in climate zones 1, 2, and 3 Titan systems, with 2 or more collectors, only be installed at orientations between 60° and 90° from the equator.

In Australia in climate zone 4, systems with selective surface Titan collectors provide optimum performance compared with non-selective surface collectors, particularly in the months of lower solar radiation.



IMPORTANT NOTES

- Working on roofs is and should always be considered a hazardous activity, particularly early in the morning, late in the evening, when the roof is wet or during and after periods of rain.
- All work must be carried out in accordance with Local, State and Federal Occupational Safety, Health and Welfare Regulations. In particular, the requirements for safety whilst manual lifting, working at heights and on roofs.
- Installers must be competently trained in
    - Height Hazard Assessment
    - Working at Height Procedures
    - Assessment / Use / Wearing of correct height safety equipment (harnesses etc.)
- All other relevant safety factors specific to the installation and maintenance work to be compliant with suitable Occupational, Health and Safety Regulations / Codes.
- All relevant permits shall be obtained from the regulatory authorities before commencing work to install the solar hot water system.
- All work carried out must be performed by appropriately qualified tradespeople or be suitably supervised for trades assistant duties.
- Every care must be taken to protect and warn occupants of the building and the public from personal injury which may occur from falling tools, roof materials, fittings or any other hazards of a general nature.
- Advise the occupants of any inconvenience which may occur due to disconnection of existing water and electrical supplies.
- The connection, attachment, integration or general association of other equipment or parts which either directly or indirectly affect the operation or performance of this equipment could void the Solahart Stainless Steel warranty.
- All packaging materials must be removed from the solar storage tank prior to its installation. Refer to the warning on page 41 in relation to the removal of the solar collector packaging.

FREEZE PROTECTION

The 52L and RL series systems do not have freeze protection. These systems are not suitable for installation in areas subject to frost or freeze conditions. Freeze conditions occur below 6°C. The system has NO WARRANTY for freeze damage (refer to "Terms of the Solarhart Stainless Steel Warranty" on page 66).

The 52H and RLX series systems are suitable for installation in areas subject to frost or freeze conditions. Freeze conditions occur below 6°C. The system has NO WARRANTY for freeze damage if non Rheem approved closed circuit fluid has been used or if the closed circuit fluid has been incorrectly mixed (refer to "Terms of the Solarhart Stainless Steel Warranty" on page 66).

The 52H and RLX series systems are supplied with closed circuit concentrate. During installation and commissioning the closed circuit concentrate is blended with water in the appropriate proportion to achieve the required frost protection. The amount of closed circuit concentrate supplied with this water heater provides protection in frost prone areas to a temperature of -8°C. If a lower temperature protection is required, additional closed circuit concentrate will be needed. The storage cylinder must be filled with water before charging the closed circuit with closed circuit fluid. Refer to "Closed Circuit Fluid" on page 60.

INSTALLATION STANDARDS

The water heater must be installed:

- by a qualified person, and
- in accordance with the installation instructions, and
- in compliance with Standards AS/NZS 3500.4, AS/NZS 3000 and all local codes and regulatory authority requirements.

In New Zealand, the installation must also conform with Clause G12 of the New Zealand Building Code.

Victorian Installers

Notice to Victorian Installers from the Victorian Plumbing Industry Commission if this solar water heater is installed in a new Class 1 dwelling in the State of Victoria. The system model number is to be recorded on the Certificate of Compliance. It is also a requirement to provide the householder with permanent documentation recording the system model number exactly as it is shown in the „List of systems capable of complying with the regulations" published by Sustainability Victoria (see www.sustainability.vic.gov.au). This documentation may be in the form of an indelible label adhered to the solar storage tank, or other suitable form placed in an accessible location, such as the meter box, for later inspection.

WATER HEATER APPLICATION

This water heater is designed for use in a single family domestic dwelling for the purpose of heating potable water. Its use in an application other than this may shorten its life.

If this water heater is to be used where an uninterrupted hot water supply is necessary for the application or business, then there should be redundancy within the hot water system design. This should ensure the continuity of hot water supply in the event that this water heater was to become inoperable for any reason. We recommend you provide advice to the system owner about their needs and building backup redundancy into the hot water supply system.

This water heater is designed to be installed as an electric boosted solar water heater with its booster heating unit connected to a power supply, however it may be installed with an in-series continuous flow or storage booster. If this water heater is installed with an in-series booster, then the electric booster heating unit will not be connected to a power supply and the references to the electric booster heating unit, thermostat and boosting controls in these installation instructions will not be applicable to the installation.

Note: AS 3498 requires that a water heater provides the means to inhibit the growth of Legionella bacteria in potable water. This water heater can satisfy this AS 3498 requirement provided the electric booster is energised for a sufficient period each day and the electric booster thermostat setting is 60°C or higher.

If this water heater is installed with an in-series continuous flow gas booster, then this requirement of AS 3498 can be satisfied provided the booster is energised, its preset outlet temperature setting is 70°C or higher and a remote temperature controller is not used.

If this water heater is installed with an in-series storage booster, then this requirement of AS 3498 can be satisfied provided the storage booster is energised and its thermostat setting is 60°C or higher.

SOLAR WATER HEATER STORAGE TANK LOCATION

The solar storage tank is designed to be installed on the roof directly coupled to the solar collectors. The solar water heater should be installed close to the most frequently used outlet and its position chosen with safety and service in mind. The solar water heater should be installed with a north facing aspect (refer to "Solar Collector Location" on page 34).

The solar water heater must not be installed with an inclination of less than 10° or greater than 45°. The water heater may not thermosiphon or will not perform efficiently.



Clearance must be allowed for servicing of the solar storage tank. Make sure the temperature pressure relief valve lever is accessible and the side cover, thermostat and booster heating unit can be removed for service. You must be able to read the information on the rating plate.

Remember you may have to remove the entire solar storage tank later for servicing. The solar storage tank must be capable of being removed without structural alteration to the building or major alteration to the piping.

For a single water heater installation, refer to the diagrams on pages 27 to 33. For multiple water heater installations, follow the instructions on pages 57 and 58.

SAFE TRAY

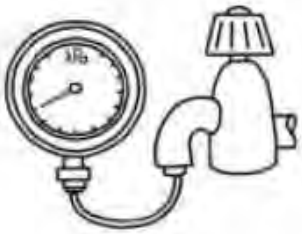
Where damage to property can occur in the event of the water heater leaking, the water heater must be installed in a safe tray. Construction, installation and draining of a safe tray must comply with AS/NZS 3500.4 and all local codes and regulatory authority requirements. AS/NZS 3500.4 also has particular requirements when a safe tray must be installed.

MAINS WATER SUPPLY

Where the mains water supply pressure exceeds that shown in the table below, an approved pressure limiting valve is required and should be fitted as shown in the installation diagram (refer to diagram on page 51).

Model	180, 300
Relief valve setting	850 kPa
Expansion control valve setting *	700 kPa
Max. mains supply pressure	
With expansion control valve	550 kPa
Without expansion control valve	680 kPa

* Expansion control valve supplied with the water heater



TANK WATER SUPPLY

If the water heater is supplied with water from a tank supply and a pressure pump system is not installed, then the bottom of the supply tank must be at least 1 m above the highest point of the hot water plumbing system, including the water heater. Care must be taken to avoid air locks. The cold water line to the water heater should be adequately sized and fitted with a full flow gate valve or ball valve.

RAIN WATER TANK

If a 52H or RLX series system is to be installed on a section of roof which is part of a rain water runoff collection system, then it is recommended this section of roof and its gutter be isolated from the rain water collection system. The gutter should be isolated to a width greater than the solar collectors and pipe work and must have suitable drainage. The installer should ensure in the event of a leak from the solar collectors or pipe work, a rainwater tank cannot be contaminated with closed circuit fluid.

While the closed circuit fluid is nontoxic to humans, it does have an adverse effect on water stored in rainwater tanks. It can cause an unpleasant odour to develop, render the rainwater foul and unfit for human consumption and result in the rain water tank having to be drained and cleaned.

The section of roof and gutter should be isolated from the rainwater collection system before the commissioning of the solar water heater, so that any leak or spillage during commissioning does not make its way into the rainwater tank.

This section of roof and guttering can be isolated by either:

- blocking this section of gutter from the remaining gutter and fitting two separate down pipes, one to take any run-off water from that section of roof away to drain and the other to the rainwater collection side of the gutter to take the rain water runoff to the rain water tank.

- blocking this section of gutter from the remaining gutter and fitting a tube or pipe of a material compatible with the gutter material in this section of the gutter and penetrating the separation pieces at either end to allow rainwater runoff to pass from one part of the rainwater collection system to the other. It may be necessary to fit a down pipe to the section of blocked gutter to take any run-off water from that section of roof away to drain.

- installing a false gutter inside of the existing gutter, with a down pipe penetrating the existing gutter to take any run-off water from that section of roof away to drain. The false gutter should be no deeper than half of the depth of the existing gutter, so as to enable rain water runoff to flow under the false gutter.

- installing a flashing from the underside of the roofing material, with a continuous fall, to over the outside lip of the gutter. The flashing should extend wider than the collectors and pipe work and turned up at the ends so if there is leakage of closed circuit fluid, it cannot enter the gutter.

If any of these solutions are not practical, then the installer should discuss alternative options to suit the installation with the house holder. Any alterations to the roof drainage system must comply with the relevant building regulations, codes and Standards.

This water heater can deliver water at temperatures which can cause scalding.

It is necessary and we recommend that a temperature limiting device be fitted between the water heater and the hot water outlets in any ablution area such as a bathroom or ensuite, to reduce the risk of scalding. The installing plumber may have a legal obligation to ensure the installation of this water heater meets the delivery water temperature requirements of AS/NZS 3500.4 so that scalding water temperatures are not delivered to a bathroom, ensuite or other ablution area.

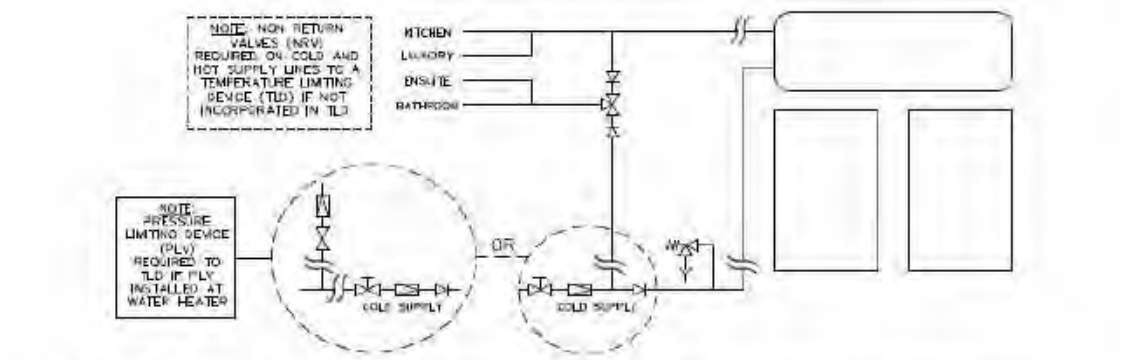
The temperature limiting device used with a solar water heater should have a specified „minimum temperature differential" between the hot water inlet and the tempered water outlet of no greater than 10°C. In addition, a temperature limiting device capable of receiving a hot water supply temperature of up to 99°C should be used in conjunction with a Solahart Stainless Steel solar thermosiphon system. Refer to the specifications of the temperature limiting device.

Where a temperature limiting device is installed adjacent to the solar water heater, the cold water line to the temperature limiting device can be branched off the cold water line either before or after the isolation valve and pressure limiting valve to the solar storage tank, but it **MUST BE** before the non-return valve to a direct 52L / RL series system. The cold water line to the temperature limiting device can be branched off the cold water line either before or after the non-return valve to the indirect 52H / RLX series system.

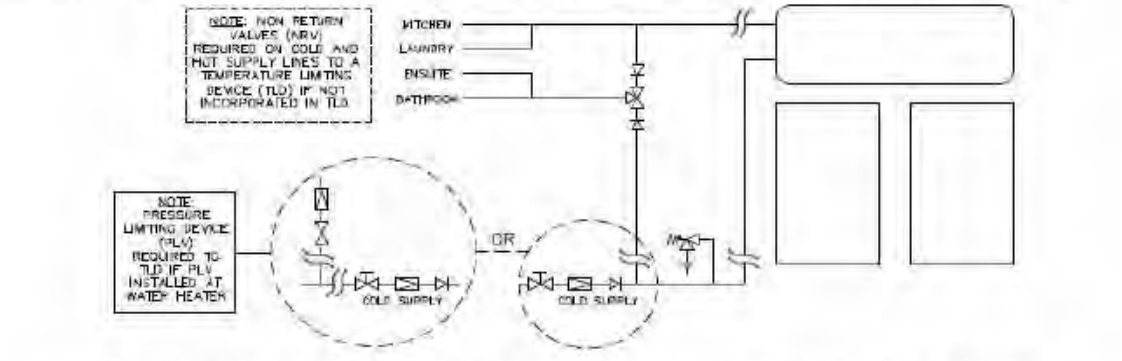
If a combination isolation valve and non-return valve (duo or trio valve) is installed on the cold water line to the solar water heater and the cold water line to the temperature limiting device branches off after this valve, then a second non return valve must be installed between the cold water branch and the solar storage tank of a direct 52L / RL series system.

Warning: A non-return valve **MUST BE** installed on the cold water line to the direct 52L / RL series system solar storage tank **AFTER** the cold water branch to a temperature limiting device.

If an expansion control valve is required, it must always be installed after the non-return valve and be the last valve prior to the solar storage tank.



Two Temperature Zones Using a Temperature Limiting Device – Direct Solar Water Heater



Two Temperature Zones Using a Temperature Limiting Device – Indirect Solar Water Heater

If a pressure limiting valve is installed on the cold water line to the solar water heater and the cold water line to a temperature limiting device branches off before this valve or from another cold water line in the premises, then a pressure limiting valve of an equal pressure setting may be required prior to the temperature limiting device.

CIRCULATED HOT WATER FLOW AND RETURN SYSTEM

A solar water heater should not be installed as part of a circulated hot water flow and return system in a building. The benefits of solar gain will be significantly reduced and energy gained from the sun lost through the pipe work.

If a circulated flow and return system is required, it is necessary to bypass the solar water heater and install a secondary water heater connected to the hot water flow and return line and supplied from the solar water heater. The secondary water heater must be a storage water heater able to provide a hot water outlet temperature of at least 60°C. **Note:** The thermostat must always be set to at least 60°C. Refer to the diagram on page 24.

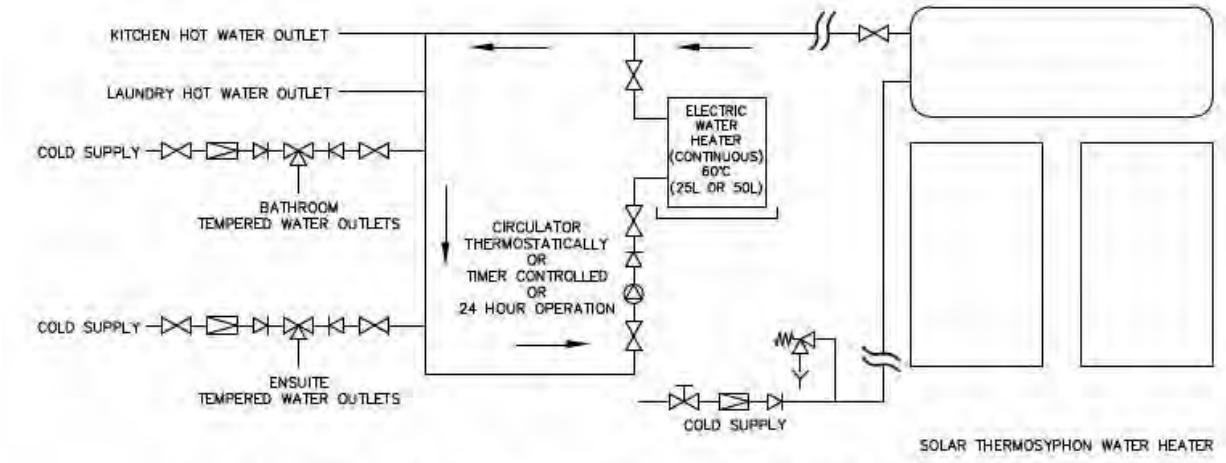
Temperature Limiting Device

A temperature limiting device cannot be installed in circulated hot water flow and return pipe work. The tempered water from a temperature limiting device cannot be circulated. Where a circulated hot water flow and return system is required in a building, a temperature limiting device can only be installed on a dead leg, branching off the circulated hot water flow and return pipe.

If circulated tempered water were to be returned back to the water heater, depending on the location of the return line connection on the water supply line to the water heater, then either:

- water will be supplied to the cold water inlet of the temperature limiting device at a temperature exceeding the maximum recommended water supply temperature, or
- when the hot taps are closed no water will be supplied to the cold water inlet of the temperature limiting device whilst hot water will continue to be supplied to the hot water inlet of the temperature limiting device.

These conditions may result in either water at a temperature exceeding the requirements of AS/NZS 3500.4 being delivered to the hot water outlets in the ablution areas, or the device closing completely and not delivering water at all, or the device failing. Under either condition, the operation and performance of the device cannot be guaranteed.



Circulated Hot Water Flow and Return System – Solar Water Heater

REDUCING HEAT LOSSES

The cold water line to and the hot water line from the water heater must be insulated in accordance with the requirements of AS/NZS 3500.4. The insulation must be weatherproof and UV resistant if exposed.

The pipe work between the solar storage tank and the solar collectors may be required to be insulated. Refer to "Warning: Plumber Be Aware" on page 36.

SADDLING - PIPE WORK

To prevent damage to the cylinder when attaching pipe clips or saddles to the water heater jacket, we recommend the use of self-drilling screws with a maximum length of 13 mm. Should pre drilling be required, extreme caution must be observed when penetrating the jacket of the water heater.

Note: If the cylinder is damaged as a result of attaching pipe clips or saddles to the jacket, any resultant faults will not be covered by the Solahart Stainless Steel warranty.

BOOSTER HEATING UNIT

The booster heating unit is for heating the water at times of low solar energy gain, such as during very cloudy or rainy weather, or during the colder months. Refer to "Connections – Electrical" on page 54 for electrical connection requirements and control options of the booster heating unit.

If this water heater is installed with an in-series booster, then the electric booster heating unit in the solar storage tank will not need to be connected to a power supply.

PLASTIC END COVER

A set plastic end covers is available for installation to the ends of the tank. These ends provide an aesthetically pleasing finish to the system by housing the pipe work and electrical connection within them.

Where a plastic end cover is to be installed, the plumbing and electrical connections need to be routed to suit. Check the installation documentation that comes with the plastic ends for these details.

TANK REPLACEMENT

If replacing a tank over 5 years old, the replacement tank must be fitted with a new temperature pressure relief valve and expansion control valve.

COLLECTOR REPLACEMENT

Care must be taken to ensure the surface area of new collectors is equal to +/- 10% that of the existing collector surface area otherwise overheating in summer or lower recovery rates in winter may occur.

OVER-TEMPERATURE PROTECTION

AS/NZS 2712:2007 includes a requirement for a no-load system operation test. In order to comply with this requirement, RL systems installed with Titan collector(s) must be fitted with TRV, and RLX systems installed with two or more Titan collectors must be fitted with OTP.

The systems listed below must be installed using the Over-Temperature Protection Parts kits described to comply with AS/NZS 2712:2007.

RL System Over-Temperature Protection
The following system requires the installation of a Thermosiphon Restrictor Valve (TRV) kit to meet the requirements of AS/NZS 2712:2007.

System Number	Parts Kit No.	No. of Collectors
RL11 Titan Series 2A	12105501	uses 1 collector
RL32 Titan Series 2A	12105503	uses 2 collectors

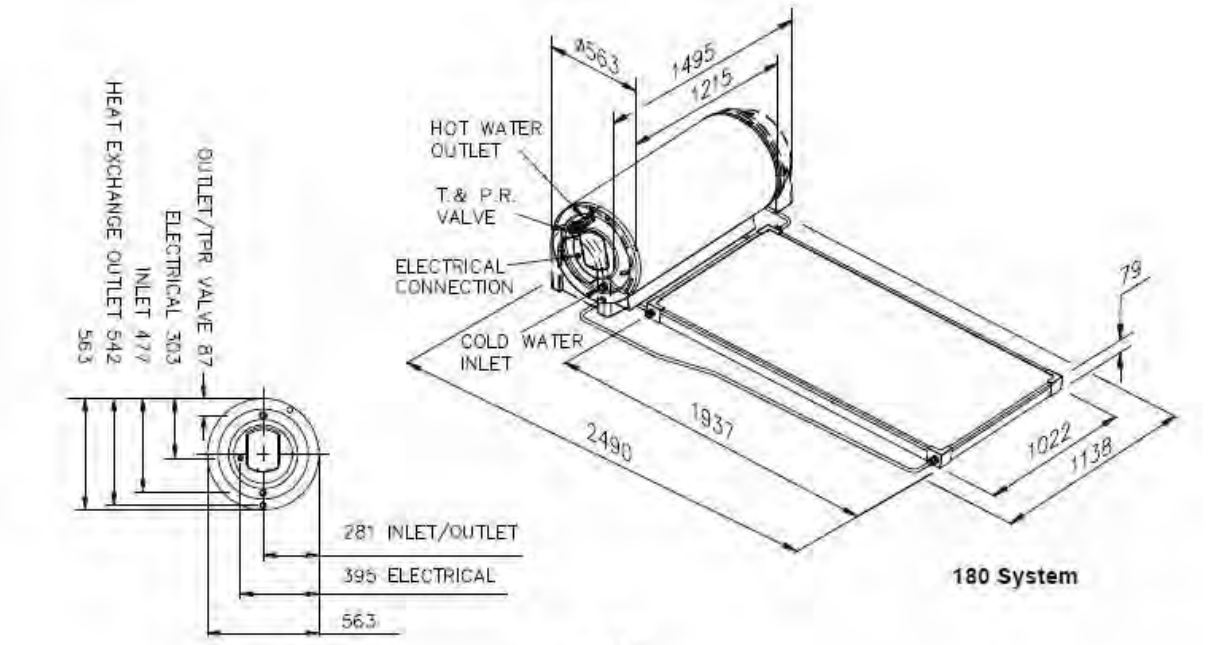
Please refer to the "System Assembly" section of this manual for full TRV installation details.

RLX System Over-Temperature Protection
The following systems require the installation of an OTP kit to meet the requirements of AS/NZS 2712:2007

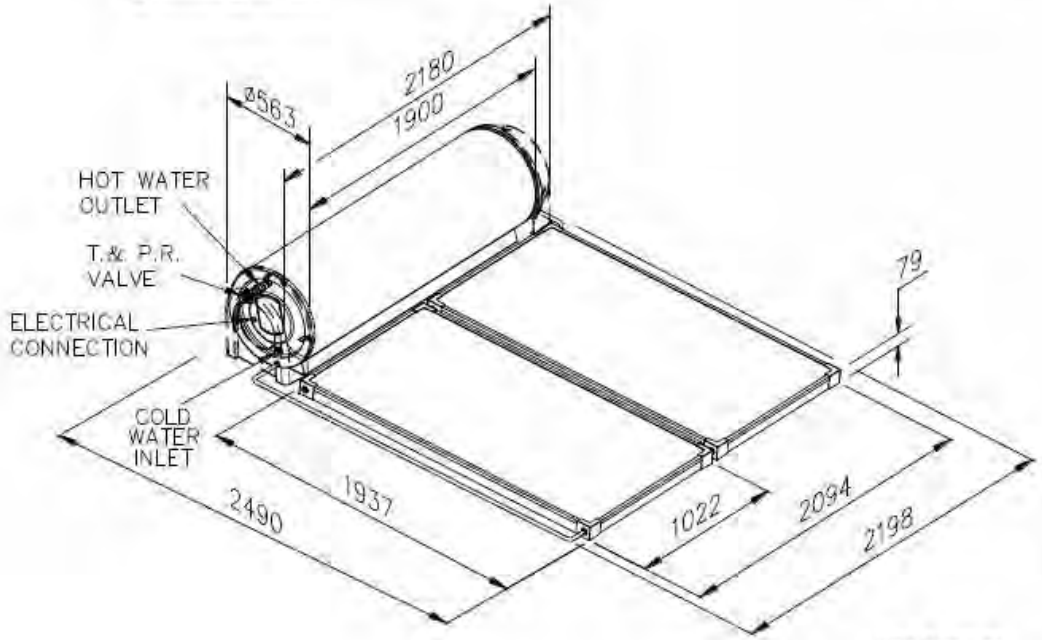
System Number	Parts Kit No.	No. of Collectors
RLX32 S3 Titan Series 2A	12105523	uses 2 collectors
RLX33 S3 Titan Series 2A	12105525	uses 3 collectors

Please refer to the specific RLX OTP Installation Instructions (34-7297) supplied in these OTP Parts Kits for full installation details.

DIMENSIONS AND TECHNICAL DATA



180 System



300 System

Direct System Data

		Solar Storage Tank				Solar Collectors				Pipe Kit	System
Direct System	Type	Model	Nominal Capacity (litres)	Empty (kg) cartoned	Full (kg)	Model	Qty	Empty	Full	Weight (kg)	Full (kg)
RL11	direct	52L180	180	48	226	Australis or Titan	1	33 34	35 36	6 7	267 269
RL32	direct	52L300	300	72	367	Australis or Titan	2	66 68	69 71	8 9	444 447

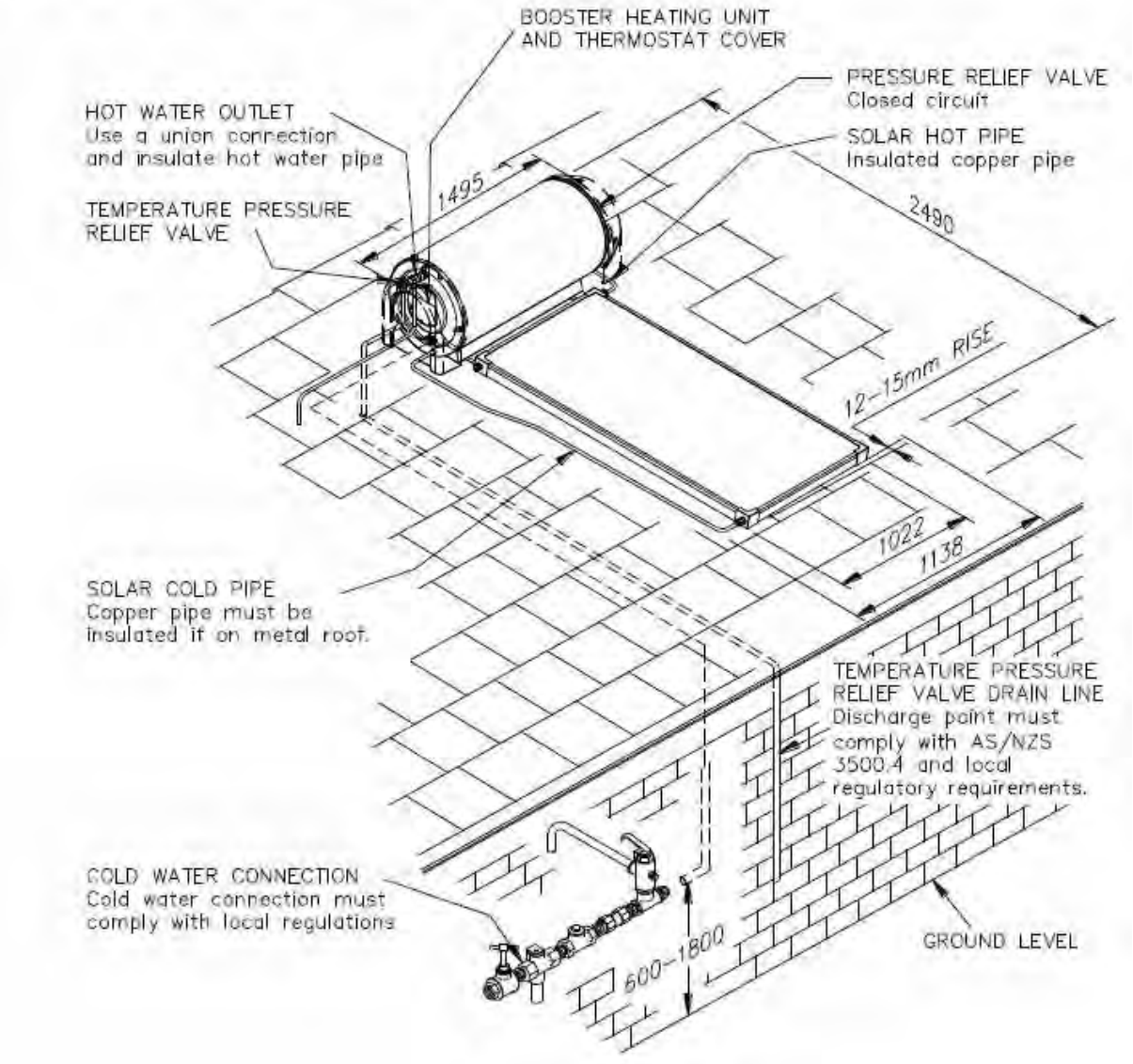
Technical data is subject to change.
Tank model number has a four digit suffix to denote the heating unit size and jacket colour, e.g. 52L300M775, where:
M5 = 2.4kW, M7 = 3.6kW
25 = Night Sky, 75 = Silver Grey, 80 = Woodland Grey, 94 = Headland

Indirect System Data

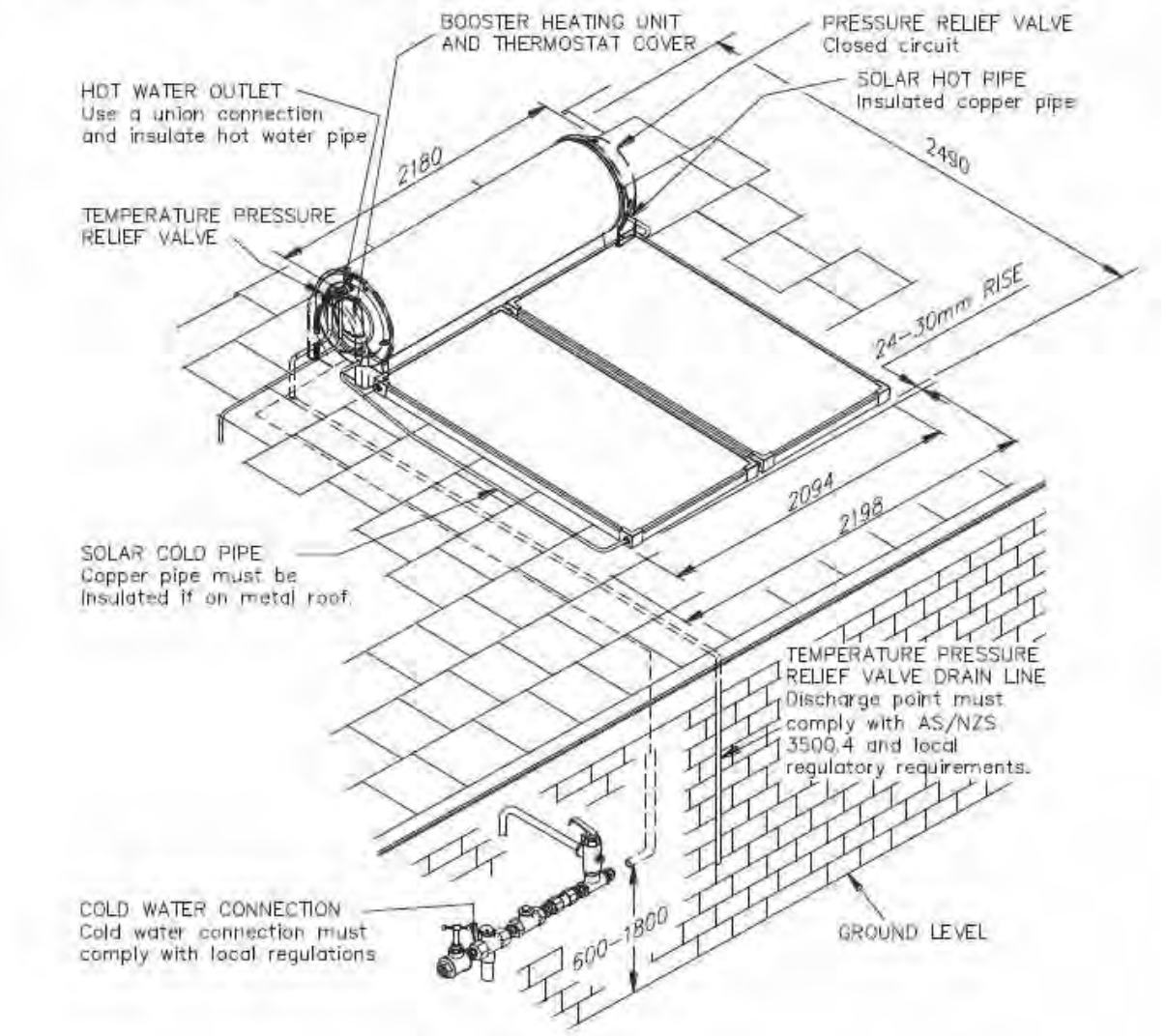
		Solar Storage Tank				Solar Collectors				Pipe Kit	System
Indirect System	Type	Model	Nominal Capacity (litres)	Empty (kg) cartoned	Full (kg)	Model	Qty	Empty	Full	Weight (kg)	Full (kg)
RLX11	indirect	52H180	180	53	231	Australis or Titan	1	33 34	35 36	6 11	272 278
RLX32	indirect	52H300	300	78	373	Australis or Titan	2	66 68	69 71	8 13	450 457
RLX33	indirect	52H300	300	78	373	Australis or Titan	3	99 102	104 107	10 16	487 496
52H180/1S	indirect	52H180	180	53	231	S200	1	48	52	6	289
52H300/2S	indirect	52H300	300	78	373	S200	2	96	104	8	485

Technical data is subject to change.
Tank model number has a four digit suffix to denote the heating unit size and jacket colour, e.g. 52H300M775, where:
M5 = 2.4kW, M7 = 3.6kW
25 = Night Sky, 75 = Silver Grey, 80 = Woodland Grey, 94 = Headland

TYPICAL INSTALLATION – SOLAR THERMOSIPHON 180



TYPICAL INSTALLATION – SOLAR THERMOSIPHON 300



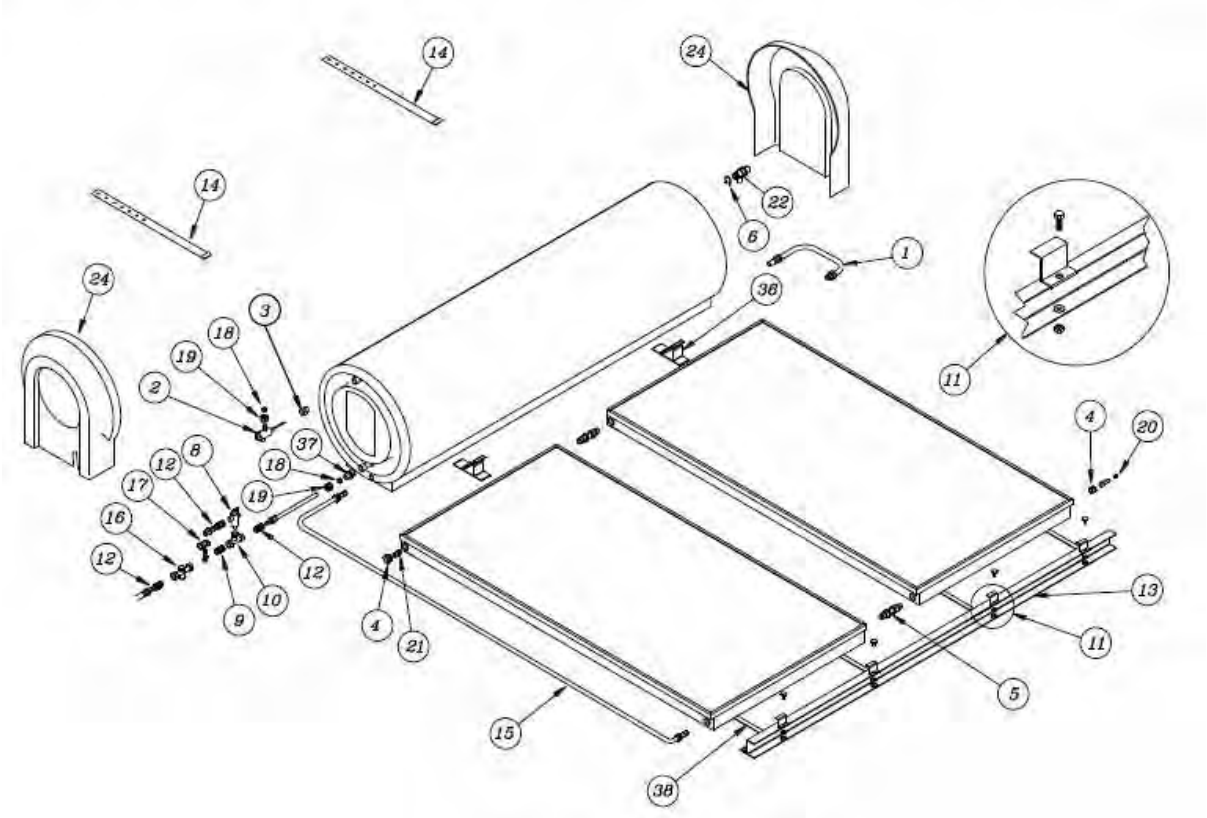
ASSEMBLY DIAGRAM – 52H SERIES WITHOUT OTP – CONETITE FITTING COLLECTORS

Components

1. Collector Hot Return Pipe
2. HTT55-1 TPR Valve 850 kPa
3. Bush Red R ¾ M x Rp ½ F
4. Collector Gland Nut
5. Collector Union - conetite
6. Retaining Clip
8. H50 ECV – 700 kPa
9. Brass Nipple **
10. Brass T **
11. Collector Clamp & Fasteners
12. Boiler Union **
13. Collector Rail
14. Tank Strap
15. Collector Flow Pipe
16. Combination Stop, Strainer & Non-Return Valve **
17. PLV 500 kPa *
18. Olive Compression
19. Nut Compression
20. Filling Plug Assembly
21. Collector Bung
22. Pressure Relief Valve 200 kPa
24. Plastic End Cover (pr) ***
36. Tank to Collector Spacer
37. Union R ¾ M x DN15 Olv
38. Collector Strap

* if required
** not supplied
*** optional

Note: Pressure Relief Valve 200 kPa (22) and Retaining Clip (6) are transported behind the electrical cover.

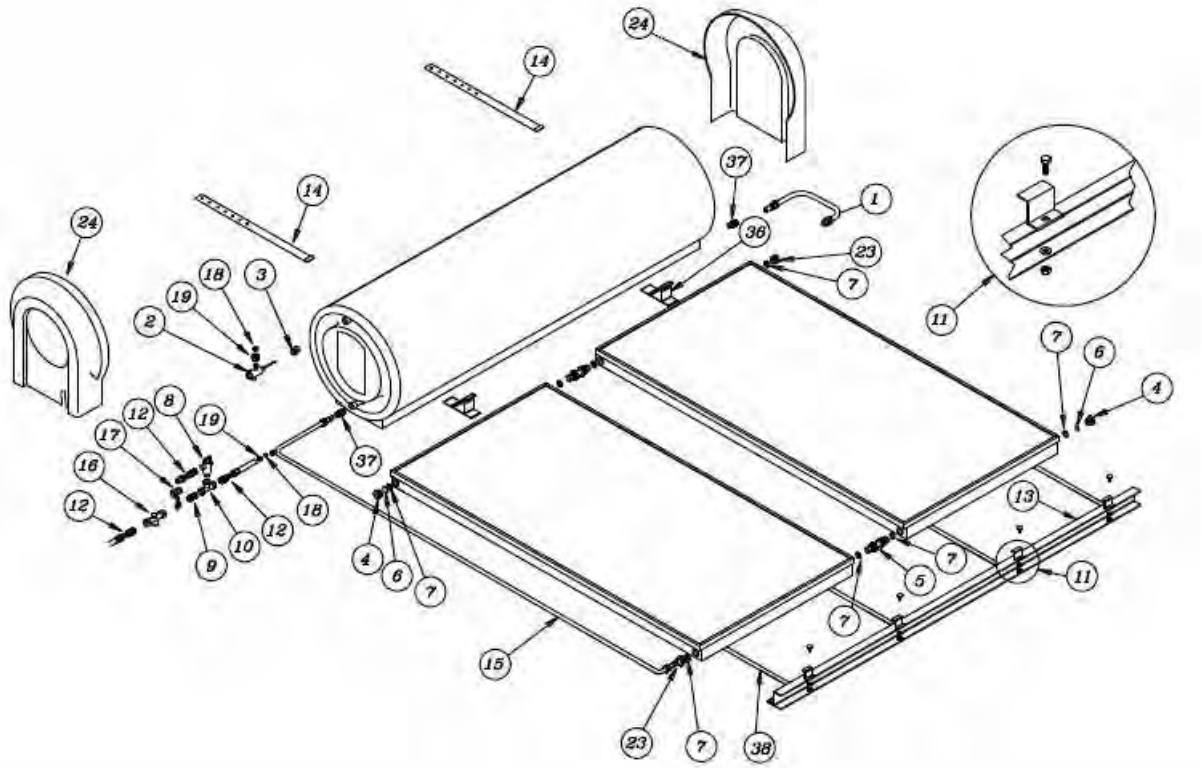


ASSEMBLY DIAGRAM – 52L, RL SERIES WITHOUT TRV – SCREWED FITTING COLLECTORS

Components

1. Collector Hot Return Pipe Assy
2. HTT55-1 TPR Valve 850 kPa
3. Bush Red R ¾ M x Rp ½ F
4. M33 Collector Nut
5. Collector Union
6. Copper Blanking Disk
7. O-ring
8. H50 ECV – 700 kPa
9. Brass Nipple **
10. Brass T **
11. Collector Clamp & Fasteners
12. Boiler Union **
13. Collector Rail
14. Tank Straps
15. Collector Flow Pipe
16. Combination Stop, Strainer & Non-Return Valve **
17. PLV 500 kPa*
18. Olive Compression
19. Nut Compression
23. Collector Union M33 M x G ¾ F Cone
24. Plastic End Cover (pr) ***
36. Tank to Collector Spacer
37. Tank Union R ¾ M x G ¾ M Cone
38. Collector Strap

* if required
** not supplied
*** optional

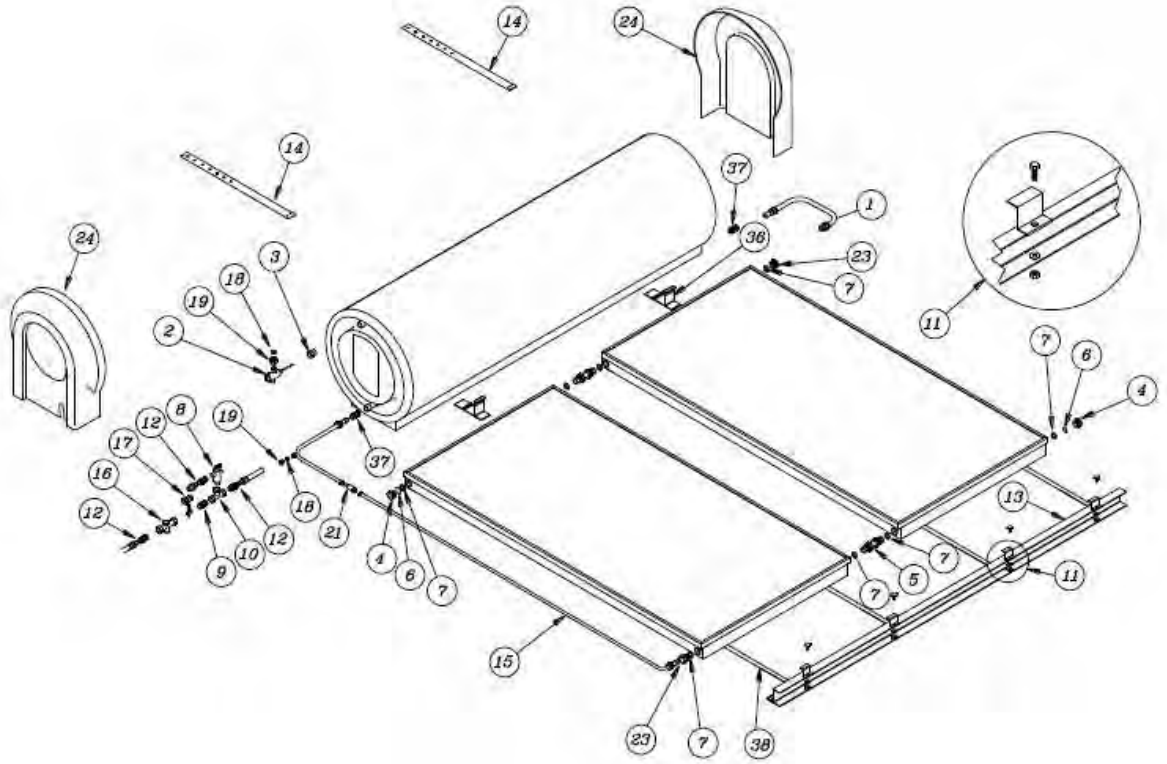


ASSEMBLY DIAGRAM – 52L, RL SERIES WITH TRV – SCREWED FITTING COLLECTORS

Components

1. Collector Hot Return Pipe Assy
2. HTT55-1 TPR Valve 850 kPa
3. Bush Red R ¾ M x Rp ½ F
4. M33 Collector Nut
5. Collector Union
6. Copper Blanking Disk
7. Silicone Rubber Washer
8. H50 ECV – 700 kPa
9. Brass Nipple **
10. Brass T **
11. Collector Clamp & Fasteners
12. Boiler Union **
13. Collector Rail
14. Tank Straps
15. Collector Flow Pipe
16. Combination Stop, Strainer & Non-Return Valve **
17. Pres. Limit Valve 500 kPa*
18. Olive Compression
19. Nut Compression
21. Thermosiphon Restrictor Valve
23. Collector Union M33 M x G ¾ F Cone
24. Plastic End Cover (pr) ***
36. Tank to Collector Spacer
37. Tank Union R ¾ M x G ¾ M Cone
38. Collector Strap

* if required
** not supplied
*** optional



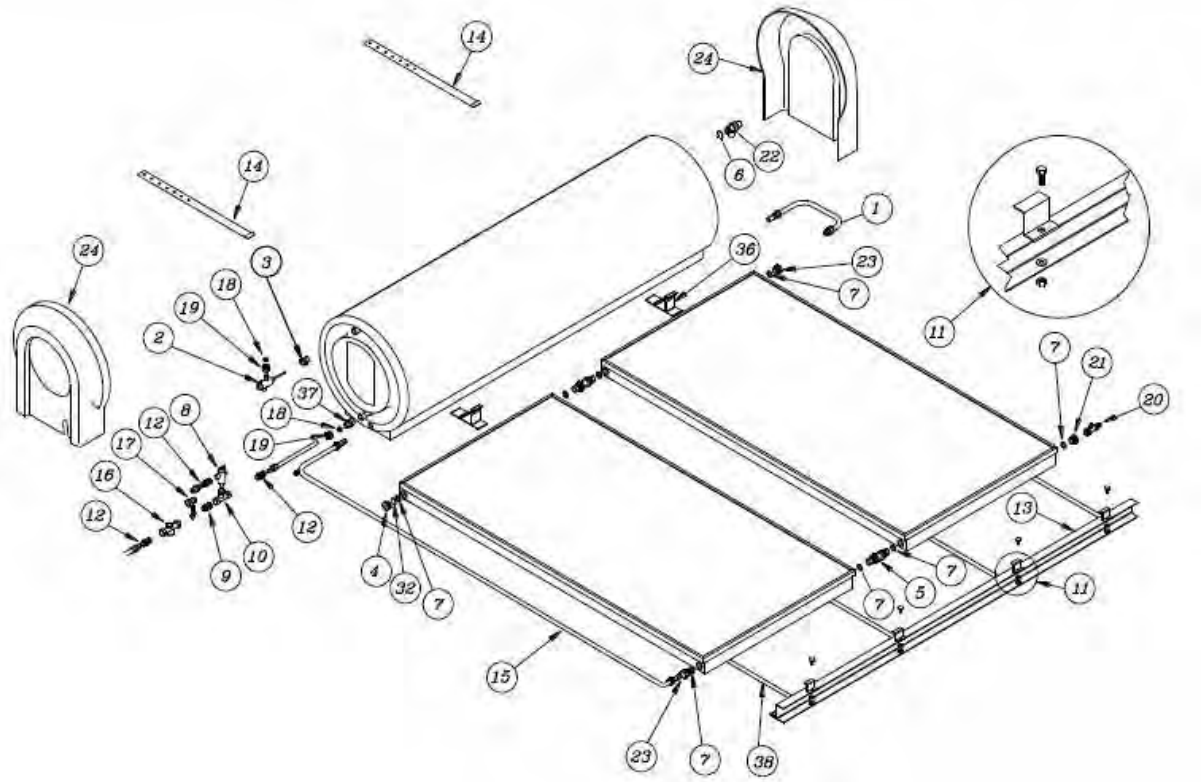
ASSEMBLY DIAGRAM – RLX SERIES WITHOUT OTP – SCREWED FITTING COLLECTORS

Components

1. Collector Hot Return Pipe Assy
2. HTT55-1 TPR Valve 850 kPa
3. Bush Red R ¾ M x Rp ½ F
4. M33 Collector Nut
5. Collector Union
6. Retaining Clip
7. O-ring
8. H50 ECV – 700 kPa
9. Brass Nipple **
10. Brass T **
11. Collector Clamp & Fasteners
12. Boiler Union **
13. Collector Rail
14. Tank Straps
15. Collector Flow Pipe
16. Combination Stop, Strainer & Non-Return Valve **
17. PLV 500 kPa *
18. Olive Compression
19. Nut Compression
20. Boiler Tap
21. M33 To ½" BSP Reducing Bush
22. Pressure Relief Valve 200 kPa
23. Collector Union M33M x G ¾ F Cone
24. Plastic End Cover (pr) ***
32. Copper Blanking Disk
36. Tank to Collector Spacer
37. Union R ¾ M x DN15 Olv
38. Collector Strap

* if required
** not supplied
*** optional

Note: Pressure Relief Valve 200 kPa (22) and Retaining Clip (6) are transported behind the electrical cover.



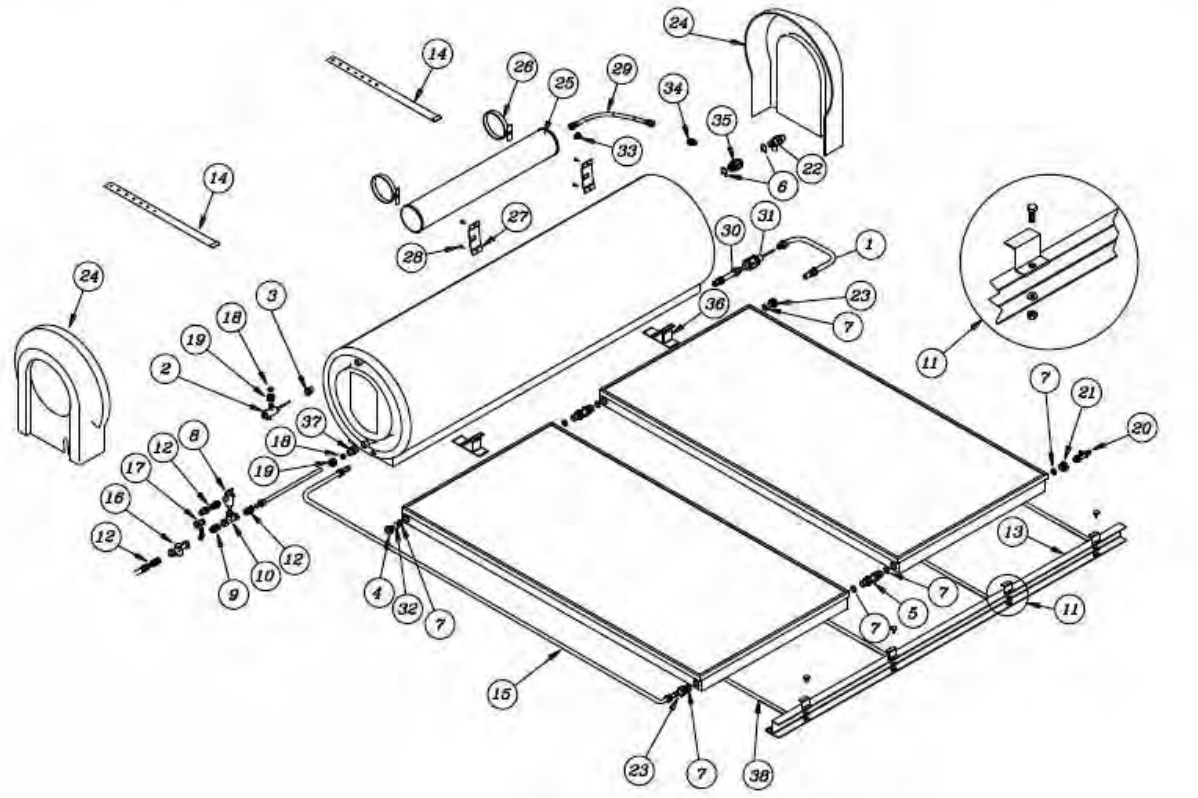
ASSEMBLY DIAGRAM – RLX SERIES WITH OTP – SCREWED FITTING COLLECTORS

Components

1. Collector Hot Return Pipe
2. HTT55-1 TPR Valve 850 kPa
3. Bush Red R ¾ M x Rp ½ F
4. M33 Collector Nut
5. Collector Union
6. Retaining Clip
7. Silicone Rubber Washer
8. H50 ECV 700 kPa
9. Brass Nipple **
10. Brass T **
11. Collector Clamp & Fasteners
12. Boiler Union **
13. Collector Rail
14. Tank Straps
15. Collector Flow Pipe
16. Combination Stop, Strainer & Non-Return Valve **
17. PLV 500 kPa *
18. Olive Compression
19. Nut Compression
20. Boiler Tap
21. M33 To ½" BSP Reducing Bush
22. PR200 Pressure Relief Valve
23. Collector Union M33M x G ¾ F Cone
24. Plastic End Cover (pr) ***
25. OTP Reservoir
26. Reservoir Clamp
27. Clamp Bracket
28. Tek Screw 10g-16 x 25mm
29. Flexi Hose 400 Long
30. Tank To Valve Pipe
31. OTP Valve
32. Copper Blanking Disk
33. Blanking Plug Including 'O' Ring
34. Reducing Nipple
35. Adaptor Including 'O' Ring
36. Tank to Collector Spacer
37. Union R ¾ M x DN15 Olv
38. Collector Strap

* if required
** not supplied
*** optional

Note: Pressure Relief Valve 200 kPa (22) and 1 x Retaining Clip (6) are transported behind the electrical cover.



INSTALLATION – SOLAR COLLECTORS

SOLAR COLLECTOR LOCATION

The solar collectors must be installed in a shade free position. The surrounding vicinity should be checked for higher buildings or trees which may cause shade at other times of the year and for small trees which may grow and shade the solar collectors in the future.

Sufficient space should be left around the thermosiphon solar water heater to allow for safe service access.

Roof area required (excluding service and access space):

180 litre x 1 collector	–	1.5 m wide x 2.5 m deep.	Weight (full) up to 289 kg approx.
300 litre x 2 collectors	–	2.5 m wide x 2.5 m deep.	Weight (full) up to 485 kg approx.
300 litre x 3 collectors	–	3.5 m wide x 2.5 m deep.	Weight (full) up to 496 kg approx.

The installation must comply with the requirements of AS/NZS 3500.4 and all local codes and regulatory authority requirements. Refer to "System Assembly" on page 37 for the procedure to mount the system and connection details of the solar hot and solar cold pipes.

ROOF STRENGTH

The installer must ensure the structural integrity of the building is not compromised by the solar water heater installation and the roof structure is suitable to carry the full weight of the solar storage tank, solar collectors and frame (if one is installed). If in any doubt of the construction or the condition of the roof, the roof should be suitably strengthened. Consult a structural engineer.

The solar storage tanks, when full of water, weigh approximately 495 kg (300 litre) and 292 kg (180 litre). Each S200 solar collector and its fittings weighs up to approximately 60 kg when full of closed circuit fluid and each Australia and Titan solar collector and its fittings weighs approximately 43 kg when full of water.

ORIENTATION OF SOLAR COLLECTORS

To help maximise system performance, solar collectors should be installed with an optimum orientation facing true north (in the southern hemisphere) or true south (in the northern hemisphere). Always check for true north or true south using a compass or other suitable device.

The solar performance of a system reduces as the orientation of the collectors moves away from the optimum orientation, resulting in the need for increased boosting to supply the same hot water load. Solar collectors facing up to 45° from the optimum orientation will receive about 4% to 5% less total solar radiation.

However, the optimum orientation of solar collectors is not always practical or achievable. Solar collectors may be installed up to 90° from the optimum orientation. Where the orientation is greater than 60° from the optimum, either an additional solar collector or selective surface collectors in lieu of non-selective surface collectors may be installed to make up for the reduction in solar performance where such an alternative is available. Each of these options should be discussed with the system owner. If neither of these options is possible nor acceptable to the system owner, then the system owner needs to be made aware of, understand and accept that increased boosting may be required to meet their hot water requirements.

Refer to "Solar Collectors" on page 19 for additional information on the selection of type of solar collectors for this system.

INCLINATION OF SOLAR COLLECTORS

To help maximise system performance, solar collectors should be installed with an optimum inclination. This is equal to 90% to 100% of the local latitude angle when collectors are oriented within 60° of true north or true south, and between 10° and 20° when the collectors are oriented between 60° and 90° from the optimum orientation.

Generally, improved summer performance is obtained from an angle of inclination less than the optimum angle and improved winter performance is obtained by an angle of inclination greater than the optimum angle. If the angle of inclination varies by 20° from the optimum angle, the solar collectors will receive about 10% less total annual solar radiation. The latitude of some Australian cities are listed on page 35.

However, the optimum inclination of solar collectors is not always practical or achievable. A thermosiphon solar water heater may be installed at the roof angle for simplicity of installation and appearance, but must never be less than 10° from the horizontal.

The water heater is suitable for installations with an inclination of up to 30°. Where the solar water heater is installed at inclinations greater than 30°, a With Pitch frame and tank frame mounting kit are necessary. Refer to your local Solar Distributor for details.

A Fixed Pitch frame can be installed to increase the angle of inclination of the thermosiphon solar water heater. This type of frame should be used if the roof pitch is less than 10° or varies by more than 20° below the optimum angle. A tank frame mounting kit is also required with a Fixed Pitch frame. Refer to your local Solar Distributor for details.

The use of a Fixed Pitch frame should be discussed with the system owner. If this option is neither possible nor acceptable to the system owner, then the system owner needs to be made aware of, understand and accept that increased boosting may be required to meet their hot water requirements.

CYCLONIC OR HIGH WIND AREAS

For an installation of a thermosiphon solar water heater in a cyclonic or high wind area, a suitable With Pitch frame and a tank frame mounting kit are required. Refer to your local Solar Distributor for details.

The installation of this solar water heater with a tank frame mounting kit on a suitable frame, subject to the frame's design criteria not being exceeded:

- is suitable for installation in geographic locations up to and within Wind Region D (With Pitch frame) or up to and within Wind Region C (Fixed Pitch frame), as defined in the Building Code of Australia, Australian / New Zealand Standard AS/NZS 1170.2:2002 and the Australian Standard AS 4055-2006, or equivalent location, and

- provides an acceptable method of installation where it is necessary to satisfy the requirements of the Building Code of Australia and AS/NZS 3500.4:2003 Clause 6.5.3.4 for high wind areas, or equivalent requirements.

LATITUDE OF SOME AUSTRALIAN CITIES

Adelaide	35°S	Cairns	17°S	Hobart	42°S	Port Hedland	20°S
Alice Springs	24°S	Canberra	35°S	Mildura	34°S	Rockhampton	24°S
Brisbane	27°S	Darwin	12°S	Melbourne	38°S	Sydney	34°S
Broken Hill	31°S	Geraldton	28°S	Perth	32°S	Townsville	19°S



WARNING: Plumber – Be Aware

- The solar hot and solar cold pipe work between the thermosiphon solar storage tank and the solar collectors are supplied in the pipe kit. The supplied copper solar hot and solar cold pipes **MUST BE** used.

- If the solar water heater is installed either on a metal roof or in a trafficable area, such as on an accessible roof, then the solar hot and solar cold pipes must be insulated. The solar hot and solar cold pipes may be required to be insulated to comply with local regulations.

    - If insulation is required, the full length of the solar hot and solar cold pipes **MUST BE** insulated.

- The insulation must:

    - be of a closed cell type or equivalent, suitable for a solar water heating application and capable of withstanding the temperature of the water or closed circuit fluid generated by the solar collectors under stagnation conditions

    - The specification of the chosen insulation material should be checked with the insulation manufacturer prior to installation as different materials may vary in temperature tolerance.

    - be at least 13 mm thick, however thicker insulation may be required to comply with the requirements of AS/NZS 3500.4

    - be weatherproof and UV resistant

    - be fitted up to and cover the connections on both the solar storage tank and the solar collectors.

- The insulation will offer corrosion protection to a metal roof against water runoff over the copper pipe, assist in avoiding accidental contact with the solar pipe work as high temperature water or closed circuit fluid can flow from the solar collectors to the solar storage tank and also reduce pipe heat losses.

- Plastic pipe **MUST NOT** be used, as it will not withstand the temperature and pressure of the closed circuit fluid (indirect system) and water (direct system) generated by the solar collectors under stagnation conditions. The solar collectors can generate extremely high water or closed circuit fluid temperatures up to 150°C and high water pressure of 850 kPa. Plastic pipe cannot withstand these temperatures and pressures and **MUST NOT** be used. Failure of plastic pipe can lead to the release of high temperature closed circuit fluid and water and cause severe water damage and flooding.

- There **must be a continuous fall of a minimum 10°** in the pipe work from the thermosiphon solar storage tank to the solar collectors. The highest point of the solar cold pipe and solar hot pipe must be where they connect to the thermosiphon solar storage tank, otherwise thermosiphoning will not occur.

- The solar water heater is to be isolated during the testing and commissioning of the heated water reticulation system in a building, in accordance with Clause 11.1 and 11.3 (a) of AS/NZS 3500.4.

SYSTEM ASSEMBLY

COMPONENTS AND KIT CONTENTS

The thermosiphon solar water heater is supplied with a pipe kit, which contains the components required to assemble the solar storage tank and solar collectors together. The thermosiphon pipe kits are suitable for:

12105530 52H180 tank with **one S200** solar collector
12105532 52H300 tank with **two S200** solar collectors

Part No	Kit Components and Description	12105530 one S200 collector	12105532 two S200 collectors
331847	Collector mounting rail 1020 mm long standard	1	-
331846	Collector mounting rail 1650 mm long standard	-	1
204600	Collector strap	2	2
343064	Tank strap	2	2
339210	Valve ECV ½" H50 700 kPa	1	1
344349	Valve TPR ½" HTT55-1 850 kPa	1	1
345074	Plastic sheet black 1800 x 1220 x 100um (rolled up)	1	1
344450	Pipe cold assembly HX180	1	-
344452	Pipe cold assembly HX300	-	1
344451	Pipe hot assembly HX180	1	-
344453	Pipe hot assembly HX300 2 collector	-	1
337144	Tank to collector spacer	2	2
331928	Collector clamp standard	2	4
330350	Screw set 5/16" UNC x ¾" SS	2	4
330806	Nut 5/16" SS	2	4
330354	Washer 5/16" SS	2	4
331658	Union Body R3/4 M x DN15 Olv	1	1
331657	Union Body R1/2M x DN15 Olv	2	2
334046	Nipple R½ M x R½ M	1	1
331656	Olive 1/2	4	4
331666	Tee G½ x G½ x G½	1	1
331655	Nut Compression G1/2	4	4
337280	Bush Reducing R3/4 M x RP1/2 F	1	1
337134	Fill plug assembly ¾" conetite, consisting of: 1 x 337116 gland nut 1 x 337117 conetite fill fitting 1 x 337130 fill plug ¾" 1 x 330150 fill plug gasket	1	1
337135	Collector bung assembly ¾" cone, consisting of: 1 x 337116 gland nut 1 x 337132 collector bung ¾" conetite	1	1
337121	Collector connector assembly cone type	-	2
345094	Insulator Valve TPR HTT55-1	1	1
347187	Instruction to attach fill / drain label	1	1
347189	Label fill / drain	1	1

12105520 52H180 tank with **one Australis** or **Titan** solar collector
12105522 52H300 tank with **two Australis** solar collectors
12105523 52H300 tank with **two Titan** solar collectors
12105524 52H300 tank with **three Australis** solar collectors
12105525 52H300 tank with **three Titan** solar collectors

Part No	Kit Components and Description	1210 5520	1210 5522	1210 5523	1210 5524	1210 5525
331847	Collector mounting rail 1020 mm long standard	1	-	-	1	1
331846	Collector mounting rail 1650mm long standard	-	1	1	1	1
331844	Drive cleat	-	-	-	1	1
343064	Tank strap	2	2	2	2	2
204600	Collector strap	2	2	2	3	3
339210	Valve ECV ½" H50 700 kPa	1	1	1	1	1
344349	Valve TPR ½" HTT55-1 850 kPa	1	1	1	1	1
344450	Pipe cold assembly HX180	1	-	-	-	-
344452	Pipe cold assembly HX300	-	1	1	1	1
344451	Pipe hot assembly HX180	1	-	-	-	-
344453	Pipe hot assembly HX300 2 collector	-	1	-	1	-
344586	Pipe hot assembly HX300 2 collector OTP	-	-	1	-	-
344587	Pipe hot assembly HX300 3 collector OTP	-	-	-	-	1
337093	Extension pipe assembly systems	-	-	-	2	1
337144	Tank to collector spacer	2	2	2	3	3
331928	Collector clamp	2	4	4	6	6
331656	Olive ½	2	2	2	2	2
331655	Nut Compression G1/2	2	2	2	2	2
330600	Gland nut M33 M	1	1	1	1	1
330606	Copper blanking disc	2	2	2	2	2
344132	Tap boiler drain	1	1	1	1	1
337280	Bush Reducing R3/4 M x RP1/2 F	1	1	1	1	1
344134	Adaptor Antifreeze M33 M x G½F	1	1	1	1	1
330695	Collector connector assembly screwed fitting	-	2	2	4	4
344297	Adaptor union body M33 M x G¾F conetite	2	2	2	2	2
330350	Screw set 5/16" UNC x ¾" SS	2	4	4	6	6
330354	Washer 5/16" SS	2	4	4	6	6
330806	Nut 5/16" SS	2	4	4	6	6
345096	Silicone rubber washer 31 x 22.5 x 2.0	5	-	10	-	15
347669	Instructions caution silicone rubber washer	1	-	1	-	1
330171	O-ring 25 ID x 3.2 mm	5	10	-	15	-
347674	Instruction on Seal Selection	1		-		-
331658	Union Body R ¾ M x G ½ M Olv	1	1	1	1	1
347187	Instruction to attach fill / drain label	1	1	1	1	1
347189	Label fill / drain	1	1	1	1	1
344327	Flexi hose 3/8 BSP F x 3/8 BSP F x 400	-	-	1	-	1
344185	Reservoir tank 2 collectors	-	-	1	-	-
344186	Reservoir tank 3 collectors	-	-	-	-	1
344399	Mounting bracket aluminium (with adhesive tape)	-	-	2	-	3
343037	Reservoir tank SS clamp assembly	-	-	2	-	3

Part No	Kit Components and Description	1210 5520	1210 5522	1210 5523	1210 5524	1210 5525
209000	Valve thermosiphon arrestor TA705 ¾	-	-	1	-	1
344573	Connector assembly tank to OTP valve	-	-	1	-	1
348085	Screw TEK 10G – 16 TPI x 25	-	-	4	-	6
347199	Instruction RLX S3 OTP installation	-	-	1	-	1
341504	Adaptor Tee clip in port to ISO7 RP¼ & O-ring	-	-	1	-	1
344593	Adaptor G3/8" x BSP to ISO7 R¼"	-	-	1	-	1
088100	Spring clip for Relief Valve Caleffi	-	-	1	-	1
341515	Plug thumb G1/8 M & O-ring assembly	-	-	1	-	1
345094	Insulator Valve TPR HTT55-1	1	1	1	1	1

12105500 52L180 tank with **one Australis**
12105501 52L180 tank with **one Titan collector**
12105502 52L300 tank with **two Australis** solar collectors
12105503 52L300 tank with **two Titan** solar collectors

Part No	Kit Components and Description	12105500	12105501	12105502	12105503
331847	Collector mounting rail 1020mm long standard	1	1	-	-
331846	Collector mounting rail 1650mm long standard	-	-	1	1
343064	Tank strap	2	2	2	2
204600	Collector strap	2	2	2	2
339210	Valve ECV ½" H50 700 kPa	1	1	1	1
344349	Valve TPR ½" HTT55-1 850 kPa	1	1	1	1
341682	Pipe cold assembly RL180 DN20	1	-	-	-
331683	Pipe cold assembly RL300 DN20	-	-	1	-
341680	Pipe hot assembly RL180 DN20	1	1	-	-
341681	Pipe hot assembly RL300 DN20	-	-	1	1
341685	Pipe cold assembly lower RL180 DN20 TRV	-	1	-	-
341687	Pipe cold assembly lower RL300 DN20 TRV	-	-	-	1
341686	Pipe cold assembly upper DN20 TRV	-	1	-	1
337144	Tank to collector spacer	2	2	2	2
331928	Collector clamp	2	2	4	4
337280	Bush Reducing R3/4 M x RP1/2 F	1	1	1	1
344298	Union Body R ¾ M x G ¾ M Con	2	2	2	2
344395	Valve thermosiphon resistor - Conetite	-	1	-	1
344297	Adaptor union body M33 M x G ¾ F conetite	2	2	2	2
331655	Nut compression G½	2	2	2	2
331656	Olive ½"	2	2	2	2
330600	Gland nut M33 M	2	2	2	2
330606	Copper blanking disc	3	3	3	3
330695	Collector connector assembly screwed fitting	-	-	2	2
330350	Screw set 5/16" UNC x ¾" SS	2	2	4	4
330354	Washer 5/16" SS	2	2	4	4
330806	Nut 5/16" SS	2	2	4	4
345096	Silicone rubber washer 31 x 22.5 x 2.0	-	5	-	10
347669	Instructions caution silicone rubber washer	-	1	-	1
330171	O-ring 25 ID x 3.2 mm	5	-	10	-
345094	Insulator Valve TPR HTT55-1	1	1	1	1

Refer to the assembly diagrams on pages 29 to 33 for the location and position of components.

DO NOT MODIFY THESE PARTS IN ANY WAY.

Notes:

All plumbing work must be carried out by a qualified person. The installation is to be in accordance with the requirements of the Standard AS/NZS 3500.4, and all local codes and regulatory authority requirements. In New Zealand, the installation must conform to Clause G12 of the New Zealand Building Code.

Pipe work, including that within the roof space, is to be securely fixed to prevent vibration.

These solar collectors have passed the AS/NZS 2712 requirements for resistance to hailstone damage, so it is not normally necessary to fit a guard to a collector. Stone Guards are available to provide a level of protection to the collectors against vandalism or accidental damage. Refer to your local Solar Distributor for details.

The Rheem warranty **DOES NOT** cover breakage of solar collector glass. Check your insurance policy covers collector glass breakage.



Warning: No attempt should be made to remove or replace broken collector glass.
The collector glass is not offered as a replacement part. Should the solar collector require replacement, contact your local Solar Distributor for details.



Warning: Do not remove the solar collector packaging completely, prior to the installation as the solar collector surface can become very hot. Remove only sufficient packaging material to enable the installation of the solar collectors.



Warning: Upon completion of the installation it is necessary to leave the solar collector packaging covering the glass and fittings on an Australis or Titan solar collector. The packaging should not be removed until the solar water heater has been commissioned and is ready for use, otherwise damage to the O-rings or silicone rubber washers in the connections to the solar collector can occur.

Upon completion of the installation of the solar water heater the packaging material may be removed from the S200 solar collectors, whether or not the solar water heater is commissioned.

The solar collector packaging must be removed completely prior to the permanent operation of the water heater.

All connectors, end plugs, O-rings, silicone rubber washers, brass fittings, collector straps, collector angle or rail, and temperature pressure relief valve required for the installation are included with the pipe kit.

Suitable screws or anchors will be required to fix the collector straps to the rafters for a pitched roof installation.



Warning: Where straps, frames, etc. are secured to roof members, all fixings must be of an appropriate type to suit the type of member. Inadequate or inappropriate fixings may result in straps becoming unsecured and the installation of the solar hot water system becoming unsafe.

All olive compression fittings must use brass or copper olives.

Use thread sealing tape or an approved thread sealant on all other but the conetite, O-ring and silicone rubber washer fittings.

If the solar storage tank is being installed with existing solar collectors, then utilise the existing fittings and pipes used on the installation. If the tank being replaced is over five years old, then a new temperature pressure relief valve and expansion relief valve must be installed.

Refer to the installation instructions supplied with the RLX system OTP kit for additional information of the installation of the over temperature protection components.

1. Roof Condition:

- Check the condition of the roof and advise the client of any broken tiles or damaged roof sheeting.

2. **Solar Frame**:

- If a solar frame is to be installed, determine the location of the frame. Assemble and fix the frame to the roof, following the installation instructions provided with the frame.

- Depending upon the positioning of the frame on the roof and any minor fall the roof may have, ensure the collector rail is either horizontal or is higher on the hot outlet side of the solar collectors. If in doubt use a spirit level.

3. Water Heater Location:

- Select a suitable position for the solar water heater.

- Refer to "Solar Water Heater Storage Tank Location" on page 21 and "Solar Collector Location" on page 34.

4. Position of Tank

- Select the position of the solar storage tank so the front of the foot is toward the nose of an even row of tiles or even metal roof sheet above a roof batten. The rear of the foot may be seated over the nose of the tiles on the next row behind. Where possible, the tank should be positioned at least three tiles from the ridge capping to prevent disturbance of the ridge.

5. Collector Mounting Rail Preparation

- Hook the Collector Straps to the Collector Mounting Rail before fixing the strap to the rafters following the steps below.

5.1 If more than two collectors are installed, locate the additional collector rail(s) adjacent to the first collector rail and join together using drive cleat supplied in the parts kit.

5.2 Determine which slots in the collector rail will be used for the collector straps after locating the rafters and taking note of the rafter spacing.

Rafter spacing	Recommended slots	
	One collector (1 x one collector rail)	Two collectors (1 x two collector rail)
300 mm (12")	1, 4 or 2, 3	1, 6 or 2, 5
400 mm (16")	1, 4	1, 5 or 2, 6
450 mm (18")	1, 4	2, 5
500 mm (20")	1, 4	1, 6 or 2, 5
600 mm (24")	2, 3	1, 5 or 2, 6
900 mm (36")	1, 4	2, 5



collector rail – one collector



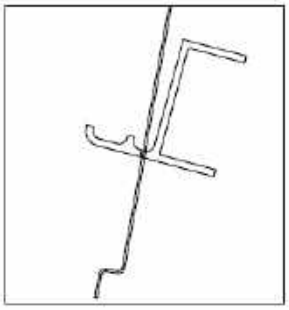
collector rail – two collectors

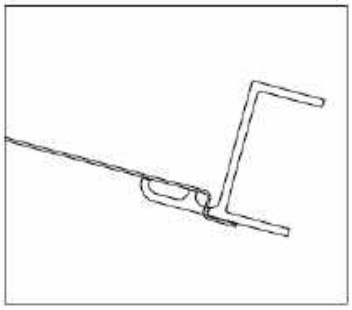
Rafter spacing	Recommended slots Three collectors (1 x two and 1 x one collector rails)
300 mm (12”)	1, 5 (long) & 3 (short)
400 mm (16”)	1, 5 (long) & 3 (short)
450 mm (18”)	2, 5 (long) & 4 (short)
500 mm (20”)	1, 6 (long) & 4 (short)
600 mm (24”)	1, 5 (long) & 3 (short)
900 mm (36”)	1, 4 (long) & 4 (short)

5.3 Noting the orientation of the collector strap’s folded end:

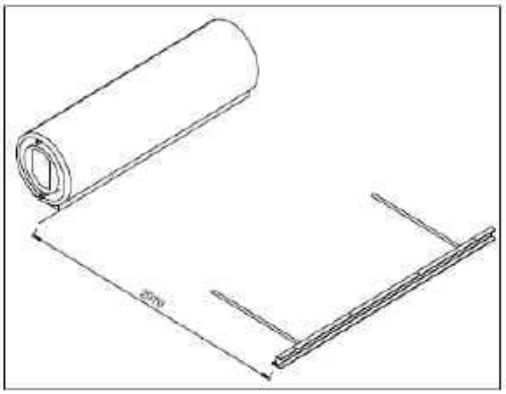
Slide the long straight end of the collector strap through the appropriate slot from the underside of the collector mounting rail as shown on the left side picture.

Pull the collector strap through until the first bend in the strap slips into the slot in the collector rail. The strap will engage with the collector rail as shown on the right side picture.





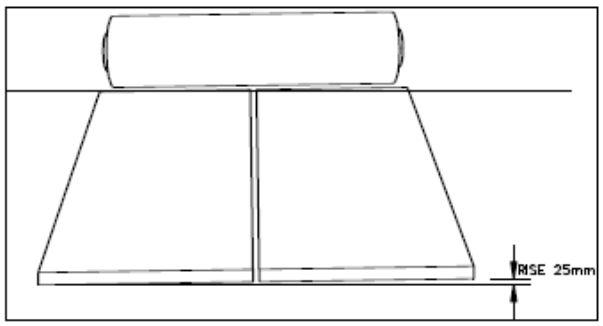
6. Collector Mounting Rail Installation:



Determine the location of the collector mounting rail. Measure down the roof 2070 mm from the position of the foot of the solar storage tank to determine the location of the collector mounting rail.

Note: The solar collectors must be installed at an angle from the horizontal. Use a spirit level to determine the horizontal. Ensure the end of the collector mounting rail at the right hand outlet side of the solar collectors is between:

- 12 – 15 mm (for one solar collector), or
- 24 – 30 mm (for two solar collectors), or
- 36 – 45 mm (for three collectors) higher up the roof from the horizontal than the left hand end of the collector mounting rail at the inlet side of the solar collectors.



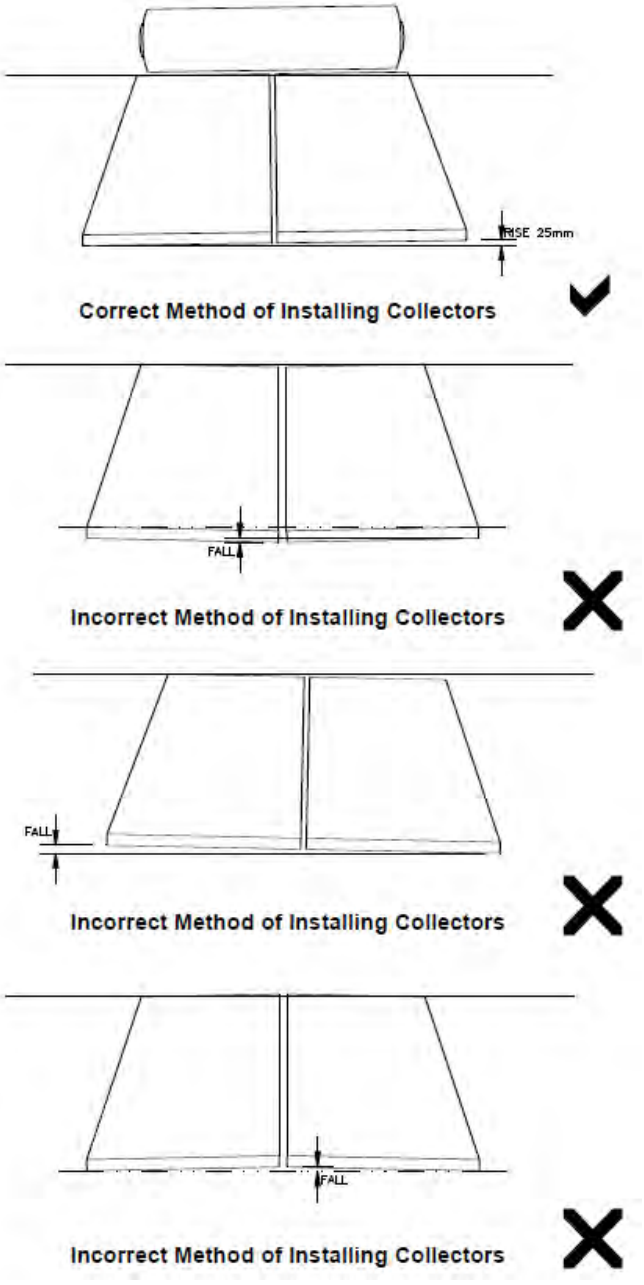
This is to ensure there is sufficient angle rise from left to right to achieve thermosiphon operation. Failure to adhere to this requirement may result in reduced solar performance from the solar water heater.

If the roof material is not even where the collectors are to be installed, then it may be necessary to add 10 mm for each collector in the array to the above distances. It is important that the solar hot outlet is the highest point in the collector waterway so the system functions efficiently.

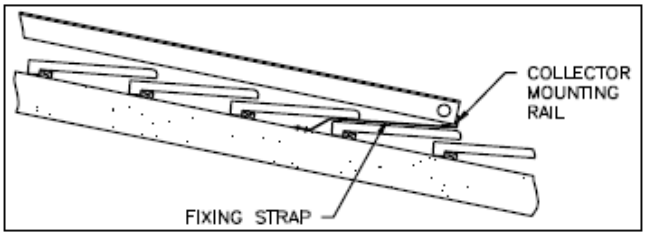
Tile Roof: Remove the tiles on the next row above the position of the collector mounting rail to expose the rafters. Ensure the collector mounting rail is at the correct angle from the horizontal. Once in position, fix the collector straps to the rafters, using suitable screws or anchors. Replace the tiles.

Metal Roof: Ensure the collector mounting rail is at the correct angle from the horizontal. Once in position, fix the collector straps to the rafters, through the metal roofing material, using suitable screws or anchors. Care should be taken not to mark Colorbond® or other metal roof sheet with a marking pen and to remove all swarf from the metal roof as these can cause deterioration of the metal roofing material.

Note: Fixings must penetrate only through the high point in the roof material profile.



7. **Solar Collectors:** Position the solar collectors in the correct configuration with the lower ends seated in the collector mounting rail.



NOTE ON SCREWED FITTING CONNECTIONS

A connection with a screwed fitting uses either an O-ring or a silicone rubber washer for sealing.

Australis collector screwed fitting – use an O-ring (supplied in all standard non TRV / OTP kits).

Titan collector screwed fitting – use a silicone rubber washer (supplied in TRV / OTP kits and single collector kits for indirect system).

Identification of the collector type can be found on the label attached on the side of the collector body.

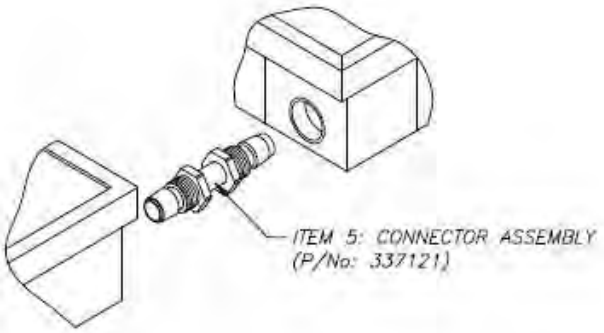


O-Ring (round profile)

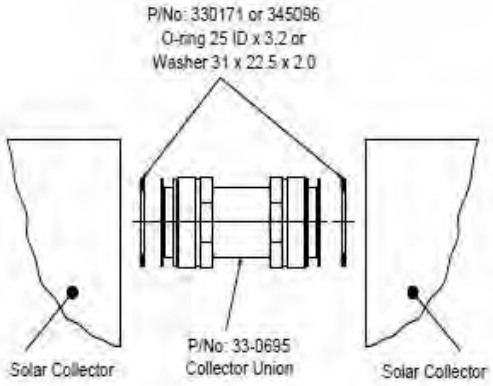


Rubber washer (flat profile)

8. **Collector Unions:** For a 300 model with two or three solar collectors, couple the solar collectors together using the M33 collector unions and O-rings or silicone rubber washers (screwed fitting collectors only) or conetite collector unions (conetite collector) supplied in the pipe kit.



Conetite collector connection

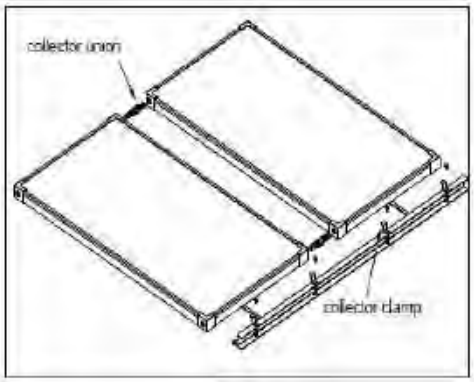


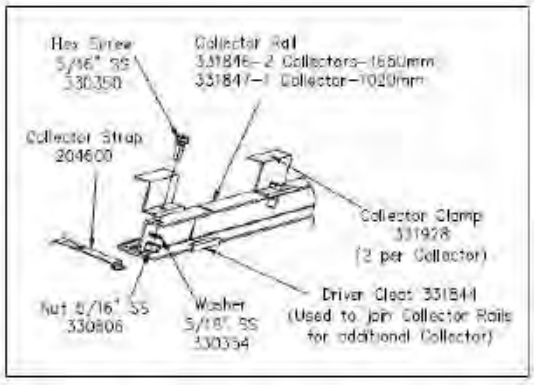
Screwed collector connection

Collector Union Assembly

9. **Clamps and Fixing Collector (Bottom):** Ensure the solar collectors are well seated and centred in the collector mounting rail.

Collector Rail: Loosely clamp the solar collectors (two clamps per collector) to the collector mounting rail, using the clamps and hex screws, washers and nuts provided.



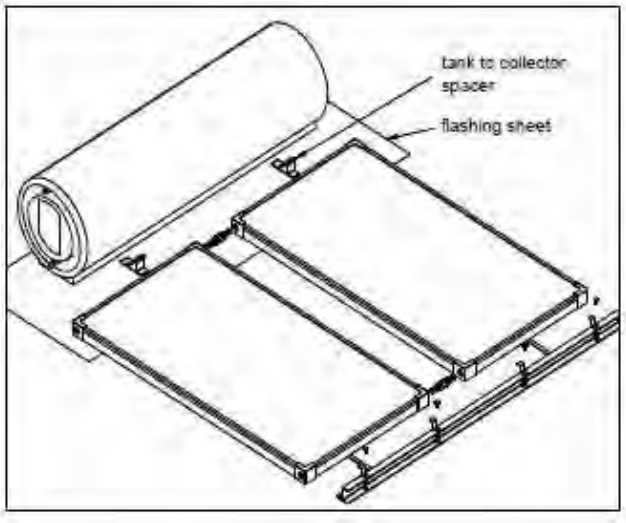


10. Tank to Collector Spacers and Solar Storage Tank:

Tile Roof: If used, fit the tank flashing sheet under the top of the solar collectors and extend up the roof to the top of the solar storage tank location. Lift the roof tiles immediately above the solar storage tank location and secure the flashing sheet to the roofing members. Ensure the flashing sheet makes the section of roof under the tank waterproof. Locate the Tank to Collector spacers against the top end of the solar collectors (one per collector).

Metal Roof: Locate the Tank to Collector spacers against the top end of the solar collectors (one per collector).

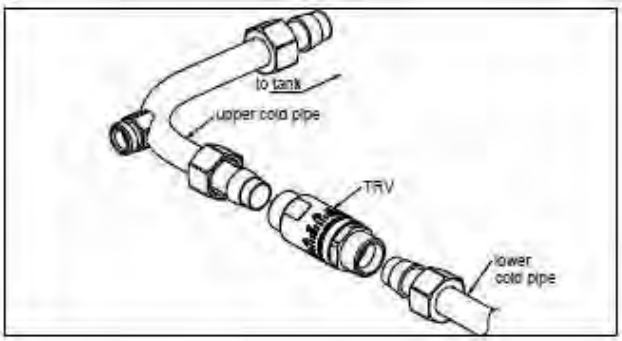
Solar Frame Installation: Ensure the solar collectors are well seated and centred in the tank / collector rail.



Position the solar storage tank in place above the Tank to Collector spacers or tank / collector mounting rail if the installation is on a solar frame. Centre the solar storage tank before commencing interconnecting pipe installations.

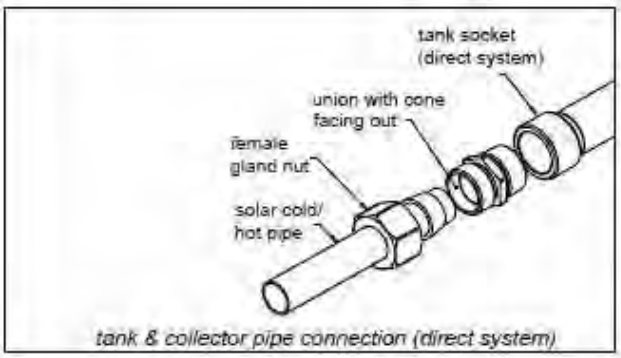
11. **TRV or OTP System Connection:**

If a Thermosiphon Restrictor Valve (TRV) is to be fitted to an RL system, assemble the cold pipe with the TRV thermostat element pointing towards the tank as per marking. If an Over Temperature Protection (OTP) fitted to an RLX system, refer to the installation instructions supplied with the kit for additional information of the installation of the over temperature protection components.



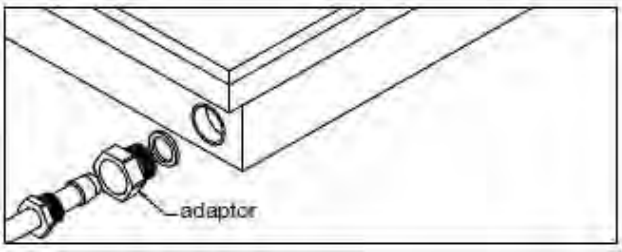
12. Tank to Collector Connections of Pipe Work:

52L / RL direct system: Fit union body R3/4 x G3/4 M with its internal cone profile facing out, one into tank socket inlet on the left hand end of the solar storage tank and one into tank socket return connection on the right hand end of the solar storage tank. Fit collector union M33 M x G3/4 F one into collector cold inlet at the bottom left hand side of the first collector and another into hot outlet at the top right hand side of the second collector for two collector systems.



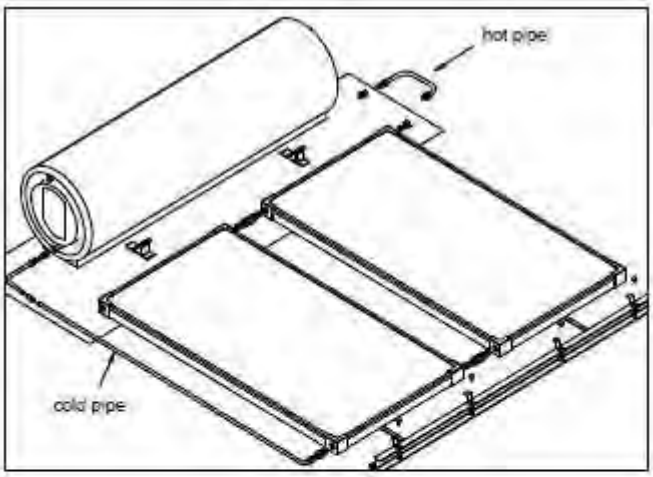
tank & collector pipe connection (direct system)

Solar cold pipe: Connect the solar cold pipe to the unions on the left hand end of the solar storage tank and collector simultaneously. Push pipe against the tank union stop and hand tighten the gland nut there. Ensure the pipe is parallel with the collector. Hand tighten the gland nut at the collector. Fully tighten both ends of the solar cold pipe.



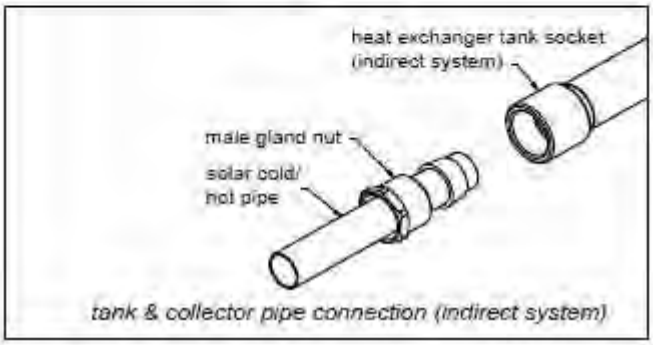
Solar hot pipe: Connect the solar hot pipe to the fitted union body on the right hand end of the solar storage tank and collector simultaneously. Push pipe against the tank union stop and hand tighten the gland nut there. Ensure the pipe is parallel with the collector. Hand tighten the gland nut at the collector. Fully tighten both ends of the solar hot pipe.

52H / RLX indirect system: Union body to tank socket is not required for the indirect system. Fit collector union M33 M x G3/4 F one into collector cold inlet at the bottom left hand side of the first collector and another into hot outlet at the top right hand side of the second collector for two collector systems. Note that collector union is not required for S200 collector.



Solar cold pipe: Connect the solar cold pipe to the heat exchanger connection on the left hand end of the solar storage tank and collector simultaneously. Push pipe against the tank socket sealing face and hand tighten the gland nut there. Ensure the pipe is parallel with the collector. Hand tighten the gland nut at the collector. Fully tighten both ends of the solar cold pipe.

Solar hot pipe: Connect the solar hot pipe to the heat exchanger connection on the right hand end of the solar storage tank and collector simultaneously. Push pipe against the tank socket sealing face and hand tighten the gland nut there. Ensure the pipe is parallel with the collector. Hand tighten the gland nut at the collector. Fully tighten both ends of the solar hot pipe.

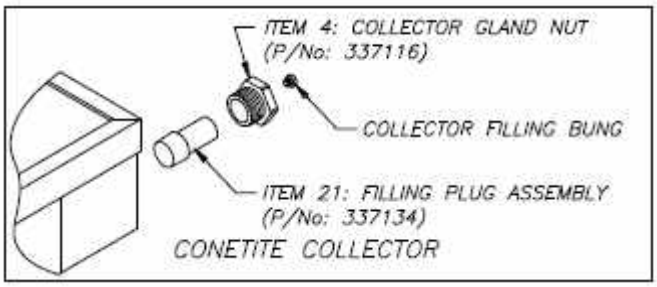


tank & collector pipe connection (indirect system)

After connecting the tank to collector pipe work, tighten the nuts on the clamps at the collector rail to secure the solar collectors.

13. Fill Plug (Indirect System Only):

52H indirect system conetite collectors: Fit the fill plug to the bottom right connection of the solar collectors using the collector gland nut provided.



RLX indirect system screwed fitting collectors:
Fit the M33 / ½" reducing bush and boiler tap supplied to the bottom right connection of the solar collectors using the O-ring or silicone rubber washer provided.

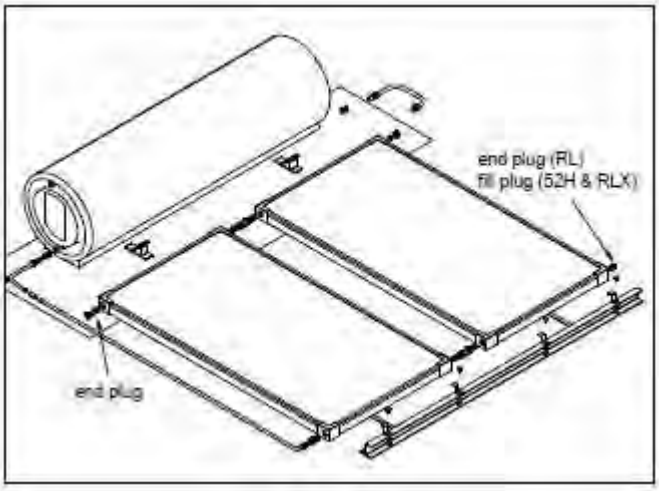
14. **Fill / Drain Label:**

52H / RLX indirect system: Attach the Fill / Drain label adjacent to the side of the solar collector to the Fill Plug / Boiler Tap.

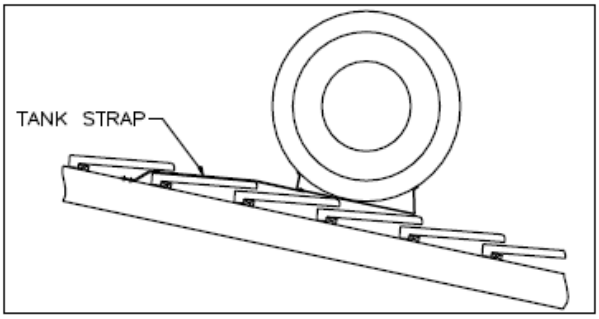
15. Collector Bung / End Plugs:

52H indirect system – conetite fitting: Fit the collector bung to the top left connection of the solar collector using the collector gland nut provided.

RL direct and RLX indirect system: Fit the blanking discs with either O-rings or silicone rubber washers to the top left and bottom right connections of the solar collectors using the M33 collector nut provided. The blanking disc should be installed with the smooth edge facing into the collector.



16. **Tank Straps:** On a pitched roof installation, position and hook the tank straps into the louvers at the back and underneath of the tank support foot.



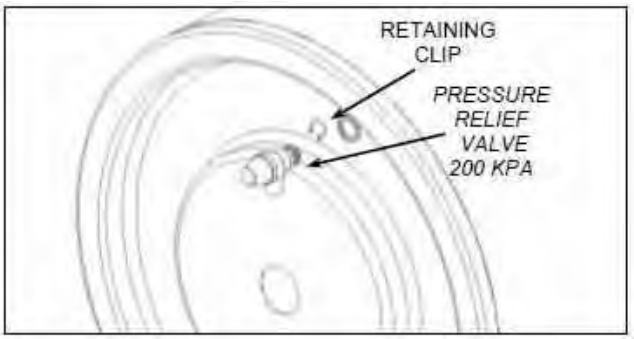
Tile Roof: Remove the tiles on the next row above the position of the solar storage tank to expose the rafters. Once in position, fix the tank straps to the rafters using suitable screws or anchors. Replace the tiles.

Metal Roof: once in position, fix the tank straps to the rafters, through the metal roofing material, using suitable screws or anchors. The tank straps may be cut to a length of approximately 400 mm to retain the aesthetics of the installation.

Note: Fixings must penetrate only through the high point in the roof material profile.

Refer to "Installation Check List" on page 50.

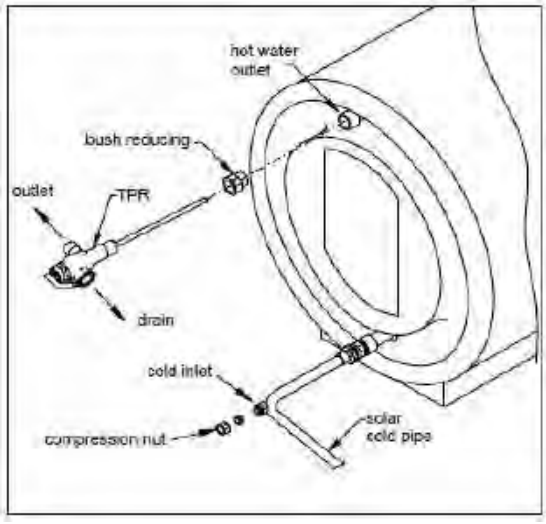
17. **Pressure Relief Valve:** *52H / RLX indirect system:* Fit the 200 kPa pressure relief valve to the top connection on the right hand side of the solar storage tank using the retaining clip provided.



The pressure relief valve and retaining clip are transported behind the electrical cover at the left hand end of the tank.

18. **Cold Water Inlet:** *52L / RL direct system:* Connect the copper cold supply pipe to the shoulder of the solar cold pipe using the G½ compression nut and copper olive provided.

52H / RLX indirect system: Connect the copper cold supply pipe to the cold water inlet using the Union Body R3/4 M x DN15 Olv provided.



19. **Hot Water Outlet:** Fit the Reducing Bush (R3/4 M x RP1/2 F) to the hot water outlet.

Screw the temperature pressure relief valve into the Reducing Bush at the hot water outlet.

Orientate the hot outlet of the temperature pressure relief valve toward the rear of the tank and away from the electrical cover. The valve drain connection on the opposite side of the valve will be orientated forwards and shall be horizontal or slightly downward to permit drainage. The hot water pipe work and drain line from the temperature pressure relief valve **must not** prevent access to the electrical cover of the water heater.

20. **Insulation of the temperature pressure relief valve:** Fit the insulation provided to the TPR valve. Ensure the lever of the TPR valve is accessible after strapping the insulation.

21. **Protective Film:** Peel the protective plastic film from the solar storage tank and the solar collectors. The protective plastic will bake on and deteriorate if exposed to sunlight, reducing the aesthetics of the installation and become difficult to remove.

22. **Installation Check List:** Refer to the "Installation Check List" on page 50 prior to making the plumbing connections and filling the system with water.

23. **Plumbing and Electrical Connections:** Refer to “Connections – Plumbing” on page 51 for details on the cold water and hot water plumbing and “Connections – Electrical” on page 54 for details on the electrical connection.

Notes:

- Penetrations through the roofing material must be:
  - at the high point of the roof tile or metal sheet;
  - made neatly and kept as small as practicable;
  - waterproofed upon installation of the hot and cold pipes.
- Exposed pipe work between the solar storage tank and the penetrations through the roofing material should be kept to a minimum to maintain the aesthetics of the installation.

24. **Closed Circuit Filling:** *52H / RLX indirect system:* Refer to “Closed Circuit Fluid” on page 60 for details on filling the closed circuit with the closed circuit fluid.
25.

Asbestos Roofs

All Occupational Health and Safety matters / procedures must be adhered to in relation to asbestos material.
If safety procedures are not adhered to then terminal illness may result from the handling of asbestos.
Care needs to be taken when fixing straps to asbestos roofs. It is suggested that longer Tek screws are used to fit securely into purlins.

Pitch roofs - Greater than 30°

The solar water heater must not be installed on a roof with a pitch greater than 45°.
For installations on a roof with a pitch between 30° and 45°, the water heater is to be installed on a With Pitch frame.

INSTALLATION CHECK LIST

Once the installation is completed and before the tank is full of water and the collector circuit is full of heating fluid, it is IMPORTANT to check the following:

- The solar hot and solar cold pipes grade downwards with a continuous fall of not less than 10° from the solar storage tank to the solar collectors. If in doubt use a spirit level.

- On a pitched roof installation without a frame, the hot outlet side of the collector array is between

  - 12 – 15 mm (for one solar collector), or

  - 24 – 30 mm (for two solar collectors), or

  - 36 – 45 mm (for three solar collectors)

higher up the roof from the horizontal than the solar cold side of the collector array. If in doubt use a spirit level.

- On a frame installation, depending upon the positioning of the frame on the roof and any fall the roof may have, ensure the collector mounting rail is either horizontal or is higher on the hot outlet side of the solar collectors. If in doubt use a spirit level.

CONNECTIONS – PLUMBING

All plumbing work must be carried out by a qualified person and in accordance with the requirements of the Standard AS/NZS 3500.4, and all local codes and regulatory authority requirements. In New Zealand, the installation must conform with Clause G12 of the New Zealand Building Code.

Warning: Certain types of plastic pipe, such as Poly-butylene pipe, are not suitable to be used as a hot water pipe between:

- this water heater and a temperature limiting device, and
- this water heater and a hot water outlet if a temperature limiting device is not installed.

This water heater can produce water at a temperature and pressure which can exceed the performance limits of these types of pipe. This may result in pipe failure leading to severe water damage to the property. If one of these types of plastic pipe is used as a hot water pipe in the property, then a temperature limiting device must be installed between the water heater and this pipe work.

Note: The solar storage tank of a solar water heater should not be installed as part of a circulated hot water flow and return system in a building. The benefits of solar gain will be significantly reduced and energy gained from the sun lost through the pipe work. If a circulated flow and return system is required, it is necessary to connect the return line after the solar storage tank and prior to the in-series water heater supplied from the solar water heater. Refer to "Circulated Hot Water Flow and Return System" on page 24.

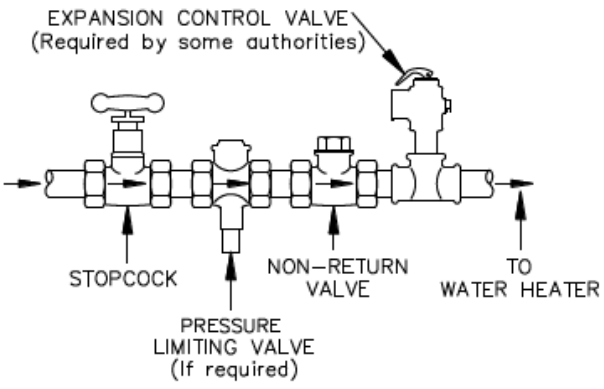
CONNECTION SIZES

	52L / RL series system	52H / RLX series system
• Hot water connection:	DN15 copper tube to DN15 olive compression fitting on TPR valve	DN15 copper tube to DN15 olive compression fitting on TPR valve
• Cold water connection:	DN15 copper tube to DN15 olive compression fitting on solar cold pipe	DN15 copper tube to R3/4 x DN15 olive union
• Relief valve connection:	Rp 1/2	Rp 1/2

WATER INLET AND OUTLET

All pipe work must be cleared of foreign matter before connection and purged before attempting to operate the water heater. All olive compression fittings must use brass or copper olives. Use thread sealing tape or approved thread sealant on all fittings.

An isolation valve and non-return valve must be installed on the cold water line to the water heater.
An acceptable arrangement is shown in the diagram and on page 58 for multiple installations. Refer also to "Hot Water Delivery" on page 23 and to "Mains Water Supply" on page 21.



The cold water isolation valve and expansion control valve, if one is installed, must be accessible from ground or floor level. A position of up to 1800 mm above ground or floor level is recommended. They must not be installed either on the roof or in the ceiling space, unless it is an accessible trafficable area. Extend the cold water line to the cold water inlet fitting on the solar storage tank.

A disconnection union must always be provided at the cold water inlet and hot water outlet of the water heater to allow for disconnection of the water heater.

The pipe work from the hot water outlet **must not** be installed in front of or prevent access to the electrical cover of the water heater.

Pipes must not be installed in direct contact with metal roofs. Where it is necessary to run piping across a metal roof, it must be fixed above the roof and surrounded with a weatherproof insulation of a minimum thickness in accordance with Clause 4.12.3 of AS/NZS 3500.4. The insulation must be UV resistant if exposed. The insulation is to assist in freeze protection and to protect the metal roof against corrosion by water runoff over the copper pipe. Consideration should be made for thermal expansion and contraction of the roof material.

Exposed pipe work between the solar storage tank and the penetrations through the roofing material should be kept to a minimum to maintain the aesthetics of the installation.

Notes:

- Penetrations through the roofing material must be:
  - at the high point of the roof tile or metal sheet;
  - made neatly and kept as small as practicable;
  - waterproofed upon installation of the hot and cold pipes.

PIPE SIZES

To achieve true mains pressure operation, the cold water line to the water heater should be the same size or bigger than the hot water line from the water heater.

The pipe sizing for hot water supply systems should be carried out by persons competent to do so, choosing the most suitable pipe size for each individual application. Reference to the technical specifications of the water heater and local regulatory authority requirements must be made.

IN-SERIES BOOSTER (IF INSTALLED)

The pipe work between the solar storage tank and an in-series booster has a minimum recommended pipe size of DN20, **MUST BE** of copper and be fully insulated with a closed cell type insulation or equivalent and in accordance with the requirements of AS/NZS 3500.4.

The insulation must be weatherproof and UV resistant if exposed. The insulation must be fitted up to the connections on both the solar storage tank and the in-series booster.

An isolation valve must be installed on the water line to the in-series booster. The isolation valve must be of a full flow type if the in-series booster is a continuous flow water heater.

TEMPERATURE PRESSURE RELIEF VALVE

The temperature pressure relief valve is supplied in the pipe kit. The temperature pressure relief valve must be fitted to the hot water outlet before the water heater is operated. Before fitting the relief valve, make sure the probe has not been bent. Seal the thread with Teflon tape - never hemp. Make sure the tape does not hang over the end of the thread.

Screw the valve into the correct opening (refer to the installation diagrams on pages 27 to 33). Do not use a wrench on the valve body. A copper drain line must be fitted to the temperature pressure relief valve (refer to "Relief Valve Drain" on page 53).

The valve must be insulated with closed cell polymer insulation or similar (minimum thickness 9 mm) and the insulation installed so as not to impede the operation of the valve. The insulation must be weatherproof and UV resistant if exposed.

EXPANSION CONTROL VALVE

An expansion control valve is supplied in the pipe kit and must be installed. Install the expansion control valve using a brass Tee, brass union and brass nipple on the cold water line to the water heater.

Local regulations may make it mandatory to install an expansion control valve (ECV) in the cold water line to the water heater. In other areas, an ECV is required if the saturation index is greater than +0.4 (refer to "Water Supplies" on page 13).

The expansion control valve must always be installed after the non return valve and be the last valve installed prior to the water heater (refer to diagrams on page 51). A copper drain line must be fitted to the expansion control valve (refer to "Relief Valve Drain" on page 53).

The expansion control valve and it"s easing gear must be accessible from ground or floor level. A position of up to 1800 mm above ground or floor level is recommended. It must not be installed either on the roof or in the ceiling space, unless it is an accessible trafficable area. Extend the cold water line from the expansion control valve to the cold water inlet fitting on the water heater.

The valve must be insulated with closed cell polymer insulation or similar (minimum thickness 9 mm) and the insulation installed so as not to impede the operation of the valve. The insulation must be weatherproof and UV resistant if exposed.

RELIEF VALVE DRAIN

DN15 copper drain lines must be fitted to the temperature pressure relief valve and expansion control valve to carry the discharge clear of the water heater. Connect the drain lines to the valves using disconnection unions. The drain line from the valve to the point of discharge should be as short as possible, have a continuous fall all the way from the water heater to the discharge outlet and have no tap, valves or other restrictions in the pipe work.

The drain line from the temperature pressure relief valve also **must not** be installed in front of or prevent access to the electrical cover of the water heater.

A drain line from a relief valve must comply with the requirements of AS/NZS 3500.4.

A drain line must be no longer than 9 metres with no more than three bends greater than 45° before discharging at an outlet or air break. The maximum length of 9 metres for a drain line is reduced by 1 metre for each additional bend required of greater than 45°, up to a maximum of three additional bends. Where the distance to the point of final discharge exceeds this length, the drain line can discharge into a tundish.

Subject to local regulatory authority approval, the drain lines from the temperature pressure relief valve and expansion control valve from an individual water heater may be interconnected.

The outlet of a drain line must be in such a position that flow out of the pipe can be easily seen, but arranged so discharge will not cause injury, damage or nuisance. The termination point of a drain line must comply with the requirements of AS/NZS 3500.4. Drain lines must not discharge into a safe tray. A discharge pipe connected to the pressure-relief valve device is to be installed in a continuously downward direction and in a frost-free environment. In locations where water pipes are prone to freezing, drain lines must be insulated, must not exceed 300 mm in length and are to discharge into a tundish through an air gap of between 75 mm and 150 mm.

If a drain line discharges into a tundish, the drain line from the tundish must be not less than DN20. The drain line from a tundish must meet the same requirements as for a drain line from a relief valve.

Where a drain line crosses over a metal roof, the pipe work must be fully insulated with weatherproof lagging to offer corrosion protection to the metal roof against water runoff over the copper pipe. The insulation must be UV resistant if exposed.

For multiple installations the drain lines from several water heaters can discharge into a common tundish (refer to "Multiple Installations" on pages 57 and 58).



Warning: As the function of the temperature pressure relief valve on this water heater is to discharge high temperature water under certain conditions, it is strongly recommended the pipe work downstream of the relief valve be capable of carrying water exceeding 93°C. Failure to observe this precaution may result in damage to pipe work and property.

CONNECTIONS – ELECTRICAL

The power supply to the water heater must not be switched on until the water heater is filled with water and a satisfactory megger reading is obtained.

All electrical work and permanent wiring must be carried out by a qualified person and in accordance with the Wiring Rules AS/NZS 3000 and all local codes and regulatory authority requirements.
If this water heater is installed with an in-series booster, then the electric booster heating unit will not need to be connected to a power supply and the references to the electric booster heating unit, thermostat and boosting controls in these installation instructions will not be applicable to the installation.

Note: AS 3498 requires that a water heater provides the means to inhibit the growth of Legionella bacteria in potable water. This water heater can satisfy this AS 3498 requirement provided the electric booster is energised for a sufficient period each day and the electric booster thermostat setting is 60°C or higher.

SOLAR STORAGE TANK

The solar storage tank with an electric booster heating unit must be directly connected to a 240 V AC 50 Hz mains power supply with an isolating switch installed at the switchboard.

A flexible 20 mm conduit is required for the electrical cable to the solar storage tank. The conduit is to be connected to the unit with a 20 mm terminator. Connect the power supply wires directly to the terminal block and earth tab connection, ensuring there are no excess wire loops inside the front cover.

The water heater is most suited for the booster heating unit to be connected to either a continuous, or a time of use, or an extended Off-Peak (overnight and day) electricity supply. A timer can also be used to control the boosting periods and help maximise solar savings. Refer to “Booster Control” on page 55.

The booster heating unit may be connected to an Off-Peak (overnight) electricity supply, however this will only allow the booster to heat the water overnight. If this type of connection is considered, care must be taken to ensure there is sufficient boost capacity to meet the household's full day and night’s hot water supply during periods of no or low solar gain, particularly in cold weather. There is also an increased risk of temperature run down occurring, particularly in cooler weather (refer to “Temperature Run Down” on page 7).

Discuss the power supply requirements with the householder.

THERMOSTAT SETTING

The thermostat is adjustable from 60°C to 70°C. The thermostat is adjusted by turning the adjuster anticlockwise to decrease the temperature setting and clockwise to increase the temperature setting. Only adjust the temperature setting when the isolating switch is switched off at the switchboard.
For reasons of safety and economy, we advise the thermostat be set at the lowest temperature that will provide sufficient hot water during periods when boosting is required. Rheem recommends the thermostat is set at 60°C to maximise solar contribution. Discuss the thermostat setting requirements with the householder.

BOOSTER CONTROL

The isolating switch installed in the electrical meter box for the solar storage tank should be left switched on.

Leaving the isolating switch switched on will also provide a sufficient period of time each day for the booster heating unit to operate, if required, to satisfy the requirements of AS 3498.

Timer Control Switch

A suitably rated timer control switch can be installed and will help maximise energy savings with an electrically boosted solar water heater connected to a **continuous, time of use or extended Off-Peak (overnight and day)** electricity supply.

If used with an extended Off-Peak (overnight and day) electricity supply, the timer switch should:

- be operated by a continuous power supply on its own circuit from the switchboard with the booster heating unit operated by the Off-Peak power supply.

A double pole isolating switch is required to be installed at the switchboard to simultaneously isolate both circuits.

Or

- be of a type which has an internal rechargeable battery to keep time when the power supply is not available to the timer.

Programming the Timer

Power must be available to the timer control switch before the booster heating unit can be activated.

The timer should be programmed:

- to suit the hot water consumption pattern of the household,
- with the end of the period to coincide with the commencement of the evening hot water usage,

(a second period, such as prior to the morning hot water usage, may be necessary - check with the householder)

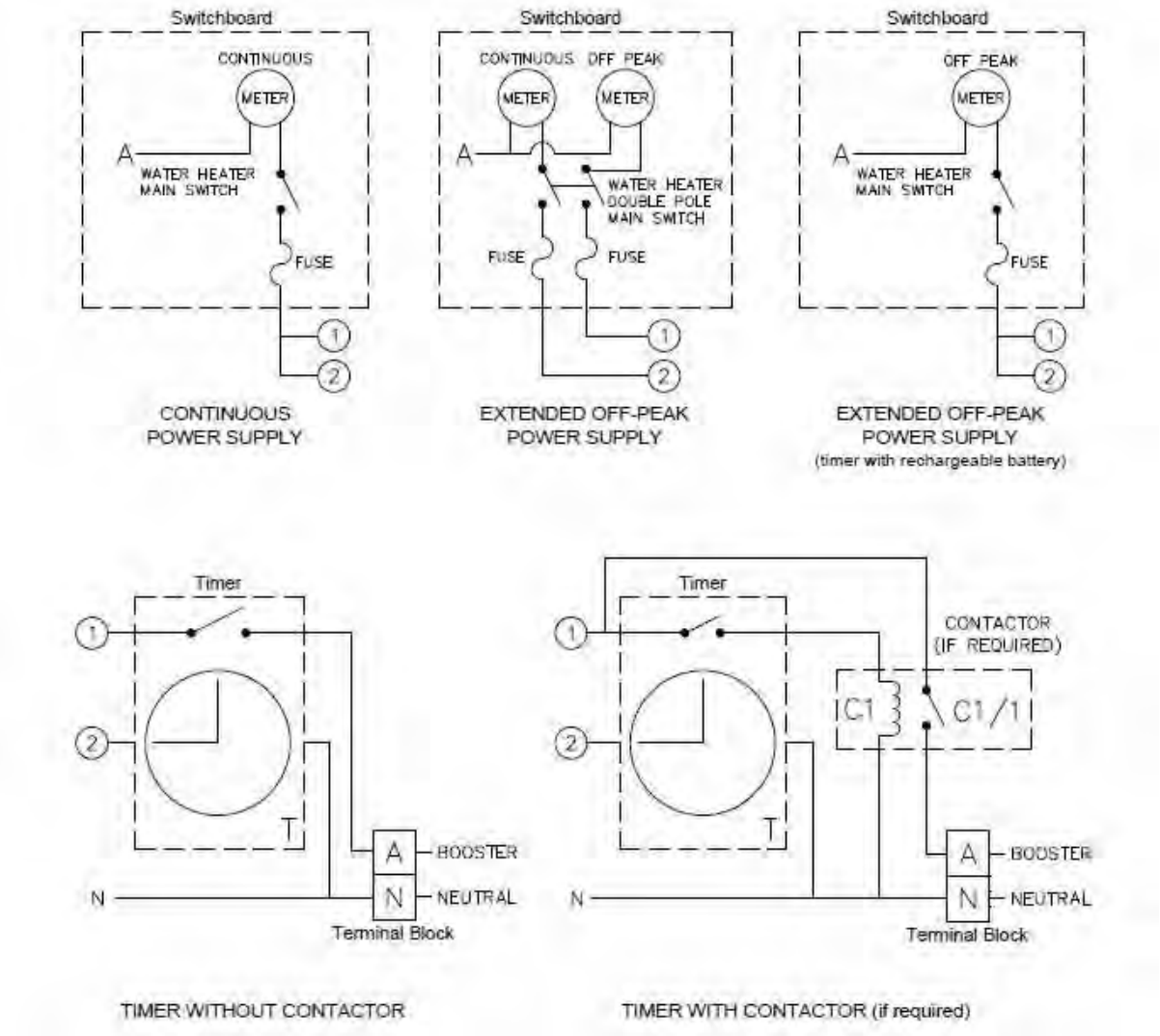
- to enable a boosting period of not less than the recommended continuous length of time for boosting, and
- for a period when power will be available for the booster heating unit to operate.

The recommended continuous length of time for boosting is:

				Booster heating unit size		
Model	Minimum winter cold water temperature		Temperature rise	2.4 kW	3.6 kW	4.8 kW
180	Cool / temperate climate	10°C	50°C	2 ¼ hours	1 ½ hours	1 ¼ hours
	Temperate / sub tropical climate	15°C	45°C	2 hours	1 ½ hours	1 hour
	Tropical climate	20°C	40°C	1 ¾ hours	1 ¼ hours	1 hour
300	Cool / temperate climate	10°C	50°C	3 ¾ hours	2 ½ hours	2 hours
	Temperate / sub tropical climate	15°C	45°C	3 ½ hours	2 ¼ hours	1 ¾ hours
	Tropical climate	20°C	40°C	3 hours	2 hours	1 ½ hours

The recommended boosting periods are sufficient to allow the booster heating unit to heat up the boost volume of the solar storage tank to 60°C where the winter cold water temperatures do not fall below those shown. This may be necessary during periods of very low solar energy gain through the solar collectors, such as during constant rain or extremely cloudy weather, particularly in winter when the incoming cold water temperature is lower. The period will also provide a sufficient heat up time for the electric booster to operate, if required, to satisfy the requirements of AS 3498.

TIMER CONTROL SWITCH WIRING DIAGRAM



MULTIPLE INSTALLATIONS

A multiple installation of Rheem thermosiphon solar water heaters on a single manifold or multiple manifolds is possible, using the Rheem Equa-Flow® manifold system, where large volumes of hot water are required. It is recommended the electrical heating units of Rheem thermosiphon solar water heaters installed in a multiple installation, not be connected to a power supply. Rheem heavy duty water heaters should be installed in series with the solar water heaters to boost the water temperature during periods of poor or no solar gain.

An over temperature protection device should be fitted to each thermosiphon water heater when used as a preheater to an inline booster water heater.

The cold water and hot water manifolds must be designed to balance the flow from each solar storage tank.

To achieve this, there are basic installation requirements and principles which must be followed:

1. The maximum number of solar storage tanks in a bank should be 8, however several banks of solar storage tanks can be installed.

2. The hot water line from the manifold must leave from the opposite end to which the cold water line enters the manifold.

3. The solar storage tanks must be of the same model.

4. The cold water line, cold and hot water headers and hot water line must be sized to meet the requirements of both AS/NZS 3500.4 and the application.

5. A non return valve, isolation valve and if required a pressure limiting valve and expansion control valve, must be installed on the cold water line to the system.

6. A full flow gate valve or ball valve (not stop taps, as used on a single solar storage tank installation) must be installed on both the cold water branch and hot water branch of each solar storage tank.

7. Non return valves or pressure limiting valves **must not** be installed on the branch lines to the solar storage tanks.

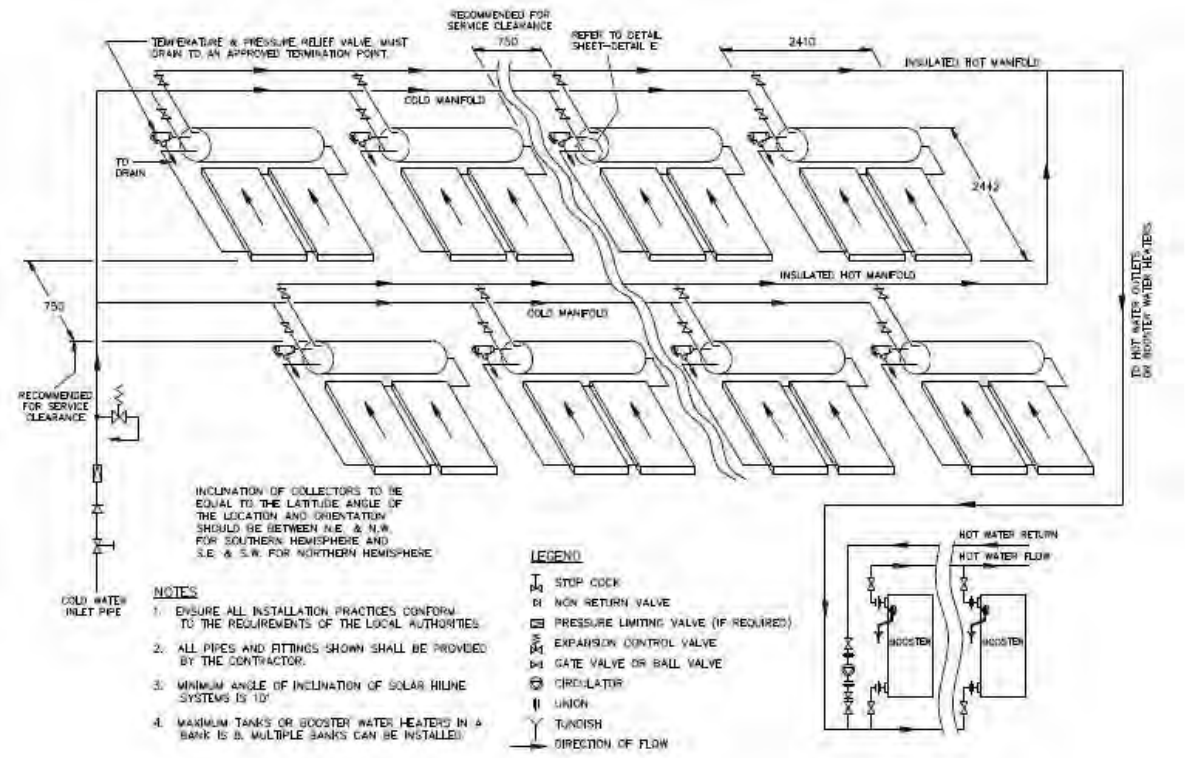
8. All fittings, valves and branch lines must be matched sets all the way along the manifold.

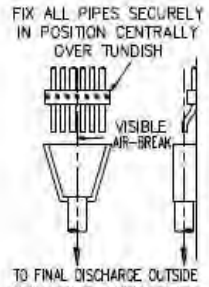
9. Sufficient space must be left to enable access, servicing or removal of each solar storage tank.

10. The temperature pressure relief valve drain line from each solar storage tank can terminate at a common tundish (funnel) with a visible air break at each drain discharge point (refer to the diagram on page 58 and to “Relief Drain Line” on page 53).

Refer to the diagram on page 58 for installation and plant layout details.

RHEEM COMMERCIAL SOLAR THERMOSIPHON – DOUBLE ARRAY





TPR Valve Drain Line
Common Discharge Point

COMMISSIONING

TO FILL AND TURN ON THE WATER HEATER
The power supply to the solar storage tank must not be switched on until the water heater is filled with water and a satisfactory megger reading is obtained.

- Open all of the hot water taps in the house (don't forget the shower).
- Open the isolation valves fully on the cold and hot water branches to the water heater(s) in a bank.
- Open the cold water isolation valve fully on the cold water line to the water heater(s).

  Air will be forced out of the taps.
- Close each tap as water flows freely from it.
- Check the pipe work for leaks.
- If an indirect system, fill the closed circuit heat exchanger and solar collectors with the closed circuit fluid. Refer to "Closed Circuit Fluid" on page 60.
- Switch on the electrical supply at the isolating switch to the solar storage tank(s).
- Set the timer if one is installed (refer to "Booster Control" on page 55).

Explain to the householder or a responsible officer the functions and operation of the water heater and the timer if one is installed. Upon completion of the installation and commissioning of the water heater, leave this guide with the householder or responsible officer.

INSTALLATION CHECKLIST
Prior to handover, complete the final check list:

1. Air bled from taps .....[ ]
2. System checked for water (and glycol) leaks ..... [ ]
3. Cold and hot water piping checked for water leaks .....[ ]
4. Roof tiles put back into position .....[ ]
5. Roof flashing watertight ..... [ ]
6. Collectors have correct kick (12-15 mm per collector) .....[ ]
7. Drain pipes free of any obstruction ..... [ ]
8. All pipe work clipped where necessary ..... [ ]
9. Operation of booster checked .....[ ]
10. Protective plastic film removed from tank and collectors (if fitted) .....[ ]
11. Owner instructed on use .....[ ]

TO TURN OFF THE WATER HEATER

If it is necessary to turn off the water heater on completion of the installation, such as on a building site or where the premises is vacant, then:

Switch off the electrical supply at the isolating switch to the solar storage tank(s).

Close the cold water isolation valve at the inlet to the water heater(s) to shut down the entire system, or;

Close the isolation valves on the cold and hot water branches to shut down an individual water heater in a bank.

CLOSED CIRCUIT FLUID

Important: It is recommended the solar storage tank be filled with water before charging the solar heat exchanger with the closed circuit fluid.

The closed circuit concentrate is supplied in 1.5 litre bottles. Mix the required quantity of closed circuit concentrate with the correct quantity of water to achieve the correct closed circuit fluid for the system. Failure to mix the closed circuit fluid correctly may void the Rheem warranty.

System	Closed Circuit Concentrate Requirement for Minimum Operating Temperature		Mixed Total
	-8°C	-28°C	
52H180 (1 collector)	1 x 1.5 litre bottle	2 x 1.5 litre bottles	4 litres
52H300 (2 collectors)	1 x 1.5 litre bottle	2 x 1.5 litre bottles	7 litres
52H300 (3 collectors)	2 x 1.5 litre bottle	3 x 1.5 litre bottles	9 litres

Caution: Although the closed circuit concentrate is of food grade and non-toxic, care must be taken not to accidentally consume or spill any of the closed circuit concentrate when handling. Only use approved closed circuit concentrate. If required, a Material Safety Data Sheet can be sought from Rheem.

While the closed circuit fluid is non-toxic to humans, it does have an adverse effect on water stored in rainwater tanks. It can cause an unpleasant odour to develop, render the rainwater foul and unfit for human consumption and result in the rain water tank having to be drained and cleaned. Refer to "Rain Water Tank" on page 22.



Warning: Although non-toxic, the following first aid advice and procedures should be followed if the closed circuit concentrate comes into human contact or is spilt:

- Swallowed - give milk or water and seek medical attention.
- Eyes – flush with flowing lukewarm water.
- Skin - remove contaminated clothing and wash skin with water and soap.
- Inhaled - seek fresh air, rest and keep warm.
- Spilt - immediately remove contaminated clothing, stop leak source, absorb with a dry agent and eliminate any ignition sources nearby.

To Fill the Closed Circuit
It is necessary to fill the heat exchanger and solar collectors with closed circuit fluid before the water heater can be operated. Refer to diagram on page 61.

Note: Care must be taken to ensure there is no spillage of the closed circuit fluid onto the roof surface, particularly if the roof is part of a rain water collection system. Any spilled closed circuit fluid must be cleaned up immediately and the roof surface cleaned of any fluid residue.

To fill the heat exchanger:

- Remove the retaining clip and 200 kPa pressure relief valve from the tank vent socket located on the right hand end of the solar storage tank.
- This is the fill level for the closed circuit fluid and will allow air to escape during filling.
- Open the Service Valve (used on collectors with screw fittings) or remove the screw from the Fill Plug Assembly (used on collectors with conetite fittings) located at the bottom right hand corner of the right hand solar collector.
- Connect a hose to the Service Valve or Fill Plug Assembly.
- Using a funnel placed in the end of the hose, pour water into the system through the funnel until water flows from the vent socket. **Note:** the funnel must be held at a level that is above the vent socket.

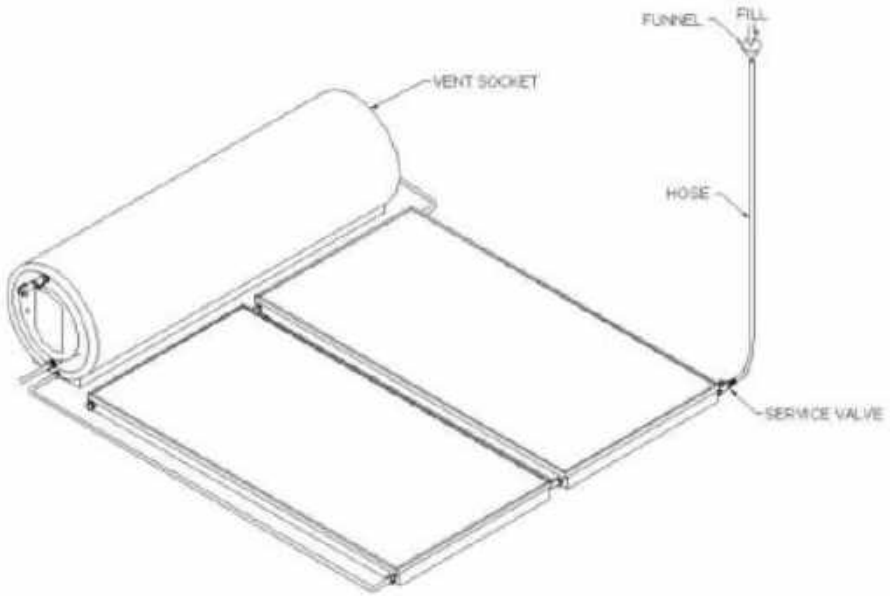
- Close the Service Valve or remove the hose and refit the screw into the Fill Plug Assembly.
- Insert the 200 kPa pressure relief valve into the vent socket and secure with the retaining clip.
- Pressurise the closed circuit system up to 170 kPa and leave for ten minutes.
- Check the system for leaks at all connections.
- If no leaks are evident:
    - remove the retaining clip and 200 kPa pressure relief valve,
    - open the Service Valve or remove the screw from the Fill Plug Assembly and reconnect the hose,
    - using a funnel placed in the end of the hose, pour the required contents of the closed circuit fluid into the system through the funnel,

    Water will be displaced through the vent socket as the closed circuit concentrate is added.

    - add a further 500 ml of water to flush the closed circuit concentrate through the hose and into the collector.
- Close the Service Valve or remove the hose and refit the screw into the Fill Plug Assembly.
- Insert the 200 kPa pressure relief valve into the vent socket and secure with the retaining clip.
- Pressurise the closed circuit system up to 170 kPa and leave for ten minutes.
- Check the system for leaks at all connections.
- When satisfied there are no leaks present, remove the hose from the Service Valve.
- Clean up any spilt closed circuit fluid.

Note: The closed circuit fluid level should be checked every five (5) years or at each major service and if required topped up or replaced.

The closed circuit fluid contains food grade additives (rust inhibitor, anti-freeze agent, and colour) and is harmless to the environment. However, it is good practice to recover any excess closed circuit fluid and remove from site.



Filling the Closed Circuit with Closed Circuit Fluid

DRAINING THE SOLAR STORAGE TANK

To drain the solar storage tank:

- Cover the solar collectors to prevent solar radiation gain and the transfer of heat to the solar storage tank.

  Failure to do so may cause a safety issue.

- Open a hot water tap and allow the water to run for five minutes immediately prior to draining the solar storage tank.

  This will assist in the transfer of any heat from high temperature closed circuit fluid in the solar collectors to the water in the solar storage tank.

- Close the hot water tap.



Warning: Exercise care to avoid splashing of water, as water discharged from the solar storage tank may be of a very high temperature.

Note: The water discharged from the solar storage tank may contain sediments and should be diverted away from any rainwater tank connected to the roof.

- Turn off the water heater (refer to "To Turn off the Water Heater" on page 59).
- Close all hot water taps.
- *52H / RLX Series* – Operate the closed circuit pressure relief valve on the right side of the solar storage tank to relieve the pressure from the closed circuit.



Warning: Relieved air or closed circuit fluid may be hot.

- Operate the temperature pressure relief valve release lever on the left hand side of the solar storage tank - do not let the lever snap back or you will damage the valve seat.

  Operating the lever will release the pressure in the solar storage tank.

- *52H / RLX Series* – Undo the union at the cold water inlet to the solar storage tank and attach a hose.

  52L / RL Series – Undo the union at the cold water inlet connection on the shoulder of the solar cold pipe and attach a hose.

  If it is necessary to drain the solar collectors, unscrew and remove the end plugs from the bottom right and top left ends of the solar collectors.

  Let the other end of the hose go to a drain.

- Operate the relief valve again.

This will let air into the solar storage tank and allow the water to drain through the hose.

DRAINING THE CLOSED CIRCUIT – 52H / RLX SERIES

It is recommended to drain the solar collectors and heat exchanger every five years. The closed circuit fluid should be checked and if necessary replaced. Draining the solar collectors and closed circuit should be conducted within three hours of sunrise, when the closed circuit fluid temperature inside the solar collectors is lower.

To drain the solar collectors and closed circuit:

- Cover the solar collectors to prevent solar radiation gain.

  Failure to do so may cause a safety issue.

- Open a hot water tap and allow the water to run for five minutes immediately prior to draining the solar storage tank.

  This will assist in the transfer of any heat from high temperature closed circuit fluid in the solar collectors to the water in the solar storage tank.

- Close the hot water tap.



Warning: Exercise care to avoid splashing of closed circuit fluid, as fluid discharged from the solar collectors may be of a very high temperature.

Note: The closed circuit fluid discharged from the solar collectors can render the water in a rain water tank unusable and should be diverted away from any rainwater tank connected to the roof.

- Operate the closed circuit pressure relief valve on the right side of the solar storage tank to relieve the pressure from the closed circuit.



Warning: Relieved air or closed circuit fluid may be hot.

- *System with Fill Plug Assembly:* Remove the screw from the Fill Plug Assembly (used on collectors with conetite fittings) and attach a hose to the assembly.

  Place the end of the hose into a container.

- *System with Service Valve:* Attach a hose to the spigot and open the Service Valve (used on collectors with screwed fittings).

  Place the end of the hose into a container.

- Remove the retaining clip and the closed circuit pressure relief valve from the tank vent socket.

- Allow the closed circuit fluid to drain into a container and dispose of in accordance with the relevant local authority.



Warning: Closed circuit fluid may be hot.

To fill the solar collectors, refer to "To Fill the Closed Circuit" on page 60.

FLUSHING THE WATER HEATER

It may be necessary to flush the storage tank (52H or 52L tank) and solar collectors (52L) if there is sediment in the water supply. This should be conducted in the morning, within three hours of sunrise, when the water or closed circuit fluid temperature inside the solar collectors is lower.

- Cover the solar collectors to prevent solar radiation gain and the transfer of heat to the solar storage tank.

  Failure to do so may cause a safety issue.

- Open a hot water tap and allow the water to run for five minutes immediately prior to flushing or draining the solar storage tank and / or solar collectors.

  This will assist in the transfer of any heat from high temperature water or closed circuit fluid in the solar collectors to the water in the solar storage tank.

- Close the hot water tap.



Warning: Exercise care to avoid splashing of water, as water discharged from the solar storage tank and solar collectors may be of a very high temperature.

Note: The water discharged from the water heater may contain sediments and should be diverted away from any rainwater tank connected to the roof.

To flush the storage tank (52H or 52L tank) and solar collectors (52L):

- Turn off the water heater (refer to "To Turn off the Water Heater" on page 59).
- *52H / RLX series* – Operate the closed circuit pressure relief valve on the right side of the solar storage tank to relieve the pressure from the closed circuit.



Warning: Relieved air or closed circuit fluid may be hot.

- Operate the relief valve lever – do not let the lever snap back or you will damage the valve seat.

  Operating the lever will release the pressure in the water heater.

- *52L / RL series* – From the bottom right and top left ends of the solar collectors, unscrew and remove the end plugs.
- *52H / RLX series* – Undo the union at the cold water inlet to the solar storage tank and attach a hose.
- *Flush and hose inside tank:*
  - disconnect and remove the booster heating unit,
  - Place a hose inside the tank,
  - Open the isolation valve to the hose,
  - Allow hose to run until water runs clear from the solar collectors (52L) or from the hose connected to the cold water connection (52H),
  - Close the isolation valve to the hose and remove the hose from the tank,
  - Replace and reconnect the booster heating unit,
- *52H / RLX series* – Disconnect the hose from the cold water inlet and reconnect the cold water pipe work.
- *52L / RL series* – Open the cold water isolation valve to the water heater.
  - Allow water to flow from the solar collectors until it is clear of any sediment.
  - When satisfied the solar storage tank and solar collectors are flushed, close the cold water isolation valve to the water heater and reconnect all fittings to their original location.
- Open the cold water isolation valve to the water heater fully, check fittings for leaks and switch on the power.

It is recommended to flush the solar storage tank and solar collectors every five years. This will assist in keeping the solar collectors, solar cold pipe and solar hot pipe clear of sediment.

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SOLARHART THERMOSIPHON WATER HEATER STAINESS STEEL WARRANTY

SOLAR THERMOSIPHON WATER HEATER SYSTEMS – L180, LX180, L305, LX305

1. THE SOLAHART WARRANTY – GENERAL

1.1 This warranty is given by Rheem Australia Pty Limited ABN 21 098 823 511 of 1 Alan Street, Rydalmere New South Wales.
1.2 Rheem offer a trained and qualified national service network who will repair or replace components at the address of the water heater subject to the terms of the Rheem warranty. Solar Group, in addition can provide preventative maintenance and advice on the operation of your water heater. The Solar Group contact number is available 7 days a week on 0800679377 with Service personnel available to take your call from 8am to 5pm daily (hours subject to change).
1.3 For details about this warranty, you can contact us on 0800679377 or by email at warranty@solargroup.co.nz or for service bookings info@solargroup.co.nz .
1.4 The terms of this warranty and what is covered by it are set out in sections 2 and 3 and apply to water heaters manufactured after 1st September 2014.
1.5 If a subsequent version of this warranty is published, the terms of that warranty and what is covered by it will apply to water heaters manufactured after the date specified in the subsequent version.

2. TERMS OF THE SOLAHART WARRANTY AND EXCLUSIONS TO IT

2.1 The decision of whether to repair or replace a faulty component is at Solahart's sole discretion.
2.2 If you require a call out and we find that the fault is not covered by the Solahart warranty, you are responsible for our standard call out charge. If you wish to have the relevant component repaired or replaced by Solahart that service will be at your cost.
2.3 Where a failed component or cylinder is replaced under this warranty, the balance of the original warranty period will remain effective. The replacement does not carry a new Solahart warranty.
2.4 Where the water heater is installed outside the boundaries of a metropolitan area as defined by Solahart or further than 25 km from either a regional Solahart branch office or an Accredited Solar Group Agent's office, the cost of transport, insurance and travelling between the nearest branch office or Solahart Accredited Service Agent's office and the installed site shall be the owner's responsibility.
2.5 Where the water heater is installed in a position that does not allow safe or ready access, the cost of that access, including the cost of additional materials handling and/or safety equipment, shall be the owner's responsibility. In other words, the cost of dismantling or removing cupboards, doors or walls and the cost of any special equipment to bring the water heater to floor or ground level or to a serviceable position is not covered by this warranty.
2.6 This warranty only applies to the original and genuine Solahart water heater in its original installed location and any genuine Solahart replacement parts.
2.7 The Solahart warranty does not cover faults that are a result of:

a) Accidental damage to the water heater or any component (for example: (i) Acts of God such as floods, storms, fires, lightning strikes and the like; and (ii) third party acts or omissions).
b) Misuse or abnormal use of the water heater.
c) Installation not in accordance with the Owner's Guide and Installation Instructions or with relevant statutory and local requirements in the State or Territory in which the water heater is installed.
d) Connection at any time to a water supply that does not comply with the water supply guidelines as outlined in the Owner's Guide and Installation Instructions.
e) Repairs, attempts to repair or modifications to the water heater by a person other than Solar Group or a Solahart Accredited Service Agent.
f) Faulty plumbing or faulty power supply.
g) Failure to maintain the water heater in accordance with the Owner's Guide and Installation Instructions.
h) Transport damage.
i) Fair wear and tear from adverse conditions (for example, corrosion).
j) Cosmetic defects.
k) Breakage of collector glass for any reason including hail damage (we suggest that the collector glass be covered by your home insurance policy).
l) Ice formation in the waterways of a: direct open circuit thermosiphon system; or an indirect closed circuit thermosiphon system due to non Solahart approved or incorrectly mixed closed circuit fluid being used.
m) Non Solahart approved or incorrectly mixed closed circuit fluid being used or incorrect or insufficient filling of the closed circuit system with the closed circuit fluid.

2.8 Subject to any statutory provisions to the contrary, this warranty excludes any and all claims for damage to furniture, carpet, walls, foundations or any other consequential loss either directly or indirectly due to leakage from the water heater, or due to leakage from fittings and/ or pipe work of metal, plastic or other materials caused by water temperature, workmanship or other modes of failure.
2.9 If the water heater is not sized to supply the hot water demand in accordance with the guidelines in the Solahart water heater literature, any resultant fault will not be covered by the Solahart warranty.

SOLAHART SOLAR THERMOSIPHON WATER HEATER WARRANTY – AUSTRALIA ONLY

SOLAR THERMOSIPHON WATER HEATER SYSTEMS – L180, LX180, L305, LX305

3. WHAT IS COVERED BY THE SOLAHART WARRANTY FOR THE WATER HEATERS DETAILED IN THIS DOCUMENT

3.1 Solahart will repair or replace a faulty component of your water heater if it fails to operate in accordance with its specifications as follows:

What components are covered	The period from the date of installation in which the fault must appear in order to be covered	What coverage you receive
All Systems (all installations)		
All components	Year 1	Repair and/or replacement of the faulty component, free of charge, including labour.
52L, 52H Series Systems		
The cylinder (if the water heater is installed in a single-family domestic dwelling)	Years 2 to 7	Replacement cylinder, free of charge. Installation and repair labour costs are the responsibility of the owner.
The cylinder (if the water heater is not installed in a single-family domestic dwelling)	Years 2 & 3	Replacement cylinder, free of charge. Installation and repair labour costs are the responsibility of the owner.
The solar collector (all installations)	Years 2 to 5	Replacement solar collector, free of charge. Installation and repair labour costs are the responsibility of the owner.
RL, RLX Australis Series Systems (if the water heater is installed in a single-family domestic dwelling)		
The cylinder and solar collector(s)	Years 2 & 3	Replacement cylinder or solar collector, free of charge, including labour.
	Years 4 to 7	Replacement cylinder or solar collector, free of charge. Installation and repair labour costs are the responsibility of the owner.
RL, RLX Australis 10 & Titan Series Systems (if the water heater is installed in a single-family domestic dwelling)		
All components	Year 2 to 5	Repair and/or replacement of the faulty component, free of charge, including labour.
The cylinder and solar collector(s)	Years 6 to 10	Replacement cylinder or solar collector, free of charge. Installation and repair labour costs are the responsibility of the owner.
RL, RLX Australis, Australis 10 & Titan Series Systems (if the water heater is not installed in a single-family domestic dwelling)		
The cylinder and solar collector(s)	Years 2 & 3	Replacement cylinder or solar collector, free of charge. Installation and repair labour costs are the responsibility of the owner.
	Year 4	Replacement cylinder or solar collector, supplied at 75% of list price. Installation and repair labour costs and 25% of cylinder or solar collector list price are the responsibility of the owner.
	Year 5	Replacement cylinder or solar collector, supplied at 50% of list price. Installation and repair labour costs and 50% of cylinder or solar collector list price are the responsibility of the owner.

SOLAHART SOLAR THERMOSIPHON WATER HEATER WARRANTY – AUSTRALIA ONLY

SOLAR THERMOSIPHON WATER HEATER SYSTEMS – L180, LX180, L305, LX305

4. ENTITLEMENT TO MAKE A CLAIM UNDER THIS WARRANTY

4.1 To be entitled to make a claim under this warranty you need to:

a) Be the owner of the water heater or have consent of the owner to act on their behalf.

b) Contact Solar Group without undue delay after detection of the defect and, in any event, within the applicable warranty period.

4.2 You are not entitled to make a claim under this warranty if your water heater:

a) Does not have its original serial numbers or rating labels.

b) Is not installed in Australia.

5. HOW TO MAKE A CLAIM UNDER THIS WARRANTY

5.1 If you wish to make a claim under this warranty, you need to:

a) Contact Solahart on 131031 and provide owner's details, address of the water heater, a contact number and date of installation of the water heater or if that's unavailable, the date of manufacture and serial number (from the rating label on the water heater).

b) Solahart will arrange for the water heater to be tested and assessed on-site.

c) If Solahart determines that you have a valid warranty claim, Solahart will repair or replace the water heater in accordance with this warranty.

5.2 Any expenses incurred in the making of a claim under this warranty will be borne by you.

6. THE NEW ZEALAND CONSUMER LAW

6.1 Our goods come with guarantees that cannot be excluded under the New Zealand Consumer Law. You are entitled to a replacement or refund for a major failure and for compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.

6.2 The Solahart warranty (set out above) is in addition to any rights and remedies that you may have under the New Zealand Consumer Law.

For Service contact Solar Group New Zealand: solargroup.co.nz **0800 769 377**

solar group

Better Solar Systems since 1986



230413
Received by
Kapiti Coast District Council
26/05/23

SOLAR EDWARDS. SINCE 1963.

Solar Edwards has manufactured solar hot water systems that meet Australian conditions for over 40 years. Today, Solar Edwards is a leader in solar hot water systems for both domestic and commercial purposes throughout Australia, Asia, the Pacific, the Americas, Europe, Africa and the Middle East.

Australian designed
& manufactured



SAVE 50–85% OF HOT WATER ENERGY USE*

A Solar Edwards stainless steel hot water system is an excellent environmental and financial investment. It can significantly reduce fossil fuel energy use and consequent pollution and greenhouse gas emissions.

Not only are you helping the environment by installing a Solar Edwards stainless steel solar hot water system, you could also enjoy substantial savings on your household hot water energy use of between 50–85%.[++]







Solar Edwards | The Stainless Steel Hot Water Specialists.

SAVE MORE WITH GOVERNMENT INCENTIVES

The Federal Government has a small scale Renewable Energy scheme whereby eligible solar water heaters are entitled to a number of Small Scale Technology Certificates (STCs).

These incentives can reduce your initial investment making a Solar Edwards hot water system not only a good choice for the environment but also for your pocket.

Ask your local Solar Edwards dealer how much you will save.

Note: The Australian Government in partnership with state and territory governments is working to phase-out electric hot water systems. This is because electric hot water systems can use at least three times the greenhouse gases produced by other more efficient technologies such as solar water heaters.

INTEREST FREE OPTIONS

Solar Edwards offers you interest free options so you can enjoy all the benefits of owning a Solar Edwards solar water heater TODAY whilst paying for your system over time – INTEREST FREE.

Ask your local Solar Edwards dealer for more information.



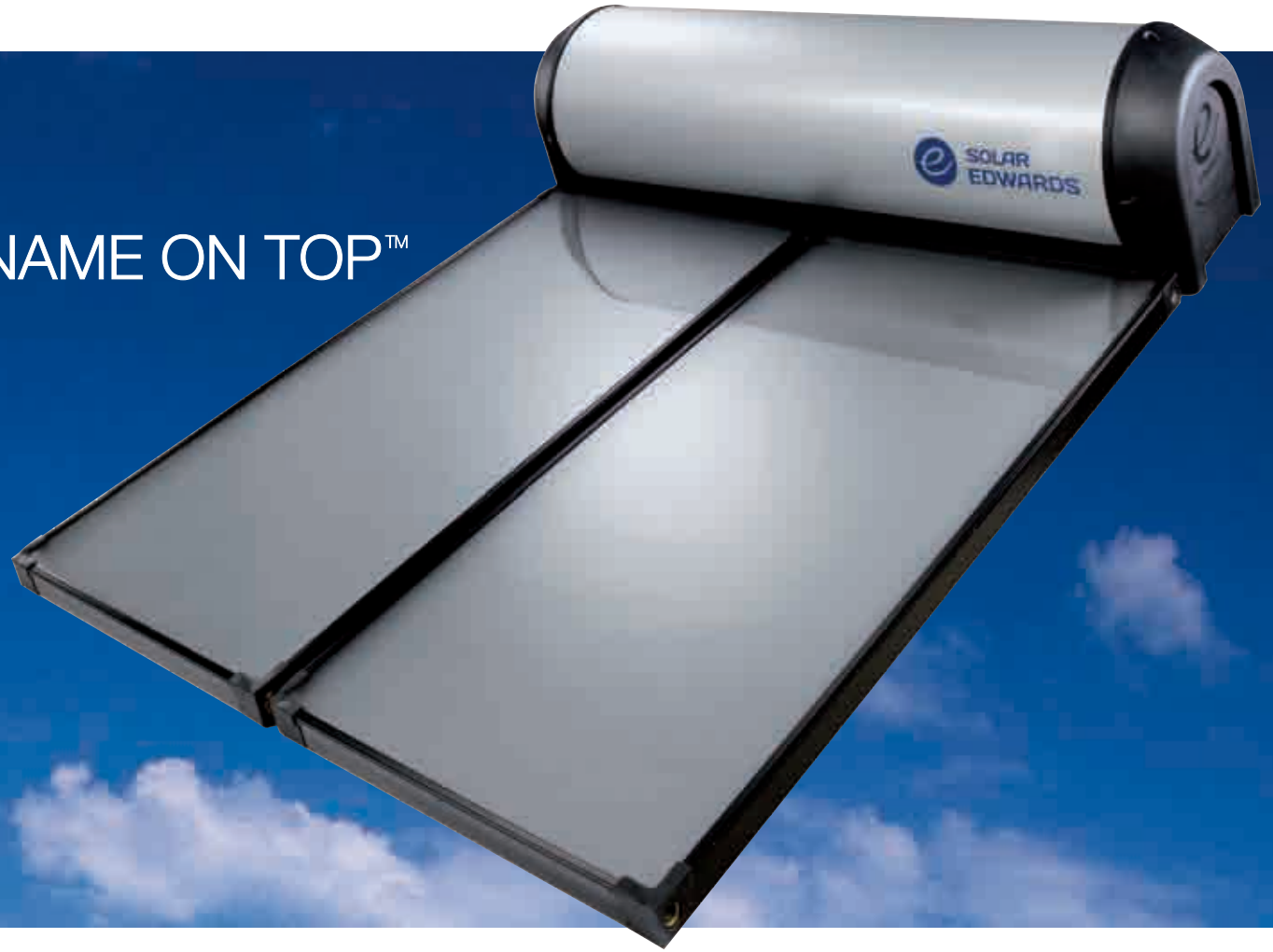




++Savings of 50–85% shown are based on Australian Government approved TRNSYS simulation modelling. Savings and incentives will vary depending upon your location, type of Solar Edwards hot water system installed, orientation and inclination of the solar collectors, type of water heater being replaced, hot water consumption and fuel tariff. Maximum financial savings off your hot water bill are achievable when replacing an electric water heater on continuous tariff.

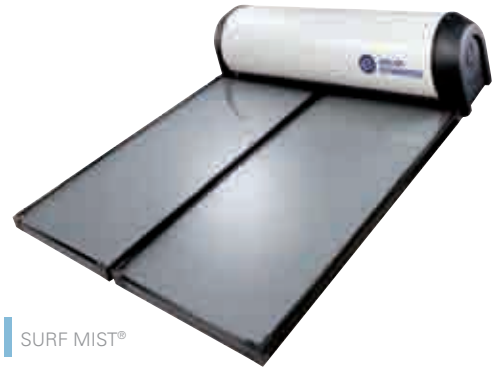
SOLAR EDWARDS
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EDWARDS THE NAME ON TOP™

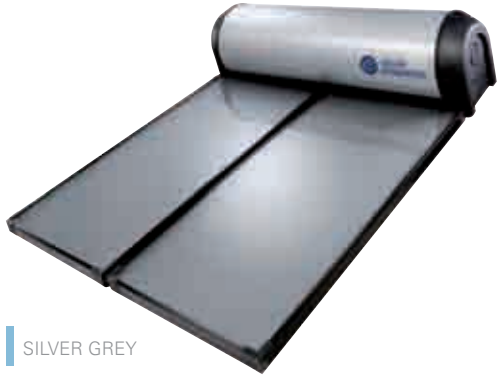




SEVEN COLORBOND® STEEL COLOURS



SURF MIST®



SILVER GREY



WOODLAND GREY®

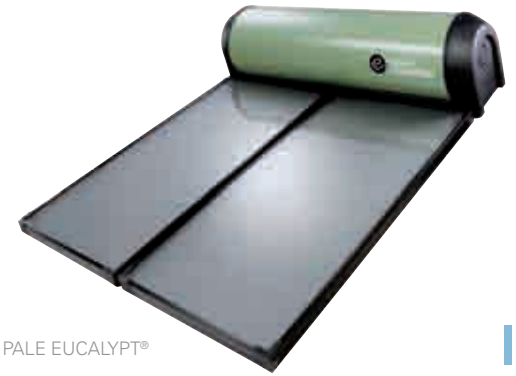
THE SOLAR EDWARDS STAINLESS STEEL ADVANTAGE

The storage cylinders for all Solar Edwards roof-mounted hot water systems are made of quality stainless steel which acts as a natural barrier to corrosion.
Most conventional water heaters are made of steel which requires a sacrificial anode for protection whereas the anti-corrosive properties of stainless steel mean that an anode is not necessary – therefore they require less maintenance.

Stainless steel is prominent in most kitchens for its purity, aesthetics, ease of maintenance and corrosion resistance. It is reassuring to know that inside every Solar Edwards roof-mounted storage cylinder your hot water is kept in a hygienic environment ready for your family's everyday hot water needs.



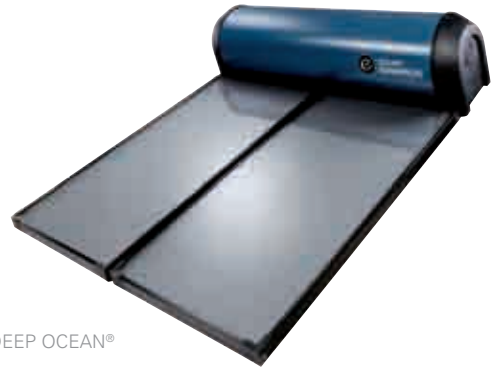
Stunning colour on the outside | Superior Stainless Steel on the inside.



PALE EUCALYPT®



HEADLAND®



DEEP OCEAN®



NIGHT SKY®

SEVEN CONTEMPORARY COLORBOND® STEEL COLOURS

The outer casing of every Solar Edwards storage tank is constructed from weatherproof COLORBOND® steel. Solar Edwards offer a choice of seven contemporary COLORBOND® steel colours with their modern design roof mounted range.

This colour choice allows you to choose a system which will complement your roof and blend with your home's aesthetics, at no additional cost.



Colours shown may vary slightly from actual COLORBOND® steel colour.

SOLAR EDWARDS. 6 AND 10 YEARS WARRANTY.*

Our roof-mounted storage systems come with either a 6 or 10 year cylinder and collector warranty depending on the model you chose. As further support Solar Edwards has in place easily accessed service providers. These experienced technical personnel are authorised to provide you with whatever service your Solar Edwards hot water system may require.

Just one call to 1300 EDWARDS (that's 1300 339 2737) is all it takes.

L SERIES – THE NON FROST SYSTEM

If your home is in a temperate or tropical location, which is not subject to frost and you have good quality drinking water, then the Solar Edwards L Series system is ideal. This system operates on the natural thermosiphon principle, i.e. when water is heated it rises. The L Series system directly heats the water as it passes through the collectors and then automatically circulates it back into the storage tank. This process continues whilst the sun is shining, giving you and your family ample hot water.

LX SERIES – THE FROST PROTECTED SYSTEM

Designed for areas which experience frost or snow and perhaps have less than reliable water quality. It uses the highly efficient heat transferring properties of a special anti-freeze fluid to transfer the absorbed energy to heat the water indirectly.

With an 'indirect system' water does not pass through the collector panels, instead the anti-freeze mixture is circulated from the collectors through a stainless steel heat exchanger, transferring the heat into the water.

The benefit of this 'indirect' heat exchange process is that the system can be used confidently in frost areas, without risking damage to the system; it offers protection against damage in freezing conditions.



*Conditions apply. See chart over page for details.

SOLAR EDWARDS
THE NAME ON TOP™

AUSTRALIS COLLECTOR

The Australis Series is our largest selling collector. Designed to supply you and your family abundant hot water, the Australis collector is solidly constructed from high grade copper and aluminium, and is housed in a durable COLORBOND® steel tray.

TITAN – THE ULTIMATE COLLECTOR

The Titan Series collector is designed especially for high performance. Solar Edwards has taken advantage of the latest advances in heat-transfer technology to build superior solar collectors to gather as much of the sun's energy as required. The Titan Series collector uses an advanced titanium coated copper solar absorber plate combining first grade copper with titanium, to show superior qualities in solar performance when compared with other solar collectors available.

WHICH SYSTEM SUITS YOU

Which system you choose will depend on where in Australia you live, which way your home faces and even the pitch of your roof. So it's important to talk to your local Solar Edwards dealer about the Solar Edwards hot water system which is ideal for you.

There will be days during the year when your solar system doesn't receive sufficient energy from the sun to provide all the hot water you need.

Solar Edwards gives you the option to have either an in tank electric element booster or a gas in-line continuous flow boosting unit. The choice is yours; ask your local Solar Edwards hot water dealer which option would be best suited to you.

LATEST SOLAR COLLECTOR TECHNOLOGY
for superior performance and quality



		Frost Areas	Water Quality	Warranty	Solar Contribution Area		
					Low	Medium	High
L Series Systems	Australis	Not Suitable	Potable	6 years*	Not Suitable	✓	✓
	Australis 10	Not Suitable	Potable	10 years*	Not Suitable	✓	✓
	Titan	Not Suitable	Potable	10 years*	✓	✓	♦
LX Series Systems	Australis	✓	Potable	6 years*	Not Suitable	✓	✓
	Australis 10	✓	Potable	10 years*	Not Suitable	✓	✓
	Titan	✓	Potable	10 years*	✓	✓	♦

*Conditions apply. Refer to separate warranty table on the technical specifications page for details.
♦ May not be suitable for all applications. Please consult your Solar Edwards dealer for more details.





RANGE OF STORAGE CYLINDER
colours and sizes to suit your home

	Units	L180	L305	L440	LX180	LX305
STORAGE CYLINDER						
Capacity	litres	180	305	440	177	294
Outside Dimensions	mm	571 x 1215	571 x 1905	571 x 2700	571 x 1215	571 x 1905
Weight – Full	kg	232	384	555	237	378
Weight – Empty	kg	52	79	115	60	84
Max Inlet Pressure	kPa	550	550	550	550	550
Insulation – Thickness	mm	47	47	47	47	47
TOTAL SYSTEM						
Dimensions – Area on roof	mm	2562 x 1615	2562 x 2494	2562 x 3581	2562 x 1615	2562 x 2494
No. of Collectors (Typical)		1	2	3	1	2
Weight – Full†	kg	267	454	660	277	455
Weight – Empty†	kg	85	145	214	98	157

†Total system weight calculated using Australis Collectors

Warranty Duration*	Cylinder	Collector	Spare Parts	Labour
L/ LX Australis Series	6 years	6 years	1 year	1 year
L/ LX Australis 10 Series	10 years	10 years	5 year	5 year
L/ LX Titan Series	10 years	10 years	5 year	5 year

*For full details refer to the Solar Edwards Warranty Guidelines in the Owner's Manual or at www.edwards.com.au

Titan Collector			
Aperture (heating) area		m^2	1.86
Dimensions	length	mm	1941
	width	mm	1027
	height	mm	84
Capacity		litres	1.5
Weight	empty	kg	34
	full	kg	35.5
Working pressure	kPa		1400
Absorber surface	Blue sputtered selective		
Absorber material	Copper		
Riser material	Copper Tube		
Number of risers	7		

Australis Collector			
Aperture (heating) area		m^2	1.86
Dimensions	length	mm	1941
	width	mm	1027
	height	mm	84
Capacity		litres	1.5
Weight	empty	kg	34
	full	kg	35.5
Working pressure	kPa		1400
Absorber surface	Black polyester powder coat		
Absorber material	Aluminium		
Riser material	Copper Tube		
Number of risers	7		

SOLAR EDWARDS
THE NAME ON TOP™

SOLAR EDWARDS
THE NAME ON TOP™

This publication is printed, using green energy, onto paper stock which is totally chlorine free and manufactured from pulp sourced from plantation grown timber. Both paper manufacturer and printer are approved to the highest environmental standards.

www.edwards.com.au
info@edwards.com.au
ABN: 21 098 823 511

Re-order Code: EDWRS10PP (March 2012)

For sales assistance call:
1300 SOLARS
1300 765 277 (Australia only)

For service assistance call:
1300 EDWARDS
1300 339 2737 (Australia only)

Your local dealer:



WATTS®

Combi Packs





Combi Valve Packs

APEX VALVES
A WATTS Brand

Literature ▶

Apex Series Combi Packs include a combination of valves used for high (mains) pressure hot water and solar systems. Combi pack offers the complete valve solution. Complies with NZBC Clause G12 (2001). Complies with NZS 4617 (1989).

- CP20P Pump Pack includes: Filterstop (FS20), Cold Water Expansion Valve (FVT 700), Tempering Valve (TV20), 1 x MF Ball Valve 20mm, Non-Return 20mm (NR) and Socket.
- CP20M Manifold Pack includes: Pressure Limiting Valve (LVT20 500), Cold Water Expansion Valve (EVT 700), Tempering Valve (TV20), 1 x MM Ball Valve 20mm, 1 x MF Ball Valve 20mm, Non-Return 20mm (NR), 100mm Cross Connector, Cap and Socket.
- CP20S Solar Pack includes: Pressure Limiting Stop Valve (LSV20 500), Cold Water Expansion Valve (EVT 700), Solar Tempering Valve (TV20S), 1 x MF Ball Valve 20mm, Non-Return 20mm (NR), and Socket.
- CP25 includes: Pressure Limiting Valve (LV25 500), Cold Water Expansion Valve Honeywell (EV25 800), Tempering Valve (TV25), 2 x MF Ball Valves (BV 25mm), Non-Return 25mm (NR 25).
- CP20T includes: Pressure Limiting Valve with take-off (LVT20 500), Cold Water Expansion Valve (EVT 700), Tempering Valve (TV20), 1 x MM Ball Valve 20mm, 1 x MF Ball Valve 20mm, Non-Return 20mm (NR), Cap and Socket
- CP20 includes: Pressure Limiting Stop Valve (LSV20 500), Cold Water Expansion Valve (EVT 700), Tempering Valve (TV 20), 1 x MF Ball valve 20mm, Non-Return 20mm (NR), and Socket
- CP20G includes: Pressure Limiting Stop Valve 20mm (LSV20-500), 20mm Ball Valve - Blue Handle for Water, 20mm Ball Valve - Yellow Handle for Gas, PLUS 1 x MF 20mm, 1 x 20mm Fibre Washer (Gas) and 1 x 20mm Rubber Washer (Water)
- CP15 includes: Pressure Limiting Valve with take off (LVT15 500), Cold Water Expansion Valve (EVT 700), Tempering Valve (TV 20), 1 x MF Ball Valve 15mm, 1 x MF Ball Valve 20mm, Non-Return 20mm (NR), Cap and Socket

Literature

- APEX Plumbing Catalogue 1939
- Specification Sheet - Combi Packs and Valve Packs

Customer Support ▶

Share this Product

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Kapiti Coast District Council
26/05/23

BRANZ Appraised
Appraisal No.548 [2013]

BRANZ Appraisals

Technical Assessments of products for building and construction

BRANZ APPRAISAL No. 548 (2013)

This Appraisal replaces BRANZ Appraisal No. 548 (2007) dated 27 July 2007.

Amended 17 December 2013

TEKTON® BUILDING WRAP

Marshall Innovations Limited
P O Box 9411
Greerton
Tauranga

Tel: 07 543 0948
Fax: 07 541 1029

BRANZ
BRANZ Limited
Private Bag 50 908
Porirua City
New Zealand
Tel: +64 4 237 1170
Fax: +64 4 237 1171
www.branz.co.nz

Product

1.1 Tekton® Building Wrap is a synthetic breather-type flexible wall underlay and air barrier for use under direct and non-direct fixed wall cladding on timber and steel framed buildings. The product is manufactured of a coated spun-bonded polypropylene.



Scope

2.1 Tekton® Building Wrap has been appraised for use as a flexible wall underlay on timber framed buildings within the following scope:

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

2.2 Tekton® Building Wrap has been appraised for use as a flexible wall underlay on steel framed buildings within the following scope:

- the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1 with regards to building height and floor plan area; and,
- with absorbent and non-absorbent wall claddings installed over an 18 mm minimum drained cavity; and,
- with masonry veneer subject to specific design; and,
- situated in NZS 3604 Wind Zones up to, and including 'Very High'.

2.3 Tekton® Building Wrap has been appraised for use as a flexible wall underlay over rigid wall underlays on timber and steel framed buildings within the following scope:

- the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1 with regards to building height and floor plan area; and,
- with absorbent and non-absorbent wall claddings installed over an 18 mm minimum drained cavity; and,
- with masonry veneer in accordance with NZBC Acceptable Solution E2/AS1 for timber framed buildings or specific design for steel framed buildings; and,
- situated in NZS 3604 Wind Zones up to and including 'Extra High'.

2.4 Tekton® Building Wrap has also been appraised for use on buildings subject to specific weathertightness design. Building designers are responsible for the building design and for the incorporation of Tekton® Building Wrap into their design in accordance with the declared properties and the instructions of Marshall Innovations Limited.

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.

Building Regulations

New Zealand Building Code (NZBC)

3.1 In the opinion of BRANZ, Tekton® Building Wrap, if used, designed, 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 B2 DURABILITY: Performance B2.3.1(a), not less than 50 years, B2.3.1(b), 15 years and B2.3.2. Tekton® Building Wrap meets these requirements. See Paragraphs 9.1 and 9.2.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.2. When used as part of the cladding system, Tekton® Building Wrap will contribute to meeting this requirement. See Paragraphs 12.1 – 12.3.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. Tekton® Building Wrap meets this requirement and will not present a health hazard to people.

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

Technical Specification

4.1 Tekton® Building Wrap is a 100 g/m^2 light grey sheet polypropylene membrane material approximately 0.6 mm thick.

4.2 The product is supplied in rolls 1.370 m x 74 m and 2.743 m x 37 m. The product is printed with the Tekton® logo repeated along the length of the roll. The rolls are wrapped with an instruction sticker.

Accessories

4.3 Accessories used with Tekton® Building Wrap which are supplied by the installer are:

- Fixings – staples, clouts, screws or proprietary wrap fixings, or other temporary fixings to attach the wall wrap to the framing.
- Wall underlay support – polypropylene strap, 75 mm galvanised mesh or galvanised wire, or vertical cavity battens where required to support the wall wrap in accordance with NZBC Acceptable Solution E2/AS1, Paragraph 9.1.8.5.

Handling and Storage

5.1 Handling and storage of the product, whether on or off site, is under the control of the installer. The rolls must be protected from damage and weather. They must be stored on end, under cover, in clean, dry conditions and must not be crushed.

Technical Literature

6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for Tekton® Building Wrap. 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

Timber and Steel Framing

7.1 Studs must be provided at maximum 600 mm centres. Dwangs must be fitted flush between the studs at maximum 1200 mm centres.

General

7.2 Tekton® Building Wrap is intended for use as an alternative to conventional building papers which are fixed over timber and steel framed walls in order to limit the entry of wind into building cavities, and to act as a secondary barrier to wind-driven rain.

7.3 The material also provides a degree of temporary weather protection during early construction. However, the product will not make the building weathertight and some wetting of the underlying structure is always possible before the building is closed in. Hence, the building must be closed-in and made weatherproof before moisture sensitive materials such as wall or ceiling linings and insulation materials are installed.

7.4 Tekton® Building Wrap must not be exposed to the weather or ultra violet light for a total of more than 60 days before being covered by the wall cladding.

7.5 Tekton® Building Wrap is suitable for use under wall claddings as a wall underlay as called up in NZBC Acceptable Solution E2/AS1, Table 23, except that it must not be used with non-absorbent wall claddings such as vinyl or metal based sidings or weatherboards in direct fixed installations. Tekton® is suitable for use under cavity based wall claddings as a non-absorbent synthetic wall underlay as called up in NZS 2295, Table 2.4 on steel framed buildings. Refer to Table 1.

7.6 Tekton® Building Wrap is also suitable for use as an air barrier to walls that are not lined, such as attic spaces at gable ends, as called up in NZBC Acceptable Solution E2/AS1, Paragraph 9.1.4 (c). Refer to Table 1.

Table 1: NZBC E2/AS1 Table 23 Requirements

NZBC E2/AS1 Table 23 Wall Wrap Properties	Property Performance Requirement	Actual Property Performance
Absorbency	≥ 100 g/m^2	Classified as non-absorbent (see paragraph 7.4)
Vapour Resistance	≤ 7 MN s/g	Pass
Water Resistance	≥ 20 mm	Pass
pH of Extract	≥ 5.5 and ≤ 8	9.78 (Note 1)
Shrinkage	≤ 0.5%	Pass
Mechanical	Edge tear and tensile strength	Edge tear: Machine direction = 228 N Cross direction = 186 N Tensile strength: Machine direction = 4.4 kN/m Cross direction = 3.9 kN/m
Air Barrier	Air resistance: ≥ 0.1 MN s/m^3	Pass

Note 1: Further testing of Tekton® Building Wrap was completed to determine the effect of the high pH level on the wall underlay and materials it is likely to come into contact with during its serviceable life. The testing confirmed that the high pH had no adverse effects on the wall underlay performance, or the performance of other materials.

7.6 In cavity installations where the cavity battens are installed at greater than 450 mm centres, the wall underlay must be supported between the battens to prevent the wall underlay bulging into the cavity space when bulk insulation is installed in the wall frame cavity in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 9.1.8.5.

Stucco Plaster

7.7 Tekton® Building Wrap is suitable for use as a non-rigid backing material for stucco plaster in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 9.3.5.1. The wall underlay must be supported with 75 mm galvanised mesh or plastic tape or wire at 150 mm centres run across the cavity battens to limit deflection to a maximum of 5 mm in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 9.3.5.2.

7.8 Tekton® Building Wrap may also be used as a slip layer over rigid backings for stucco plaster in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 9.3.3(b).

Structure

8.1 Tekton® Building Wrap is suitable for use in all Wind Zones of NZS 3604 up to, and including, 'Very High' when used as a flexible building underlay, and all Wind Zones of NZS 3604 up to, and including, 'Extra High' when used as an overlay for rigid building underlays.

Durability

9.1 Tekton® Building Wrap meets code compliance with NZBC Clause B2.3.1 (a), not less than 50 years for building wraps used where the cladding durability requirement or expected serviceable life is not less than 50 years, and code compliance with NZBC Clause B2.3.1 (b), 15 years for building wraps used where the cladding durability requirement is 15 years.

Serviceable Life

9.2 Provided it is not exposed to the weather or ultra-violet light for a total of more than 60 days, and provided the exterior cladding is maintained in accordance with the cladding manufacturer's instructions and the cladding remains weather resistant, Tekton® Building Wrap is expected to have a serviceable life equal to that of the cladding.

Control of Internal Fire and Smoke Spread

10.1 Tekton® Building Wrap has an AS 1530 Part 2 flammability index of not greater than 5 and therefore meets the requirements of NZBC Acceptable Solutions C/AS2 to C/AS6, Paragraph 4.17.8 b), for the surface finish requirements of suspended flexible fabric used as an underlay to exterior cladding that is exposed to view in occupied spaces. It may therefore be used with no restrictions in all buildings.

Prevention of Fire Occurring

11.1 Separation or protection must be provided to Tekton® Building Wrap from heat sources such as fire places, heating appliances, flues and chimneys. Part 7 of NZBC Acceptable Solutions C/AS1 – C/AS6 and NZBC Verification Method C/VM1 provide methods for separation and protection of combustible materials from heat sources.

External Moisture

12.1 Tekton® Building Wrap must be used behind claddings that meet the requirements of the NZBC, e.g. such as those covered by NZBC Acceptable Solution E2/AS1, or claddings covered by a valid BRANZ Appraisal.

12.2 Tekton® Building Wrap, when installed in accordance with the Technical Literature and this Appraisal, will assist in the total cladding systems compliance with NZBC Clause E2.

12.3 When used as an air barrier, particular care must be taken to ensure an air tight barrier is achieved, and weather sealing at all openings and penetrations through the cladding meets the requirements of the NZBC.

Installation Information

Installation Skill Level Requirements

13.1 Installation must always be carried out in accordance with the Technical Literature and this Appraisal, by competent tradespersons with an understanding of wall wrap installation.

Wrap Installation

14.1 Tekton® Building Wrap must be fixed to all framing members at maximum 300 mm centres with hot-dip galvanised, large-head clouts 20 mm long, zinc plated 6-8 mm staples, self-drilling screws, or proprietary wrap fixings. The membrane must be pulled taut over the framing before fixing.

14.2 Tekton® Building Wrap must be run horizontally and must extend from the upper-side of the top plate to the under-side of the bearers or wall plates supporting ground floor joists, or below bottom plates on concrete slabs. Horizontal laps must be no less than 75 mm wide, with the direction of the lap ensuring that water is shed to the outer face of the membrane. End laps must be made over framing and be no less than 150 mm wide.

14.3 The wall underlay should be run over openings and these left covered until windows and doors are ready to be installed. Openings are formed in the membrane by cutting on a 45 degree diagonal from each corner of the penetration. The flaps of the cut membrane must be folded inside the opening and stapled to the penetration framing. Excess wall underlay may be cut off flush with the internal face of the wall frame.

14.4 Tekton® Building Wrap can be added as a second layer over head flashings in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 9.1.10.3.

14.5 When fixing the product in windy conditions, care must be taken due to the large sail area created by wide roll widths.

14.6 Any damaged areas of Tekton® Building Wrap, such as tears, holes or gaps around service penetrations, must be repaired. Damaged areas can be repaired by covering with new material lapping the damaged area by at least 150 mm and taping, or by taping small tears.

Inspections

14.7 The Technical Literature must be referred to during the inspection of Tekton® Building Wrap installations.

Basis of Appraisal

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

Tests

15.1 The following tests have been carried out on Tekton® Building Wrap by Scion: Folding strength of paper in accordance with AS/NZS 1301.423; edge tear resistance and tensile strength in accordance with AS/NZS 4200.1 and air resistance in accordance with BS 6538-3.

15.2 The following tests have been carried out on Tekton® Building Wrap by BRANZ: Absorbency in accordance with AS/NZS 4201.6, Vapour transmission in accordance with ASTM E 96B, Shrinkage in accordance with AS/NZS 4201.3, Water barrier in accordance with AS/NZS 4201.4 and pH of extract in accordance with AS/NZS 1301.421. A range of these tests were completed before and after Tekton® Building Wrap was exposed to ultra-violet light.

15.3 The Flammability Index of Tekton® Building Wrap has been evaluated in accordance with AS 1530.2.

Other Investigations

16.1 A durability opinion was given by BRANZ technical experts.

16.2 Site inspections were carried out by BRANZ to assess methods used for the installation of Tekton® Building Wrap, and to examine completed installations.

16.3 The marketer's Technical Literature, including installation instructions, have been examined by BRANZ and found to be satisfactory.

Quality

17.1 The manufacture of Tekton® Building Wrap has not been examined by BRANZ, but details regarding the quality and composition of the materials used were obtained by BRANZ and found to be satisfactory. BRANZ has taken note of product certification by ICC-ES and CCMC covering quality aspects associated with the product.

17.2 The quality of supply to the market is the responsibility of Marshall Innovations Limited.

17.3 Building designers are responsible for the design of the building, and for the incorporation of the wall wrap into their design in accordance with the instructions of Marshall Innovations Limited.

17.4 Quality of installation is the responsibility of the installer in accordance with the instructions of Marshall Innovations Limited.

Sources of Information

- AS 1530.2 – 1993 Test for flammability of materials.
- AS/NZS 1301.421s: 1988 Determination of the pH value of aqueous extracts of paper, board and pulp – cold extraction method.
- AS/NZS 4200.1: 1994 Pliable building membranes and underlays – materials.
- AS/NZS 4201.1: 1994 Pliable building membranes and underlays – Methods of test – Resistance to dry delamination.
- AS/NZS 4201.2: 1994 Pliable building membranes and underlays – Methods of test – Resistance to wet delamination.
- AS/NZS 4201.3: 1994 Pliable building membranes and underlays – Methods of test – Shrinkage.
- AS/NZS 4201.4: 1994 Pliable building membranes and underlays – Methods of test – Resistance to water penetration.
- AS/NZS 4201.6: 1994 Pliable building membranes and underlays – Methods of test – Surface water absorbency.
- BS 6538.3: 1987 Method for determination of air permeance using the Garley apparatus.
- NZS 2295: 2006 Pliable, Permeable Building Underlays.
- NZS 3604: 2011 Timber-framed buildings.
- Compliance Document for New Zealand Building Code External Moisture Clause E2, Department of Building and Housing, Third Edition July 2005 (Amendment 5, 1 August 2011).
- Ministry of Business, Innovation and Employment Record of Amendments for Compliance Documents and Handbooks.
- The Building Regulations 1992.

In the opinion of BRANZ, Tekton® Building Wrap 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 Marshall Innovations Limited, 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. Marshall Innovations Limited:
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 Marshall Innovations Limited.
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 Marshall Innovations Limited or any third party.

For BRANZ

C Percy
Chief Executive

Date of issue: 16 December 2013

Amendment No. 1, dated 17 December 2013.
This Appraisal has been amended to fix an editorial error.

230413
Received by
Kapiti Coast District Council
26/05/23

BRANZ Appraised
Appraisal No.846 [2013]

BRANZ Appraisals

Technical Assessments of products for building and construction

BRANZ APPRAISAL No. 846 (2013)

Amended 13 March 2014

SUPER-STICK
FLEXIBLE FLASHING TAPE

Marshall Innovations Ltd
PO Box 9411
Greerton
Tauranga

Tel: 07 543 0948
Fax: 07 541 1029

BRANZ
BRANZ Limited
Private Bag 50 908
Porirua City
New Zealand
Tel: +64 4 237 1170
Fax: +64 4 237 1171
www.branz.co.nz

Product

1.1 SUPER-STICK is a flexible flashing tape used around framed joinery openings as a secondary weather resistant barrier.
1.2 SUPER-STICK is installed into and around the framed joinery opening over the building wrap and exposed frame to cover both the face and edge of the opening framing. SUPER-STICK is also used at joinery heads to seal flashing upstands to the building wrap.



Scope

2.1 SUPER-STICK has been appraised as a flexible flashing system for use around window and door joinery openings for buildings within the following scope:
- the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1; and,
- with a risk score of 0-20, calculated in accordance with NZBC Acceptable Solution E2/AS1, Table 2; and,
- with wall cladding systems complying with NZBC Acceptable Solution E2/AS1 or a valid BRANZ Appraisal that specifies a flexible flashing tape system; and,
- with wall underlays compatible with the flexible flashing tape; and,
- situated in NZS 3604 Wind Zones up to, and including, 'Extra High'.

2.2 SUPER-STICK has also been appraised as a flexible flashing system for use around window and door joinery openings for steel framed buildings within the following scope:
- the scope limitations of NZBC Acceptable Solution E2/AS1, with regards to building height and floor plan area; and,
- constructed with steel framing complying with the NZBC; and,
- with a risk score of 0-20, calculated in accordance with NZBC Acceptable Solution E2/AS1, Table 2; and,
- with wall cladding systems covered by a valid BRANZ Appraisal that specifies a flexible flashing system; and,
- with wall underlays compatible with the flashing tape and steel frame; and,
- situated in NZS 3604 Wind Zones up to, and including, 'Extra High'.

Note: Marshall Innovations Ltd offer SUPER-STICK as a jointing and flashing tape for use with rigid air barrier systems that do not require a flexible wall underlay, but this aspect is outside the scope of this Appraisal. Contact the rigid air barrier system proprietor for system details including recommended jointing and flashing tapes.

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.

Building Regulations

New Zealand Building Code (NZBC)

3.1 In the opinion of BRANZ, SUPER-STICK, 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 B2 DURABILITY: Performance B2.3.1 (b), 15 years and B2.3.2. SUPER-STICK meets these requirements. See Paragraphs 8.1 and 8.2.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.2. SUPER-STICK contributes to meeting this requirement. See Paragraphs 7.1 - 7.4 and 11.1.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. SUPER-STICK meets this requirement and will not present a health hazard to people.

3.2 This is an Appraisal of an **Alternative Solution** in terms of New Zealand Building Code compliance. See Paragraph 7.1.

Technical Specification

4.1 SUPER-STICK is a multi-layered silver polyester faced, copolymer, self-adhesive tape. The tape is supplied in rolls of 75 mm X 22.86 m, 150 mm X 22.86 m and 230 mm X 22.86 m.

Handling and Storage

5.1 Handling and storage of all materials supplied by Marshall Innovations Ltd, whether on or off site, is under the control of the installer. Rolls must be stored under cover, in clean, dry conditions away from direct exposure to sunlight.

Technical Literature

6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for SUPER-STICK. 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 SUPER-STICK meets the requirements of AC148: 2001 which is an alternative solution to the version of AC148 referenced by NZBC Acceptable Solution E2/AS1 Paragraph 9.1.5 (b). The installation method for SUPER-STICK is an alternative solution to the installation method shown within NZBC Acceptable Solution E2/AS1, Figure 72A and 72B.

7.2 The use of flexible flashing tape systems around window and door joinery openings is critical to assist the overall weathertightness performance of window and door joinery installations.

7.3 SUPER-STICK is suitable for use over flexible wall underlays compatible with the flashing tape in NZS 3604 Wind Zones up to and including Extra High. In the Extra High Wind Zone, the flexible underlay must be installed over a rigid underlay complying with NZBC Acceptable Solution E2/AS1, Table 23.

7.4 SUPER-STICK is designed to prevent air leakage and water penetration around window and door openings at framing junctions (e.g. at the sill trimmer and opening stud junction), and to keep any water that gets past the cladding, or through the joinery, from direct contact with the framing timber.

7.5 SUPER-STICK is not designed to overcome poor detailing and workmanship of the window or door joinery installation. The system must not be considered in isolation, but be considered as part of the wall cladding system. SUPER-STICK flashing tape is designed to be used in conjunction with air seals and joinery flashing systems, not as a substitute.

7.6 When SUPER-STICK is used in conjunction with LOSP (light organic solvent preservative) treated timber, the solvent from the timber treatment must be allowed to evaporate (generally at least one week) prior to the installation of the system.

Durability

8.1 Assessment of durability to meet the NZBC is based on difficulty of access and replacement, and the ability to detect failure of SUPER-STICK both during normal use and maintenance of the building.

Serviceable Life

8.2 Provided it is not exposed to the weather or ultra-violet light for a total of more than 90 days, and provided the exterior cladding is maintained in accordance with the cladding manufacturer's instructions and the cladding remains weather resistant, SUPER-STICK is expected to have a serviceable life equal to that of the cladding. The maximum exposure period may however be limited by the requirements of the substrate supplier.

Maintenance

9.1 No maintenance is required for SUPER-STICK. Regular checks, at least annually, must be made of the junctions between the joinery and wall cladding to ensure that they are maintained weathertight and that the primary means of weather resistance for the junction e.g. flashing, sealant, etc continues to perform its function, to ensure that water will not penetrate the cladding.

Prevention of Fire Occurring

10.1 Separation or protection must be provided to SUPER-STICK from heat sources such as fire places, heating appliances, flues and chimneys. Part 7 of NZBC Acceptable Solutions C/AS1 – C/AS6 and NZBC Verification Method C/VM1 provide methods for separation and protection of combustible materials from heat sources.

External Moisture

11.1 Where a cladding manufacturer specifies the use of generic flashing tapes around window and door joinery openings at framing junctions as part of their system, or they specify the use of flexible flashing tapes that comply with NZBC E2/AS1, Paragraph 9.1.5(b), SUPER-STICK may be used.

Installation Information

Installation Skill Level Requirements

12.1 Installation of SUPER-STICK must be completed by tradespersons with an understanding of flexible flashing systems, in accordance with instructions given within SUPER-STICK Technical Literature and this Appraisal.

General

13.1 The selected building wrap must be installed in accordance with the manufacturer's instructions, and must completely cover the joinery opening. The wrap is then cut on a 45° angle away from each corner of the opening so the flaps can be folded into the opening and secured to the interior face of the timber framing.

13.2 Before SUPER-STICK is applied, the substrate surfaces must be clean, dry and free from any surface contaminants such as dust and grease that may cause loss of adhesion.

13.3 A 75 mm wide x 150 mm long sealing tape 'butterfly' must be installed at 45° across the corner of the jamb/sill junction overlapping the corner by 3 mm to create a seal at the corner junction. A length of SUPER-STICK is then cut to the length of the sill plus 300 mm. The tape is installed flush with the interior face of the opening and is applied along the entire length of the sill and 150 mm up each jamb. The overhanging tape is cut at the corner of the opening to allow the tape to be folded onto the face of the building wrap and "butterfly" installed across the corner. Cut another length of SUPER-STICK the exact length of the sill and overlay onto the already installed Tape to ensure nail sealability requirements are met.

13.4 A 300 mm length of SUPER-STICK must be installed 150 mm down the jamb and 150 mm along the lintel at each of the top corners of the window or door joinery opening. A 75 mm wide x 150 mm long sealing tape 'butterfly' must be installed at 45° across the corner of the head/jamb junction overlapping the corner by 3 mm to create a seal at the corner junction.

13.5 SUPER-STICK must not be stretched. When joining two sections of tape, the overlap must be 100 mm minimum.

13.6 If SUPER-STICK is exposed to the weather or UV light for more than 90 days, it must be replaced with new material.

Installation Temperature

13.7 SUPER-STICK must not be installed where temperatures are less than -5°C (*Note: Marshall Innovations Ltd approve the installation of SUPER-STICK down to -20°C. This has not been addressed by this Appraisal and is outside its scope.)*

Inspections

13.8 The Technical Literature must be referred to during the inspection of SUPER-STICK installations.

Basis of Appraisal

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

Tests

14.1 Testing of SUPER-STICK has been completed by BRANZ to the requirements of ICC Evaluation Service Acceptance Criteria for Flashing Materials AC148. The adhesion of SUPER-STICK to black bituminous Kraft building paper complying with the requirements of NZBC Acceptable Solution E2/AS1, Table 23 and selected other synthetic wall underlays have been tested and found to be satisfactory.

Other Investigations

15.1 An assessment was made of the durability of SUPER-STICK by BRANZ technical experts.

15.2 Site inspections were carried out by BRANZ to examine the practicability of installation.

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

Quality

16.1 The manufacture of SUPER-STICK has not been examined by BRANZ, but details regarding the quality and composition of the materials used were obtained by BRANZ and found to be satisfactory. BRANZ undertakes an ongoing review of product quality on an inwards goods basis.

16.2 The quality of supply to the market is the responsibility of Marshall Innovations Ltd.

16.3 Designers are responsible for the building design, and building contractors are responsible for the quality of installation of framing systems and building wraps in accordance with the instructions of the designer.

16.4 The quality of installation, handling and storage on site is the responsibility of the installer in accordance with the instructions of Marshall Innovations Ltd.

Sources of Information

- ICC Evaluation Service, Inc, AC148 Acceptable Criteria for Flexible Flashing Materials, July 2001.
- NZS 3604: 2011 Timber-framed buildings.
- Compliance Document for New Zealand Building Code External Moisture Clause E2, Department of Building and Housing, Third Edition July 2005 (Amendment 5, 1 August 2011).
- Ministry of Business, Innovation and Employment Record of Amendments for Compliance Documents and Handbooks.
- The Building Regulations 1992.

BRANZ

In the opinion of BRANZ, SUPER-STICK 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 Marshall Innovations Ltd, and is valid until further notice, subject to the Conditions of Appraisal.

Conditions of Appraisal

1. This Appraisal:
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d) is copyright of BRANZ.
2. Marshall Innovations Ltd:
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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 Marshall Innovations 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 Marshall Innovations Ltd or any third party.

For BRANZ

C Percy
Chief Executive

Date of issue: 23 December 2013

Amendment No. 1, dated 13 March 2014.
This Appraisal has been amended to increase maximum exposure days and to reduce the minimum temperature application.

CI/SfB
MARCH 2016

Thermakraft

THERMAKRAFT 215 BITUMINOUS SELF SUPPORTING ROOFING UNDERLAY

APPLICATION AND INSTALLATION

Product Description

Thermakraft 215 **BITUMINOUS SELF SUPPORTING ROOFING UNDERLAY is** specifically designed for use in Domestic and Commercial type buildings.

Thermakraft 215 is a breathable, absorbent bituminous wall and roofing underlay.

Thermakraft 215 will provide the following functions:

- Reduce wind entry into the cavity, thereby assisting the performance of thermal insulation.
- Highly water vapour permeable, thereby allowing excess water vapour which might otherwise condense in the structure, to escape.
- Provides a temporary protection against wind, dust, rain and other weathering elements until the external cladding is applied.

Applications

Thermakraft 215 is suitable as a wall and roofing underlay where Fire Retardancy is **NOT** required, and with all cladding types.

Thermakraft 215 is self-supporting to 1200mm rafter/purlin spacing.

Thermakraft 215 can be used as an Air Barrier.

Thermakraft 215 must not be left exposed to the elements for more than 7 days. Cladding on the same day is recommended.

If Fire Retardancy (FI <5) is required, use Thermakraft CoverTek roof underlay

Installation
Roofing

Thermakraft 215 may be run unsupported vertically over purlins with a 150mm lap if roof pitch ≥8 degrees. May be run vertically at pitches ≥3-8degrees if supported

Fix securely to purlins with 8mm staples or 20mm clouts.

The membrane should be firmly laid to avoid excessive dishing between purlins.

Control of Condensation

Thermakraft 215 may be run horizontally across rafter/trusses with a 150mm lap, for roof pitches ≥ 3 degrees. Fix securely with 8mm staples or 20mm clouts.

In climatic regions where condensation risks are high, such as cold or high humidity areas, care needs to be taken in specifying the correct design and installation to prevent moisture build-up in the roof cavities. Factors which adversely affect the condensation risk in roofing systems include;

- Humid, and/or cold climatic regions
- Warm/Skillion roof construction
- Low roof cavity air volume and restricted air movement
- Omitting Vapour Control Layers
- Ceiling penetrations and entry of warm air into roof cavities
- Occupancy activities which have high moisture loading on conditioned spaces
- Low pitched roof
- Bulk insulation
- Building structures ability to naturally dry Construction Moisture

Skillion and Warm Roof Construction are particularly sensitive to moisture accumulation and the design and installation of roof construction needs to take into account the higher condensation risks. Refer MRM Code of Practice for details.

Storage

Thermakraft 215 should be stood on end in dry conditions.
Protect from the weather and direct sunlight.

Roll Dimensions

1250mm x 40.0m = 50m^2 20kg
1250mm x 20.0m = 25m^2 10kg

For more information regarding **Thermakraft** COVERTEK 407 **FIRE RETARDANT SELF SUPPORTING ABSORBENT BREATHABLE SYNTHETIC NON WOVEN ROOFING UNDERLAY** refer to the "DESIGNER and USER GUIDELINES" - Direct and Cavity Fix, or contact **Thermakraft Customer Services** on 0800 806 595.

230413
Received by
Kapiti Coast District Council
26/05/23

Thermakraft

CI/SfB

Feb 2016

THERMAKRAFT 215 BITUMINOUS SELF SUPPORTING ROOFING UNDERLAY

TECHNICAL SPECIFICATIONS

Technical Data

THERMAKRAFT 215 **BITUMINOUS SELF SUPPORTING ROOFING UNDERLAY** complies with the requirements of NZBC E2/AS1 Table 23.

Nominal Grammage 400g/m2

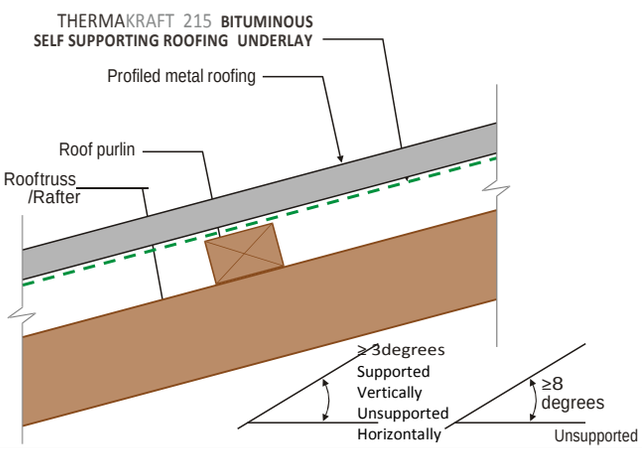
NZBC E2/AS1 TABLE 23 AS A WALL UNDERLAY REQUIREMENTS		
NZBC E2/AS1 TABLE 23 WALL UNDERLAY PROPERTIES	**PROPERTY PERFORMANCE REQUIREMENTS**	**PROPERTY PERFORMANCE**
Absorbency	≥100 gsm	Pass
Vapour Resistance	≤7 MN.s/g	Pass
pH of Extract	≥6 and ≤9	Pass
Shrinkage	≤0.5%	Pass
Water Resistance	≥100mm	Pass
Air Barrier	≥0.1 MN.s/m^3	Pass
Duty		Heavy

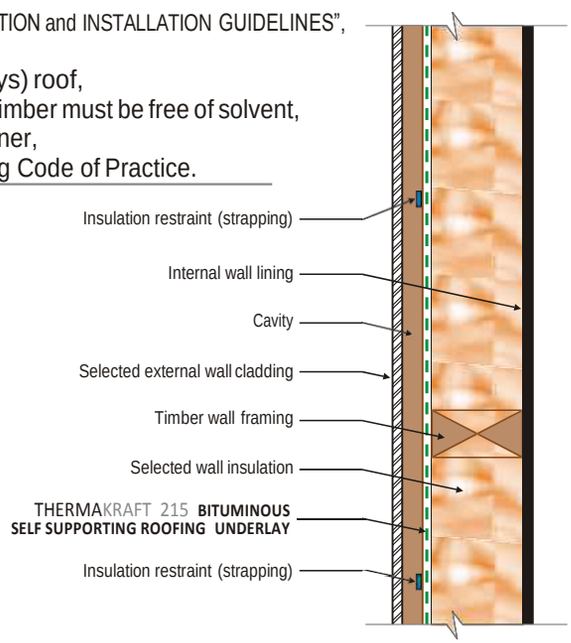
NZS2295:2206 Classification		
Flammability Index		**Non Fire Retardant**
Wind Zone	R2	Up to Very High
NZS2295:2006 Classification	R2	Self Supporting

Durability/Limitations

For THERMAKRAFT 215 to meet the Performance Requirements of NZBC Clause B2, Durability B2.3.1(a) 50 years and B2.3.1(b) 15 years, E2 External Moisture, THERMAKRAFT 215:

- must be installed in accordance to the "APPLICATION and INSTALLATION GUIDELINES",
- run length no greater than 10 metres,
- is not left exposed for more than (7 days) roof,
- when used on LOSP treated timber, the timber must be free of solvent,
- installed by a licensed building practitioner,
- Installed in accordance with the Roofing Code of Practice.





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

Thermakraft Industries (NZ) Ltd

11 Turin Place, East Tamaki, Auckland, N ew Zealand
PO Box 58-112, Botany, Manukau 2163, New Zealand
Phone: 09-273 3727 Fax: 09-273 3726 Free Phone: 0800 806 595
Email: sales@thermakraft.co.nz Website: www.thermakraft.co.nz

E. & O. E.

4221HV HERMPAC VERTICAL WEATHERBOARD CLADDING SYSTEM

1 GENERAL

This section relates to the supply and fixing of **Hermpac** Vertical cladding:

- Vertical Shiplap weatherboards
- Board and Batten weatherboards
- Fascia
- Mouldings
- Proprietary flashing systems
- Vertical Shiplap 'VertiLine' cavity batten systems

1.1 RELATED WORK

Refer to painting sections for finishes to weatherboard cladding.

1.2 ABBREVIATIONS AND DEFINITIONS

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

The following abbreviations apply specifically to this section:

FSC®	Forest Stewardship Council®
COC	Chain of Custody
PEFC	Programme for the Endorsement of Forest Certification
CSA	Canadian Standards Association (International Standards)
SFI	Sustainable Forestry Initiative

Documents

1.3 DOCUMENTS

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

NZBC B2/AS1	Durability
NZBC E2/AS1	External moisture
NZS 3602	Timber and wood-based products for use in building
NZS 3604	Timber-framed buildings
NZS 3617	Profiles of weatherboards, fascia boards and flooring

1.4 MANUFACTURER/SUPPLIER DOCUMENTS

Hermpac Construction Drawings
Hermpac VertiLine Vertical Shiplap Weatherboard Cavity System installation specifications
Hermpac Vertical Shiplap Weatherboard Direct Fix System Installation Specifications
Quality Assurance Checklist - Hermpac VertiLine Vertical Shiplap Weatherboard Cavity System
Hermpac Board and Batten Weatherboard Cavity System Installation Specifications
Hermpac Board and Batten Weatherboard Direct Fix System Installation Specifications
Quality Assurance Checklist - Hermpac Board and Batten Weatherboard Cavity System

Hermpac Standard and Custom profiles
Hermpac Profile Portfolio
Hermpac Grade descriptions
Hermpac Nail fixings
Hermpac Legal and / or Sustainable Certification
Hermpac Product Technical Statement
Machinecoat - Flood Coat Inundation versus Spray Application
Maintenance of selected Wood Oil/Oil Based Stain Finishes

BRANZ Appraisal 650 - Hermpac VertiLine Vertical Shiplap Weatherboard Cavity System
BRANZ Appraisal 828 - Hermpac Board and Batten Cavity System
JAS-ANZ CodeMark Certification GM-CM30036 - Hermpac VertiLine Vertical Shiplap Weatherboard Cavity System
Hermpac Limited - FSC Licence No FSC-C102539, Certificate Code SGS-COC-008082, expires 30 Nov 2024
Hermpac Pacific Limited - PEFC Forestry Sustainable Certificate Code SGS-PEFC/CoC NZ10/1212, expires 23 Nov 2026

Manufacturer/supplier contact details:

Company: **Hermpac Ltd**
Contacts: Kyle Deans - 021 771 857, kyle.deans@hermpac.co.nz
Carmen Hansen - 027 809 4588, carmen@hermpac.co.nz
Web: www.hermpac.co.nz
Email: technical@hermpac.co.nz
Telephone: 09 421 9840 Auckland
04 586 9674 Wellington
03 341 2163 Christchurch

Requirements

1.5 FSC CERTIFIED RESPONSIBLY SOURCED TIMBER

Abbreviations and definitions:
FSC 100%

- FSC-certified material originating in FSC-certified forests or plantations that has not been mixed with material from another category throughout the supply chain. FSC 100% products can be used in FSC Mix product group.

FSC Mix % or FSC Mix Credit

- A mixture of the following - FSC 100%, FSC recycled timber, FSC Controlled Wood - and supplied with a percentage claim or Credit claim.

FSC Controlled Wood

- Forest of origin risk-assessed against FSC Controlled Wood standards and deemed low risk of being: illegally logged, violating traditional/civil/conservation rights, change of use or GM planting. All non-FSC certified timber plantations in NZ have been assessed and deemed low risk by FSC.

FSC Forest Management (FM) Certification

- A forest management unit independently FSC inspected and certified that it complies with the internationally-agreed FSC Principles.

FSC Chain of Custody (COC) Certification

- COC certification applies to those who process, transform or trade forest products, providing a guarantee about the production and source of FSC-certified products and tracking the production and distribution of the products.

Organisation website details:
Forest Stewardship Council website:- https://nz.fsc.org/en-nz
Herman Pacific Limited - FSC COC Code: SGS-COC-008082 Expires 30 Nov 2024
Herman Pacific Limited: - FSC Licence Code: FSC-C102539 Expires 30 Nov 2024

1.6 PEFC CERTIFIED RESPONSIBLY SOURCED TIMBER

PEFC (Programme for the Endorsement of Forest Certification) is a global alliance of national forest certification systems, which endorses national forest certification systems developed through multi-stakeholder processes that are tailored to local conditions.

PEFC Chain of Custody certification tracks forest based products from sustainable sources to the final product. Each step of the supply chain is closely monitored through independent auditing ensuring that unsustainable sources are excluded.
Organisation website details:
Programme for the Endorsement of Forest Certification website: www.pefc.org
Hermpac Limited - PEFC Certificate Code SGS-PEFC/COC-1212, expires 23 Nov 2021.

Performance

1.7 FIXINGS, WIND

Design and use the fixings appropriate for the wind zone (R) and topographical classification (T) of this site and building height; as required by NZS 3604.

1.8 PERFORMANCE

Accept responsibility for the weather-tight performance of the completed cladding system, including all penetrations. To NZBC B2 Durability and NZBC E2/AS1 External moisture.

2 PRODUCTS

Materials

2.1 WESTERN RED CEDAR

Hermpac Canadian Coastal Western Red Cedar (Thuja plicata) harvested from the sustainable managed forests of British Columbia, Canada. Hermpac Western Red Cedar is supplied from forest sources, certified legal and sustainable under one or more independent third party verified certification systems (PEFC, CSA, SFI or FSC).

2.2 YELLOW CEDAR

Hermpac Canadian Yellow Cedar (Chamaecyparis nootkatensis) harvested from the sustainable managed forests of British Columbian coast, through to Alaska. Hermpac Yellow Cedar is supplied from forest sources, certified legal and sustainable under one or more independent third party verified certification systems (PEFC, CSA, SFI or FSC).

2.3 DURALARCH

Hermpac DuraLarch™ (Larix Sibirica) harvested from the sustainable managed forests of Northern Europe. Hermpac DuraLarch™ is supplied from forest sources, certified legal and sustainable under one or more independent third party verified certification systems (FSC).

2.4 ASHINDURA

Hermpac Single Species AshinDura™ is harvested from the sustainable managed forests of British Columbia, Canada. Hermpac AshinDura™ is supplied with Quarter Sawn grain orientation, from forest sources certified legal and sustainable under one or more independent third party verified certification systems (PEFC, CSA, SFI or FSC). AshinDura™ is specific to Hermpac.

2.5 VERTICAL SHIPLAP / VERTICAL BOARD AND BATTEN

Weatherboards to Hermpac profiles, Lap and Rebate details to BRANZ BU 411 and general design to the NZS 3617, species and grading to NZS 3602, table 2, reference 2A.1, Requirements for wood-based building components to achieve a 15-year durability performance. Weatherboards in lengths relevant to profile selection and application, with all unsound and open split knots excluded by cross cut removal prior to fixing into position.

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

- Vertical Standard Shiplap and Hermpac Custom Profiles
- Vertical Standard Board and Batten and Hermpac Custom Profiles

A selection of the above profiles are also available in Western Red Cedar Finger-Joint (CEDARONE) and AshinDura™ pre-primed and undercoated, sanded and/or de-nibbed/buffed between coats.

2.6 COVER BOARDS, SMART CORNERS, MOULDINGS AND SCRIBERS

To Hermpac profiles as detailed, with species and grading to NZS 3602, but with all unsound and open split knots excluded by cross cut removal prior to fixing into position. To NZS 3602, table 2, reference 2A.3, Requirements for wood-based building components to achieve a 15-year durability performance.

2.7 FASCIA BOARDS

To Hermpac profiles, with species and grading to NZS 3602, but with all unsound and open split knots excluded by cross cut removal prior to fixing into position. To NZS 3602, table 2, reference 2A.3, Requirements for wood-based building components to achieve a 15-year durability performance.

2.8 WALL UNDERLAYS

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

2.9 VERTIBAT V8 WRC EXTERIOR CAVITY WALL BATTENS - NON STRUCTURALLY FIXED

Vertibat Western Red Cedar, 18mm x 45mm lightweight castellated and double bevelled cavity batten, made from finger-jointed premium Western Red Cedar offcuts.

2.10 VERTIBAT EXTERIOR CAVITY WALL BATTENS - NON STRUCTURALLY FIXED

Vertibat Radiata Pine H3.1 or H3.2 castellated and double bevelled cavity batten.

2.11 VERTIBAT EXTERIOR CAVITY WALL BATTENS - STRUCTURALLY FIXED

Vertibat Radiata Pine H3.1 or H3.2 castellated and double bevelled cavity batten.

2.12 EXTERIOR CAVITY CLOSER/VERMIN-PROOFING

Aluminium, PVC or stainless steel cavity closure strip, punched with 3mm-5mm holes or slots to provide a minimum ventilation opening area of 1000mm² per lineal metre of wall. Length and width to suit cavity. To NZBC E2/AS1: clause 9.1.8.3 and figure 66.

Components

2.13 NAILS, SILICON BRONZE

Hermpac Crown, Rose or Flat Head, Annular Grooved Silicon Bronze fixings to NZBC E2/AS1 Table 24. Refer to Hermpac Construction Drawings for fixing details and to SELECTIONS for fixing sizes.

2.14 NAILS, STAINLESS STEEL

Hermpac Crown, Rose or Flat Head, Annular Grooved Grade 316 Stainless Steel fixings to NZBC E2/AS1 Table 24. Refer to Hermpac Construction Drawings for fixing details and to SELECTIONS for fixing sizes.

2.15 JOLT HEAD NAILS, STAINLESS STEEL

Hermpac Jolt Head, Annular Grooved Grade 316 Stainless Steel fixings to NZBC E2/AS1 Table 24. Refer to Hermpac Construction Drawings for fixing details and to SELECTIONS for fixing sizes.

2.16 CLINCH NAILS, STAINLESS STEEL

Hermpac proprietary 40 x 2.0mm, 50 x 2.0mm and 27 x 2.0mm Clinch Nail, Annular Grooved Grade 316 Stainless Steel.

2.17 FLASHINGS

To NZBC E2/AS1, 4.0 **Flashings**. Material, grade and colour as detailed and scheduled and to NZBC E2/AS1; Table 21: Compatibility of materials in contact and table 22: Compatibility of materials subject to run-off. Ensure that materials used for flashings are compatible with the window frame materials and fixings and cladding materials and fixings.

Finishes

2.18 FACTORY PRE-FINISHING - MACHINECOAT (NZ) - PENETRATING WOOD OIL / OIL BASED STAIN

Flood Coat Inundation: Factory application of selected oil-based stain finishes by flood inundation and enhanced penetration of timber surface by roller pressure and fibre saturation.
Refer to: www.hermpac.co.nz/our-products/coatings

Wood X:	Penetrating wood oil - exclusive Machinecoat (NZ) factory formulation, standard and custom colour range.
Resene:	Machinecoat (NZ) Waterborne Woodsman oil stain - exclusive pigment and fungicide enriched factory formulation.

Site applications to manufacturers specifications. All Hermpac weatherboards and mouldings must be coated all six sides prior to installation.

2.19 FACTORY PRE-FINISHING - MACHINECOAT (NZ) PAINT

Factory spray application of premium primer and undercoat. Option also available for first finishing coat on to pre-primed and undercoated timber surface.

Refer to: www.hermpac.co.nz/our-products/coatings

Primer:	Hermpac White or as specified by special contract.
Undercoat:	Hermpac Off White or as specified by special contract.
Factory Applied Finishing:	Refer to SELECTIONS.

2.20 SITE APPLICATION OF WOOD OIL/OIL BASED STAIN & PAINTS

Coatiing applications to manufacturers specifications. All Hermpac weatherboards and mouldings must be coated with a specified coating system on all six sides prior to installation. Refer to SELECTIONS.

3 EXECUTION

Conditions

3.1 GENERALLY

Execution to NZBC E2/AS1: 3.0 Weathertightness risk factors, and 9.0 Wall claddings, 9.1.8 Drained cavities and 9.4 Timber weatherboards.

3.2 STORAGE

Take delivery of Hermpac timber products, dry, unmarked and undamaged from freight and handling (Grade characteristics excluded). Stack Hermpac weatherboards flat and true, clear of the ground by a minimum of 150mm and supported on dry, clean timber bearers at maximum 900mm centres. Keep weatherboards dry at all times, either by storing within an enclosed building, or when stored externally place an additional secondary cover on the plastic wrapping. Care must be taken to avoid damage to weatherboard edges and surfaces.

3.3 SUBSTRATE

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

Application - preparation

3.4 SITE STAINING - WOOD OIL/OIL STAIN FINISH

If not pre-finished before delivery, prepare and coat all faces and edges with one coat of premium wood oil or oil stain to coating manufacturers specifications, immediately the block stack is opened.
Open stack each board to dry with the back facing down, ensuring faces remain well finished, untouched and unblemished. Once dry, place boards in fillet stack, laid flat and true, until fixed. Keep dry and undamaged.

Apply a second coat to the boards once they have been installed. Coating timeframes for oils/stains will vary. Check timeframe requirements for the second coat with the coating manufacturer.

3.5 SITE PRIMING AND UNDERCOAT - PAINT FINISH

If not pre-primed and/or undercoated before delivery, prepare and coat all faces and edges with one coat of primer and then once dry-to-re-coat, apply one coat of a premium primer undercoat. Consult with the nominated paint manufacturer for specification on paint system for the timber specified. Open stack each board to dry with the back facing down, ensuring faces remain well finished, untouched and unblemished. Once dry, place boards in fillet stack, laid flat and true, until fixed. Keep dry and undamaged. Allow to re-coat if exposed for more than one month before the final coating is applied.

Application - vertical cladding over cavity battens

3.6 VERTIBAT V8 WRC DRAINED CAVITY / NON STRUCTURALLY FIXED

Install 18mm - 20mm minimum thickness drained cavity to NZBC E2/AS1: 9.0 Wall claddings, where required. The Vertibat V8 WRC battens are temporarily fixed over the wall underlay using stainless steel nails and then firmly fixed by the cladding fixings which will penetrate the wall framing studs, nogs/dwangs. Refer Hermpac Installation Specification for detailed fixing.

3.7 VERTIBAT DRAINED CAVITY / NON STRUCTURALLY FIXED

Install 20mm minimum thickness drained cavity to NZBC E2/AS1: 9.0 Wall claddings, where required. The Vertibat battens are temporarily fixed over the wall underlay using galvanized or stainless steel nails and then firmly fixed by the cladding fixings which will penetrate the wall framing studs, nogs/dwangs. Refer Hermpac Installation Specification for detailed fixing.

3.8 VERTIBAT DRAINED CAVITY / STRUCTURALLY FIXED

Install 40mm minimum thickness drained cavity to NZBC E2/AS1: 9.0 Wall claddings, where required. The Vertibat battens are permanently fixed using grade 304 Hermpac stainless steel Hex head screws ensuring minimum 25mm penetration into framing studs. (Refer Hermpac Construction Drawings and Installation Specification for detailed structural fixing).

3.9 CAVITY CLOSER / VERMIN PROOFING

Refer to Hermpac Cavity System Installation Specification. Seal the top of the cavity and install cavity closer/vermin-proofing at base of walls, open horizontal (or raking) junctions, over openings (windows, meters etc). Use cavity spacers where fixing is required between cavity battens.

3.10 PENETRATIONS

Confirm that exterior wall openings have been prepared ready for the installation of all window and door frames and other penetrations through the cladding. Required preparatory work includes the following:

- wall underlay to openings finished and dressed off ready for the installation of window and door frames and other penetrations
- claddings neatly finished off to all sides of openings
- installation of flashings (those required to be installed prior to installation of penetrating elements).

Hermpac Construction Drawings call for a compressible bond breaker, closed cell PVC foam seal to NZBC E2/AS1 9.1.10.7.

3.11 SET-OUT

Use a string line, laser or mechanical device to set out all nailing that will be visible in the finished work. Align all nailing accurately in straight lines. Refer to relevant Hermpac Installation Specification and Construction Drawings to establish correct angle of nail and consistent, accurate placement relative to visible edge of board. For vertical shiplap boards, where possible the exposed lap should face away from the prevailing wind.

Application - fixing

3.12 FIXING - OIL / STAIN FINISH

Install level, true to line and face, to NZBC E2/AS1: 9.4 Timber weatherboards. Double coat all cut ends before fixing. Pilot drill all fixings slightly smaller than gauge of fixing to ensure a snug fit and to minimise risk of moisture entry. Finish the heads of Hermpac Crown, Rose and Flat head nails flush onto and not into the board surface. Do not over drive the nail head and crush the timber surface beneath and surrounding the nail.

Refer to Hermpac Construction Drawings for fixing details and to SELECTIONS for fixing sizes.

3.13 FIXING - PAINT FINISH

Install level, true to line and face, to NZBC E2/AS1: 9.4 **Timber weatherboards**. Double coat all cut ends before fixing. Pilot drill all fixings slightly smaller than gauge of fixing to ensure a snug fit and to minimise risk of moisture entry. When using stainless steel jolt head nails, punch all fixings and prime all raw, exposed timber surfaces. Using an appropriate primer and filler, fill all nail holes flush with board surface.

3.14 FIXING/FINISH - WIND ZONE

Hermpac Western Red Cedar, Yellow Cedar, DuraLarch™ or AshinDura™ weatherboards fixed with Stainless Steel or Silicon Bronze Hermpac Crown, Rose and Flat Head nails are limited to use in NZS 3604 Wind Zones up to and including Extra High when dwangs or structurally fixed Vertibat cavity battens are at maximum 480mm centres.

Hermpac Western Red Cedar weatherboards fixed with stainless steel jolt head nails are limited to use in NZS 3604 Wind Zones up to and including Medium when dwangs or structurally fixed Vertibat cavity battens are at maximum 480mm centres, and NZS 3604 Wind Zones up to and including Very High when dwangs or structurally fixed Vertibat cavity battens are at maximum 400mm centres.

Hermpac Yellow Cedar, DuraLarch™ and AshinDura™ weatherboards fixed with jolt head nails are limited to use in NZS 3604 Wind Zones up to and including Extra High when dwangs or structurally fixed Vertibat cavity battens are at maximum 480mm centres.

Refer to Hermpac Construction Drawings for fixing details and to SELECTIONS for fixing sizes.

3.15 FIXING VERTICAL SHIPLAP WEATHERBOARDS

Install level, true to line and face, to NZBC E2/AS1: 9.4 **Timber weatherboards**. Single nail weatherboards to every fixing point, clear of the adjacent lapped board. Nails to be driven in with a slightly upward slope. Line nails horizontally across the boards. Pilot drill all fixings slightly smaller than gauge of fixing to ensure a snug fit and to minimise risk of moisture entry. Refer to Hermpac Construction Drawings for accurate weatherboard fixing information.

Using a Hermpac specialty clinch nail, prior to the next row of Vertical Shiplap boards being fixed alongside (nogs or dwangs at maximum 480mm centres) and at a position hard up against but not into the hidden lap board edge at every fixing point, restrain the hidden lap tongue by driving the clinch nail into the frame so that the clinch head settles flush into the weatherboard's surface. The clinch nail head must not sit proud of the timber surface nor prevent the correct separation of each adjacent row of boards. Do not pin laps or weatherboard faces.

Refer to Hermpac Construction Drawings and Installation Specification for external and internal corner construction and fixing details.

3.16 FIXING BOARD AND BATTEN

Install level, true to line and face, to NZBC E2/AS1: 9.4 **Timber weatherboards**. Nail at the centre of the board width (nogs at maximum 480mm centres). Nails to be driven in with a slightly upward slope. Line nails horizontally across the boards. Pilot drill all fixings slightly smaller than gauge of fixing to ensure a snug fit and to minimise risk of moisture entry. Refer to Hermpac Construction Drawings for accurate weatherboard fixing information.

Using a Hermpac 50 x 2.0mm speciality Clinch Nail, restrain both hidden Board edges by driving the Clinch Nail positioned hard up against the Board edge but not into the Board. Drive the Clinch Nail into the frame so that the clinch head settles flush into the Board surface, prior to the Batten being fixed over top (nogs or dwangs at maximum 480mm centres).

Space boards with a 6-8mm gap for correct alignment of battens over each board beneath. Nail the batten with a single fixing through the gap between boards at every fixing point. Nails to be driven in with a slightly upward slope. Line nails horizontally across the battens and boards.

Refer to Hermpac Construction Drawings and Installation Specification for external and internal corner construction and fixing details.

3.17 INSTALL FLASHINGS

Install flashings, covers and soakers as detailed on the drawings and to NZBC E2/AS1.

3.18 COMPLETE

Ensure the work is complete with all flashings, finishings and trim properly installed so the cladding system is completely weathertight.

Completion

3.19 REPLACE

Replace all damaged or marked elements.

3.20 LEAVE

Leave work to the standard required for following procedures.

3.21 REMOVE

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

4 SELECTIONS

Substitutions are not permitted to the following, unless stated otherwise. Contact technical@hermpac.co.nz for assistance or more information.

4.1 FSC CERTIFIED TIMBER - SOURCING

The following timber from sourced to installed to be FSC COC Certified.
Delivery notes and/or invoices must clearly show the FSC-COC Certificate Code of the company supplying the product, and the FSC Claim against the relevant product description: eg FSC 100%, FSC Mix, FSC Mix Credit or FSC Recycled.

Species:	DuraLarch
Manuf./supplier:	Herman Pacific Limited (Hermpac)
FSC COC Code:	SGS-COC-008082 Expires Nov 2024
FSC Lic. Code:	FSC-C102539. Expires Nov 2024
FSC Claim:	~
Product / type:	~
Amount:	~

4.2 PEFC CERTIFIED TIMBER - SOURCING

The following timber from sourced to installed to be PEFC COC Certified.
Delivery notes and/or invoices must clearly show the PEFC-COC Certificate Code of the company supplying the product, and the PEFC Claim against the relevant product description: e.g. PEFC 100%, PEFC Mix.

Species:	Western Red Cedar
Manuf./supplier:	Herman Pacific Limited (Hermpac)
PEFC COC Code:	SGS-PEFC/COC-1212 Expires on 23 Nov 2021
PEFC Claim:	
Product/type:	~
Amount:	~
Origin Country:	Canada

4.3 HERMPAC - VERTICAL SHIPLAP

Location:	~
Species:	~
Grade:	HERMPAC Premium Clears No.1 (PC1)
Profile Number/Series:	~
Profile type:	Vertical Shiplap
Cover dimensions:	~mm
Thickness:	~mm
Cavity Fixing system:	~
Surface finish:	Band Sawn Face (BSF)
Moisture content:	≤18 % at fixing

4.4 HERMPAC BOARD AND BATTEN

Location:	~
Species:	~
Grade:	HERMPAC Premium Clears No.1 (PC1)
Profile Number/Series:	~
Profile type:	Board and Batten
Fixing system:	~
Board dimensions:	~mm x ~mm
Batten dimensions:	~mm x ~mm
Cavity fixing system:	~
Surface finish:	Band Sawn Face (BSF)
Moisture content:	≤18% at fixing
External corner battens:	HP201 and HP202
Internal corner battens:	HP201 and HP202

4.5 HERMPAC CORNER MOULDS, COVER BOARDS, BOXED CORNERS & SCRIBERS

Location:	~
Species:	~
Grade:	HERMPAC Premium Clears No.1 (PC1)
External Corner Mould:	~
Internal Corner Mould:	~
Cover boards:	HP 201 and HP 202
Scriber:	HP11 - HP18
Surface finish:	Band Sawn Face (BSF)
Moisture content:	≤18% at fixing

4.6 HERMPAC FASCIA

Species:	~
Grade:	HERMPAC Premium Clears No.1 (PC1)
Profile:	~
Surface finish:	Band Sawn Face (BSF).

4.7 WEATHERBOARD FASTENINGS - STAINLESS STEEL NAILS

Nails:	~
Type:	Grade 316 stainless steel
Size:~	

4.8 WEATHERBOARD FASTENINGS - SILICON BRONZE NAILS

Nails:	Crown Head
Type:	Silicon Bronze
Size:~	

4.9 WEATHERBOARD FASTENINGS - STAINLESS STEEL JOLT HEAD NAILS

Nails:	Jolt Head
Type:	Grade 316 stainless steel
Size:	~

4.10 WEATHERBOARD FASTENINGS - CLINCH NAILS

Nails:	Clinch nails
Type:	Grade 316 stainless steel
Size:	~mm x 2.0mm

4.11 VERTIBAT V8 WRC CAVITY BATTENS - NON STRUCTURALLY FIXED

Product:	Vertibat (V8 WRC)
Material:	Western Red Cedar (FJ)
Size:	45mm wide x 18mm thick x 2700mm long
Fixings:	Stainless steel nails
Fixing size:	40mm x 2.5mm

4.12 VERTIBAT CAVITY BATTENS - NON STRUCTURALLY FIXED

Product:	Vertibat (V1)
Material:	H3.1 or H3.2 Radiata Pine
Size:	Min. 45mm wide x 20mm thick x 2700mm long
Fixings:	Hot dipped galvanized nails
Fixing size:	40mm x 2.0mm

4.13 VERTIBAT CAVITY BATTENS - STRUCTURALLY FIXED

Product:	~
Material:	H3.1 or H3.2 Radiata Pine
Size:	45mm wide x 40mm thick x 2700mm long
Fixing:	Grade 304 Stainless steel Hex drive screws
Fixing size:	~

4.14 SIGMA CAVITY CLOSER/VERMIN-PROOFING

Brand/type:	Sigma cavity closure
Material:	Aluminium

4.15 HERMPAC INTERNAL AND EXTERNAL CORNER BACK FLASHINGS

Material:	Aluminium
Size:	~
Length:	~
Type:	Unhemmed

4.16 FACTORY FINISH - WOOD OIL / OIL STAIN - FLOOD COAT INUNDATION

Brand:	Machinecoat (NZ) Ltd
Product:	Wood-X penetrating wood oil
Coating process:	Machinecoat (NZ) Ltd. Flood Coat Inundation
Colour:	~
Factory coats:	One
On site coats:	One, or as per coating manufacturers specification

4.17 FACTORY FINISH - PAINT

Brand:	Machinecoat (NZ) Ltd
Product:	Dulux
Coating process:	Machinecoat (NZ) Ltd. Spray Application
Primer:	HERMPAC White
Undercoat:	HERMPAC Off White
Top coat product and colour:	~

4.18 SITE FINISH - PENETRATING WOOD OIL / OIL STAIN

Brand:	Wood-X penetrating wood oil
Colour:	~
On site manual coats:	Refer Manufacturers specifications

4.19 SITE FINISH - PAINT

Brand:	~
Type:	~
Primer:	~
Undercoat:	~
Topcoat colour:	~

Hermpac

VertiLine Vertical Shiplap Weatherboard Direct Fix System

Installation Specifications

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PEFC™ PEFC/01-31-237

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Premium timbers that don't cost the earth

Auckland
110 Foundry Rd, Silverdale.
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Auckland 0753
p. 09 421 9840 **f.** 09 426 7638

Wellington
160 Gracefield Rd, Seaview.
PO Box 38-123, Wellington Mail Centre,
Lower Hutt 5045
p. 04 586 9674 **f.** 04 586 9675

Christchurch
27 Nga Mahi Road, Sockburn.
PO Box 8822, Riccarton,
Christchurch 8440
p. 03 341 2163 **f.** 03 341 2173

technical@hermpac.co.nz **hermpac.co.nz**

VertiLine Vertical Shiplap Weatherboard Direct Fix System

Installation Specifications

1.0 General Information

1.1 Introduction

The Hermpac Vertical Shiplap Weatherboard System is an external cladding system for residential and light commercial type buildings where domestic construction techniques are used.

The cladding system consists of vertically fixed Hermpac shiplap timber weatherboards, flashings and accessories and is finished with a premium penetrating oil/stain or paint finish to Hermpac specifications.

1.2 Hermpac Vertical Shiplap Weatherboards

Hermpac vertical shiplap weatherboards are manufactured from Canadian Coastal Western Red Cedar. Selected profiles are manufactured from DuraLarch (oil/stain or paint finish) or AshinDura (paint finish only).

The weatherboard lap and rebate profiles are in accordance with NZS 3617 and BRANZ Bulletin 411. The weatherboards are minimum 18.5mm thick and are available in a range of widths and face profiles. They are supplied as a random length supply. Select lengths are outside of the general specification and are available by special contract.

1.3 Accessories

Accessories supplied by Hermpac for use with the Hermpac Vertical Shiplap include:

- Hermpac external corner mouldings – HP40 (40 x 40mm) and HP42 (42 x 42mm) and the Hermpac 'Smart Corner' series, profiled external corner moulds.
- Hermpac internal corner mould – HP41 (18.5 x 18.5mm) through to HP110 (39 x 39mm) and the Hermpac 'Smart Corner' series.
- Hermpac cover battens – HP201 (69 x 18mm) and HP202 (90 x 18mm).
- Hermpac eaves moulding – HP32 (40 x 27 mm), HP33 (26 x 15mm) and HP7 (30 x 18mm) bevelled profile.
- Hermpac shiplap weatherboard fixings – (oil/stain finish) - silicon bronze or Grade 316 stainless steel annular grooved Hermpac Crown Head, Rose Head or Flat Head nails. The nail shank must be minimum 2.8mm diameter and the length must allow minimum 30mm penetration of the wall frame.
- Hermpac shiplap weatherboard fixings – (paint finish) - Grade 316 stainless steel annular grooved Hermpac Jolt Head nails. The nail shank must be minimum 3.25mm diameter and the length must allow minimum 35mm penetration of the wall frame for Western Red Cedar. For DuraLarch and AshinDura allow minimum 30 mm.
- Hermpac clinch nails - Grade 316 stainless steel annular grooved nails with an off-set flat head.
- Hermpac cover batten fixings – 50 x 2.8mm silicon bronze or Grade 316 stainless steel annular grooved Hermpac Crown Head, Rose Head or Flat Head nails for oil/stain finish or Grade 316 stainless steel annular grooved Jolt Head for paint finish.
- Hermpac aluminium flashings – widths to suit specified corners – 2.4m or 3.0m lengths.

1.4 Handling and Storage

Hermpac vertical shiplap weatherboards must be stacked flat and true, clear of the ground by a minimum of 150mm and supported on dry and clean timber bearers at maximum 900mm centres.

The weatherboards must be kept dry at all times either by storing within an enclosed building or when stored externally an additional secondary cover to the plastic wrapping is required. Care must be taken to avoid damage to edges, ends and the weatherboard surfaces. Water must not be allowed to enter the stack.

2.0 Design Information

2.1 Design Responsibility

The Specifier for the project must ensure that the details in this literature are suitable for the intended application and that additional detailing is provided for specific design or any areas that fall outside the scope and specifications of this literature.

2.2 Scope

This specification covers the use of the Hermpac Vertical Shiplap System as an external, vertically fixed wall cladding system for buildings within the following scope:

- the scope limitations of NZBC Acceptable System E2/AS1, Paragraph 1.1; and,
- constructed with timber framing complying with the NZBC; and,
- with a risk score of 0-6, calculated in accordance with NZBC Acceptable Solution E2/AS1, Table 2; and,
- situated in NZS 3604 Building Wind Zones up to, and including 'Very High'.

Paint finished cedar/CedarOne weatherboards fixed with Grade 316 stainless steel annular grooved Jolt Head nails are limited to use in NZ 3604 Wind Zones up to, and including Medium where studs are at 600mm centres maximum, and NZS 3604 Wind Zones High and Very High where studs are at 400mm centres maximum.

For applications which are outside the scope of this literature and details which are not in this literature the specifier must ensure that the design meets the relevant performance requirements of the NZBC.

Hermpac recommends that professional design advice is sought in these circumstances.

2.3 Building Regulations

The Hermpac Vertical Shiplap Weatherboard System if designed, used and installed in accordance with the statements and conditions of this literature, will meet the following provisions of the New Zealand Building Code:

- Clause B1 Structure
- Clause B2 Durability
- Clause E2 External Moisture
- Clause F2 Hazardous Building Materials

2.4 Ground Clearances

The finished floor level must have a minimum clearance to paved or unprotected ground as required by NZS 3604:2011.

Hermpac weatherboards must overhang the bottom plate on a concrete slab by a minimum of 50mm as required by NZBC Acceptable Solution E2/AS1, Table 18.

The bottom edge of the Hermpac weatherboard must finish a minimum of 100mm above paved surfaces or 175mm above unprotected ground.

At deck or low pitch roof/wall junctions, the bottom edge of the Hermpac weatherboards must be kept clear of any adjacent surface, or above the top surface of any adjacent roof flashing by a minimum of 35mm.

2.5 Structure & Framing

Timber wall framing behind the Hermpac Vertical Shiplap System must be treated as required by NZS 3602:2003 Timber and wood-based products for use in building.

Timber framing must comply with NZS 3604 for buildings or parts of buildings within the scope limitations of NZS 3604. Buildings or parts of buildings outside the scope of NZS 3604 must be to a specific design in accordance with NZS 3603 and AS/NZS 1170. Where specific design is required, the framing must be of at least equivalent stiffness to the framing provisions of NZS 3604. Use of timber framing must be in accordance with framing manufacturer's specifications.

VertiLine Vertical Shiplap Weatherboard Direct Fix System

Installation Specifications

In all cases, studs must be at maximum 600mm centres, with nogs/dwangs fitted flush between the studs at maximum 480mm centres. **Note:** For paint finished cedar/CedarOne weatherboards fixed with Grade 316 stainless steel annular grooved Jolt Head nails, nogs/dwangs must be at a maximum 480mm centres for NZS 3604 Wind Zones up to, and including Medium and at a maximum 400mm centres for NZS 3604 Wind Zones High and Very High.

2.6 Framing Tolerances

In order to achieve an acceptable wall finish, it is imperative that framing is straight and true. Framing tolerances must comply with the requirements of NZS 3604:2011.

2.7 Wall Underlay

The Hermpac Vertical Shiplap weatherboards must be installed over wall underlay complying with NZBC Acceptable Solution E2/AS1, Table 23, or other BRANZ Appraised breather-type membranes.

Unlined gables and walls must incorporate a rigid sheathing or an air barrier fixed to the framing, which meets the requirements of NZBC Acceptable Solution E2/AS1, Table 23. For attached garages, wall underlays must be selected in accordance with NZBC Acceptable Solution E2/AS1, Paragraph 9.1.3.4. Where rigid sheathings are used, the fixing length must be increased by a minimum of the thickness of the sheathing.

2.8 Hermpac Vertical Shiplap Weatherboards

Hermpac vertical shiplap weatherboards shall be fixed with an approximate 2mm vertical expansion gap at the overlap between boards. Hermpac vertical shiplap profiles are all manufactured in accordance with BRANZ Bulletin 411 (Refer to E2/AS1 page 106, paragraph 9.4.1.1) and have a 27mm rebate for a 25mm lap.

The weatherboards shall be pre-coated with the selected coating (prior to site delivery and installation) by Hermpac associate Machinecoat (NZ) Ltd, by the flood coat inundation method or in-line spray coat system (subject to coating type selected).

Pre-finished vertical shiplap weatherboards shall be over-coated and maintained in accordance with the coating manufacturer's specification. All cut ends and/or uncoated surfaces shall be double coated during installation to protect against the penetration of moisture, post installation.

The weatherboards shall be fixed to nogs/dwangs at 400mm to 480mm centres using Hermpac shiplap weatherboard fixings (refer to Section 1.3 of this specification).

External corners shall be weatherproofed by the use of corrosion resistant corner flashings and corner facings, e.g. Hermpac proprietary profiles HP40, HP42, the Hermpac 'Smart Corner' series, or cover battens HP201 or HP202.

Internal corners shall be weatherproofed by the use of corrosion resistant internal corner flashings along with internal mouldings, e.g. Hermpac profiles HP41 or HP110, or the Hermpac 'Smart Corner' series.

3.0 Installation Information

3.1 System Installation

This section of the literature should be read in conjunction with the installation details.

The selected wall underlay and flexible sill and jamb tape system must be installed in accordance with the manufacturer's instructions prior to the installation of the rest of the Hermpac Shiplap Weatherboard System. The wall underlay must be installed horizontally and be continuous around corners. Underlay must be lapped 75mm minimum at horizontal joints and 150mm minimum over studs at vertical joints.

Particular attention must be paid to the installation of the wall underlay and sill and jamb tapes around window and door openings to ensure a continuous seal is achieved and all exposed timber wall framing in the opening is protected.

All penetrations through the wall underlay must be sealed and joints sealed or lapped 150mm.

3.1.1 Aluminium Joinery Installation

Aluminium joinery and associated head flashings must be installed in accordance with the window manufacturer's instructions. A 7.5 - 10mm nominal gap must be left between the joinery reveal and the wall framing so a PEF rod and air seal can be installed in accordance with NZBC Acceptable Solution E2/AS1, Paragraph 9.1.6 after the joinery has been secured in place.

3.1.2 Hermpac Vertical Shiplap Weatherboard Installation

Hermpac vertical shiplap weatherboards must not be wet prior to installation. Prior to installation, all faces and edges of the Hermpac shiplap weatherboards must be sealed with an exterior grade oil-based penetrating oil/stain or paint. During installation, cut ends and edges and all fresh cut or exposed timber must be double sealed with an exterior grade oil-based penetrating oil/stain or paint.

Before the weatherboards are installed, the corner detail must be prepared to suit the selected option, e.g. external box corner/corner moulding etc. The necessary flashings must be installed before commencing weatherboard fixing.

Hermpac vertical shiplap weatherboards must be installed starting at the corner of the wall section being clad. The first weatherboard must be installed plumb to assist with the installation of subsequent weatherboards. The weatherboards must overhang the bottom plate by a minimum of 50mm. The weatherboards should be installed with the lap facing away from the prevailing winds.

Immediately prior to installing the weatherboards over the internal and external corner flashings, a continuous bead of sealant must be applied to the face of the flashing along the fixing line.

Hermpac vertical shiplap weatherboards must be overlapped a minimum of 25mm with an expansion gap of 2mm at the overlap. For best practice use the Hermpac clinch nail to restrain the top of the weatherboard lap at every nog or dwang.

Hermpac vertical shiplap weatherboards must be pre-drilled on a slight up-slope with a hole slightly smaller than that of the nail. Fix each weatherboard with one nail per board at every nog/dwang. Fixing must be carried out using silicon bronze or Grade 316 stainless steel annular grooved Hermpac Crown Head, Rose Head or Flat Head nails.

The nail shank must be minimum 2.8mm diameter and the length must allow minimum 30mm penetration of the wall frame.

Note: For paint finished cedar/CedarOne weatherboards, use Grade 316 Stainless Steel annular grooved Jolt Head nails and allow minimum 35mm penetration of the wall frame. Punch nails 2mm below the weatherboard surface, prime nail holes and fill prior to sanding and finishing.

The fixing must be located 30-35mm in from the weatherboard lap, be located no closer than 32mm from the end of the board (where practical) and must finish flush onto the surface of the weatherboard, not into or below the surface.

Fix weatherboards in full lengths where possible. Where joints are unavoidable, scarf the weatherboard at 30° over a nog or dwang and fix as per drawn detail.

3.1.3 Boxed Corners, Cover Battens and Mouldings

External and internal corners must be finished in accordance with the installation detailing.

VertiLine Vertical Shiplap Weatherboard Direct Fix System

Installation Specifications

3.1.4 Finishing

At least two coats of an exterior grade quality oil-based penetrating oil/stain must be used over the front face of the Hermpac shiplap weatherboards to protect the weatherboards and give the desired finish colour to the exterior walls. The oil/stain must be recommended for use as a wall cladding oil/stain by the manufacturer and must be brush or Machinecoat NZ Ltd applied. Hermpac recommends the use of oil based stains manufactured by Wood-X and Resene.

Follow the oil/stain manufacturer's instructions at all times for application of the oil/stain finish.

For paint finish the paint must be recommended for use as a wall cladding paint by the manufacturer and must be brush or Machinecoat NZ Ltd applied.

To ensure a top quality paint finish:

1. Any sharp edges should be removed to provide a radius to aid in uniform paint film coverage.
2. Use a premium alkyd oil or acrylic based primer to envelope prime all cut ends and bare timber surfaces twice.
3. Punch nail holes and prime promptly after punching.
4. Fill holes with a suitable filler and allow to dry.
5. When filler is fully dry and cured, sand area smooth.
6. Apply one coat of an alkyd oil or acrylic based primer to sanded area and allow to fully dry before sanding lightly.
7. Ensure surface is clean and free from any chalking, dirt, dust, mould or other contaminants prior to painting top coats.
8. Apply two coats of premium high quality 100% exterior grade acrylic to surface allowing adequate time for drying between coats.

Timber is a natural product and for best results use a colour with a LRV of 40-45% or above. Please consult with us for a specific recommendation minimum for your chosen timber.

Follow the paint manufacturer's instructions at all times for application of the paint finish.

Refer to Section 4.0 for maintenance requirements.

4.0 Maintenance

Building owners are responsible for the maintenance of the Hermpac Vertical Shiplap Weatherboard System. Annual inspections must be made to ensure that all aspects of the cladding system, including flashings remain in a weatherproof condition. Any damaged areas or areas showing signs of deterioration which would allow water ingress, must be repaired immediately. Sealant, coatings, flashings or the weatherboards must be repaired in accordance with the relevant manufacturer's instructions.

Regular cleaning (at least annually) of the surface finish with water and a mild detergent is recommended to remove grime, dirt and organic growth, to maximise the life and appearance of the cladding.

Recoating of the oil/stain finish will be necessary throughout the life of the cladding system. Re-staining must be carried out every 2-3 years or at least in accordance with the oil/stain manufacturer's instructions. Re-staining will be required more frequently on exposed northern and western facing walls. When re-staining, care must be taken to ensure bottom edges and shiplap edges are well covered and penetrated with the stain.

Recoating of the paint finish will be necessary throughout the life of the cladding system. Re-coating must be carried out every 7-10 years in accordance with the paint manufacturer's instructions. When re-coating, care must be taken to ensure bottom edges are well covered and penetrated with the paint.

5.0 Health & Safety

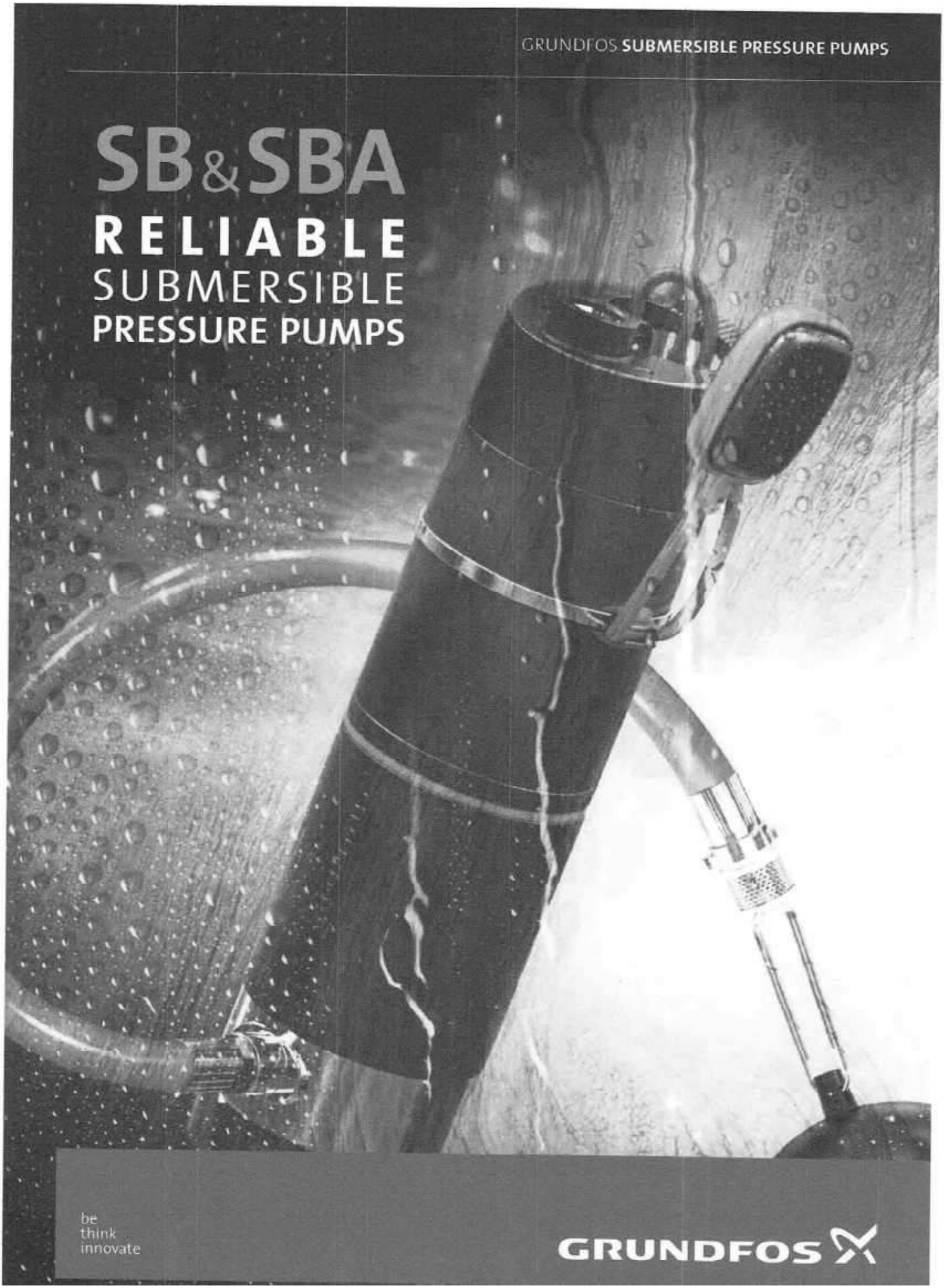
Cutting of Hermpac shiplap weatherboards must be carried out in well ventilated areas and dust masks, eye and hearing protection must be worn.

All relevant sections of AS/NZS2311:2017 "Guide to the painting of Buildings" should be adhered to. Technical Data Sheets and Safety Data Sheets for the specified coating should be obtained from the coating supplier and consulted prior to commencing work.

MBIE guidelines and regulations must be followed at all times.

SB & SBA

RELIABLE SUBMERSIBLE PRESSURE PUMPS



be
think
innovate

GRUNDFOS

GRUNDFOS PUMP SOLUTIONS

Grundfos submersible pump solutions range from small submersible pressure pumps for domestic purposes to complete pressure management systems for commercial applications.

Our pump solutions turn rainwater in collecting tanks or water from wells into a reliable source of water for domestic and commercial applications.

Domestic submersible pressure pumps

The Grundfos SB and SBA are submersible pressure pumps. They offer simple installation and reliable operation in domestic applications such as:

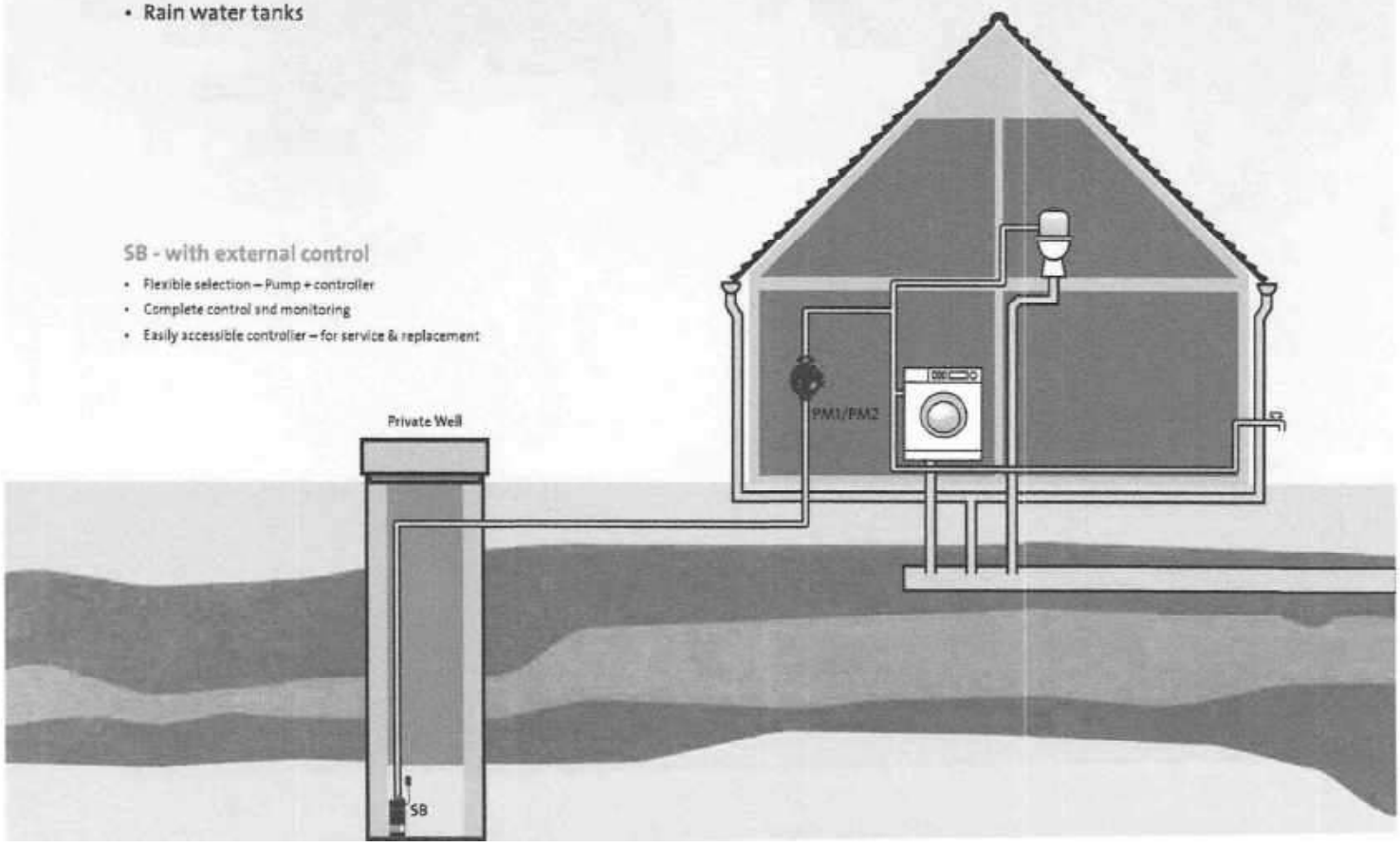
- Private wells
- Rain water tanks

Water from private wells

Water from private well, typically supplies drinking water to areas that are not connected to the municipal water supply. Or serves as a supplement to traditional water supply and used for irrigation, flushing toilets, washing machines in private homes and weekend cottages.

SB - with external control

- Flexible selection – Pump + controller
- Complete control and monitoring
- Easily accessible controller – for service & replacement



Water from rainwater tanks

The harvesting of rainwater involves filtration of roof run-off and subsequent stovage for later use.
The water is collected from the roofs of buildings and stored in rainwater tanks.

The collected and stored rainwater is ideal for:

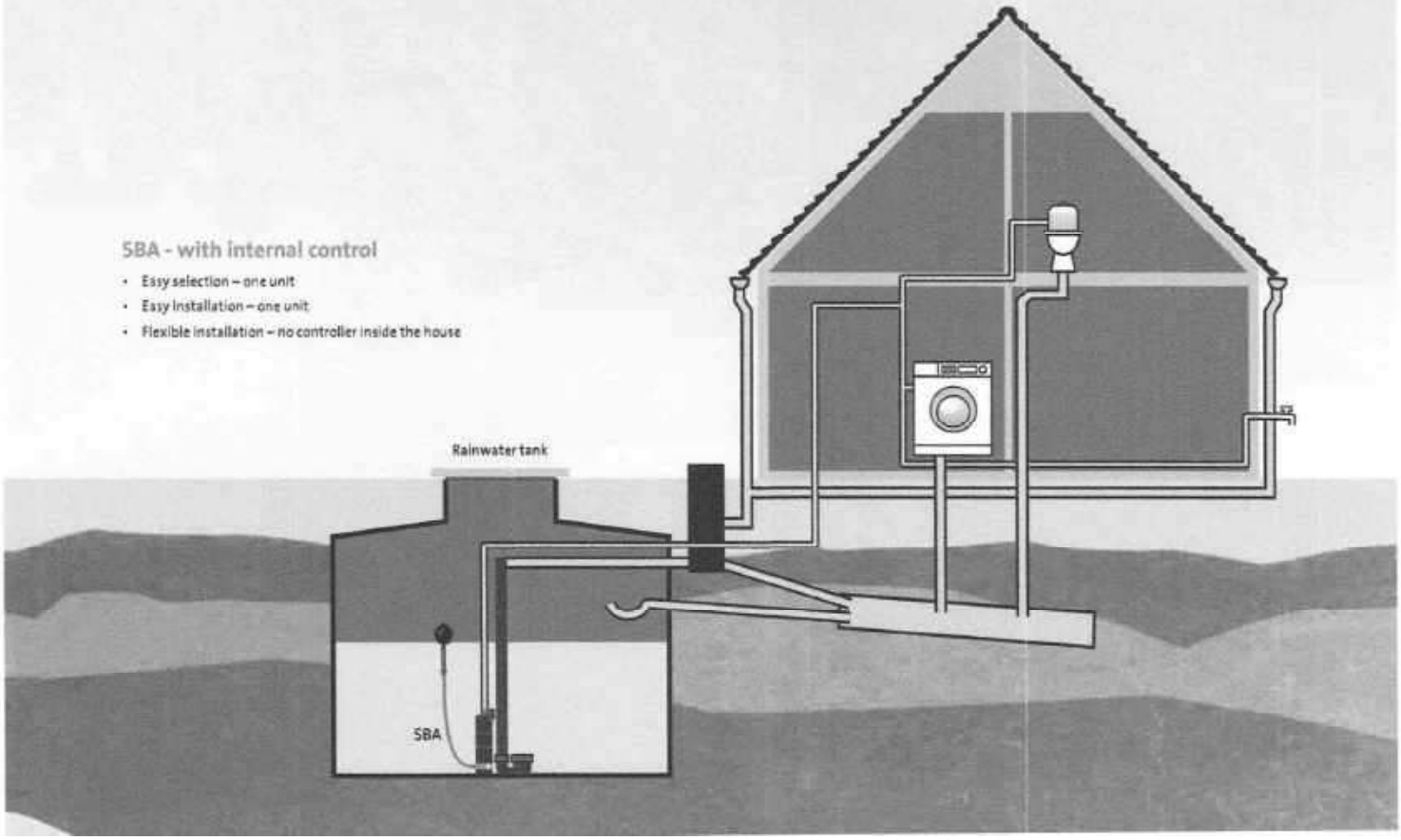
- Garden watering
- Toilet flushing
- Washing machines
- Car washing

Benefits of rainwater harvesting:

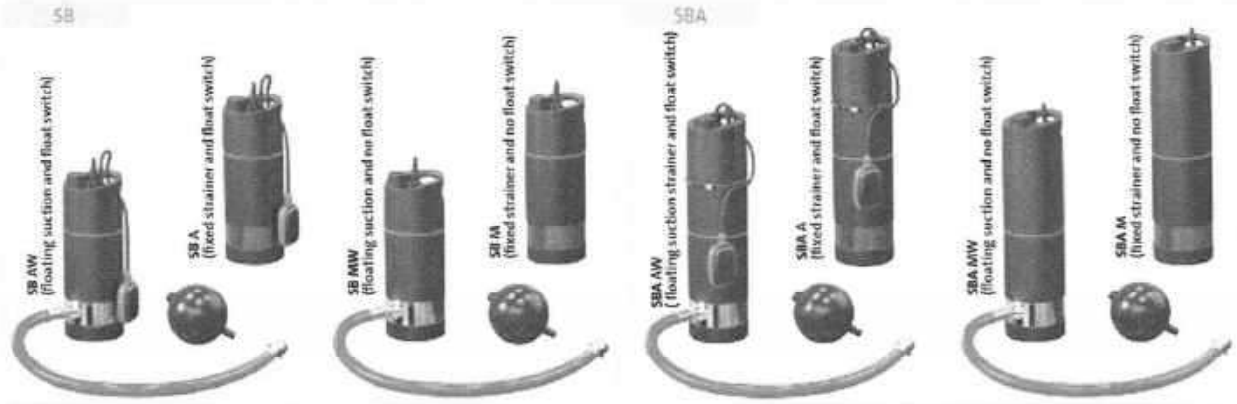
- **Reduces the risk of flooding**
  Less pressure on the sewer at peak loads
- **Saves up to 50 % of drinking water**
  Use rainwater for purposes that do not require drinking water quality
- **Prolongs the life of appliances**
  Rainwater is soft water, which reduces lime scale build-up

SBA - with internal control

- Easy selection – one unit
- Easy installation – one unit
- Flexible installation – no controller inside the house



PRODUCT OVERVIEW



SB

The Grundfos SB is a submersible pump for the pumping of clean water. It is designed for use in domestic applications.

The pump itself is very silent, and when installed underground in a rainwater collecting tank or well, noise will never become an issue. The SB pump requires an external controller, like Pressure Manager, for automatic operation.

SBA

The new Grundfos SBA is a complete all-in-one unit. It is built on the proven SB platform, but comes with an integrated control unit – eliminating the need for an external pump controller.

With the new SBA, everything you need to guarantee reliable pumping of water is included.

Built to your needs

Many installers and home owners want simple but reliable pump solutions that require only a minimum of changes to the original installation.

The SBA is literally a plug- and pump solution. Once installed and connected to the piping, all you need to do is switch on the pump. The result is a reliable solution and greatly reduced installation costs.

SB/SBA two main versions:

All SB and SBA are available in the following configurations:

- With integrated suction strainer (1 mm mesh)
- Or with side inlet/flexible suction hose with floating suction strainer (1 mm mesh).

All variants are available with or without float switch

The float switch offers stop at low water level, ensuring that surface fragments do not enter the strainer.

SB/SBA features and benefits:

Noiseless operation

The SB pump emits no noise when submerged and is therefore a noiseless alternative to non-submersible pumps.

High reliability

The SB pump is built from composite and stainless-steel materials which are resistant to corrosion. Furthermore, the pump has a stainless-steel strainer which prevents large particles from entering the pump housing.

Integrated protection

The pump offers thermal overload protection.

Floating suction strainer

The model with floating suction strainer always draws the water from just below the water surface where the water is clean and free from solid particles.

Especially for SBA:

- Simplicity – all-in-one unit
- Easy installation – no external control unit
- Integrated dry-running protection
- Automatic restart after dry-running
- Lifting eye



EXTERNAL PRESSURE MANAGER

The SB requires an external control unit. Used in combination with a Grundfos Pressure Manager PM1 or PM2 placed above ground, users have easy access to all information and complete control over the application.

Complete control

The external Pressure Manager for SB pumps comes in two variants:

- PM1 for basic flexibility
- PM2 for all-round control

PM1/PM2 Features and benefits:

Well-known Grundfos quality

- State-of-the-art product design
- Robust materials and electronics

Flexibility & adaptability

- Fits all domestic water supply pumps
- Easy to adapt to different types of systems (PM2 only)
- Free positioning in installation
- Adjustable start pressure (PM2 only)
- Plug-and-pump operation

High safety

- Dry-running protection
- Cycling alarm

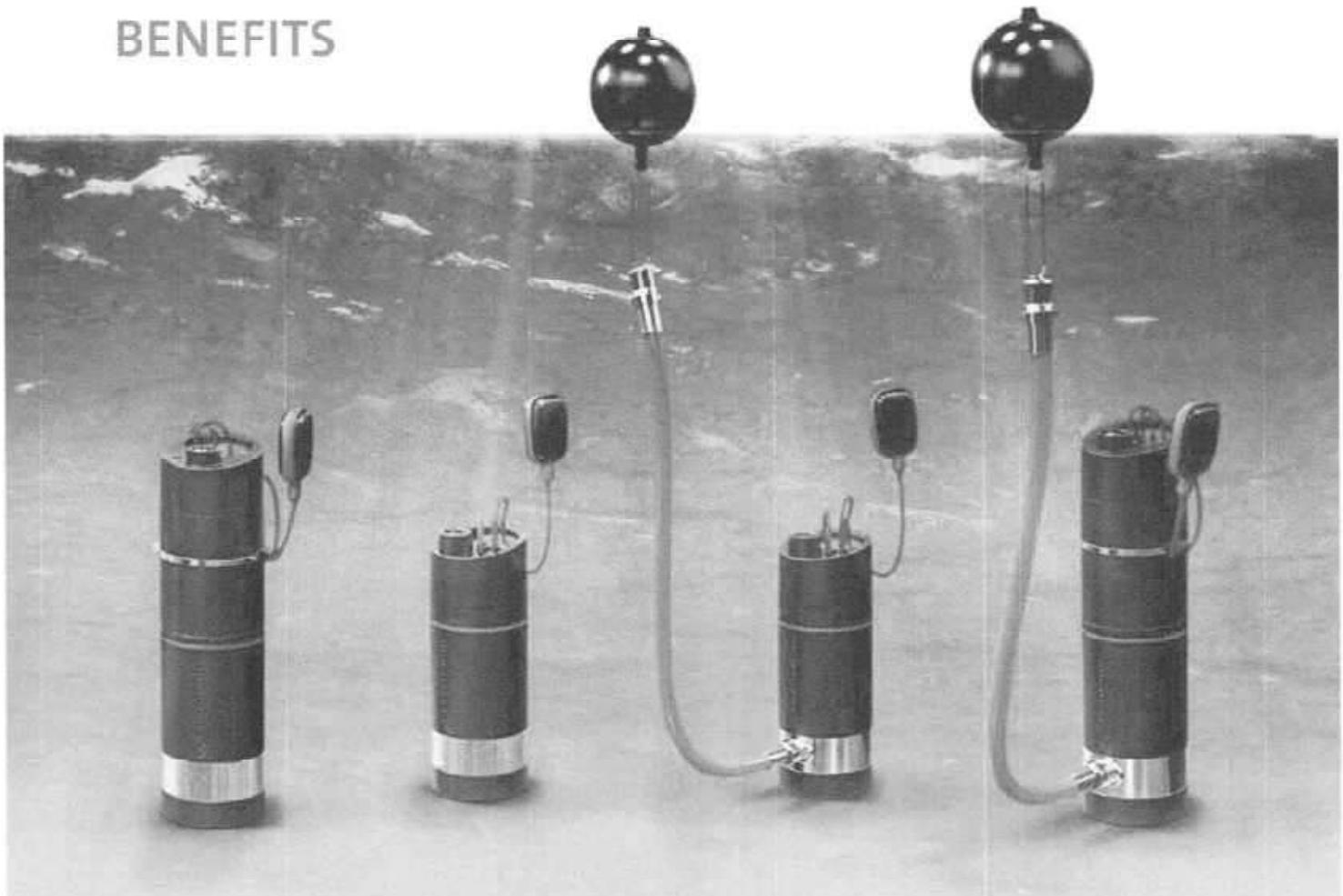
Easy control & monitoring

- Intuitive LED user interface

PM1 and PM2 features

Model	PM1	PM2
Power on indication	•	•
Pump running indication	•	•
Alarm indication	•	•
Dry-running protection	•	•
Free position in installation	•	•
Suitable for generator supply	•	•
Rotary outlet connection	•	•
Integrated non-return valve	•	•
Cycling alarm	•	•
Internal pressure tank	•	•
Integrated pressure sensor from Grundfos Direct Sensors™		•
Adjustable start pressure		•
Start/stop with 1 bar differential pressure		•
Auto restart after dry running		•
Maximum run time 30 min. (safety)		•
Pressure indication		•

BENEFITS



Unique user benefits

Noiseless operation
Submerged SB/SBA pumps are noiseless alternatives to non-submersible pumps.

Resistant to corrosion
Made from composite and stainless-steel materials.

No clogging
Stainless-steel strainer prevents large particles from entering the pump housing.

No defects in case of water shortage
The SBA features integrated dry-running protection. All pumps are available with float switches for low water stop.

Clean water
The floating suction strainer draws the water from just below the water surface where the water is clean and free from solid particles.

Longer life
A Grundfos float switch prevents air from entering the system as a result of dry running.

Overheat protection
Built-in thermal protection immediately stops the pump if it overheats. The pump automatically restarts when it has returned to normal temperature.

Automatic restart
SBA with float switch automatically restarts when water is added.
SBA without float switch will try to restart every 24 hours.
SB with float switch will stop in case of low water. Restart is managed by the external controller.

TECHNICAL INFORMATION

SB pump range

Pump type	Max head/ nominal flow
3-25	25 mWc / 3m³/h
3-35	35 mWc / 3m³/h
3-45	45 mWc / 3m³/h

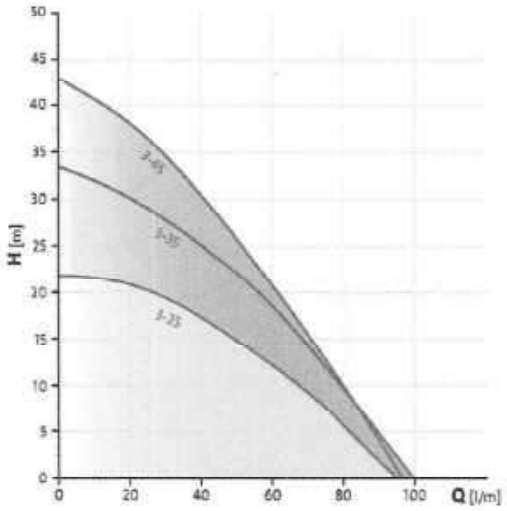
SBA pump range

Pump type	Max head /nominal flow
3-35	35 mWc / 3m³/h
3-45	45 mWc / 3m³/h

Technical data

Max depth	10 m. (for both SB and SBA)
Liquid temperature	0-40 °C

Performance: SB & SBA (50 & 60 hz)



be think innovate

Pumps for every purpose

In addition to submersible pump solution for installation inside rainwater-collecting tanks and wells, Grundfos offers a wide range of other solution – including dry installed pumps. These cover applications such as:

- Households
- Gardens
- Hobby activities
- Agriculture
- Horticulture
- Small industries

All Grundfos pump solutions come either as complete ready-to-install systems for monitoring and control of water distribution, or as custom solutions tailored specifically for your application.

To learn more and find your Grundfos solution please visit:
www.moderncomfort.grundfos.com

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GRUNDFOS Holding A/S
Poul Due Jensens Vej 7
DK-8850 Bjerringbro
Tel: +45 87 50 14 00
www.grundfos.com

GRUNDFOS

230413
Received by
Kapiti Coast District Council
26/05/23

LARSENS CONCRETE & DRAINAGE Wanganui

PRODUCER STATEMENT
– SUPPLY -

Issued By: Larsens Concrete & Drainage

To: Kapiti Coast District Council

In Respect of: **Ele10 Plus – 10,000 L Underground Tank & Pump System**

Larsens Concrete & Drainage Ltd were engaged to supply the above item to KCDC Plan Change 75 specification and AS/NZS1546 and AS/NZS1547 Standards; at

The article has been built and installed in accordance with the above standards and as described in our technical descriptions and drawings as issued by Larsens Concrete & Drainage and Septech Australia Pty Ltd.

I believe on reasonable grounds that subject to;

(i) all proprietary products meeting the performance specification requirements that this item is constructed and installed in accordance with the New Zealand Standards as listed above.

Signed ..... Dated:

Note: This producer statement covers only these sections of the work specifically referred to in the details above.
Some items of installation are required to be performed by others and we are not qualified to inspect these or these have not yet been performed.

- Electrical Connection
- House Plumbing Connection

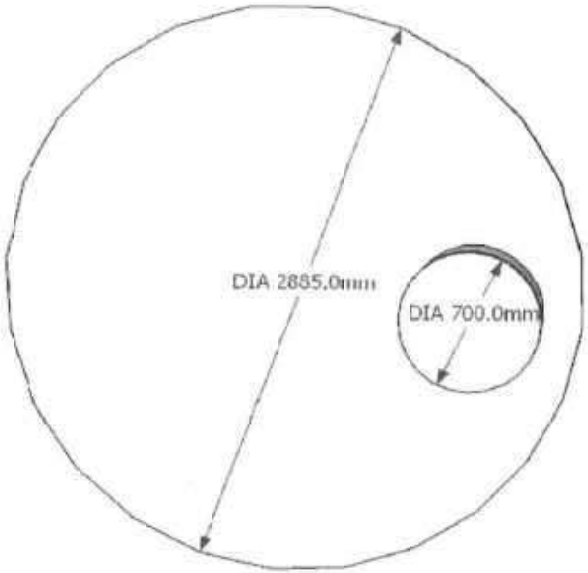
437 Heads Road
WANGANUI
Phone: (06) 344 5911 Fax: (06) 344 8189

LARSENS
CONCRETE & DRAINAGE
Wanganui

10,000 Litre Underground Water Tank

SUITABLE FOR 300mm Topsoil Coverage

NOT SUITABLE FOR INSTALATION UNDER A DRIVEWAY WITHOUT EXTRA ENGINEERING WORK





Tank internal capacity to roof max 11420 Litres

230413
Received by
Kapiti Coast District Council
26/05/23

RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD

Historical Search Copy

R.W. Muir
Registrar-General of Land

Identifier **1089904**
Land Registration District **Wellington**
Date Issued 21 December 2022

Prior References
920990

Estate Fee Simple
Area 709 square metres more or less
Legal Description Lot 45 Deposited Plan 582129
Original Registered Owners
W North Limited

Interests

9099897.6 Consent Notice pursuant to Section 221 Resource Management Act 1991 - 1.10.2012 at 11:53 am

9099897.8 Encumbrance to Charles Fleming Retirement Village Limited - 1.10.2012 at 11:53 am

10089378.1 Variation of Consent Notice 9099897.6 pursuant to Section 221(5) Resource Management Act 1991 - 10.6.2015 at 9:54 am

10089378.2 Consent Notice pursuant to Section 221 Resource Management Act 1991 - 10.6.2015 at 9:54 am

10130867.3 Mortgage to ASB Bank Limited - 31.7.2015 at 4:46 pm

10268001.2 Variation of Consent Notice 9099897.6 pursuant to Section 221(5) Resource Management Act 1991 - 19.1.2016 at 4:29 pm

10936482.1 Variation of Consent Notice 10089378.2 pursuant to Section 221(5) Resource Management Act 1991 - 2.11.2017 at 11:25 am

11264939.1 Variation of Mortgage 10130867.3 - 22.11.2018 at 5:24 pm

12459169.2 Variation of Mortgage 10130867.3 - 1.6.2022 at 3:44 pm

12643497.5 Consent Notice pursuant to Section 221 Resource Management Act 1991 - 21.12.2022 at 5:28 pm

Land Covenant in Covenant Instrument 12663739.1 - 8.2.2023 at 9:01 am

GoGet Inspection Audit Report

Consent No: **230413**

Applicant: **The Plan Workz - Steve Neale**

Site Address: **163 Karuhiruhi Street, Waikanae**

Work Type: **3 Bedroom, 2 Bathroom, attached Double Garage, Concrete Slab Foundation, Brick Veneer/WB Cladding, Metal Tile Roof**

Inspection Type: **Pre Clad**

Inspection Outcome: **Pass**

Inspected By: **Gareth McCullagh**

Inspection Date: **11 June 2024 9:14 a.m.**

Duration: **15 minutes**

Inspection Element	Status
General	Pass
Other	Pass

GoGet Inspection Audit Report

Consent No: **230413**

Applicant: **The Plan Workz - Steve Neale**

Site Address: **163 Karuhiruhi Street, Waikanae**

Work Type: **3 Bedroom, 2 Bathroom, attached Double Garage, Concrete Slab Foundation, Brick Veneer/WB Cladding, Metal Tile Roof**

Inspection Type: **Brick Veneer**

Inspection Outcome: **Pass**

Inspected By: **Gareth McCullagh**

Inspection Date: **11 June 2024 9:25 a.m.**

Duration: **30 minutes**

Inspection Element	Status
General	Pass
Min/max cavity achieved **40-50mm**	Pass
Brick tie fixings - durability and spacing **First then every third used galv**	Pass
Washouts	Pass
Weep holes **In place** **Weep hopes and vents are in place to allow sufficient air flow to cavity**	Pass
Mortar strength **Trade mortar**	Pass
Mortar bedding	Pass
Flashings	Pass
Brick tie durability **Galv**	Pass
Building wrap	N/A
Under window vents	N/A
Rebate **Clean and clear**	Pass
Cavity fire protection in place	N/A
Veneer overhang	Pass
Brick tie spacing	Pass
Head lintels	N/A
Control joints	N/A
LBP number **Steve Gillespie**	Pass
Agent/owner written approval	N/A
Non compliance discussed onsite	N/A
Next Inspection required	N/A
Other **All aspects relating to this inspection have been assessed and checked against the consented documentation and deemed to comply.**	Pass



Taken at 9:14 AM on Tuesday 11/06/2024



Taken at 9:15 AM on Tuesday 11/06/2024



Taken at 9:15 AM on Tuesday 11/06/2024



Taken at 9:15 AM on Tuesday 11/06/2024



Taken at 9:15 AM on Tuesday 11/06/2024


Taken at 9:16 AM on Tuesday 11/06/2024



Taken at 9:16 AM on Tuesday 11/06/2024



Taken at 9:16 AM on Tuesday 11/06/2024



Taken at 9:17 AM on Tuesday 11/06/2024



Taken at 9:21 AM on Tuesday 11/06/2024



Taken at 9:22 AM on Tuesday 11/06/2024

Consent No: **230413**

Applicant: **The Plan Workz - Steve Neale**

Site Address: **163 Karuhiruhi Street, Waikanae**

Work Type: **3 Bedroom, 2 Bathroom, attached Double Garage, Concrete Slab Foundation, Brick Veneer/WB Cladding, Metal Tile Roof**

Inspection Type: **Preline Plumbing**

Inspection Outcome: **Pass**

Inspected By: **Gareth McCullagh**

Inspection Date: **11 June 2024 9:37 a.m.**

Duration: **30 minutes**

Inspection Element	Status
General	Pass
Sighted previous inspection notes	Pass
Conforms with approved drawings	Pass
Confirm additional information/amended plan	N/A
Plumber ***Mark White***	Pass
Soil pipe size and test **Not part of this consent**	N/A
Pipes fixed/supported **All clipped and secured**	Pass
System used ***AS3500*** **Non potable to toilets and hosetaps**	Pass
TPR line/discharge point **In place copper**	Pass
Inbuilt S/W pipes tested	N/A
Vents terminated **50mm completed**	Pass
Pressure test **All dux secura 20-15 and 10mm tested**	Pass
Back flow preventor	N/A
Waste pipe size and test	Pass
Floor wastes	N/A
Shut off valves	N/A
Fire wraps and collars	N/A
Agent/owner written approval	N/A
Non compliance discussed onsite	N/A
Next Inspection required	N/A
Other **All aspects relating to this inspection have been assessed and checked against the consented documentation and deemed to comply.**	Pass



Taken at 9:27 AM on Tuesday 11/06/2024



Taken at 9:28 AM on Tuesday 11/06/2024



Taken at 9:28 AM on Tuesday 11/06/2024



Taken at 9:28 AM on Tuesday 11/06/2024



Copper tpr
Taken at 9:29 AM on Tuesday 11/06/2024



Taken at 9:29 AM on Tuesday 11/06/2024



Cylinder
Taken at 9:30 AM on Tuesday 11/06/2024



Taken at 9:31 AM on Tuesday 11/06/2024



Taken at 9:31 AM on Tuesday 11/06/2024



Taken at 9:31 AM on Tuesday 11/06/2024



Taken at 9:31 AM on Tuesday 11/06/2024



Taken at 9:31 AM on Tuesday 11/06/2024



Taken at 9:31 AM on Tuesday 11/06/2024



Taken at 9:31 AM on Tuesday 11/06/2024



Kitchen
Taken at 9:32 AM on Tuesday 11/06/2024



Taken at 9:32 AM on Tuesday 11/06/2024

Kapiti Coast District Council
175 Rimu Road
Private Bag 60601
Paraparaumu 5254
Phone (04) 296 4700

SITE NOTICE

Consent No: **230413**
Applicant: **Glen Paterson**
Site Address: **163 Karuhiruhi Street, Waikanae**
Work Type: **3 Bedroom, 2 Bathroom, attached Double Garage, Concrete Slab Foundation, Brick Veneer/WB Cladding, Metal Tile Roof**
Building Category: **R2**

Inspection Type: **Pre Clad**
Inspection Outcome: **Pass**
Inspected By: **Gareth McCullagh**
Inspection Date: **11 June 2024**

Passed Items

General
Other

Inspection Type: **Brick Veneer**
Inspection Outcome: **Pass**
Inspected By: **Gareth McCullagh**
Inspection Date: **11 June 2024**

Passed Items

General

Min/max cavity achieved	**40-50mm**
Brick tie fixings - durability and spacing	**First then every third used galv**
Washouts	
Weep holes	**In place** **Weep hopes and vents are in place to allow sufficient air flow to cavity**
Mortar strength	**Trade mortar**
Mortar bedding	
Flashings	
Brick tie durability	**Galv**
Rebate	**Clean and clear**
Veneer overhang	
Brick tie spacing	
LBP number	**Steve Gillespie**
Other	**All aspects relating to this inspection have been assessed and checked against the consented documentation and deemed to comply.**

Inspection Type: **Preline Plumbing**
Inspection Outcome: **Pass**
Inspected By: **Gareth McCullagh**

Inspection Date: **11 June 2024**

Passed Items

General

Sighted previous inspection notes	
Conforms with approved drawings	
Plumber	**Mark White**
Pipes fixed/supported	**All clipped and secured**
System used	**AS3500** **Non potable to toilets and hosetaps**
TPR line/discharge point	**In place copper**
Vents terminated	**50mm completed**
Pressure test	**All dux secura 20-15 and 10mm tested**
Waste pipe size and test	
Other	**All aspects relating to this inspection have been assessed and checked against the consented documentation and deemed to comply.**

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Consent No: **230413**

Applicant: **The Plan Workz - Steve Neale**

Site Address: **163 Karuhiruhi Street, Waikanae**

Work Type: **3 Bedroom, 2 Bathroom, attached Double Garage, Concrete Slab Foundation, Brick Veneer/WB Cladding, Metal Tile Roof**

Inspection Type: **Drainage**

Inspection Outcome: **Pass**

Inspected By: **Gareth McCullagh**

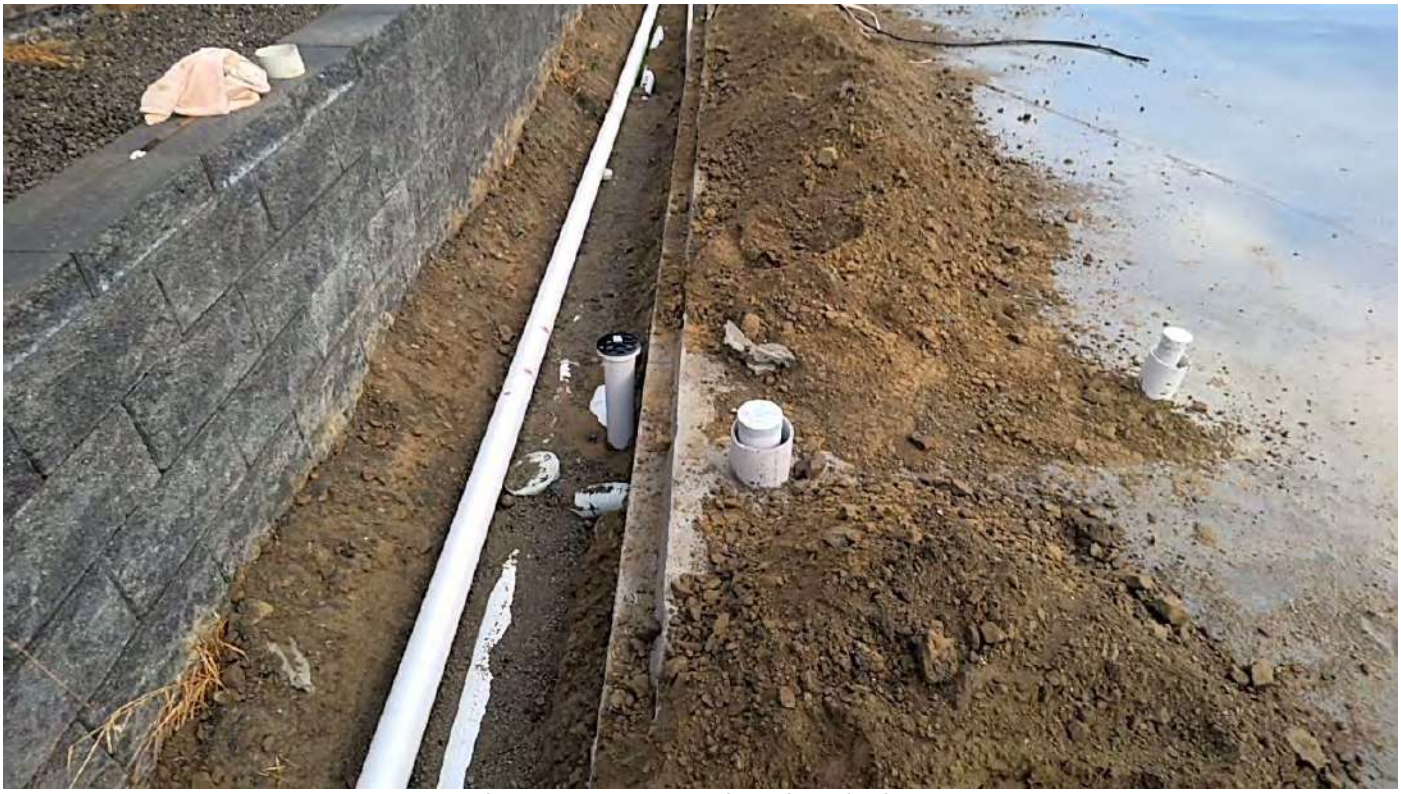
Inspection Date: **4 April 2024 8:34 a.m.**

Duration: **30 minutes**

Inspection Element	Status
General	Pass
Pipe diameter **Sewer 100mm stormwater 100mm**	Pass
Bedding material **Bedded in sand**	Pass
Gully trap **Gully trap in place two**	Pass
Connections/angles	Pass
Branch length	Pass
Direction/fall **Sewer good fall to lateral stormwater to tank**	Pass
Holding water	Pass
Terminal vent **Not assessed at this inspection**	N/A
Registration number **17059**	Pass
Stormwater sumps **Not assessed at this inspection**	N/A
Elevated drainage	N/A
Soak pit **Engineered and installed**	Pass
Agent/owner written approval	N/A
non compliance discussed onsite	N/A
Next Inspection required	N/A
Other **All aspects relating to this inspection have been assessed and checked against the consented documentation and deemed to comply.**	Pass



Vent
Taken at 8:25 AM on Thursday 4/04/2024



Taken at 8:25 AM on Thursday 4/04/2024



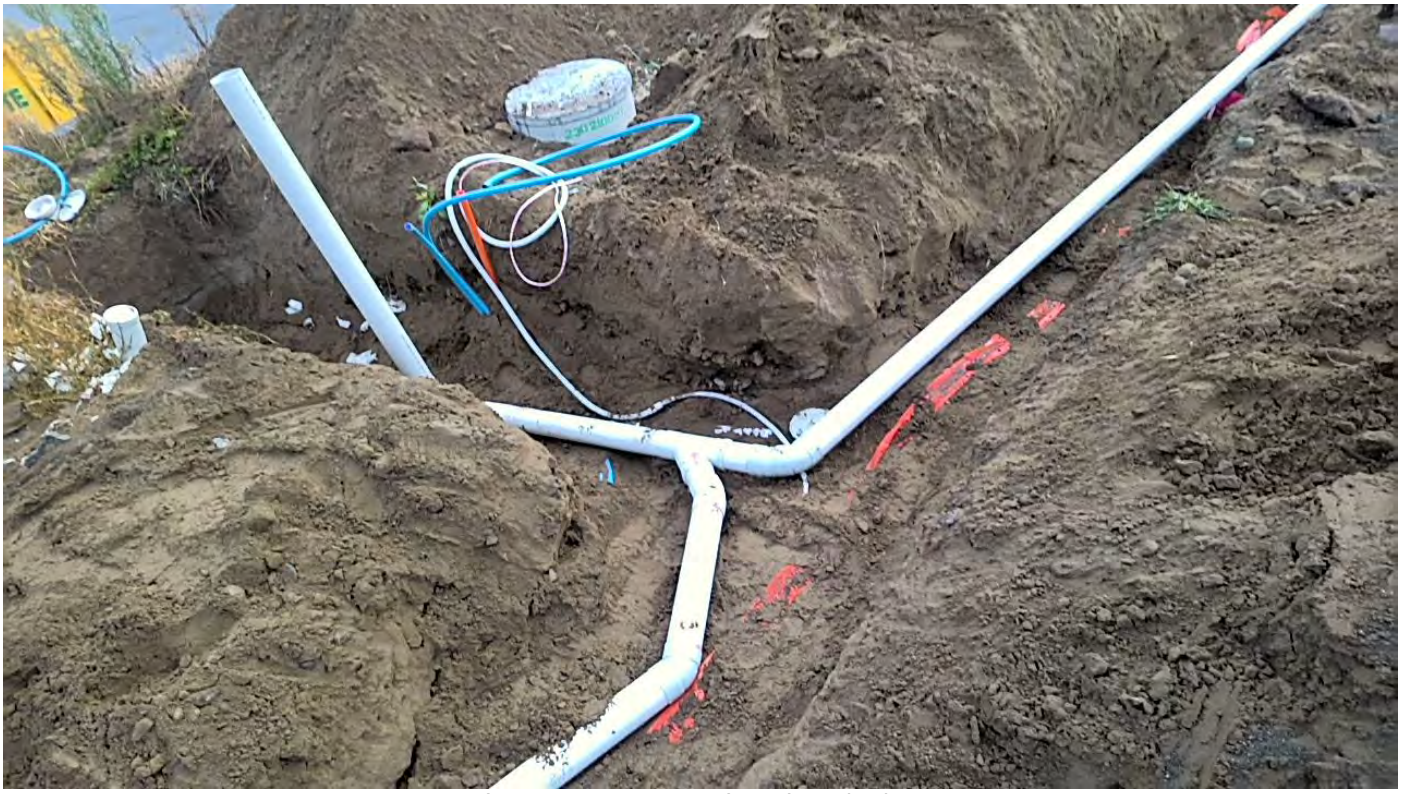
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Taken at 8:26 AM on Thursday 4/04/2024



Taken at 8:26 AM on Thursday 4/04/2024



Taken at 8:26 AM on Thursday 4/04/2024



Taken at 8:27 AM on Thursday 4/04/2024



Taken at 8:27 AM on Thursday 4/04/2024



Taken at 8:27 AM on Thursday 4/04/2024



Taken at 8:28 AM on Thursday 4/04/2024

Kapiti Coast District Council
175 Rimu Road
Private Bag 60601
Paraparaumu 5254
Phone (04) 296 4700

SITE NOTICE

Consent No:	**230413**
Applicant:	**Glen Paterson**
Site Address:	**163 Karuhiruhi Street, Waikanae**
Work Type:	**3 Bedroom, 2 Bathroom, attached Double Garage, Concrete Slab Foundation, Brick Veneer/WB Cladding, Metal Tile Roof**
Building Category:	**R2**

Inspection Type:	**Drainage**
Inspection Outcome:	**Pass**
Inspected By:	**Gareth McCullagh**
Inspection Date:	**4 April 2024**

Passed Items

General

Pipe diameter	**Sewer 100mm stormwater 100mm**
Bedding material	**Bedded in sand**
Gully trap	**Gully trap in place two**
Connections/angles	
Branch length	
Direction/fall	**Sewer good fall to lateral stormwater to tank**
Holding water	
Registration number	**17059**
Soak pit	**Engineered and installed**
Other	**All aspects relating to this inspection have been assessed and checked against the consented documentation and deemed to comply.**

Consent No: **230413**

Applicant: **The Plan Workz - Steve Neale**

Site Address: **163 Karuhiruhi Street, Waikanae**

Work Type: **3 Bedroom, 2 Bathroom, attached Double Garage, Concrete Slab Foundation, Brick Veneer/WB Cladding, Metal Tile Roof**

Inspection Type: **Final Inspection**

Inspection Outcome: **Pass**

Inspected By: **Gareth McCullagh**

Inspection Date: **2 October 2024 9:24 a.m.**

Duration: **30 minutes**

Inspection Element	Status
Exterior	Pass
All previous inspections/notes passed **All passed items on this inspection have been assessed against the consented documentation.**	Pass
Drawings	Pass
Additional information/plan	N/A
Sub-floor ventilation	N/A
Roof fixings **Nailed as required**	Pass
Spouting and down-pipes **In and connected**	Pass
Deck structure	N/A
Flashings - roof	Pass
Penetrations - flashings	Pass
Barriers	Pass
Gully dishes **In place**	Pass
Stormwater and site drainage	Pass
Handrails	N/A
Wastes to gully	Pass
Fixings - durability	Pass
Steps/stairs **Steps/stairs in place and have a consistent rise and going as required**	Pass
Terminal vents/AAVs	Pass
Brick veneer cladding **Brick veneer cladding has been finished as required**	Pass
Cladding painted/sealed **All cladding has been painted and sealed as required**	Pass
Flashings - windows/doors **All windows and doors flashed as required**	Pass
Cladding ground clearance	Pass
Non compliance discussed onsite	N/A
Final check complete	Pass
Other **All aspects relating to this inspection have been assessed and checked against the consented documentation and deemed to comply.**	Pass
Interior	Pass
All previous inspections/notes passed	Pass

Sighted and failed items have been reassessed where appropriate	
Drawings	Pass
Additional information/plan	N/A
Service areas-floors/walls **All sealed as required**	Pass
Stair design	N/A
Handrails	N/A
Barriers from falling	N/A
Lighting **Windows and light fixtures in place for natural and artificial lighting**	Pass
Laundering	Pass
Cooking facilities **Oven and hob in place for cooking facilities**	Pass
Smoke detectors	Pass
Food storage/preparation	Pass
Ventilation	Pass
HWC flues	N/A
HWC restraint	Pass
Tempering valve **A tempering valve is fitted and the temperature of the hot water to sanitary fixtures has been checked for appropriate temperature of.....**	Pass
Glazing - human impact **Safety glass in where required**	Pass
Window restrictors	N/A
Hot water temp **52 degrees**	Pass
Solid fuel heater	N/A
Water supply tank	Pass
Trap seals and AAVS	Pass
Cistern flushing **Toilets flushing as required and running off non potable water**	Pass
WC pan connection **Toilet bolted and sealed as required**	Pass
Non potable water signs	Pass
Septic system	N/A
Window labels	Pass
Non compliance discussed onsite	N/A
Final check complete	Pass
Other	N/A
Intertenancy/commercial	N/A
Other	N/A

Residential Documentation

Application for CCC	Accepted
Electrical safety certificate - Electrician	Accepted
Electrical safety certificate - Inspector	Accepted
As-built drainage plan	Accepted
Drainage (Form 126) for stormwater & private Sewer installation	Accepted
Plumbing (Form 125) for pressure test and installation piped services	Accepted
Construction review PS4 statement for structural engineering **Foundation waffle slab and confirmation of good ground**	Accepted

Membrane applicator certificates - internal wet area	Accepted
Timber framing and truss certification	Accepted
Record of Work	Accepted

Building Practitioners

Carpentry 1	Accepted
Foundations 1	Clear
Bricklaying and Blocklaying 1	Accepted
Roofing 1	Accepted



Taken at 9:04 AM on Wednesday 2/10/2024



Taken at 9:04 AM on Wednesday 2/10/2024



Taken at 9:04 AM on Wednesday 2/10/2024



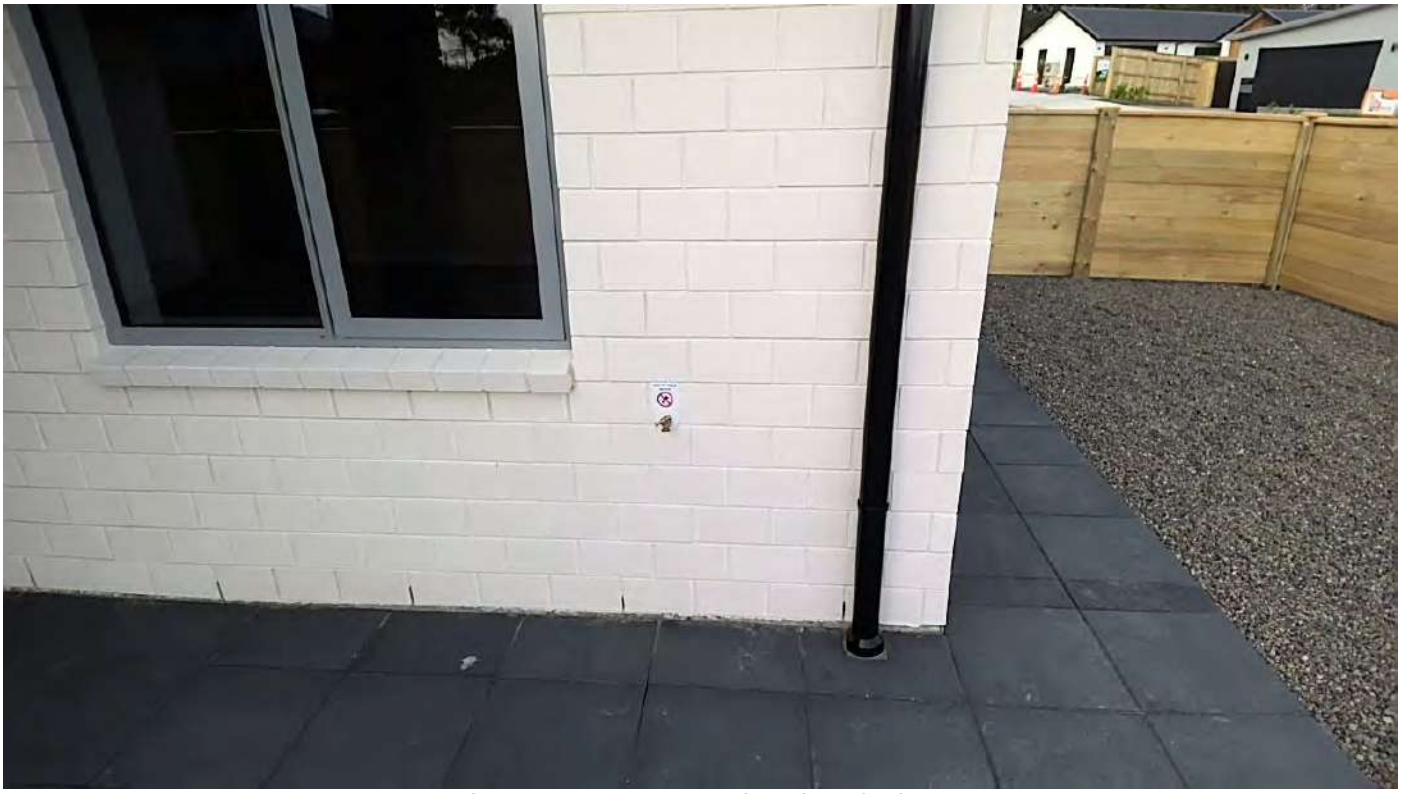
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Taken at 9:05 AM on Wednesday 2/10/2024



Taken at 9:05 AM on Wednesday 2/10/2024



Taken at 9:05 AM on Wednesday 2/10/2024



Taken at 9:05 AM on Wednesday 2/10/2024



Taken at 9:06 AM on Wednesday 2/10/2024



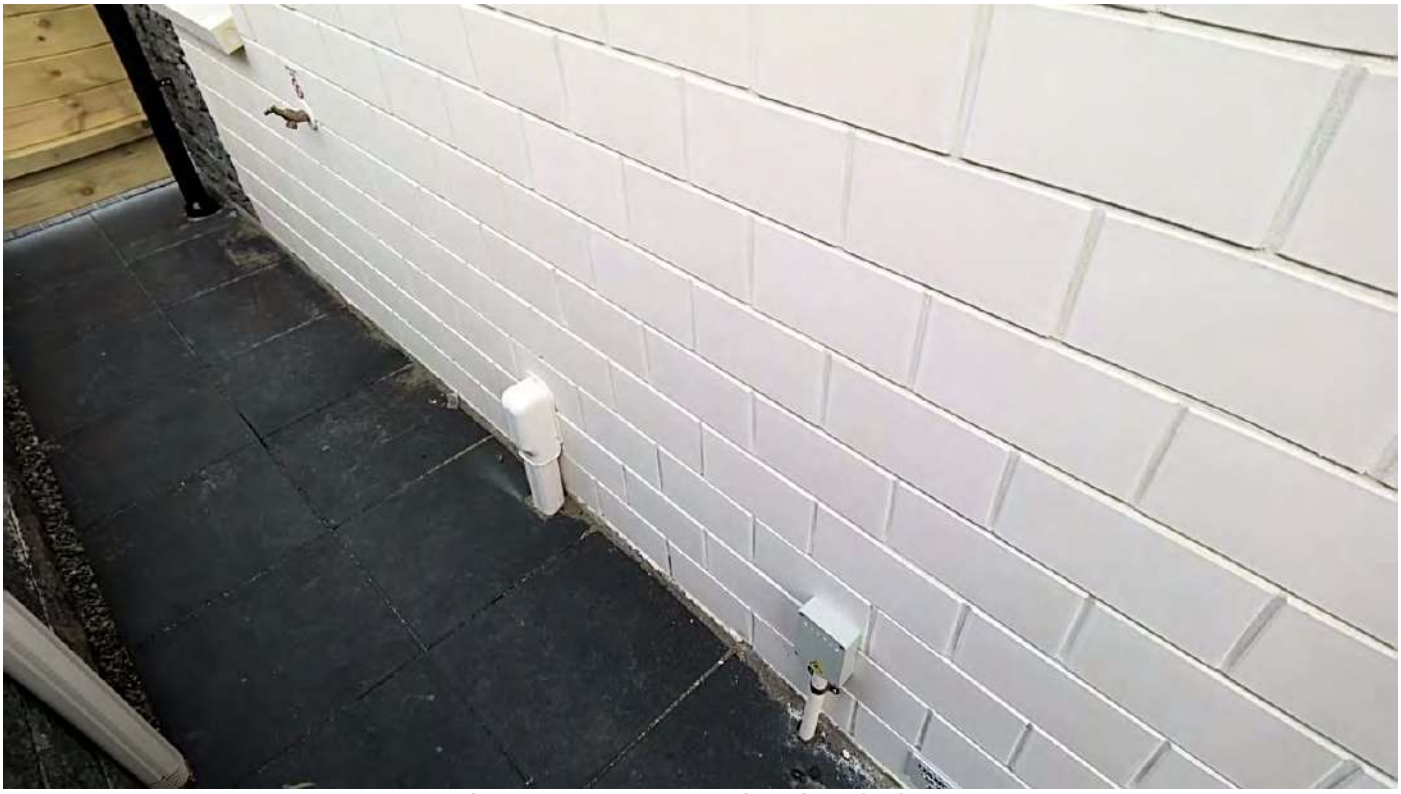
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Taken at 9:06 AM on Wednesday 2/10/2024



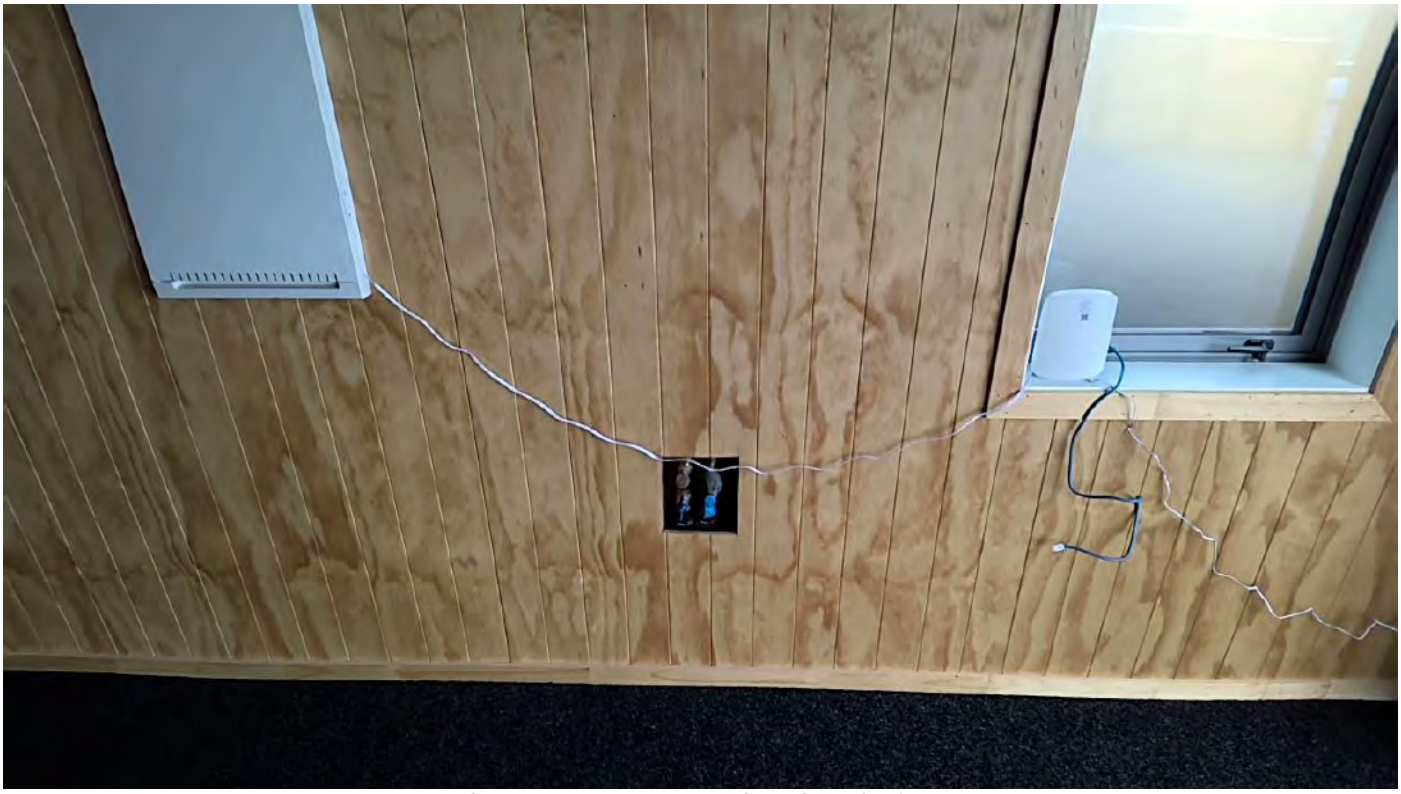
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Taken at 9:07 AM on Wednesday 2/10/2024



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Taken at 9:09 AM on Wednesday 2/10/2024



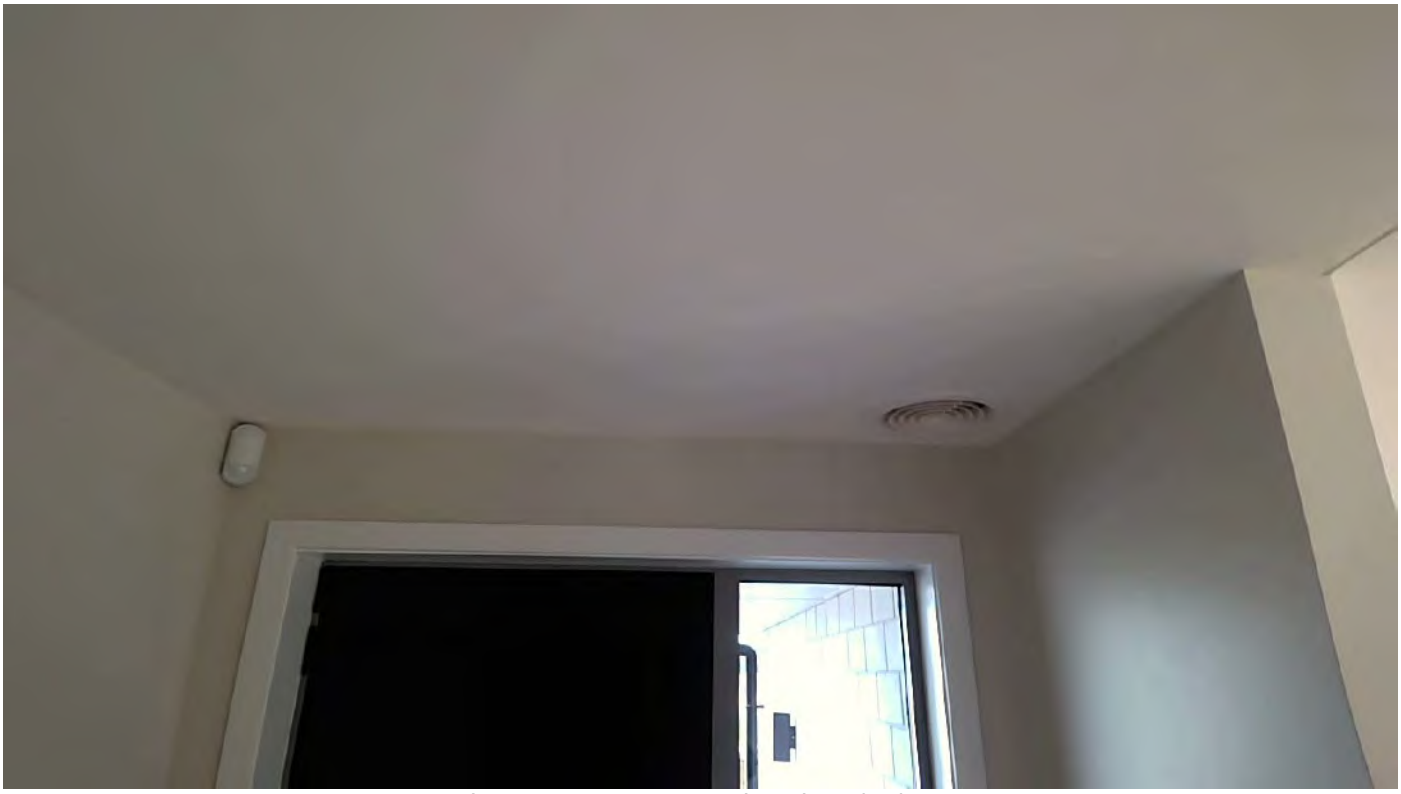
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Taken at 9:12 AM on Wednesday 2/10/2024



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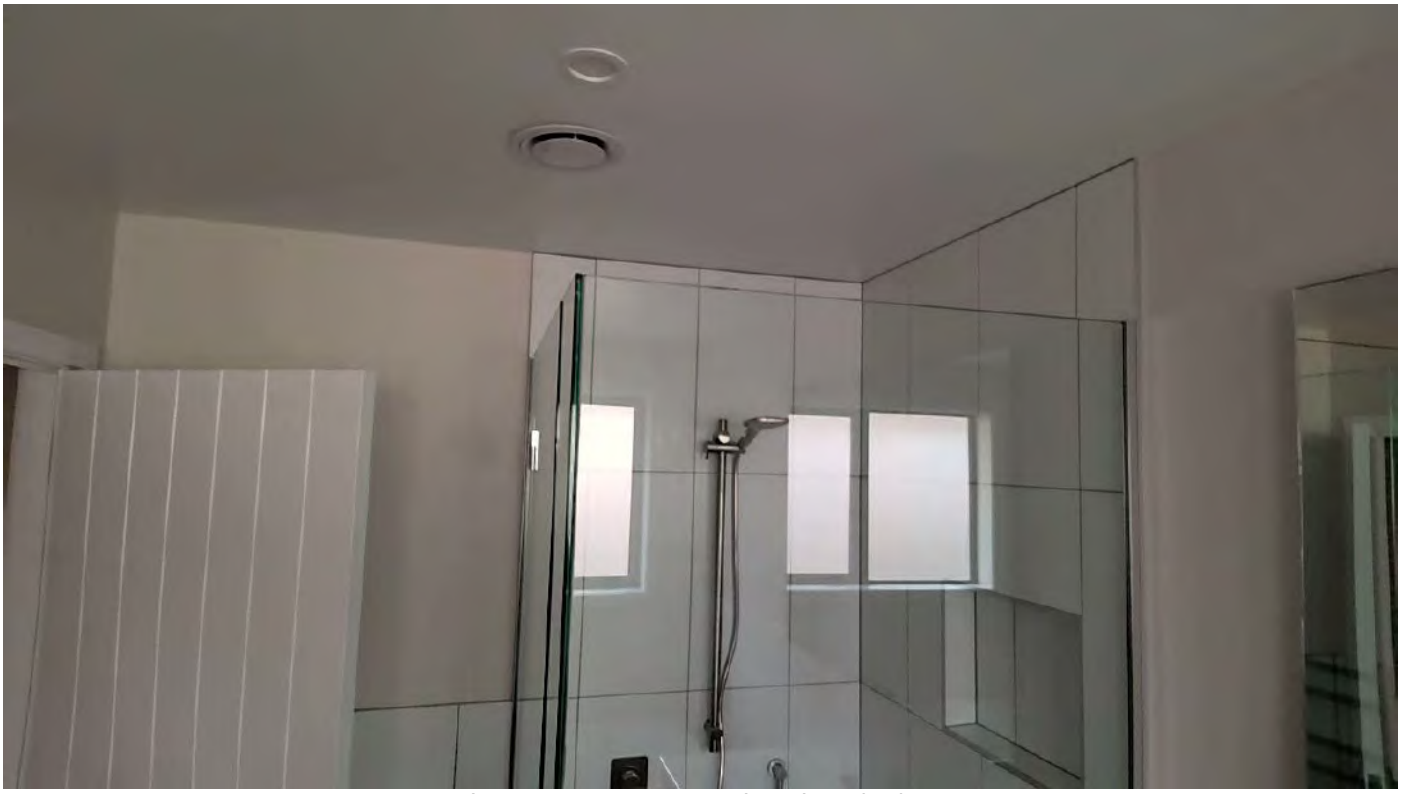
Taken at 9:13 AM on Wednesday 2/10/2024



Safety glass stamp right corner
Taken at 9:13 AM on Wednesday 2/10/2024



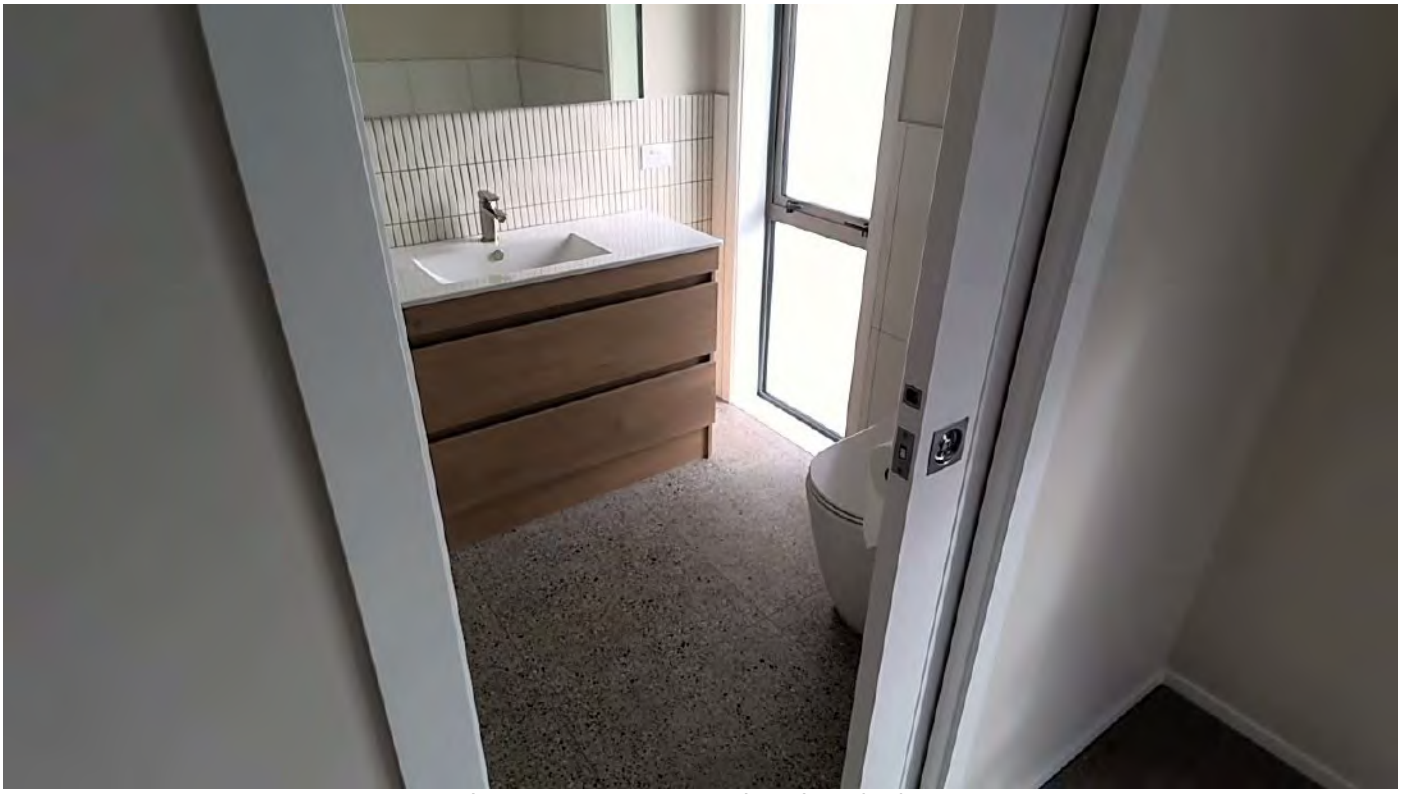
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Taken at 9:13 AM on Wednesday 2/10/2024



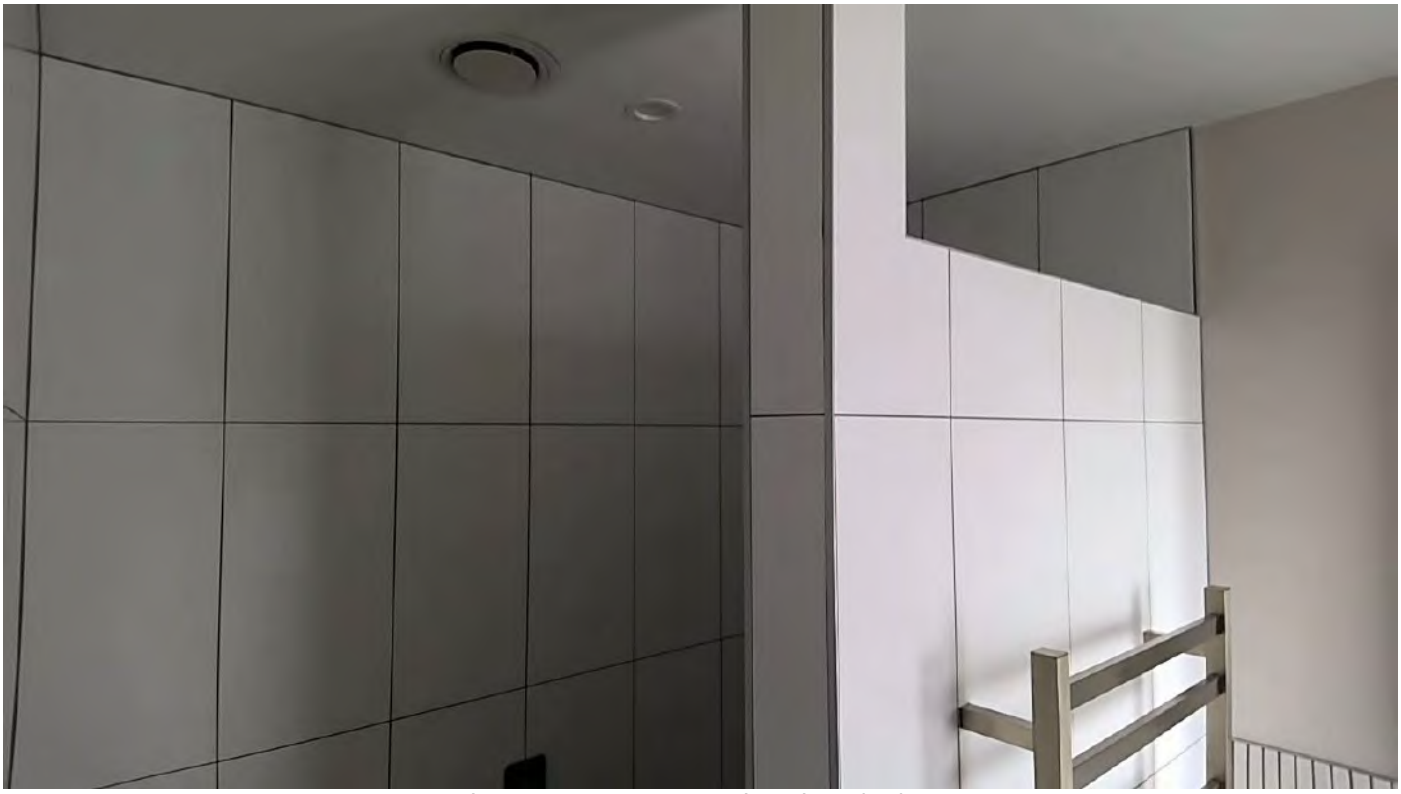
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Taken at 9:14 AM on Wednesday 2/10/2024



Taken at 9:14 AM on Wednesday 2/10/2024



Taken at 9:14 AM on Wednesday 2/10/2024



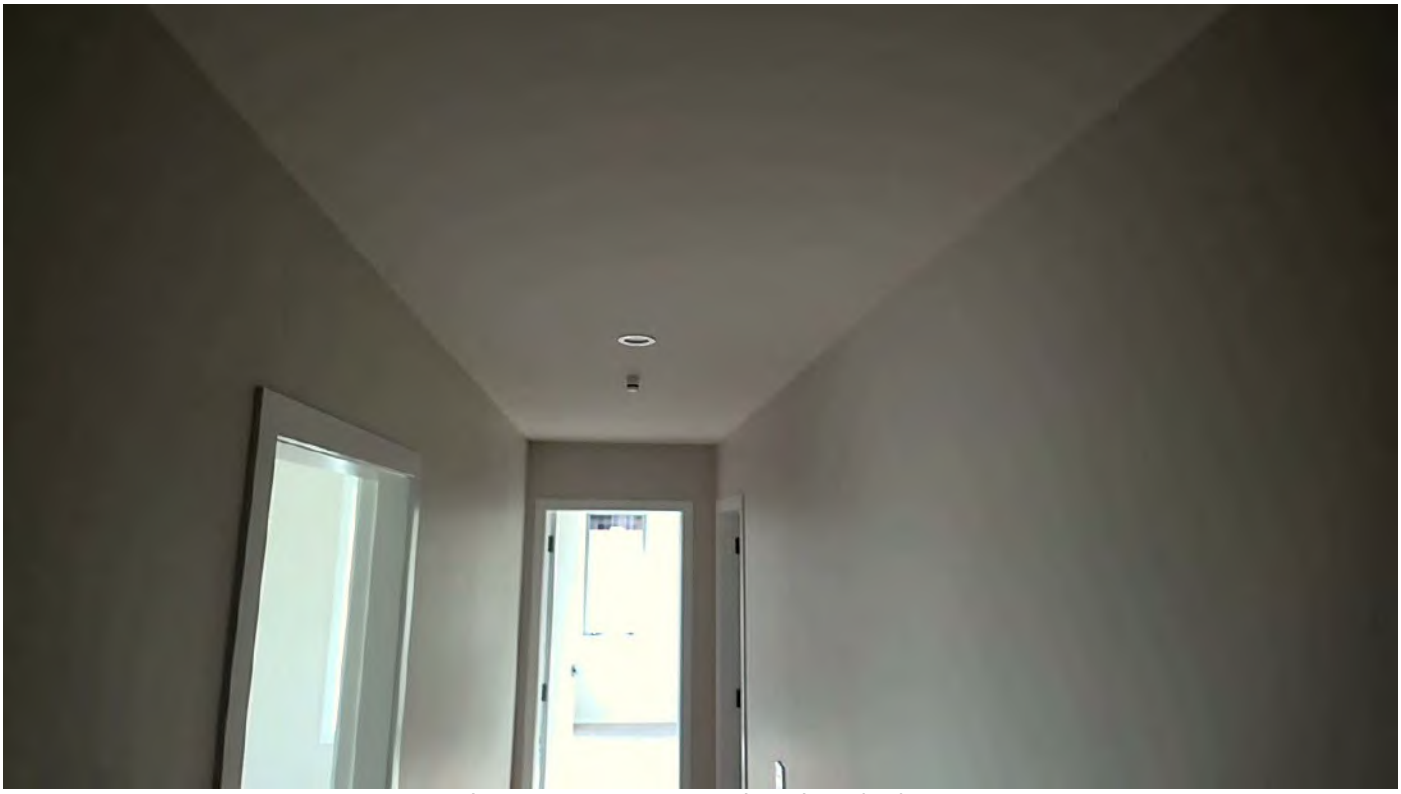
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Taken at 9:17 AM on Wednesday 2/10/2024



Taken at 9:17 AM on Wednesday 2/10/2024



Taken at 9:24 AM on Wednesday 2/10/2024

Kapiti Coast District Council
175 Rimu Road
Private Bag 60601
Paraparaumu 5254
Phone (04) 296 4700

SITE NOTICE

Consent No: **230413**
Applicant: **Glen Paterson**
Site Address: **163 Karuhiruhi Street, Waikanae**
Work Type: **3 Bedroom, 2 Bathroom, attached Double Garage, Concrete Slab Foundation, Brick Veneer/WB Cladding, Metal Tile Roof**
Building Category: **R2**

Inspection Type: **Final Inspection**
Inspection Outcome: **Pass**
Inspected By: **Gareth McCullagh**
Inspection Date: **2 October 2024**

Passed Items

Exterior

All previous inspections/notes passed	**All passed items on this inspection have been assessed against the consented documentation.**
Drawings	
Roof fixings	**Nailed as required**
Spouting and down-pipes	**In and connected**
Flashings - roof	
Penetrations - flashings	
Barriers	
Gully dishes	**In place**
Stormwater and site drainage	
Wastes to gully	
Fixings - durability	
Steps/stairs	**Steps/stairs in place and have a consistent rise and going as required**
Terminal vents/AAVs	
Brick veneer cladding	**Brick veneer cladding has been finished as required**
Cladding painted/sealed	**All cladding has been painted and sealed as required**
Flashings - windows/doors	**All windows and doors flashed as required**
Cladding ground clearance	
Final check complete	
Other	**All aspects relating to this inspection have been assessed and checked against the consented documentation and deemed to comply.**

Interior

All previous inspections/notes passed	**Sighted and failed items have been reassessed where appropriate**
Drawings	
Service areas-floors/walls	**All sealed as required**
Lighting	**Windows and light fixtures in place for natural and**

	artificial lighting
Laundering	
Cooking facilities	**Oven and hob in place for cooking facilities**
Smoke detectors	
Food storage/preparation	
Ventilation	
HWC restraint	
Tempering valve	**A tempering valve is fitted and the temperature of the hot water to sanitary fixtures has been checked for appropriate temperature of.....**
Glazing - human impact	**Safety glass in where required**
Hot water temp	**52 degrees**
Water supply tank	
Trap seals and AAVS	
Cistern flushing	**Toilets flushing as required and running off non potable water**
WC pan connection	**Toilet bolted and sealed as required**
Non potable water signs	
Window labels	
Final check complete	

Residential Documentation	**Status**
Application for CCC	Accepted
Electrical safety certificate - Electrician	Accepted
Electrical safety certificate - Inspector	Accepted
As-built drainage plan	Accepted
Drainage (Form 126) for stormwater & private Sewer installation	Accepted
Plumbing (Form 125) for pressure test and installation piped services	Accepted
Construction review PS4 statement for structural engineering	Accepted
Foundation waffle slab and confirmation of good ground	
Membrane applicator certificates - internal wet area	Accepted
Timber framing and truss certification	Accepted
Record of Work	Accepted

Building Practitioners	**Status**
Roofing 1	Accepted
Bricklaying and Blocklaying 1	Accepted
Designer 1	Accepted
Steve Neale	
Carpentry 1	Accepted

Kapiti Coast District Council
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SITE NOTICE

Consent No:	**230413**
Applicant:	**Glen Paterson**
Site Address:	**163 Karuhiruhi Street, Waikanae**
Work Type:	**3 Bedroom, 2 Bathroom, attached Double Garage, Concrete Slab Foundation, Brick Veneer/WB Cladding, Metal Tile Roof**
Building Category:	**R2**

Inspection Type:	**Pre Clad**
Inspection Outcome:	**Fail**
Inspected By:	**Meng Xu**
Inspection Date:	**10 May 2024**

Failed Items

General

Other	**Preclad inspection to area behind the brick veneer. Approved to proceed with laying the bricks. Areas still need to be inspected - DPC flashings around joinery - Cavity system for weatherboard cladding behind the gable frame**

Passed Items

General

Inspection notes	
Drawings	
Building wrap type	**Tekton**
Flexible sealing tape	**Ecoply tape**
non compliance discussed onsite	
Next Inspection required	

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Consent No: **230413**

Applicant: **The Plan Workz - Steve Neale**

Site Address: **163 Karuhiruhi Street, Waikanae**

Work Type: **3 Bedroom, 2 Bathroom, attached Double Garage, Concrete Slab Foundation, Brick Veneer/WB Cladding, Metal Tile Roof**

Inspection Type: **Pre Wrap**

Inspection Outcome: **Pass**

Inspected By: **Gareth McCullagh**

Inspection Date: **26 April 2024 2:55 p.m.**

Duration: **30 minutes**

Inspection Element	Status
General	Pass
Inspection notes	Pass
Drawings	Pass
Additional information/plan	N/A
Fire Separations	N/A
Cladding type identified	Pass
Framing moisture meets cladding requirements	Pass
Stud spacing appropiate for cladding **400 mm centres**	Pass
Exterior sheet bracing and angle brace fixing **eco ply nailed as required**	Pass
Bottom plate connections **bolted as required and handi bracks in for braces** **All bottom plate connections fixed in compliance with the building consent documentation**	Pass
Building wrap type **Tekton building wrap**	Pass
Roof Cross Bracing **four in place**	Pass
Purlin fixing **done by roofer tile**	N/A
Decking substrate	N/A
Top Plate Connection **75 mm nailed on ply to top plate**	Pass
Lintel Connections **all stud locked**	Pass
Truss connections **all completed cpc 40s double and cpc 80s and also z nails internals joist hangers and multi grips**	Pass
Column posts **bracket at bottom and bolts to top**	Pass
LBP number **Glen Paterson**	Pass
Agent/owner written approval	N/A
non compliance discussed onsite	N/A
Next Inspection required	N/A
Other **All aspects relating to this inspection have been assessed and checked against the consented documentation and deemed to comply.**	Pass

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SITE NOTICE

Consent No: **230413**
Applicant: **Glen Paterson**
Site Address: **163 Karuhiruhi Street, Waikanae**
Work Type: **3 Bedroom, 2 Bathroom, attached Double Garage, Concrete Slab Foundation, Brick Veneer/WB Cladding, Metal Tile Roof**
Building Category: **R2**

Inspection Type: **Pre Wrap**
Inspection Outcome: **Pass**
Inspected By: **Gareth McCullagh**
Inspection Date: **26 April 2024**

Passed Items

General

Inspection notes	
Drawings	
Cladding type identified	
Framing moisture meets cladding requirements	
Stud spacing appropiate for cladding	**400 mm centres**
Exterior sheet bracing and angle brace fixing	**eco ply nailed as required**
Bottom plate connections	**bolted as required and handi bracks in for braces All bottom plate connections fixed in compliance with the building consent documentation**
Building wrap type	**Tekton building wrap**
Roof Cross Bracing	**four in place**
Top Plate Connection	**75 mm nailed on ply to top plate**
Lintel Connections	**all stud locked**
Truss connections	**all completed cpc 40s double and cpc 80s and also z nails internals joist hangers and multi grips**
Column posts	**bracket at bottom and bolts to top**
LBP number	**Glen Paterson**
Other	**All aspects relating to this inspection have been assessed and checked against the consented documentation and deemed to comply.**

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Consent No: **230413**

Applicant: **The Plan Workz - Steve Neale**

Site Address: **163 Karuhiruhi Street, Waikanae**

Work Type: **3 Bedroom, 2 Bathroom, attached Double Garage, Concrete Slab Foundation, Brick Veneer/WB Cladding, Metal Tile Roof**

Inspection Type: **Preline Building**

Inspection Outcome: **Fail**

Inspected By: **Jeremy Lincoln**

Inspection Date: **17 June 2024 9:41 a.m.**

Duration: **30 minutes**

Inspection Element	Status
Frame	Fail
Ceiling diaphram	N/A
Timber treatment and grades **Msg8** **All H1** **MSG8**	Pass
Lintel/beam size and fix **Lami** **External**	N/A
Insulation	Pass
Top plate fix **External**	N/A
Ceiling batten **Rondo** **600c** **Rondo battens installed at**	Pass
Stud spacing **External at 400** **Internal at 400**	Pass
Bracing connections **GIB Handi brackets in place where required**	Pass
Air seals **All windows and doors foamed and sealed as required**	Pass
Bottom plate fixings **All correctly fitted with minimum distance to slab edge, at 900mm centres and 150mm from ends of frames**	Pass
Building closed in	Pass
Wet area substrate **Metal corners to be fitted, provide photos at next inspection**	Fail
Wood burner	N/A
LBP number **Glen pattersen**	Pass
Written approval	N/A
Non compliance discussed onsite **With Glen**	Pass
Next inspection	N/A
Other	N/A
General	Fail
Sighted previous inspection notes **Sighted and reviewed previous inspection notes**	Pass

Conforms with approved drawings **All items assessed and deemed to comply with approved plans**	Pass
Confirm additional information/amended plan	N/A
Fire Separations	N/A
Max moisture content **Mas bed east wall & East wall in Eastern bed & South wall bedroom 3. Soth wall to living area** **Still High recheck** **All others OK**	Fail
Ventilation to rooms **Opening windows and doors align with the consented plans**	Pass
Framing - timber treatment and grades	Pass
Lintel/beam size and fixing **External**	N/A
Insulation	Pass
Top plate connection **External**	N/A
Ceiling batten **Rondo @ 600c**	Pass
Stud spacing	Pass
Ceiling diaphram	N/A
Bracing connections **GIB handi brackets in place where required**	Pass
Air seals **All windows and doors foamed and sealed as required**	Pass
Bottom plate fixings **All correctly fitted with minimum distance to slab edge, at 900mm centres and 150 from ends of frames**	Pass
Building closed in	Pass
Grade of timber framing	Pass
Wet area substrate **Angles to be fitted to showers**	Fail
Wood burner	N/A
LBP number **Glen**	Pass
Agent/owner written approval	N/A
Non compliance discussed onsite **with glen**	Pass
Next Inspection required **Recheck**	Fail
Other	N/A



Taken at 9:35 AM on Monday 17/06/2024



Taken at 9:35 AM on Monday 17/06/2024



overview of insulation installed
Taken at 9:35 AM on Monday 17/06/2024



Taken at 9:39 AM on Monday 17/06/2024



Typical shot nail plate fixings
Taken at 9:39 AM on Monday 17/06/2024

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SITE NOTICE

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Site Address: **163 Karuhiruhi Street, Waikanae**
Work Type: **3 Bedroom, 2 Bathroom, attached Double Garage, Concrete Slab Foundation, Brick Veneer/WB Cladding, Metal Tile Roof**
Building Category: **R2**

Inspection Type: **Preline Building**
Inspection Outcome: **Fail**
Inspected By: **Jeremy Lincoln**
Inspection Date: **17 June 2024**

Failed Items

Frame

Wet area substrate	**Metal corners to be fitted, provide photos at next inspection**

General

Max moisture content	**Mas bed east wall & East wall in Eastern bed & South wall bedroom 3. Soth wall to living area** **Still High recheck** **All others OK**
Wet area substrate	**Angles to be fitted to showers**
Next Inspection required	**Recheck**

Passed Items

Frame

Timber treatment and grades	**Msg8** **All H1** **MSG8**
Insulation	
Ceiling batten	**Rondo** **600c** **Rondo battens installed at**
Stud spacing	**External at 400** **Internal at 400**
Bracing connections	**GIB Handi brackets in place where required**
Air seals	**All windows and doors foamed and sealed as required**
Bottom plate fixings	**All correctly fitted with minimum distance to slab edge, at 900mm centres and 150mm from ends of frames**
Building closed in	
LBP number	**Glen pattersen**
Non compliance discussed onsite	**With Glen**

General

Sighted previous inspection notes	**Sighted and reviewed previous inspection notes**
Conforms with approved drawings	**All items assessed and deemed to comply with approved plans**
Ventilation to rooms	**Opening windows and doors align with the consented plans**
Framing - timber treatment and grades	
Insulation	
Ceiling batten	**Rondo @ 600c**
Stud spacing	
Bracing connections	**GIB handi brackets in place where required**
Air seals	**All windows and doors foamed and sealed as required**
Bottom plate fixings	**All correctly fitted with minimum distance to slab edge, at 900mm centres and 150 from ends of frames**
Building closed in	
Grade of timber framing	
LBP number	**Glen**
Non compliance discussed onsite	**with glen**

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Consent No: **230413**

Applicant: **The Plan Workz - Steve Neale**

Site Address: **163 Karuhiruhi Street, Waikanae**

Work Type: **3 Bedroom, 2 Bathroom, attached Double Garage, Concrete Slab Foundation, Brick Veneer/WB Cladding, Metal Tile Roof**

Inspection Type: **Preline Building**

Inspection Outcome: **Fail**

Inspected By: **Jeremy Lincoln**

Inspection Date: **25 June 2024 1:48 p.m.**

Duration: **30 minutes**

Inspection Element	Status
Frame	Pass
Wet area substrate	Pass
Metal corners in place	
General	Fail
Max moisture content	Fail
Mas bed east wall & East wall in Eastern bed Still High recheck	
All others OK	

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Consent No: **230413**

Applicant: **The Plan Workz - Steve Neale**

Site Address: **163 Karuhiruhi Street, Waikanae**

Work Type: **3 Bedroom, 2 Bathroom, attached Double Garage, Concrete Slab Foundation, Brick Veneer/WB Cladding, Metal Tile Roof**

Inspection Type: **Postline / Wet area Pre Application**

Inspection Outcome: **Fail**

Inspected By: **Jeremy Lincoln**

Inspection Date: **25 June 2024 1:55 p.m.**

Duration: **30 minutes**

Inspection Element	Status
General	Fail
Sighted previous inspection notes **Sighted and failed items have been reassessed where appropriate**	Pass
Conforms with approved drawings	Pass
Confirm additional information/amended plan	N/A
Sheet bracing **Correct sheet materials used to align with consented plans**	Pass
Sheet fixings **Correct fixing patterns and fixing type align with product specifications**	Pass
Sheet heights **Sheets are the required distance off the floor**	Pass
Fire/acoustic separation	N/A
Agent/owner written approval	N/A
Wet area substrate system **Horizontal joints to be rechecked** **"Row of nogs required behind all horizontal joints in showers" (page 79 gib site guide 2024)**	Fail
LBP number **Glen**	Pass
Non compliance discussed onsite **With Glen**	Pass
Next Inspection required **Recheck**	Pass
Other	N/A



wet area shower
Taken at 1:52 PM on Tuesday 25/06/2024

Kapiti Coast District Council
175 Rimu Road
Private Bag 60601
Paraparaumu 5254
Phone (04) 296 4700

SITE NOTICE

Consent No: **230413**
Applicant: **Glen Paterson**
Site Address: **163 Karuhiruhi Street, Waikanae**
Work Type: **3 Bedroom, 2 Bathroom, attached Double Garage, Concrete Slab Foundation, Brick Veneer/WB Cladding, Metal Tile Roof**
Building Category: **R2**

Inspection Type: **Preline Building**
Inspection Outcome: **Fail**
Inspected By: **Jeremy Lincoln**
Inspection Date: **25 June 2024**

Failed Items

General

Max moisture content	**Mas bed east wall & East wall in Eastern bed Still High recheck** **All others OK**
Wet area substrate	**Angles to be fitted to showers**
Next Inspection required	**Recheck**

Passed Items

Frame

Wet area substrate	**Metal corners in place**

Inspection Type: **Postline / Wet area Pre Application**
Inspection Outcome: **Fail**
Inspected By: **Jeremy Lincoln**
Inspection Date: **25 June 2024**

Failed Items

General

Wet area substrate system	**Horizontal joints to be rechecked** **"Row of nogs required behind all horizontal joints in showers" (page 79 gib site guide 2024)**

Passed Items

General

Sighted previous inspection notes	**Sighted and failed items have been reassessed where appropriate**
Conforms with approved drawings	
Sheet bracing	**Correct sheet materials used to align with consented plans**
Sheet fixings	**Correct fixing patterns and fixing type align with product specifications**
Sheet heights	**Sheets are the required distance off the floor**

LBP number	**Glen**
Non compliance discussed onsite	**With Glen**
Next Inspection required	**Recheck**

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Consent No: **230413**

Applicant: **The Plan Workz - Steve Neale**

Site Address: **163 Karuhiruhi Street, Waikanae**

Work Type: **3 Bedroom, 2 Bathroom, attached Double Garage, Concrete Slab Foundation, Brick Veneer/WB Cladding, Metal Tile Roof**

Inspection Type: **Preline Building**

Inspection Outcome: **Pass**

Inspected By: **Luke Nattrass**

Inspection Date: **3 July 2024 12:25 p.m.**

Duration: **30 minutes**

Inspection Element	Status
General	Pass
Max moisture content **Multiple check points indicate compliant moisture levels of 16-17%**	Pass
Wet area substrate **Sighted metal angles installed to internal corners of the wet area showers**	Pass
Non compliance discussed onsite	N/A
Next Inspection required **Membrane inspection**	Pass
Other **All aspects relating to this inspection have been assessed and checked against the consented documentation and deemed to comply.**	Pass



Taken at 11:15 AM on Wednesday 3/07/2024



Taken at 11:15 AM on Wednesday 3/07/2024

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Consent No: **230413**

Applicant: **The Plan Workz - Steve Neale**

Site Address: **163 Karuhiruhi Street, Waikanae**

Work Type: **3 Bedroom, 2 Bathroom, attached Double Garage, Concrete Slab Foundation, Brick Veneer/WB Cladding, Metal Tile Roof**

Inspection Type: **Postline / Wet area Pre Application**

Inspection Outcome: **Pass**

Inspected By: **Luke Nattrass**

Inspection Date: **3 July 2024 12:27 p.m.**

Duration: **30 minutes**

Inspection Element	Status
General	Pass
Wet area substrate system	Pass
Gib aqualine installed and screwed off as required with solid blocking in place as required	
Other	Pass
All aspects relating to this inspection have been assessed and checked against the consented documentation and deemed to comply	

Kapiti Coast District Council
175 Rimu Road
Private Bag 60601
Paraparaumu 5254
Phone (04) 296 4700

SITE NOTICE

Consent No: **230413**
Applicant: **Glen Paterson**
Site Address: **163 Karuhiruhi Street, Waikanae**
Work Type: **3 Bedroom, 2 Bathroom, attached Double Garage, Concrete Slab Foundation, Brick Veneer/WB Cladding, Metal Tile Roof**
Building Category: **R2**

Inspection Type: **Preline Building**
Inspection Outcome: **Pass**
Inspected By: **Luke Nattrass**
Inspection Date: **3 July 2024**

Passed Items

General

Max moisture content	**Multiple check points indicate compliant moisture levels of 16-17%**
Wet area substrate	**Sighted metal angles installed to internal corners of the wet area showers**
Next Inspection required	**Membrane inspection**
Other	**All aspects relating to this inspection have been assessed and checked against the consented documentation and deemed to comply.**

Inspection Type: **Postline / Wet area Pre Application**
Inspection Outcome: **Pass**
Inspected By: **Luke Nattrass**
Inspection Date: **3 July 2024**

Passed Items

General

Wet area substrate system	**Gib aqualine installed and screwed off as required with solid blocking in place as required**
Other	**All aspects relating to this inspection have been assessed and checked against the consented documentation and deemed to comply**

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Consent No: **230413**

Applicant: **The Plan Workz - Steve Neale**

Site Address: **163 Karuhiruhi Street, Waikanae**

Work Type: **3 Bedroom, 2 Bathroom, attached Double Garage, Concrete Slab Foundation, Brick Veneer/WB Cladding, Metal Tile Roof**

Inspection Type: **Pre-Slab Building**

Inspection Outcome: **Pass**

Inspected By: **Luke Nattrass**

Inspection Date: **16 January 2024 12:14 p.m.**

Duration: **45 minutes**

Inspection Element	Status
General	Pass
Engineers details required **Bryce from certa engineering confirming**	Pass
Rebate for brick veneer	Pass
Ground clearance	Pass
Concrete cover	Pass
Driveway S/W control	N/A
Sand blinding	Pass
Slab thickenings	Pass
Vapour barrier	Pass
Bottom plate fixings	N/A
Steel reinforcing **All steel work placed and tied as per consented documentation**	Pass
Bar chairs **Bar chairs placed as required**	Pass
DPC penetrations taped **All penetrations taped as required**	Pass
Minimum floor level	Pass
Registration numbers	N/A
Siting	Pass
Sub slab insulation	N/A
In-slab heating	N/A
LBP number **Glen Patterson 100392**	Pass
Agent/owner written approval	N/A
non compliance discussed onsite	N/A
Next Inspection required **Pre wrap**	Pass
Other **All aspects relating to this inspection have been assessed and checked against the consented documentation and deemed to comply.**	Pass



Taken at 11:52 AM on Tuesday 16/01/2024



Taken at 11:53 AM on Tuesday 16/01/2024



Taken at 11:53 AM on Tuesday 16/01/2024



Taken at 11:53 AM on Tuesday 16/01/2024