



**RAPIDWALL**  
**THE BOOK**

INSTALLATION MANUAL

**Building** a better world  
RAPID BUILDING SYSTEMS PTY LTD



# Contents

	PAGE	SECTION
Introduction	1	1
The Rapidwall Panel	2 - 3	2
Rapidwall Overview	4 - 7	3
Planning	8 - 9	4
Pre-Panel Installation	10 - 11	5
Transportation	12 - 13	6
Lifting, Positioning and Props	14 - 27	7
Rapidwall Installation	28 - 36	8
Openings	37 - 41	9
Services	42 - 43	10
Fixing & Fastening to Rapidwall	44 - 45	11
Concrete Fill	46 - 51	12
Insulation Fill	52- 53	13
Sand Fill	54 - 55	14
Rapidfence Installation	56 - 62	15
Rapidfloor Overview	63	16
Rapidfloor Installation	64 -69	17
Rapidroof Overview	70	18
Rapidroof Installation	71 - 76	19
Preparing Panels for Finishing	77 - 78	20
Repairing Panels	79 - 82	21
Finishing Panel Joints	83 - 90	22
Finishing Panels	91 - 102	23
Waterproofing	103 - 108	24
Engineering	109 - 111	25
Health & Safety	112 - 143	26
Appendix	144 -151	27

Important Note:

This Installation Manual has been developed to provide installers with the recommended method of installing Rapidwall globally.

It has however been based upon building practices and regulations current in Australia at the time and therefore each installer or user of this manual must seek clarification from their local manufacturer as to any changes or amendments that may have been made to comply with local regulations or requirements.

Rapid Building Systems accepts no responsibility whatsoever for any damages caused by users deviating from the building practices recommended herewith or as officially amended by the local, in country, Rapidwall manufacturer.

In any case, users should check, at least every 6 months that they are using the latest updated version from the Global web site [www.rapidwall.com.au](http://www.rapidwall.com.au)

Version 1 April 2013

# INTRODUCTION

Rapidwall is a cost effective prefabricated load-bearing, single panel, walling system with significant benefits for the building industry, especially in the speed of construction.

Manufactured to precise specifications the panels are cut in the factory and delivered on-site ready for erection.

Unlike other systems Rapidwall can be erected by a small crew of trained manual workers thereby reducing the need for traditional building skills.

## Range of uses:

- Domestic homes.
- Multi-storey buildings.
- Formwork for suspended concrete floor structures.
- Most other purposes for which traditional building materials are currently used.

Around the world there is a growing need for low energy, low cost, environmentally friendly and ecologically sound building solutions.

Rapidwall is ideal for this as it looks after the environment as well as the well being of construction workers and ultimately the people who will reside in a Rapidwall building.

Rapidwall is 100% recyclable; earthquake, fire and cyclone tested to the highest standards as well as being rot, and termite resistant.

Developed in Australia in the early 1990s, Rapidwall is now in use in a number of countries around the world and is one of the few products approved under the strict Building Code of China.

Off cuts from panels can be returned to factory for recycling.



**Economical**



**High quality finish**



**Lightweight and accurate**



**Load bearing**



**Quick to erect**



**Environmentally positive**



**Fire resistant**



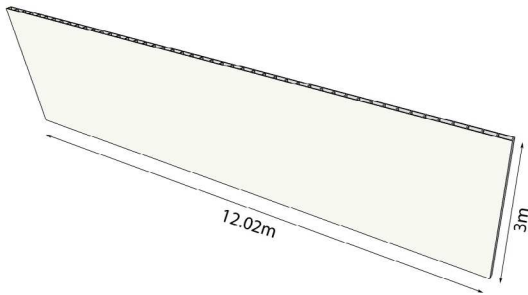
**Earthquake resistant**



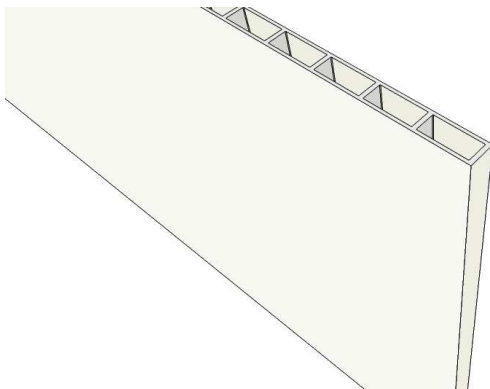
**Termite resistant**

## THE RAPIDWALL PANEL

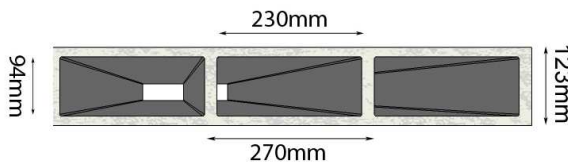
The Rapidwall panel measures 12.02 m long by 3 m high.



The panels are cellular in form. The cavities extend to the full height of the panel which has an overall thickness of 123mm plus or minus 3mm.



The panel has an inner and outer leaf of 13mm thick plus or minus 3mm, with cavities 94mm deep by 230mm wide separated by a 20mm wide web.



	Rapidwall Panel non fill
Total Weight	1,586.64 Kg
Weight/ m <sup>2</sup>	44 Kg
Face area	36.06 m <sup>2</sup>
Cavity numbers	48
Single Cavity volume	0.063 m <sup>3</sup> or 63 litres
Cavity volume per square metre of wall	0.084 m <sup>3</sup> or 84 litres
Total Cavity volume per panel	3.029m <sup>3</sup> or 3029 litres

### Panel Properties:

- Water resistant.
- Rot resistant.
- Termite resistant.
- Suitable for fire, cyclone and earthquake prone regions.
- Manufactured to precise specifications and pre-cut in the factory.
- Made principally from naturally occurring Gypsum or from waste Flue-Gas or Phospho Gypsum.
- Lower embodied energy than all other walling products.
  - Embodied energy is the total energy used in extraction of materials, manufacturing, transportation and installation.
- 100% recyclable.
- Panels can be re-processed through a calciner and recast into new Rapidwall panels.
- Panels are air dried within the factory complex, they produce no CO<sup>2</sup> emissions.
- The finish of Rapidwall is superior to an equivalent off-form, precast-concrete or in-situ wall panel.

### Materials:

- Gypsum plaster - Calcium Sulphate Hemihydrate.
- Fibreglass strands for reinforcement.
- Clean water.
- Additives including waterproofing agents.



Rapidwall panel manufacture



Laying fibreglass during manufacture



A transport stillage

Panels are precut in the factory to specified dimensions for construction.

- ❑ Openings for doors and windows are cut in the factory.
- ❑ Panels do not expand or contract like brick or concrete and can be cut to within a 5mm tolerance.
- ❑ Rapidwall Panels are transported by either a stillage or open top container.
- ❑ A transport stillage can carry between five and eight Panels.
- ❑ An open top container can carry up to 500 square metres of Rapidwall Panel.
- ❑ A semi-trailer can transport the stillages or containers to the building site.
- ❑ Panels are unloaded by a crane.
- ❑ Stillages are positioned and stabilised on prepared flat ground near the construction site in readiness for erection.

Table: Comparing a typical non filled Rapidwall panel with a precast concrete panel of the same size.

Panels: same size	Rapidwall	Precast Concrete
Installed cost	70%	100%
Weight - tonnes	1.5	10.5

Table showing drop deck truck capacity

	Area/m <sup>2</sup>
Rapidwall 123 mm thick	340
Precast concrete panel 123 mm thick	75
Concrete grey hollow block 140 mm thick	144

# 3

## RAPIDWALL OVERVIEW



Rapidwall panels can be used for numerous wall construction applications.

They can be used anywhere traditional construction methods would be used, replacing, brick, block, concrete, steel framed systems and other prefabricated panels. They are suitable for any type of building from domestic housing, commercial and industrial buildings to multi-storey.

The use and properties of the panel change depending on the material with which the cavities are filled. Standard fills include insulation, concrete and sand. A non-filled, insulation or sand filled panel can be used for non-load bearing walls or load bearing walls in single or in certain cases double storey construction but have different properties. Concrete filled panels are load bearing.

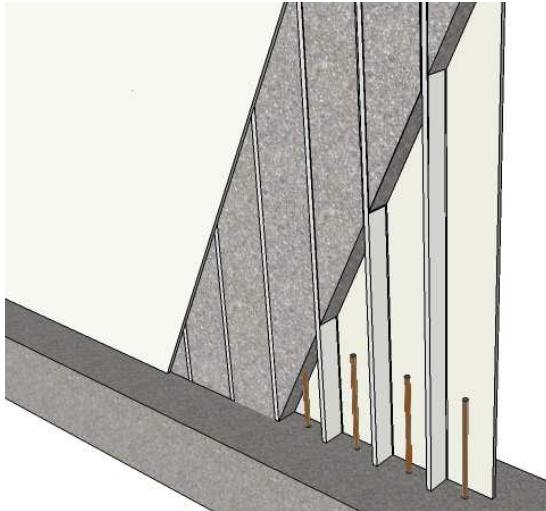
The engineering design will determine how the cavities should be filled.

### Specific Applications:

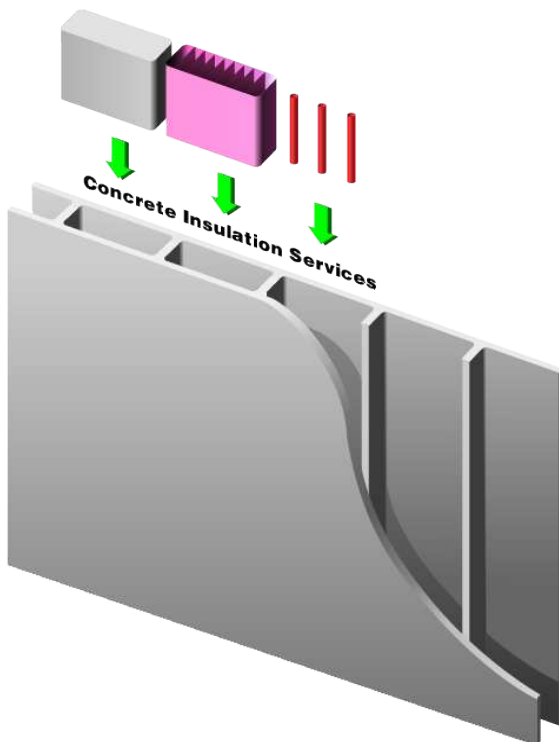
- ❑ Load-bearing walls in multi-storey apartments.
- ❑ Firewalls.
- ❑ Fencing.
- ❑ Domestic housing construction, single and double storey.
- ❑ Townhouses.
- ❑ Shops.
- ❑ Offices.
- ❑ Resorts.
- ❑ Hospitals.
- ❑ Factory buildings.
- ❑ Cinemas and sound studios.

**NOTE:** Although it is not recommended, if Rapidwall is used below ground it must be fully watertanked. For below ground structures Dincel - [www.dincelconstructionssystem.com](http://www.dincelconstructionssystem.com) or a similar system provides an ideal base for the erection of Rapidwall above ground.





*Cross sectional view showing starter bars, concrete cavity fill and Rapidwall skins and cavities.*



*Cavities can accommodate concrete, insulation or plumbing and electrical services.*

### The Rapidwall Benefits:

- ❑ Greater speed of on-site construction.
- ❑ Lower on-site labour requirements.
- ❑ Simpler methods of on-site fixing.
- ❑ Excellent modulation capabilities.
- ❑ Load bearing for multi-storey construction.
- ❑ Lightweight.
- ❑ Thermal properties dependent on cavity fill. See next page.
- ❑ Fire rating dependant on cavity fill. See next page.
- ❑ Acoustic ratings dependant on cavity fill. See next page.
- ❑ Low transportation and crantage costs.

Rapidwall concrete filled load bearing structures can conceivably support between twelve and twenty storeys thus eliminating the need for columns and floor beams.

Rapidwall unfilled load bearing structures can conceivably support up to three storeys when suspended timber floors are used.

When used as load-bearing shear walls Rapidwall exhibits ductile qualities that make it safer than masonry in earthquake prone structures.

## FIRE/ THERMAL/ ACOUSTIC

Rapidwall Panel Build Up	Thickness mm	Load bearing	Fire Resistance			Acoustic Rw rating	Additional coat or lining	Attachment Method
			Structural	Integrity	Insulation			
<b>Single Panel cavity filling</b>								
Unfilled	123	No	180	120	60*	28	NA	NA
Unfilled with internal insulated plasterboard lining (R1.25)	158	No					35mm Kingspan Kooltherm® K17	
Rockwool batts	123	No	180	90	90*		Standard texture finish on external face	NA
60kg/m <sup>3</sup> cellulose fibre insulation	123					31	NA	NA
90kg/m <sup>3</sup> cellulose fibre insulation	123					33	NA	NA
90kg/m <sup>3</sup> cellulose fibre insulation	137					36	13mm Gyprock	screw fixed - thin glue daubs
90kg/m <sup>3</sup> cellulose fibre insulation	165					45	13mm Gyprock -Tontine TSB3 insulation	28mm Rondo 129 fuming channels
12mm scoria aggregate	123	Yes	30	30	30			
No fines scoria	123	Yes	120	120	120*			
20 MPa normal concrete	123							
32MPa concrete	123	Yes	240	240	240*			
Lightweight concrete	123							
Concrete	123					45		
Concrete filled with internal insulated plasterboard lining (R1.25)	158	Yes					35mm Kingspan Kooltherm® K17	
Concrete	175					54	13mm Gyprock - Tontine TSB3 insulation	Heavy gauge (1.2mm) Rondo 38mm top hat sections
Concrete	178				180*	55	13mm Gyprock - Tontine TSB3 insulation	28mm Rondo 129 fuming channels with Gyprock resilient mounts
Concrete	198					55	13mm Gyprock -Tontine TSB3 insulation	51mm steel studs spaced 10mm from Rapidwall
<b>Double Panel cavity filling</b>								
Cellulose fibre		Yes	180	180				

Fire resistance levels marked with an \* are test results from previous 100 mm Rapidwall panel tests. These results are deemed to be applicable to 123mm thick Rapidwall.

## INSTALLATION OVERVIEW



*Lowering panel*



*Panel placement*



*Panel propping*

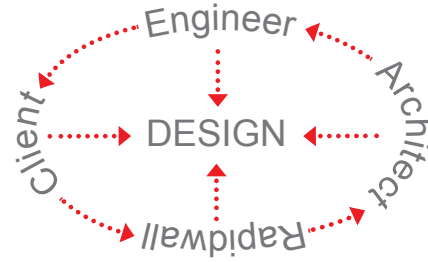
- ❑ Prior to delivery of the panels the surveyors establish and mark any high points on the slab and all main grid lines on the foundations or the concrete suspended floor onto which Rapidwall is to be positioned.
- ❑ Using the Architectural layout drawings the erection crew marks out the wall positions in reference to these grid lines.
- ❑ Holes are drilled in the concrete foundation, starter bars inserted and waterproof membrane applied.
- ❑ Precut Rapidwall panels are lifted by crane onto the prepared concrete floor or foundation.
- ❑ Using Rapidwall lifting jaws, the precut Rapidwall panels are decanted, one by one, from the stillage and placed into their final position, propped and screwed together.
- ❑ Plumbing and electrical services are installed in the cavities and if required, concrete is poured or insulation inserted into the cavities.
- ❑ Post construction the Rapidwall panels are finished in a conventional manner.
- ❑ Each panel has an "A" and a "B" face (side). The smoother "A" face is installed internally whereas the "B" face is used externally.
- ❑ Externally renders or decorative facings can be added, whereas internally the panels are usually flushed and finished ready for primers and paint.

# 4

## PLANNING



*Preliminary discussions*



Efficiency in design, construction and cost savings are maximised by early assessment in the project planning stage when specifying Rapidwall panels.



*Comprehensive package of drawings*

It is essential that engineering and architectural consultants, the client and the Rapidwall supplier have preliminary discussions to ensure the building is designed for Rapidwall and is suitable for the specific project requirements in terms of structural adequacy, fire ratings, acoustic and thermal performance, cost and appearance.

Cutting and fabrication schedules are produced manually or computer generated to suit each project and can include window and door cut outs, insulation, cavity core-filling, panel end closure studs and top plate details.



*Rapidwall is cut in the factory, using a computer-controlled saw, to an accuracy of 5mm*

Effective pre-planning and fabrication at the factory can overcome expensive on site delays and provide fast track construction solutions. Should the need arise to cut and fabricate panels on site this can be easily achieved using conventional hand and power tools.

Window and door openings can be wholly or partially cut out at the factory to retain stability in transport. In this case, the final cut outs are completed on site after the installation of the panels.

Factory cutting of windows and doors will minimise on site labour costs.

At initial design stage and before panel delivery to site and erection, the following items should be reviewed and a site visit undertaken to confirm no issues will arise during on-site installation.

### Planning Checklist

- Site power and water.
- Terrain conditions.
- All weather access to site: roads for delivery trucks and crane.
- Obstructions to installation.
  - Overhead power or communication cables and underground services.
  - Building materials, overburden and Site buildings.
  - Shrubs, trees and overhanging branch restrictions.
- Location of Panel storage stillages or containers.
- Traffic control when unloading panels.
- Permits for Roads controlled by State Government, local council or the like.
- Any other structural restrictions.
- Permits from neighbours where necessary.
- Crane type, size and location.
- Delivery date confirmed.
- Long range weather forecast for the planned erection period: temperature, rain and wind

**NOTE:** Even though some buildings will be designed without full cavity concrete fill, it is recommended that the bottom 300mm of each cavity be filled with concrete.

The key to successfully installing Rapidwall quickly is the dimensional accuracy and level consistency of the slab. If the poured slab is not level packers will be required, extending installation time.

### Site visit Checklist

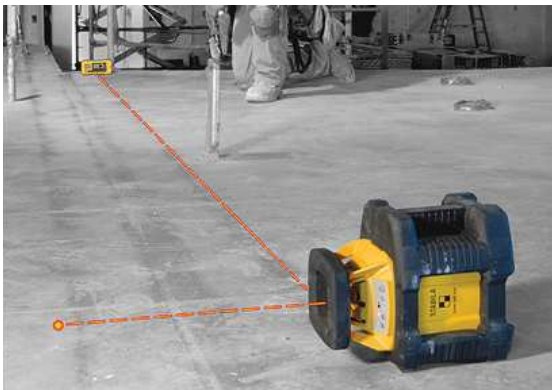
- Set out completed.
- Slab rectification works: complete and checked.
- Concrete substrate control sheet.
- Check the level of the concrete slab and determine and mark the highest point.
  - If packing is required it is helpful to do this the day prior to installation. Ensure that packing is positioned below the ribs and not the cell cavities.
- All reinforcement bars in place.
- Damp Proof Material (DPM)/ damp course/waterproofing in place.
- All necessary tools, equipment and installation consumables.
- Props, Lifting jaws and spreader bars delivered; quantity confirmed and checked.

### Documentation Checklist

- Safe work method statement.
- Material safety data sheets (MSDS) for all chemicals on site.
- Panel layout plan.
- Latest revisions of all required drawings, panel cutting list and site panel drawings.
- Building permits.
- Review weather forecasts.

# 5

## PRE PANEL INSTALLATION



Based on construction drawings the slab contractor should lay the floor slab to the exact dimensions and ensure the slab is level and has the correct rebates.

Checking the accuracy of the slab and rebate a few days prior to installation, will provide sufficient time for any remedial action to be taken.

Any level inaccuracies in the level of the slab and rebates can cause installation difficulties or prevent compressive contact between the bottom of the panel and the damp course. If not corrected this may result in failure of the damp course.

Level inaccuracies should be determined with a laser level. Any high or low spots should be marked so the builder can correct the slab heights with appropriate packing material. 4.5mm or 10mm cement sheet, or proprietary building wedges, are commonly used.

Panels must always be installed from the highest point and the lower points packed with appropriate packing material.

Panels must always be installed in an absolutely horizontal plane.

Should any major tolerance problems be evident, the slab contractor should be notified and rectification undertaken.

### Set out Wall locations with:

Mickey pins, chalked lines, crayon and/or marking pens.

In some situations it may be necessary to install an offset or recovery line, the position of which is established from either a grid line or a known fixed reference point. This will be necessary because of:

- Badly prepared rebate.
- Part of the structure prevents marking the true wall position.
- Adding a line for the positioning of the blocking timbers.
- General obstacles.

Accurately and clearly mark the location of doors and windows to prevent the installation and fixing of tie down or reinforcement bars (REO) at these positions.

Pay particular attention to the size and accuracy of the rebate required for the external Rapidwall walls as this is a critical element that needs careful and proper layout by the slab contractor when pouring the slab.



*Checking the accuracy of the slab*



*Prepare slab for panel installation*



*Reinforcement bars and damp proof course installed*



Before installation of panels the following items need to be fixed in the following order:

### Reinforcement bars

Great care needs to be taken in the positioning of reinforcement bars to ensure they are centrally located in all cavities after the panels are installed.

They can either be installed during the pouring of the slab or later, holes drilled in the slab after it has cured. In the latter case the bars are inserted into holes and secured with epoxy grout or in accordance with certifying engineers specification.

### Damp proof course and rebate waterproofing

All external walls require one of the following approved continuous damp proof courses installed before the panels are placed in position (refer to the manufacturers installation instructions and the building code of the country of installation).

- Liquid waterproof membrane.
- Polymer dampcourse min125mm wide.
- Aluminium bitumen dampcourse 125mm wide.
- Waterproofed mortar; used when slab is uneven. Recommended Product: Mapelastic. Excess mortar should be wiped or trowelled flush with the panel to give a smooth boundary.

In wet areas, a damp proof membrane, that extends at least 150mm above the floor level is required. See page 97.

Where Rapidwall is installed internally and except in wet areas, it does not require a damp course.

### Rapidwall panels

Install from the highest rebate point. Lift into position over the starter bars.

# TRANSPORTATION

Rapidwall panels are vertically loaded and can be transported on purpose built stillages or in open top shipping containers ready to be picked up by the appropriate transport vehicle.

To determine which type of transporter is best suited to your project refer to their properties and discuss with your Rapidwall representative when ordering panels.

Road traffic control management is a critical issue in the transport of Rapidwall panels.

Correct permits will be required as loads may be classified as “oversize” and therefore only permitted to be transported during certain hours.

Whether to transport using stillages or open top containers will largely depend upon the type of construction and the location. The most efficient type of transport to the site will be recommended by the Rapidwall transport manager after discussion with the site manager.

The use of a truck crane, for suitable projects, can provide the delivery and on site unloading of the panels into position without the use of a separate crane.



*Rapidwall packed for transport in open top container*

## Open top container

- ❑ An open top container is best suited for long trips greater than 500km.
- ❑ The container has a maximum capacity of 196 lineal metres or 520m<sup>2</sup> of panel.
- ❑ It is easier to carry small panels.
- ❑ Crane or side loader truck required for loading and unloading container.
- ❑ When removing a panel from the container the remaining panels may need retaining to avoid falling over.
- ❑ On multi-storey projects additional time in retrieving panels from ground level.
- ❑ Can't be moved easily.
- ❑ Maximum panel length for 40ft open top container is 11.53m

## Stillage

- ❑ A stillage is well suited to short trips.
- ❑ Stillages can transport up to 500m<sup>2</sup> of uncut panels on a single deck truck. On average 300m<sup>2</sup> of cut panel can be transported on the average drop deck truck.
- ❑ Small panels stacked horizontally in either 5 or 8 panel configuration.
- ❑ Panels can be damaged during transportation from overhead obstacles or tree branches.
- ❑ A fully loaded stillage is 4.5 tonnes.
- ❑ Holds either 5 or 8 average sized panels only.
- ❑ Can easily be placed on each working level of multi storey building.
- ❑ Smaller crane needed.
- ❑ Maximum panel length for a standard drop deck is 9.6m.





*Factory panel handling equipment*



*Loaded 5 panel stillage*



*Removing panel from stillage*



*Craning panel into position.*

## Handling

Lifting, loading and general handling of the Rapidwall panels can be achieved using conventional and affordable specialised systems.

Stillages can be lifted using forklifts, cranes and truck cranes.

Panels can be moved; unloaded and installed using the equipment previously outlined and with specially built Rapidwall lifting jaws.

For larger projects a special set of hydraulic lifting jaws can greatly increase the installation rate.

It is also possible to install smaller panels manually or by using specially built trolleys, hand trucks and hand frames. Rapidwall weighs approximately 44kg per m<sup>2</sup> and while this is much lighter than concrete panels, it is advisable to carry out a risk assessment prior to manually handling of any panels.

A minimum three people, including the crane operator, can erect Rapidwall however, a team of five, including the crane operator, is the optimum number of personnel for an effective installation rate.

In both cases it is advisable that one of the installation crew has rigging qualifications or experience and this may be a prerequisite on some sites. Rigging experience will help expedite the installation of the panels and reduce costs.

The recommended minimum skills base is that of a carpenter, leading hand and two skilled labourers. Of course, more highly skilled people will not disadvantage the process.

# 7

## LIFTING, POSITIONING AND PROPS



*Multi-storey building using tower crane*



*Lifting jaws being lowered into position*



*Panel being removed from stillage*



*Panel being lifted into position*

When lifting a Rapidwall panel it is extremely important to always have control of the panel. This is especially so when lifting overhead with a crane as the mass and the large surface area can act like a sail.

An uncontrolled panel has the potential to cause serious personal injury or property damage.

During the lifting process no-one should be allowed to: stand under, reach under, or pass objects under the panel.

It is the responsibility of the erection crew to ensure they are aware of and apply all current practices relating to occupational health and safety in the state or country in which they are operating.

Care should be taken to ensure that anyone involved in inserting a lifting jaw into a panel be prevented from falling.

Specific working heights are legislated and operators must make themselves aware of the requirements and comply with the control measures used to manage risk.



*Lifting jaw showing clamping method*

## LIFTING SAFETY CHECK LIST:

- ❑ A travel restraint system prevents a person from falling and must:
  - Not allow a free fall either from an edge or through the work surface.
  - Anchorage point with a capacity to withstand load exerted in normal operation.
  - Only be used by a person trained in the safe and correct use of the system.
  - Not to be used if a component of the system shows evidence of wear or weakness to an extent that may affect the system's safety.
  
- ❑ A fall arrest system consisting of harnesses or ladder belts attached by lanyards to a suitable anchor point must have each anchorage point:
  - Engineer designed, inspected and approved by a competent person before being used.
  - Capacity of 12kN to 15kN if only 1 person is using the anchorage point and the person could have a free fall.
  - Capacity of 21kN if 2 people are using the anchorage point.
  - Each anchorage point located so that the person using the system can attach a lanyard without the risk of falling.
  - Use an energy absorber to limit the force applied to a person when falling to not more than 6kN.
  - Sufficient free fall distance taking into consideration:
    - Person's height.
    - Height and position of the anchorage point.
    - Length of the lanyard.
    - Slack in the static line.
    - Stretching of the lanyard or static line when extended by a fall.
    - Length of the energy absorber when extended by a fall.
    - Other relevant factors.
  - Have no part of the system contacting anything affecting the safe use of the system.
  - Only be used by a person trained in the safe and correct use of the system.
  - Written safe rescue procedures.
  - Inspection by a competent person at least every 6 months (written records to be kept).
  - Not be used after a fall unless its manufacturer or a competent person has inspected it and decided that it is fit for safe use.
  - Not be used by a person working alone.
  - In every case, the relevant people carrying out work must:
    - Prevent a fall.
    - Or if prevention is not possible.
    - Arrest the fall and minimise the risk of injury from the arrest of the fall.



## LIFTING JAWS



*Lifting jaws set up on spreader bar*



*Single jaw lift of small panel*



*Double lifting jaw lift of large panel*

Purpose designed Rapidwall Lifting Jaws enable rapid and safe lifting of the panels into position.

The minimum requirement for a construction site is two sets of Lifting Jaws and a rated commercially available adjustable Spreader Bar.

The lifting jaws fit within the top cavity core of the panel and lock into the vertical and side ribs.

It is imperative that the jaws be placed as close to the centre of gravity as possible and equidistant apart. This will allow the panel to remain as level as possible during lifting and provide the greatest control which in turn, will speed up the placement and therefore the installation process.

Once located within the panel in the correct place, the jaws are tightened, compressing the rib. Levers on the lifting jaws are then pushed down, piercing the alternate ribs and thereby providing an extra safety margin when lifting.

The maximum allowable panel length to be lifted with a single lifting jaw is 4 m.

For panels longer than 4 metres 2 jaws, combined with a spreader bar, are to be used.

The spreader bar is essential to avoid lateral strain being imposed on the panel web. Lateral strain may weaken the panel and result in catastrophic failure, potentially allowing the panel to fall away from the lifting jaws during the lift (see caution note below).

The jaws therefore need to drop perpendicularly from the spreader bar and be aligned as near as possible to the centre of gravity of the panel.

### **CAUTION:**

Caution must be exercised at all times when a panel is being lifted. No person is to stand underneath a lifted panel. All non-essential personnel are to remain clear.

Never remove or loosen the lifting jaws until the panel is securely propped.

No person who has not read and acknowledged the Work Instruction for the use of Rapidwall Lifting Jaws should operate this equipment. The Work Instruction is available from: [www.rapidwall.com.au](http://www.rapidwall.com.au)

## LIFTING PROCEDURE:

- ❑ Jaws are cleaned and free of plaster or foreign bodies.
- ❑ Central jaw and outer pin arms can move freely.
- ❑ Grease the thread section of the clamp.
- ❑ Inspect the arms and pins for any sign of cracking or yielding.

Do not use the lifting jaws if they are damaged.

- ❑ Make sure that the jaws are securely fitted to the spreader bar and are spaced exactly at 250mm intervals (a minimum distance of 1,250mm apart).
- ❑ Jaws to be placed at equal distances from central lifting point.
- ❑ Re-check the stillage is stable and all stabilizing legs are in place.
- ❑ Check the wind speed is low enough for a safe lift; below 25km/h is recommended.
- ❑ Insert the first jaw as close as possible to the centre of balance and equally space the rest of the jaws. Note that the centre of balance may not be the centre of the panel due to voids cut into the panel.
- ❑ Tighten the jaw firmly using a ratchet with a 21mm socket. Ensure that the jaw is tightened in a clockwise direction. The thread is to be tightened to a torque of 50lb/ft or 68Nm to give the recommended clamp load.

### IMPORTANT:

If the Rapidwall Jaws do not tighten in a clockwise direction do not use and return to the manufacturer.

- ❑ Push down the handles on both sides of the central jaw, one at a time. This action engages a secondary safety pin into the ribs on each side of the cavity.

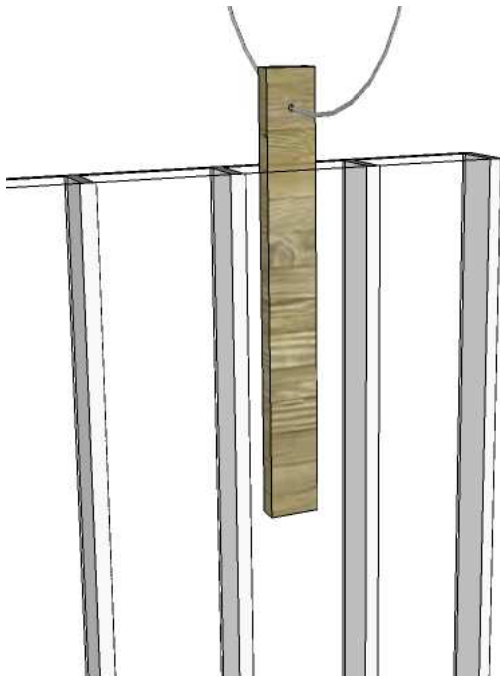
**Note:** handles should be horizontal when pins are fully engaged.

- ❑ The panel is only ready for lifting when all Jaws are tightened and the two secondary safety pins engaged as previously described.
- ❑ Avoid jerking movements when lifting.
- ❑ Avoid lifting panels that are jammed tightly in containers and or stillages.
- ❑ Panels can be controlled by hand from the ground when the panel is at a manageable height.
- ❑ The Dogman and Crane operator undertaking the lifting operation should determine if a panel dog and/or safety slings and ropes are required for controlling the panel during lifting or lowering into position.
- ❑ A safety sling can be placed around or through the panel at each end of the spreader bar and a rope secured to one or both ends of the panel to stop the panel swinging.
- ❑ For high lifts into multi storey buildings, it is advisable to use a panel dog safety system.
- ❑ Once the panel is in place, secure using props.
- ❑ Once the props are in place and secured, loosen the central jaws by turning the ratchet in the reverse direction to the tightening motion (anti-clockwise). Then lift both outer jaw handles to disengage the pins from the rib. After this the jaws can be carefully lifted out of the panel.
- ❑ If not required for another lift the moving parts should be lubricated and the lifting equipment stored in a clean, dry place.

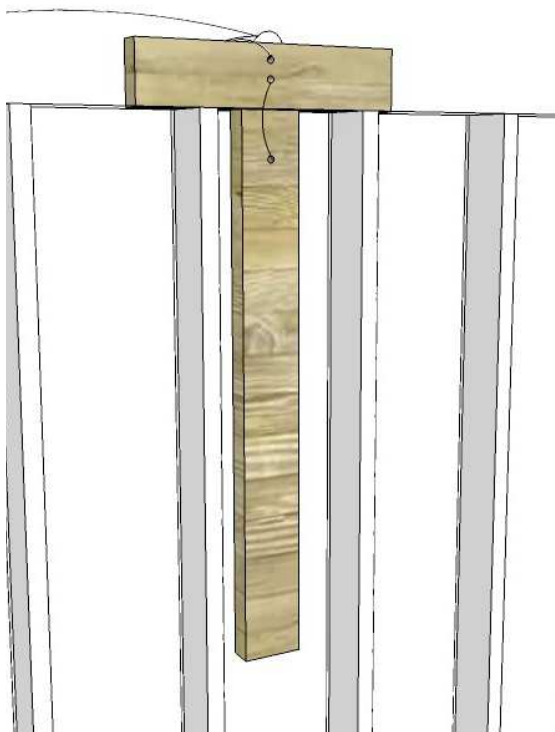
### IMPORTANT:

A panel must never be lifted twice on the same rib. If the panel needs to be lifted again change the spacing of the jaws on the spreader bar. Use a rib that does not have any marks of a previous lift.

## PANEL DOG SYSTEM



T1 diagram



T2 diagram

A Panel Dog System is a panel mechanism for controlling the panel during lifting or lowering into position.

Dogs are made from either metal or timber. A welded metal section SHS is inserted over the panel and is more versatile and easier to use than a timber dog. If a timber dog is used it is inserted into the panel cavity.

The dogs have a fixing point where a 12mm thick long rope is attached. The rope allows a person standing on the ground holding the rope to have some control over the panel and prevent it from spinning in a slight breeze.

The rope should also be tied back to a rigid fixing point either the container side or the stillage frame.

Panel Dogs offer a more direct restraining force onto the panel than using simple slings and ropes. Panel Dogs are recommended for use in Multistorey builds and in adverse conditions.

The use and design of 'dogs' should be included in any safe work method statement or similar risk management document for the site.

### Timber Dogs

The timber dog fits within the panel cavity. Type T1 has the risk of falling through the panel and striking someone standing or walking below, however type T2 prevents this happening.

The two designs can be made simply on-site by using 90 x 35mm framing timber.

#### Type T1

- ❑ One piece of timber 600 – 800mm long with a hole drilled into one end of the timber for the rope to be attached to.

#### Type T2

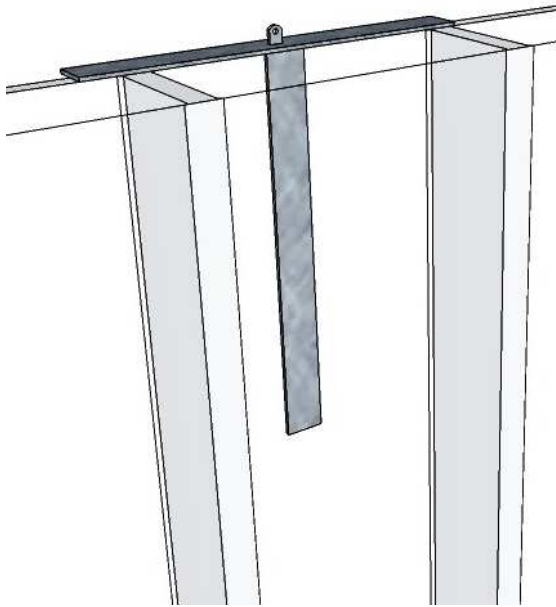
- ❑ Two pieces fixed to form a 'T' shape.
- ❑ 'A', 600 - 800mm long.
- ❑ 'B' approx 400mm long.
- ❑ Drill three holes to allow the rope to pass through both sections.
- ❑ Tie the rope on top of the 'T' and to the centre of the 'T'.

## Metal Dogs

The metal dog straddles the web of a cavity approximately the 2nd or 3rd cell in from one end of the panel.

This means that the metal dog can be inserted without fear that it could fall through; safer than the timber dog T1.

Type M2 distributes the panel weight over a larger area and avoids point loading. This would be more suited when there is a need to hold back several panels for example when selecting a panel from the centre of a container or stillage and they are not sitting exactly level.



M1 diagram

## Fabrication

Some off-site fabrication may be required due to the sections requiring welding.

The dog has three sections welded together and also requires a top central fixing point for a rope or chain: Weld a fixing point or lug to the top of 'A' for either a chain or a rope to be attached. A permanent rope/chain has limitations.

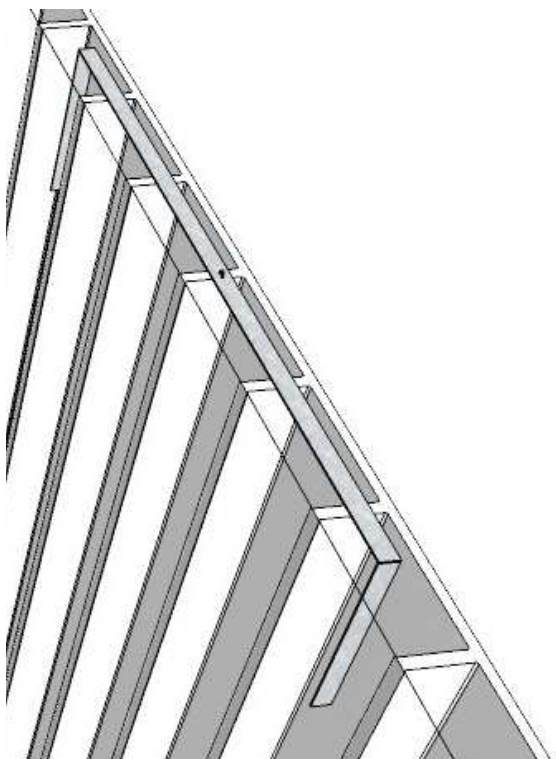
Ensure all tolerances are maintained and the following pieces are fixed at right angles.

### Type M1

- ❑ 'A' approx 300mm long (horizontal part).
- ❑ 'B' & 'C' approx 400mm long (vertical parts) located at centre of piece 'A', fixed 30mm apart.

### Type M2

- ❑ 'A' a horizontal top section, approx 1250mm long.
- ❑ 'B' & 'C' approx 400mm long (vertical parts) attached at either end of part 'A' perpendicular to it.



M2 diagram

## UNDER PANEL SPREADER BAR



*Sequence of photographs showing lifting of roof panel into position with under panel spreader bar*

A spreader bar is used as the additional support when lifting panels to distribute the weight of the panel over a wider area. It minimises the bending action of the panel and significantly reduces the risk of the panel breaking. The bar needs to be rigid enough to withstand the forces exerted on it by the panel.

The selection of the spreader bar should be included in any safe work method statement or similar risk management document for the site.

### Materials for spreader bars:

- ❑ Structural grade timber, laminated veneer lumber (LVL) or natural milled lumber.
- ❑ A square hollow steel section (SHS).

### Timber Spreader Bar

Favoured of the two options, LVL is rigid and light weight compared with an equivalent steel section.

- ❑ Panels less than 9 metres in length: 4m x 170mm x 63mm.
- ❑ Panels greater than 9 metres in length: 8m x 170mm x 63mm.

### Metal Spreader Bar

More durable but considerably heavier than an equivalent LVL Spreader Bar and may require two people to lift it into place.

- ❑ Minimum SHS section: 4m x 100mm x 100 mm x 2mm.

### Spreader bar and panel sizes

- ❑ 4 metre max panel length to have one 4 metre spreader bar with a single lifting point centred over the slinging point.
- ❑ 4 to 9 metre long panels to have two 4 metre spreader bars with two lifting sling points, each lifting bar centred over the respective slinging point.
- ❑ 9 to 12 metre long panels to have an 8 metre spreader bar equidistant between two sling points.



## SOFT SLING LIFTING

Used for lifting Rapidfloor into place.

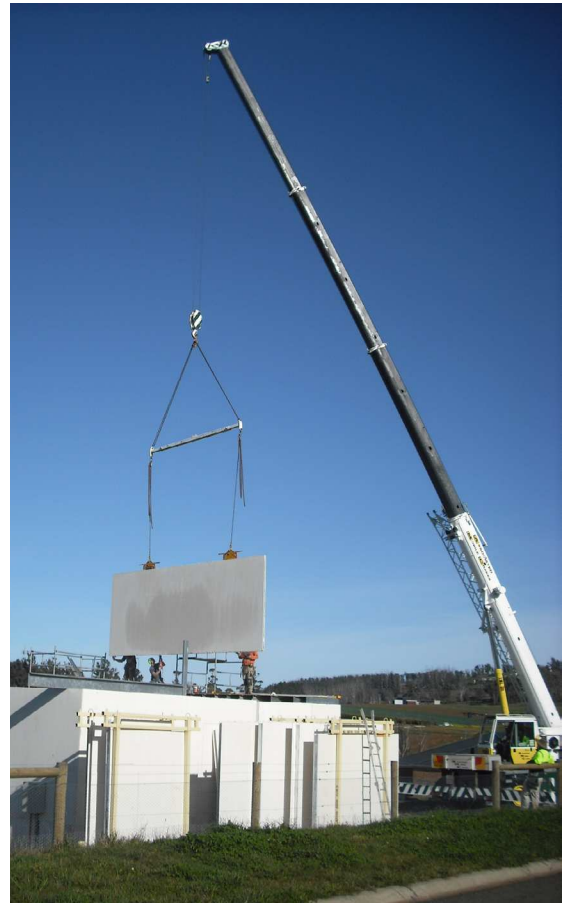
- ❑ Lift Rapidwall panel out of the container or stillage using standard practice.
- ❑ Lower panel into an empty stillage. This will serve as a cradle for the panel whilst it is being worked on for its second stage of the lift. The stillage has a suitable base and requires no additional support.
- ❑ If no empty stillage is available lean the panel gently against a container at an angle of approximately 80 – 85°. The base must also be kept off the ground using suitable material (timber or the like) to keep it clean and to protect the base from damage or moisture absorption.
- ❑ Using either the timber or metal dogs, secure the top of the panel to a secure point i.e. the top of the stillage or container.
- ❑ Once the panel is secured find the centre point of the panel.
- ❑ Small panel centre point: On the 'B' face use a chalk- line to mark the centre from opposite corners of the panel. Mark the point at the top and bottom of the panel.
- ❑ Larger panels requiring two lifting points: Mark centre point as described above. From the centre point repeat the process on each half of the panel. This will give two centre points approximately 1/3rd in from either end of the panel. If the floor panel has sections removed, calculate centres by surface area.
- ❑ The accuracy of the centre point will determine how balanced the panel will be during lifting.
- ❑ When lifting ensure no person is under the panel and follow all appropriate workplace safety practices.
- ❑ Hold the spreader in position, with the narrow face against the panel and slowly raise the crane. Guide the sling and the spreader bar for correct position ensuring fingers, hands and other body parts are kept clear.
- ❑ Start to slowly lift the panel from the stillage.
- ❑ As the panel is lifted it will level into a horizontal plane once it is free from the stillage.
- ❑ Using the dog, previously inserted, run the rope down the 'B' face of the panel. As the panel is raised apply minimal resistance to the pivoting of the panel to avoid damage to the 'A' face coming into contact with the top of the stillage or container.
- ❑ Correct use of the dog will stop the panel from spinning and assist with the correct orientation for placement.
- ❑ Move the panel to its final resting position and lower it to a height where it can be held and controlled comfortably by two people.
- ❑ Remove the dog and any other obstructions.
- ❑ Lower the panel and guide it into position ensuring correct bearing on the walls.
- ❑ Once the crane has allowed the panel to rest on the supports check the position of the panel in relation to walls. In multi storey construction the panel will sit on the inner skin of the upright wall panels and later, when the beams are poured, will be tied together with formwork and concrete, in one continuous beam.
- ❑ Check measure the distances between any subsequent floor panels allowing for appropriate tolerances.
- ❑ When satisfied completely lower the panel. Once propped this will allow for the removal of the spreader bar and soft slings.

## SOFT SLING LIFTING Cont.

When working with a soft sling, additional items that will be required are a spreader bar, hole saw that will fully penetrate the panel thickness and two soft slings appropriately rated for the task at hand.

### Hole positions

- ❑ At the intersection point of where the chalked lines have been marked on the panel. Core a hole completely through the panel using the hole saw this hole will allow the soft sling to pass through the panel.
- ❑ Keep the cut-outs as they will be used for repairing the holes later.
- ❑ The hole should be just big enough for the sling to pass through without being oversized.
- ❑ Attach slings to crane.
- ❑ Minimum safe soft sling lifting capacity is 2.5 tonnes.
- ❑ Lower the slings so they pass easily through each hole made in the panel.
- ❑ The loop at the bottom of the sling, that passes through the panel, will allow the spreader to pass through it.
- ❑ Mark the mid-point of the spreader and slide through the loop of the sling until the sling is at mid point of the bar.
- ❑ Place a metal or timber dog into the panel prior to lifting.
- ❑ Ensure, before the crane takes the weight of the panel, it is no longer secured to the container or stillage.



*Spreader bar used with Jaws to lift large panel into position*

### 'Whale' board used for positioning panels

When setting out the panel location prior to positioning the panels 'whale' boards can be installed to help guide panels into position.

On the outer walls the rebate's inner edge helps align the panel, but it is recommended that 'vertical whale' boards made from 45x90mm framing pine approximately 400mm long are temporarily attached every 2 to 3 metres along the outer edge of the slab with concrete anchor style screws.

On inner walls horizontal whale boards can also be applied to the surface, again using pine framing timber. These are temporarily fixed along the layout lines using concrete nails manually or explosively driven.

## POSITIONING PANELS

Using either a crane, forklift with lifting boom and or a crane-truck, the pre-cut panels are lowered or placed into position either in the rebate for external walls or internally on the slab by lowering them over the already installed starter bars.

It should be noted that while rebates are recommended for external walls, Rapidwall can be installed externally without rebates provided recommended waterproofing methods are used. See Section 23 Waterproofing.

If a crane is to be used it is advisable to start at the farthest point of the building to avoid reach issues and or weight concerns. This aspect of installing the panels should be considered and discussed prior to the shop drawings for the project being prepared.

If, for whatever reason, an alternative plan needs to be considered due to inadequacies of the lifting equipment, consult with the builder and crane operator well in advance of starting the erection of panels. It is imperative never to work beyond the limits of the equipment that you have on-site. Never let the project programme effect good judgement and safe working practices that ensure the safety of all on-site.

Once the starting position has been agreed a corner should be installed first. Start with the longest panel of the corner, for example, panel number 1 (P1) and prop it in accordance with the instructions under Props and Propping. The next panel, P2, should then be installed and propped to complete the corner and provide a stable reference point to ensure the accuracy of the building.

Panels P1 and P2 need to be securely screwed before prop removal should be considered.

Once the first corner is in place it is important to check the external line of the building in relation to the set out. This is critical especially if a long wall that consists of several panels is to be installed.

Set up a string line along the length of the external wall and ensure that the entire wall is straight. In the same process you should always ensure that the panels are level, plumb and square to each other.

All panels must be temporarily supported



*Whale boards positioned to assist panel placement with external concrete fill supports*



*Lowering panel into position over starter bars and waterproof membrane*

during installation using approved props that have the correct load ratings. Generally a minimum of two props per panel are required.

## PROPS



*Panel being propped*



*Props on-site*



*Top of prop with pivoting bracket*

The use of a simple propping system allows the wall panels to be installed in an efficient and safe manner.

The basic prop consists of a square hollow section (SHS) tube around 2850mm long with a coarse acme thread or square thread rod that would extend approximately 300mm secured into SHS.

The bottom has a pivoting base that allows for an approved concrete fastener. It should move freely and without resistance of any kind.

The top, has a pivoting gimballed support bracket with a hole to take a 10mm galvanized bolt to secure the prop head to the panel face.

The bottom of the prop has the acme thread with a pivoting base that allows for an approved concrete fastener. Generally the bottom of the prop has a rating tag.

Concrete fasteners must have a minimum Tensile and Shear Capacity of 5kN.

It is recommended that an Ankascrew™ or similar be used to restrain the bottom of the prop to the slab.

Ankascrew™ M10 is recommended as it provides an added safety margin however an Ankascrew™ M8 can be used. An effective depth of 60mm into concrete at 25mpa, will suffice.

These fasteners are quick to install and to remove and there are no remaining parts left in the slab or above the finished floor level (FFL).

### **Important:**

Props should be located in accordance with the Engineers instructions and the Prop Location Guide. Location depends on wall lengths, heights and internal bracing.

At no time must an unsupported panel be left without props attached. Never remove or loosen the lifting jaws until the panel is propped securely.

## PROPPING

- ❑ Position the top support bracket first. The top plate must be a minimum of 400mm down from the top of the panel and no lower than 2100mm up from the slab.
- ❑ Place props at a maximum spacing of 2.7m.
- ❑ Maximum distance from last prop to the panel end is 1.3m.
- ❑ Maximum un-propped length of panel between cross walls and/or corner connections is 4m.



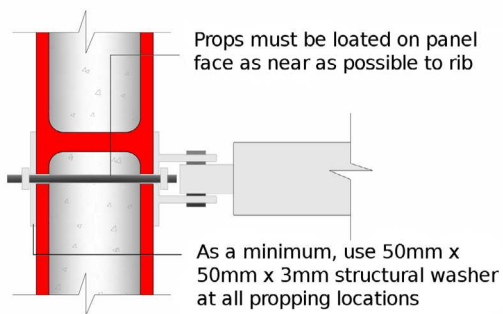
*Props in position, note 'whale' boards also installed to assist in positioning panel*

Building storey height	Max O/Hang m	Max Prop Spacing m
1-3	1.3	2.7
4-6	1.2	2.3
7-9	1.1	2.1
10-15	1.0	2.0

### To install:

- ❑ Ensure the panel is positioned and bearing fully on the slab/ packers.
- ❑ Mark the position of the hole next to or through a rib. Ensure that the prop can be sufficiently tightened without potentially fracturing the panel.
- ❑ Drill a 10mm hole completely through the panel. Ensure the hole is not "oversized".
- ❑ Position the top of the prop against the wall with the fastening aligned with the hole. On the opposite side of the panel place a square structural washer or similar, minimum 50mm x 50mm square x 3mm thick, insert 10mm bolt or threaded rod through the hole.
- ❑ Check the panel is in position and secure the prop with a bolt but do not over tighten.
- ❑ Adjust the panel to plumb horizontally and vertically.
- ❑ Mark the base hole position and drill the hole into the slab.
- ❑ Insert the Ankascrew™ into the prop base and tighten with a rattle gun.
- ❑ Remove the lifting jaws in the correct manner and check panel is plumb. When correct, lock the props into position and move onto the next panel.

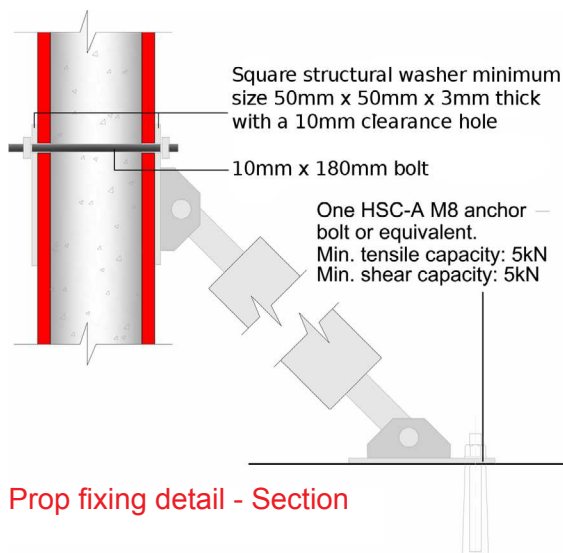
## PROPPING



Preferably leave the props installed as long as possible and especially where an upper storey is to be installed using the Rapidfloor method.

It is possible to gradually remove all propping at the completion of the last wall panel. This reduces greatly the number of props required for a project and saves time in the recovery of the propping system at a later date.

### Prop fixing detail - Plan



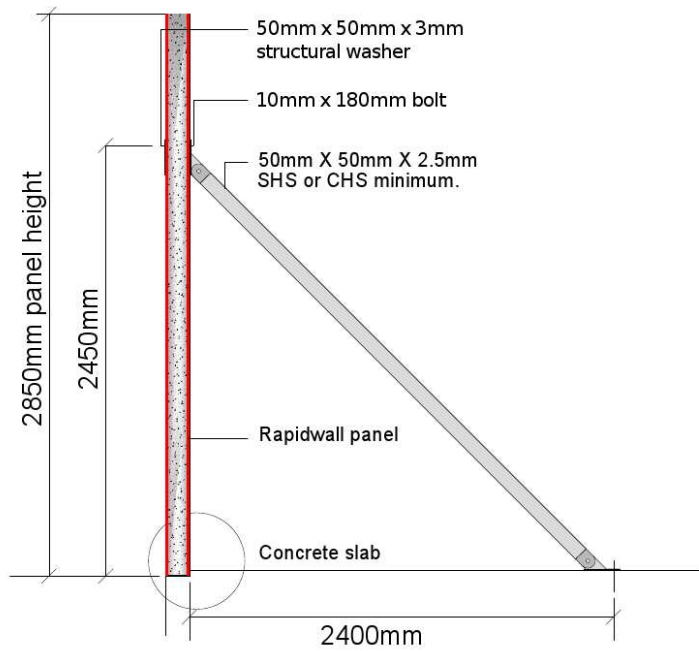
**Important Note:** If changes are required such as an additional roof structure, floor slab above or structural steel to be added refer to the appropriate drawings and consultants prior to the removal of props.

**CAUTION:** If the wall panels are not concrete filled and or propped it is possible to shunt the wall panel out of position when the floor panel is lowered into position.

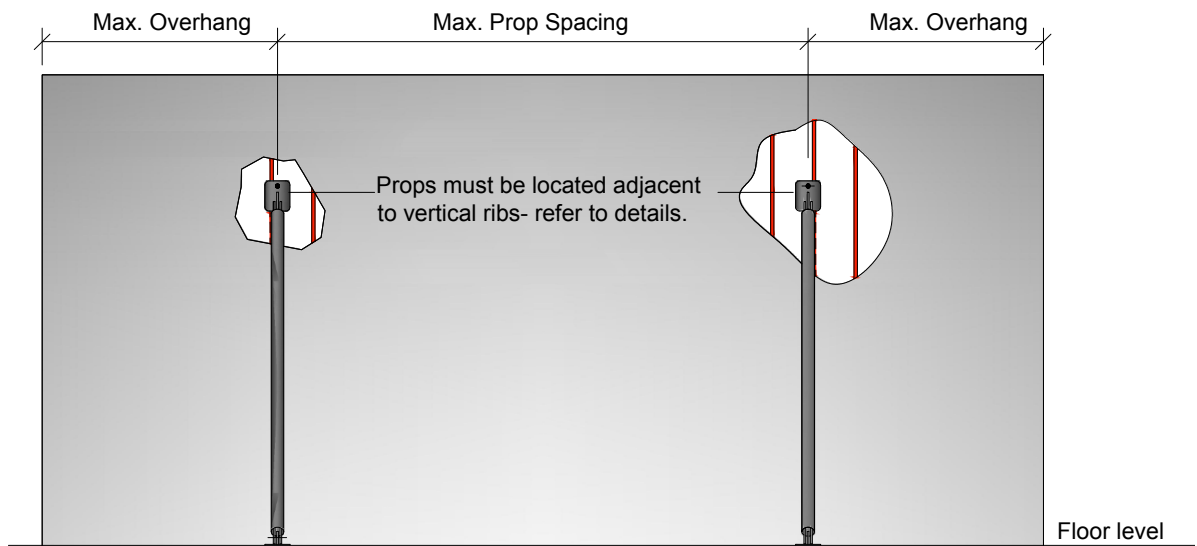
Once the panels are full or partially filled with concrete the structure is in a rigid state and will not move without extreme forces being exerted on it.

### Prop fixing detail - Section

In every case use extreme care and apply appropriate safety procedures when removing props.



Typical Propping detail - Section



Typical Propping detail - Elevation

# RAPIDWALL INSTALLATION

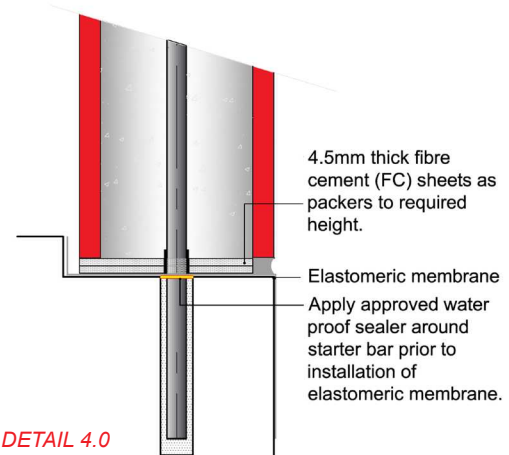
## PACKERS

Due to differing standards, the concrete slab may vary in height making it difficult to place or align the Rapidwall panels. In which case packers are required.

Ideally and to speed up panel installation, packers should be glued to the slab at the correct height the day prior to installation in positions that ensure, wherever placed, they are under a rib section.

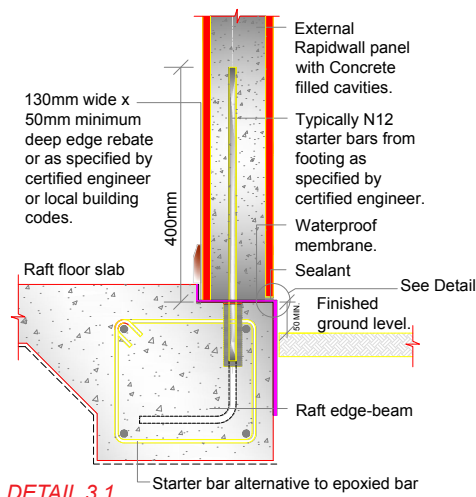
Before the panels are installed follow the following guidelines:

- ❑ Establish a height profile using a self levelling laser. (Hilti Type PR25 is recommended).
- ❑ Determine and mark out a zero level.
- ❑ Provide installer with the measured levels so size of packers can be calculated.
- ❑ Installation should always start from the highest point on the concrete slab.
- ❑ Use 4.5mm or 10mm thick fibre cement (FC) sheets as packers. This type of packing provides a stable base that will not crush under the weight of the panel and unlike timber, will not rot and therefore does not need to be removed, even after core-fill.
- ❑ Packers to be cut to approximately 120 x 50 mm to provide ease of use and be wide enough to support the panel web and be placed under the rib section. If wider than the panel size the packers will need to be trimmed after the panel is installed in order not to interfere with later finishing.
- ❑ Place packers so that the resting panel is left plumb and level either on the slab or in the rebate of the slab.
- ❑ Panel junctions need a packer placed at the junction to provide the correct height alignment of the two panels.
- ❑ **Note:** Packers are only to be placed under the rib section and not the skin.



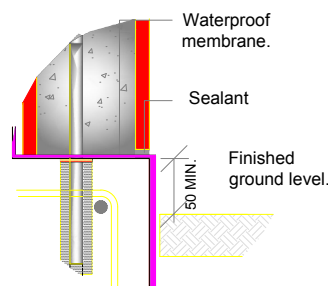
DETAIL 4.0

Packer detail - Section



DETAIL 3.1

External Wall to Footing detail - Section





## TOOLS

Rapidwall can be sawn, drilled, screwed and nailed with commonly used carpentry tools.

Cutting panels to size is usually undertaken at the factory but if necessary, can be cut using conventional woodworking hand or power tools.

Secondary fabrication, such as timber or steel closure studs; top plates; window and door cut outs and first and second fixing can all be achieved using conventional tools and a range of fixing systems.

### □ Hand Tools

Timber or plasterboard hand saw; hole saw; rasp; trimming knife and hand sanding floats.

### □ Power Tools

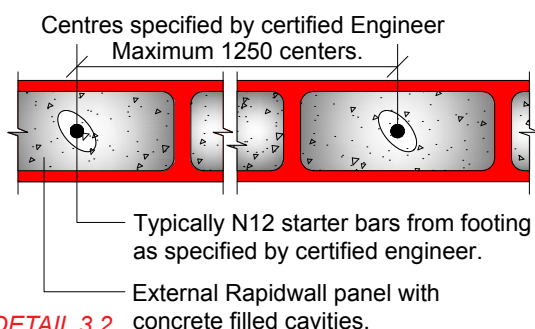
Circular saw, reciprocating saw, chainsaw, jigsaw, power sander and angle grinder using appropriate blades.

When using either hand or power tools usual safety precautions need to be taken and the manufacturers' recommendations applied.

## REINFORCEMENT BARS

The Engineering drawings will specify where Reinforcement bars (tie down and lateral location supports) are required for exterior and interior walls.

When required, the tie down (deformed or threaded bar) is first secured to the slab using either appropriate masonry anchors or by using an approved chemical bonding system after the concrete has been poured and sufficiently cured.



DETAIL 3.2

### Reinforcement bar setting out - Plan

### Non fill cavity

- Use Threaded rods, also referred to as "all thread" or "booker rod".
- The rods must be continuous. Align and lower the panel in close proximity to its final position.
- Pass the rod through the panel cavity at the designated locations and secure to the slab by the Engineer approved method.
- Once rods are secure, lower the panel into its final position.

### Full or partially filled with concrete

- Insert starter bars, which are typically 10 and 12mm in diameter (N10-N12) and 600mm long. These are generally placed at 1000-1250mm centres, ideally in the centre to the cell.
- When a threaded rod is required any approved method, either chemical or mechanical fixing, may be used.
- When using the deformed bar method, the starter bars can be installed the day prior to the panel installation and the tie down connected at the top and bottom of the panel.

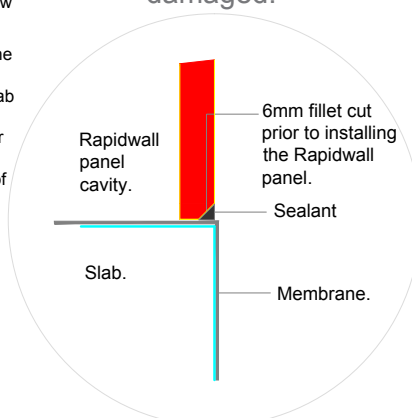
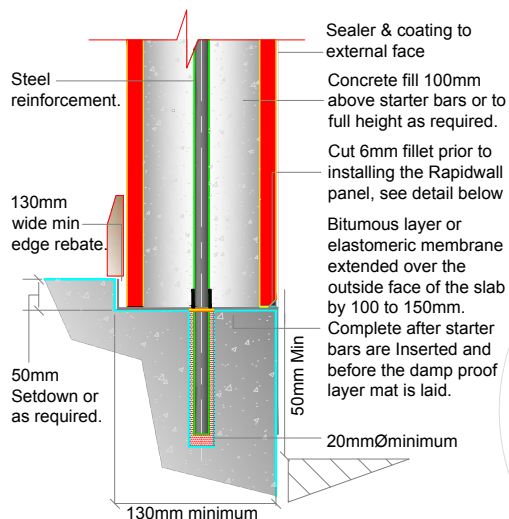
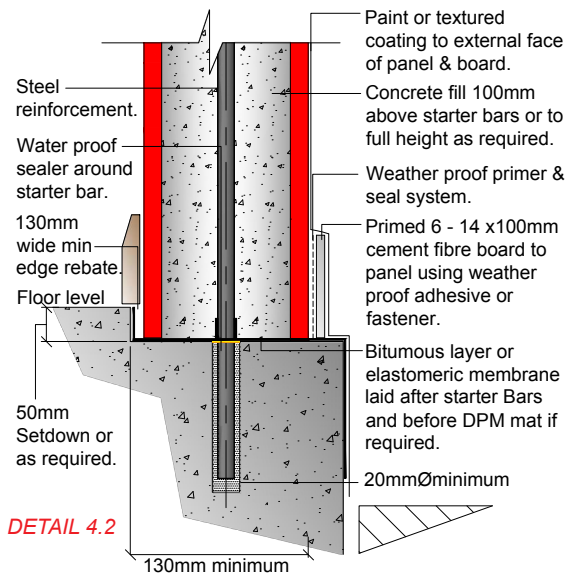
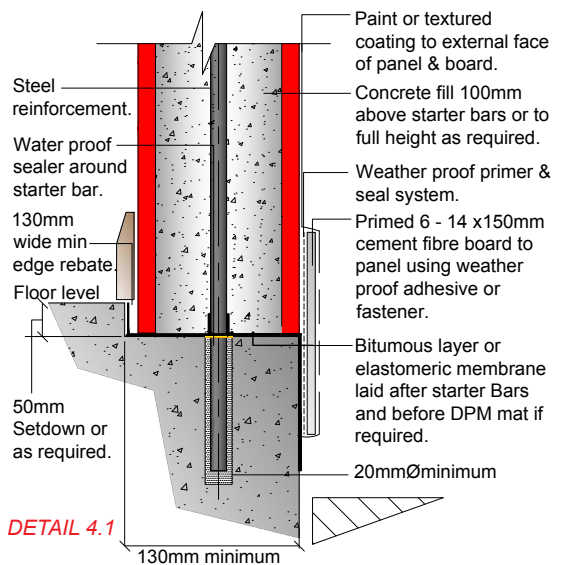
### Concrete filled Rapidwall

- Reinforcing steel starter rods either inserted into the concrete slab during pouring or drilled and chemically fixed into the slab prior to locating the panels.
- It is often easier to locate the walls with the aid of whale board, running along the outsides of the walls, rather than using keeper blocks.
- **Note:** Do not install timber blocks into base of panel.

### Door openings or corners

- Fill adjacent cavities with concrete.

## External Wall to Footing details



Three methods of installing external Rapidwall to footings are shown.

In method 1 and 3, the external panel finishes flush with the outside face of the footing. In method 2 the footing extends beyond the outside face of the panel.

Regardless of which method is chosen, particular care must be taken to ensure weather proofing is properly applied and remains intact after installation of panels is completed.

### Method One

After panel is positioned, prime the face of the panel to a height of 120mm. Then affix a primed 6 to 14mm x 150mm cement fibre board to the outer face of the panel and over the joint of the footing using weather proof adhesive or fasteners. Once in place apply weather proof seal along the top of the cement sheet prior to priming, painting or applying texture coat or other finishes.

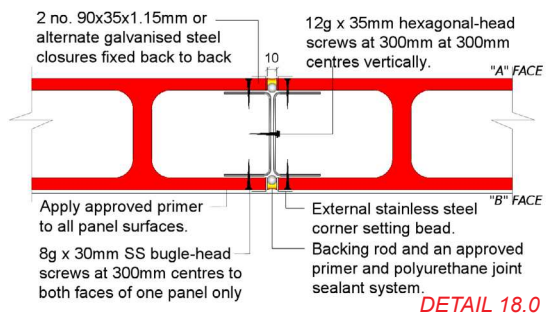
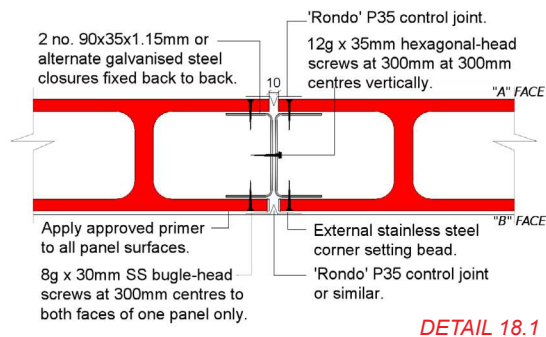
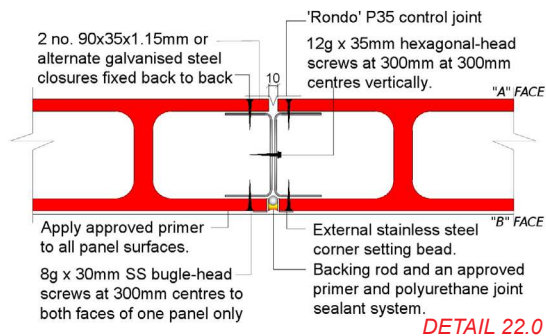
### Method Two

After panel is positioned, prime and weather proof the face of the panel to a height of 120mm. Then affix a primed 6 to 14mm x 100mm cement fibre board to the outer face of the panel along the footing using weather proof adhesive or fasteners. Once in place apply weather proof seal along the top of the cement sheet prior to priming, painting or applying texture coat or other finishes.

### Method Three

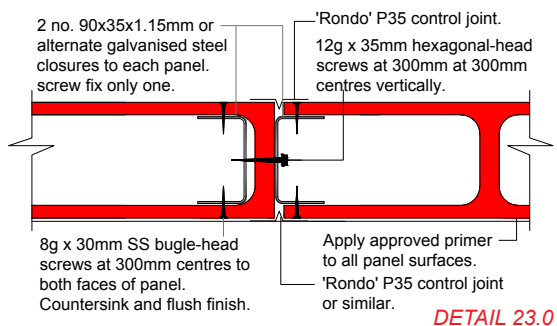
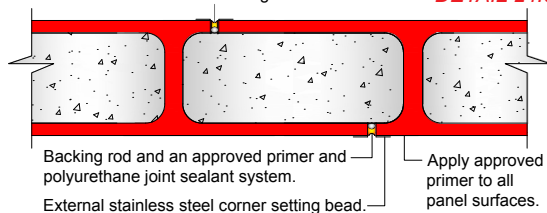
Grind a 6mm fillet off the bottom of the external face of the panel prior to installation. This can be done just prior to the panel being lowered into its final position. Once in place on the footing the fillet is filled with approved sealant. If using this method ensure the footing is flat and the bottom of the panel has not been damaged.

## Control Joint details



Note:- Joints must be in the same cavity but need not be opposite  
Expansion joint spacings to be as per engineers specification

Using twin cutting blades cut a 6mm joint in both faces after concrete filling has set 24 hours. **DETAIL 24.0**

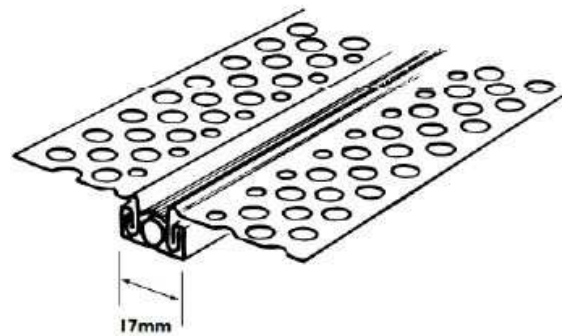


The position of a control joint is determined by the engineer during the design phase of the construction and after referencing the design guidelines found at [www.rapidwall.com.au](http://www.rapidwall.com.au)

It should be noted that Rapidwall is not a masonry wall by definition and hence should not be compared to regulations dealing with conventional brick and mortar walls.

To hide their presence and where possible, panel joints should be positioned so they are behind abutted walls.

The control joint for an interior wall surface is best finished using a proprietary control joint such as a 'Rondo P35' or similar.



The joint requires a 17mm gap between the Rapidwall faces as a minimum, the gap cannot exceed 20mm.

The joint needs to be fastened every 150mm.

Apply setting compounds over the beads and finish normally. Once dry remove the protective tape.

An alternate exterior wall control joint can be constructed by placing stainless steel or plastic external beads on each face of the panels to be joined. Ensure at least a 17mm gap.

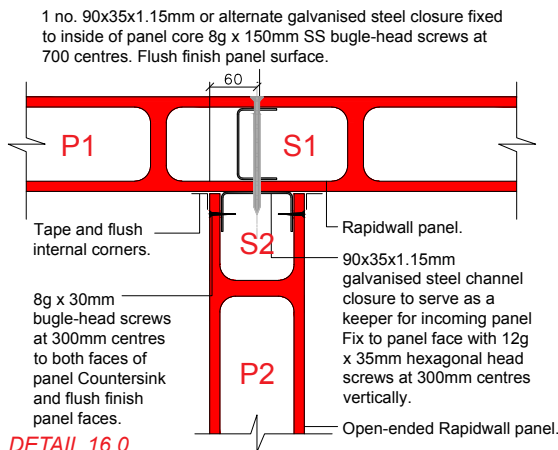
A backing rod of foam or polyethylene is inserted into the gap. The area is primed and left to dry. It is then caulked with suitable polyurethane sealant such as Sikaflex Pro.

The illustrations on the left highlight the various elements that form the control joints.

If a control joint is required at a T-junction please refer to Construction Details in the Downloads section of [www.rapidwall.com.au](http://www.rapidwall.com.au).

# JUNCTIONS

## Stud method



**DETAIL 16.0**  
T-Junction details - Plan

In this example panel P1 is assumed to have been installed in accordance standard panel installation. An extra metal stud S1 will be required for this junction type.

### T-Junction

Locate and mark position plumb lines on panel P1, to align with the correctly marked out lines that represent panel P2's position on the slab.

These two lines represent the outer finished faces of where the panel P2 is to be positioned.

Insert the extra stud S1 vertically into the cavity ensuring that it is centred between the two plumb lines. Secure with a few 8g x 30mm screws from the non-marked side.

Remove second panel from the container or stillage.

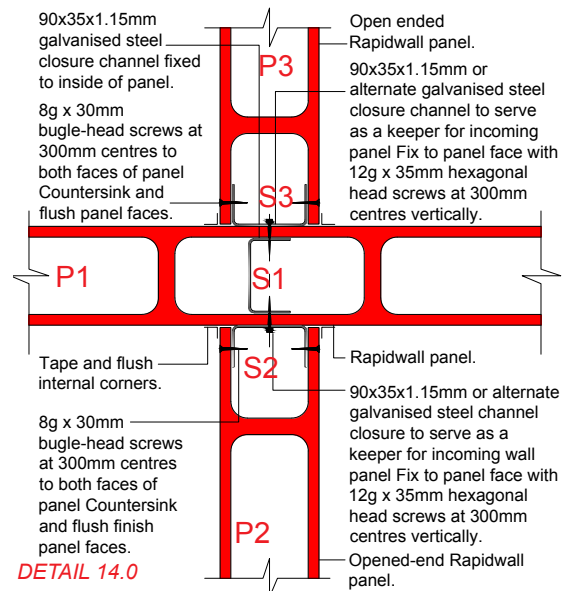
#### Method A

This panel will have a 'butt end' with a stud S2 fitted in its end.

Ensure the 'B' face is correctly orientated as per the layout drawing.

The 'B' face should be orientated to a wet area, when possible, as it will be covered by tiles.

Once the panel is located between the plumb lines, check levels and screw in place using 8g x 150mm bugle-head screws at 300mm centres from the non-marked side of panel P1.



**DETAIL 14.0**  
Cross Junction details - Plan

Screw entirely through panel and stud S1 into stud S2 and screw off using 8g x 30mm bugle-head screws at 300mm centres, starting no more than 35mm from the floor.

Once panel P2 is in place, secure it with props as discussed in section 7.

#### Method B

Remove the stud S2 from the end of panel P2.

Centre over stud S1 on plumb lines marked on panel P1 and screw in place using 8g x 30mm bugle-head screws at 300mm centres, through the plaster face and into stud S1.

Slip panel P2 over stud S2.

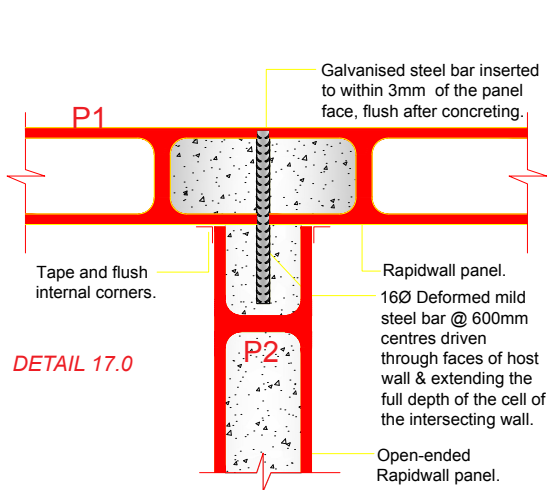
Check levels and screw off using 8g x 30mm bugle-head screws at 300mm centres, starting no more than 35mm from the floor.

Once panel P2 is in place, secure it with props as discussed in section 7.

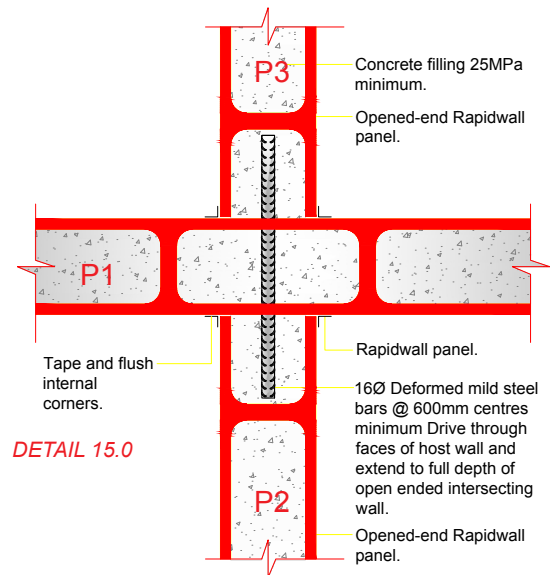
### Cross Junction

To form the cross junction walls illustrated in the diagram, panel P3 is fixed in place by repeating Method B process on the alternate side of panel P1.

## T- Junction - Concrete filled without studs



T-Junction details - Plan



Cross Junction details - Plan

## T- Junction- Concrete filled without studs

Locate and mark plumb lines on panel P1 to align with the correctly marked out lines that represent panel P2's position on the slab. These two lines represent the outer finished faces of where the panel P2 is to be positioned.

Draw a vertical line, centrally located between the two edge lines. This line will be used to locate the dowel pins.

Place a mark on the central line, 75mm from the bottom and top of the panel, then place marks at approximately 600mm centres between the upper and lower marks.

On these marks, drill 15mm holes through both faces of the panel.

Remove second panel from the container or stillage.

This panel will have a 'butt end' with an open cavity that is at least 190mm deep.

Ensure the 'B' face is correctly orientated as per the layout drawing and, if possible, to a wet area, as it will covered by tiles.

Once the panel is located between the lines and levels checked, it must be propped on both sides of the abutted panel.

Drive 300mm long, 16mm mild steel 'deformed bar' dowels into the predrilled holes of panel P1, from the face of panel P1 into panel P2.

These should be finished so that they are 3mm below the wall face, to allow the wall to be later flushed.

The walls should be rechecked for plumb before the cavities are filled with concrete.

## Cross Junction

To form the cross junction walls illustrated in the diagram use 480mm long 16mm mild steel deformed bars. Drive the bars through the predrilled holes with 180mm left protruding on both sides of panel P1.

Panels P2 and P3 are then aligned, propped and filled as described above.

## EXTERNAL CORNERS

### Preparation

Based on shop drawings remove the first panel P1 from container. This panel will have the 'butt end' portion of the corner.

Ensure the 'B' face is on the exterior.

Before installation check that the metal stud S1 is positioned flush to the external edge of the panel. If it is not, remove transport screws and realign. The metal studs that are installed in the factory may not be perfectly aligned as they are installed mainly for transportation reasons more than function.

### Method A - Butt End

- Butt End
  - The 'butt end' is designed to be used in either the corner detail or as part of a butt-joint where two panels are to be joined together to extend the length of the wall.

Follow the External corner preparation guidelines first.

With the lifting jaws retrieve panel P1 from the stillage or container. Position it on the slab rebate and prop as previously described.

Screw through the A and B faces of panel P1 at 300mm centres to secure the stud S1 in place.

Place a 90mm x 35mm x 1.15mm galvanised metal stud S2, 15mm in from the edge of the external face of panel P2.

Screw through plaster face of S2 at 300mm centres, and through the edge of S1.

With the lifting jaws retrieve the next panel P2 from the stillage or container.

Slip the panel P2 in from the direction of the A face of panel P1, ensuring that it fits neatly into the 90 degree joint.

Screw through the A and B faces of panel P2 at 300mm centres to secure the panel.

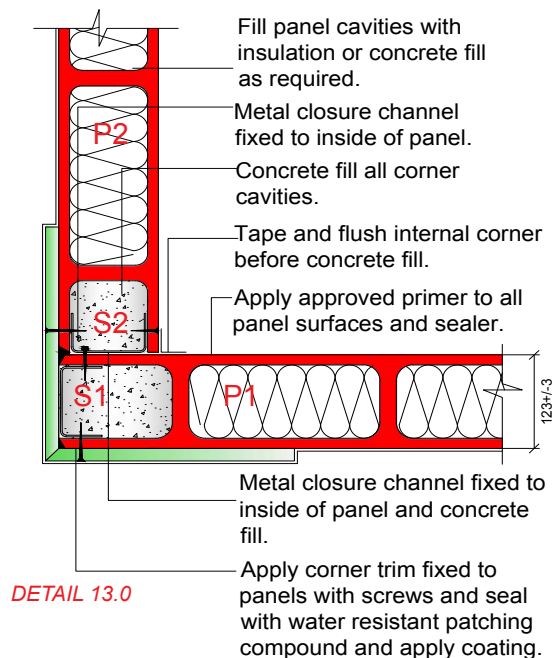
Prop panel P2 as previously described.

Completely screw-off the metal stud S1 externally on the 'B' face of the panel.

Where you need to screw off the studs on the 'A' face put in enough screws to keep the stud in the required position only.

Install the panel as described in previous sections. If using Methods B (leaf end) or C (solid end) position panel P1 15mm back from the corner to allow for the overlapping section of the panel P2.

### 90° Corner details - Plan



After priming, apply polyurethane sealant to the outer joint of the panel intersection.

Affix the corner trim sheets with screws, ensuring that one row of screws is placed in both studs S1 and S2.

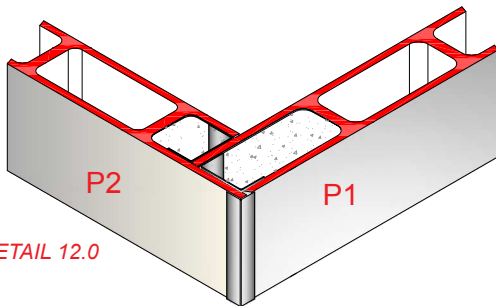
Leave the props in place until cavity-filling is completed in the corner cavities.

To finish, staple a stainless steel or approved external use plastic corner setting bead of the edge of the corner sheets.

Flush the prepared corner with water resistant patching compound, then apply an approved coating system.

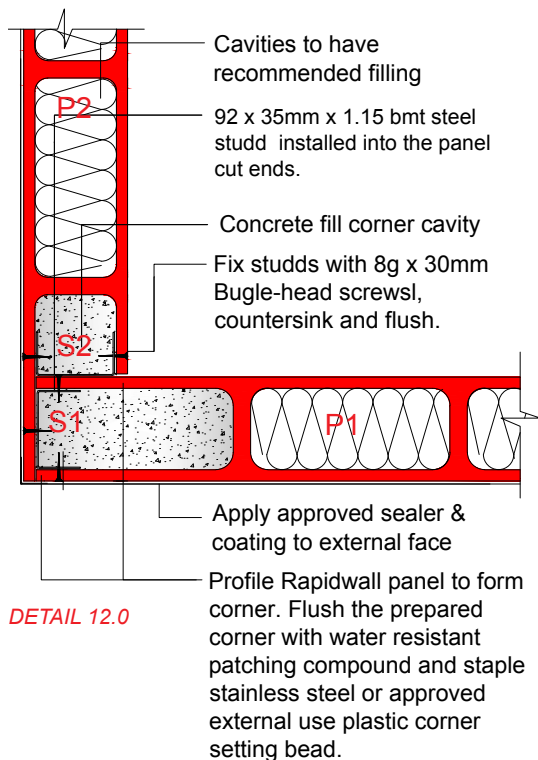
## Method B -Leaf End

- Leaf End
- The “leaf end” is designed to join another panel to form a neat corner joint.
- This corner junction is the easiest to work with and the strongest junction detail for a corner.
- This type of junction results in a traditional external corner and requires little finishing work.



DETAIL 12.0

### 90° Corner details - Plan



DETAIL 12.0

Follow the External corner preparation guidelines first.

With the lifting jaws, position panel P1 15mm back from the corner to allow for the overlapping section of the panel P2. Prop as previously described.

Check the stud S1 is flush with the end of the panel and screw it off through the A and B faces using 8g x30mm bugle-head screws at 300mm centres, starting no more than 35mm from the floor.

With the lifting jaws retrieve the next panel P2 from the stillage or container.

Check that the A face rebate is 124mm in length.

Remove the stud S2 from the panel. Place this stud S2 flush with the edge of the panel P1. Screw through stud S2, at 300mm centres, into the A face of panel P1 and into stud S1.

Slip the panel P2 in from the direction of the A face of panel P1. Screw through the A and B faces into stud S2 at 300mm centres, using 8g x 30mm bugle-head screws, starting no more than 35mm off the floor.

Then secure the ‘leaf’ panel section by placing a row of 8g x30mm bugle-head screws at 300mm centres through it into stud S1.

Prop the panel P2 as previously described.

Leave the props in place until cavity-filling is completed.

After priming, apply polyurethane sealant to the outer joint of the panel intersection.

To finish staple a stainless steel or approved external-use plastic corner sealing bead over the corner joint.

Flush the prepared corner with water resistant patching compound before applying an approved coating system.

#### Note:

If the panels are to be cavity-filled with cement prior to the panels being placed in position, mark the deformed bar positions on the face of panel for future ease of reference. Do not use any other marker than pencil on a Rapidwall panel.

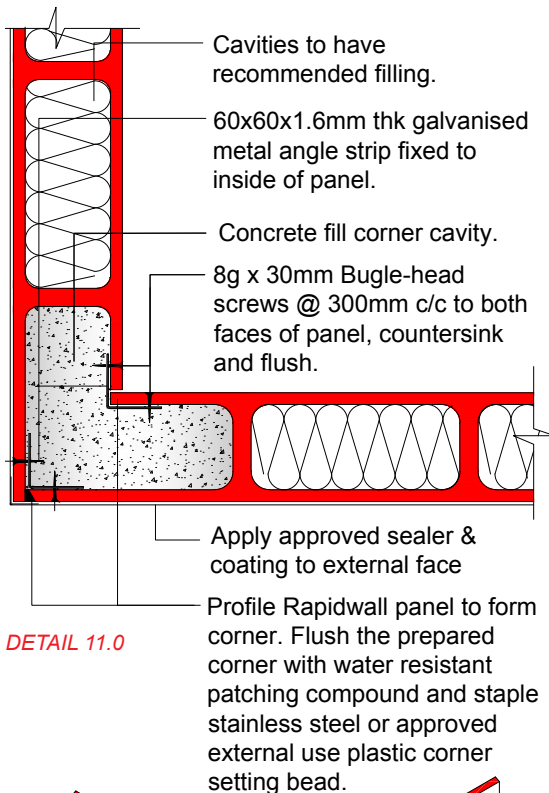
## Method C - Solid End

### □ Solid End

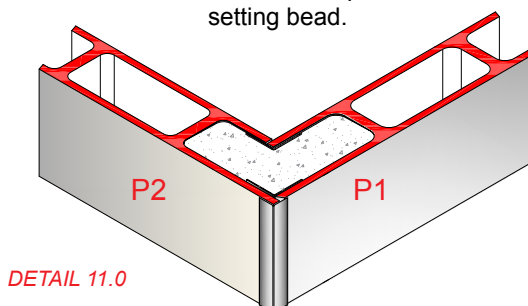
The 'solid end' is simply the end of the panel that has most, if not all of the rib evident and closes off the panel cell at the end of the wall.

- The thickness of the rib must always be checked to ensure it is in fact thick enough for the purpose for which it will be used.
- This is most necessary when that cell will be corefilled with concrete. If the 'solid end' is too thin then it could rupture from the concrete displacement at the time of the core-fill.
- If this is the case, it will be necessary to cut out the rib and create a 'butt end' and then finish as required.

### 90° Corner details - Plan



DETAIL 11.0



DETAIL 11.0

Follow the External corner preparation guidelines first.

With the lifting jaws retrieve panel P1 from the stillage or container.

Position it on the slab rebate 15mm back from the building line on the left side of the panel to allow for panel P2 to fit flush with the building line.

Prop the wall as previously described.

Check the left side; A face rebate is cut at a length of 90mm.

Place the 60mm x 60mm x 1.6mm galvanised metal angle strip inside the cavity, as shown in the drawing, and screw in place via the A and B faces of the panel.

With the lifting jaws retrieve the next panel, P2, from the stillage or container.

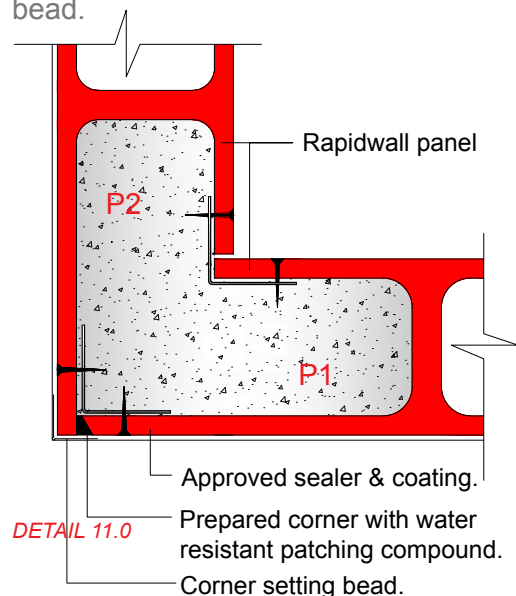
Check that the A face rebate is 123mm in length.

Slip the panel in from the direction of the A face of panel P1, ensuring that the unscrewed sides of the metal angles fit neatly into the 90 degree joint.

Screw through the A and B faces of panel P2 to secure the metal angles in place.

Leave the props in place until cavity-filling is completed.

Flush the prepared corner with water resistant patching compound and staple stainless steel or approved external use plastic corner setting bead.



DETAIL 11.0



# 9

## OPENINGS



In most cases openings will be cut in the factory by either plunge cut or completely removing the openings. If not they can be cut on-site.

### On-site cutting procedure:

- ❑ Mark out opening location based on the latest architectural plans, double checking the width, height and that it is plumb and level.
- ❑ Check that all blocking to the base of the panel is in the correct position and secured appropriately. This will ensure that the doorway is not twisted and remains true.
- ❑ Accurately cut out the section using a plasterboard hand saw or a powered sawing tool. To minimize any straying off line while cutting, powered tools need to have high profiled blades.
- ❑ Do not attempt to remove or carry any overly large sections of panel that might cause strain or injury.
- ❑ For ease of handling, cut the section into half or smaller sizes if necessary.
- ❑ Minimize any unnecessary manual lifting where possible. When lifting ensure there are enough people to lift the load.
- ❑ Do not use a dry circular saw unless it has an extraction vacuum attached directly to it.
- ❑ No standard circular saw can cut through the thickness of the panel, therefore you need to cut from both sides.
- ❑ Close off exposed cavities using either a metal stud, timber stud or shutter/formwork.
- ❑ Closing cavities protects the panel's integrity and provides a barrier to retain any filling such as concrete, sand or insulation.



*Metal studs: 92mm x 135mm x 1.15 bmt*



*Timber stud: 90mm x 35mm*



*Vertical and Horizontal metal studs fitted in opening*



*Vertical and Horizontal metal studs fitted in opening, screw heads flushed*

## Metal Studs

Metal studs are the preferred cavity closing device. As part of the factory cutting process, metal studs, 92 x 35mm x 1.15 base metal thickness (bmt) are installed into the panel cut ends.

- ❑ Are strong, straight and free from warping and cracking.
- ❑ Are quickly and easily installed.
- ❑ They provide strength during transportation.

Metal studs are generally galvanized however, stainless steel studs can be specified at an additional cost.

The studs are used as part of the panel fixing system as the thickness helps with connecting panels, especially where force is to be exerted as with the 'T' intersection.

It is recommended that a 32mm drill point screw be used for fixing through studs. Reduce fixing time by using a collated screw gun.

In some countries metal studs may prove too costly. Instead fix temporary formwork to the corners and connections and fill with concrete to hold the panels together.

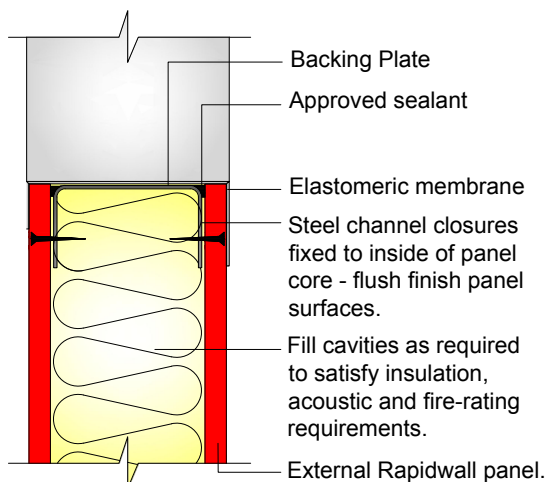
## Timber studs

Timber studs can be used instead of metal, however availability of standard timber sizes which fit the cavity should be considered.

- ❑ Timber should be of appropriate quality and seasoned.
- ❑ 90mm dressed timber is recommended as timber that fits poorly will cause problems and damage the panel.
- ❑ Do not install timber sections in corners and junctions as this will hinder filling the cavities with concrete.
- ❑ If timber studs are to be used in external or wet areas refer to the Waterproofing on the next page.
- ❑ For timber stud installation follow metal stud instructions.

## Metal Stud method

- ❑ Cut opening as described on previous page.
- ❑ A 50mm high channel needs to be cut into the head and sill (if there is one) of the opening.
- Leave the panel faces intact and remove the ribs above the head and below the sill of the opening to a height of 50mm
- Remove ribs by cutting through them at their junction with the panel faces.
- ❑ Install the metal stud into the head/sill channel of the opening where the ribs have been removed. Ensure that the stud is flush and level to the opening.
- ❑ Once fitted and checked, permanently screw into position and seal.
- ❑ The jambs of the opening require metal studs to be inserted into the cavity. The length of stud to be same as opening, check for discrepancies which may affect length. There should be no gaps. If the depth of the cavity at the jamb is less than the metal stud use timber instead.

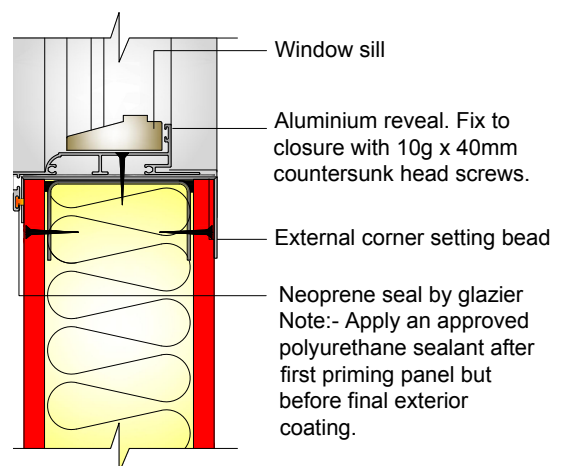


DETAIL 26.2

Metal Stud and waterproofing opening detail -Section

## External and wet areas

- ❑ All external and wet areas require the studs to fit tightly within the cavity and with minimum gaps to avoid leaking when filling cavity with concrete.
- Secure studs with screws at 200mm intervals.
- Paint all cavity openings with approved (elastomeric membrane) waterproof coating e.g. Sika Flex Pro polyurethane primer and seal system.
- Ensure that the edges of the Rapidwall panel, screws and studs are covered by the membrane to provide a watertight seal.
- Adequate waterproofing material (e.g. Sika Flex) must be applied to ensure that the screw holes do not compromise the tanking.
- Install doors or windows as detailed under the Doors and Window frames guidelines below taking care to ensure that the waterproof coating is not damaged during installation.
- After installation of door or window seal around the entire perimeter with an approved weatherproof sealer.



DETAIL 26.0

Window frame insert and waterproofing detail -Section



## Door And Window Frames

- ❑ All frame types are compatible: Timber, steel, aluminium and PVC are all easily fitted to the panel regardless of whether the cavities are filled or unfilled.
- ❑ In most cases openings do not need lintels unless over 2.4m wide in which case posts will be inserted into the cavities to take the load of the lintel. Refer to engineers design.
- ❑ Fire door openings require the use of steel closure studs, steel door frames and fire resistant cavity filling grout to achieve the fire rating.
- ❑ All window and sub window drains must have external outlets.
- ❑ Check that the opening is clean and does not require any repair prior to proceeding.
- ❑ Ensure frame fits the thickness of the panel : 123mm.
- ❑ Consider frame position within the Rapidwall panel at design stage to enhance the overall building appearance.
- ❑ Consider type and size of reveals, architraves and sill profiles. Standard construction materials such as timber, plasterboard and fibre cement sheet can be used.
- ❑ External features can be added around the openings using plaster cast features, foam moulding, fibre cement sheet, timber or aluminium.
- ❑ Metal frames can have a metal external flange fitted to the frame to cover the reveal and provide a fast and cost effective solution, eliminating the need for exterior reveals. Seal flange at junction with exterior face of panel.
- ❑ If the frame is positioned towards the external face of the panel, it is possible to install a counter flash over the frame. This will add to the water tightness of the frame.

### Prior to installation:

#### Water tanking

- ❑ Rapidwall is a single skin construction system, therefore all wet areas and external openings need to be water tanked.
- To water tank install a continuous elastomeric membrane that covers the entire opening and overlaps the panel thickness.
- Once the membrane is installed protect it from damage and exposure to the elements.
- Any fixings that penetrate through the membrane need to be filled with a polyurethane sealant that is appropriate for the use and environmental conditions.
- This will ensure that moisture cannot enter through the fixing and enter the panel cavity.



*Waterproofing with liquid elastomeric membrane for windows and doors*



### Metal Frames

Metal frame will need to be installed after concrete core filling, if this is required.

The use of standard 3 piece “knock down” steel door frames, allows for efficient installation, handling and transportation costs.

Ideally, a metal door frame will be welded and allow for the use of countersunk masonry fixings.

The installation of a fire-rated metal frame after cavity filling has taken place and will still comply with relevant doorway fire codes.

Aluminium frames will need to have a polyurethane seal to ensure required water proof integrity.

Architraves for security or fire doors should be designed in accordance with the manufacturers guidelines.

- ❑ Install frame and door in accordance with manufacturers guidelines.

### Timber Frames

Timber frames can be installed in either concrete filled, no-fill, sand or insulation filled panels.

#### Concrete filled cavities

- ❑ Drill through the frame then use a masonry bit to drill hole into the concrete core of the panel.
- ❑ Use plastic plugs, plastic spaghetti, nylon anchors or any other approved product to fasten the frame to the concrete.
- ❑ Install in accordance with manufacturers guidelines

#### No-fill, sand or insulation filled panels.

- ❑ It is recommended that an appropriately sized timber stud be inserted behind the metal stud to create hold when fixing the frame. Drill through the frame and secure the window to the stud.

## SERVICES



Installing plumbing, electrical and other cable services throughout the building is very similar to current building practice.

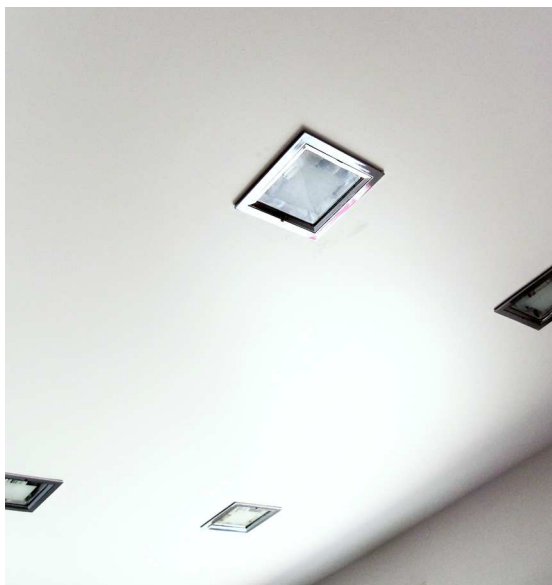
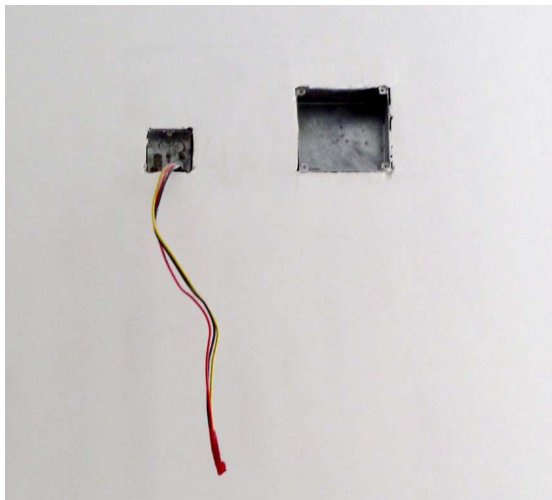
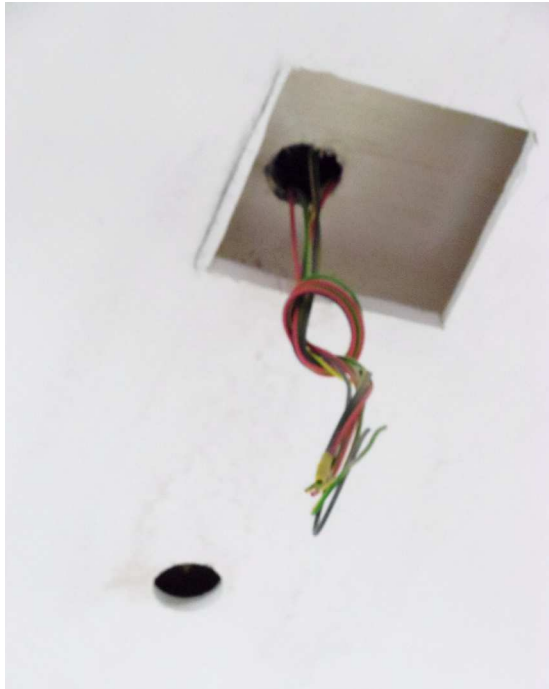
For single leaf Rapidwall construction all plumbing and electrical services can be located by using architectural and MEP plans. This will minimise the possibility of misalignment or incorrectly locating these services into the Rapidwall cavities.

- ❑ All services should be installed in accordance with industry standards best practice and relevant rules and regulations.
- ❑ Install after the panels have been erected into final positions and prior to filling cavities.



### Water services

- ❑ Install plumbing within wall panel cavities using flexible high-density polyethylene (PE-Xa) pipe
- ❑ If copper is to be used in the wall cavities all precautions should be taken regarding joints and care taken to prevent contact with concrete.
- ❑ Care should be taken to eliminate water pipe hammer in accordance with normal procedures.



### Electrical services

- ❑ Install cables into conduits.

### Horizontal runs

- ❑ In walls panels remove a section of the ribs at the top of the panels to accommodate conduits.
- ❑ In ceilings run conduits within panel cavities
- ❑ In trussed roofs run conduits over the top of the bottom cord.

### Vertical runs

- ❑ Placed within the wall cavities
- ❑ Use wall boxes at the required locations.

### Retrofit services

- ❑ Services can be surface mounted, these will need to be boxed in, concrete cement sheet should be used in wet areas.
- ❑ Non fill cavities or cavities with compressible insulation can have the services installed within the cavities by feeding through access points cut into the panel.
- ❑ Panels with concrete or any other solid fill can be chased, however this will weaken the panel and flexural strength is destroyed. Consult engineer.

## FIXING & FASTENING TO RAPIDWALL

Fixing of skirting boards, handrails, basins and the like to Rapidwall is similar to fixing to other types of cellular, drywall or plasterboard material. Many brands and fastener types can be used by following the manufacturer's recommendations and instructions for installation and allowable loading capabilities.

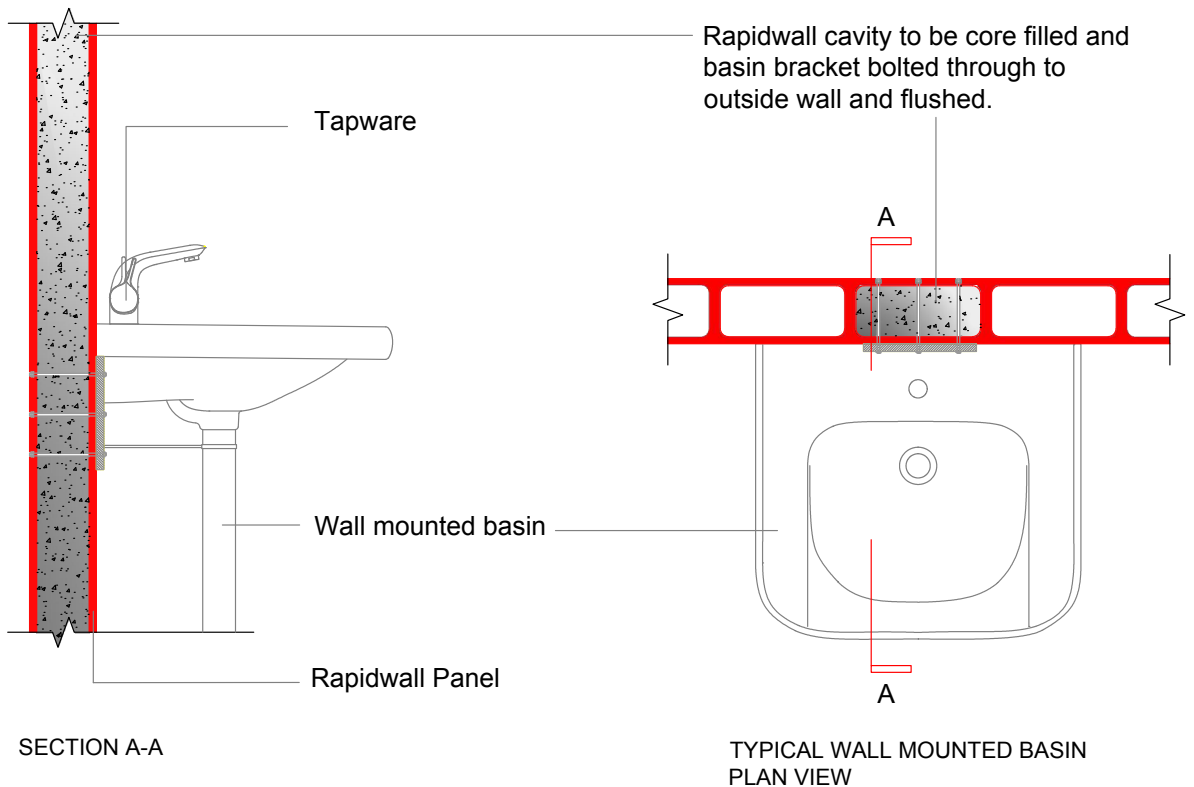
Because of the cavity and vertical ribs at 250mm centres, the use of nail or screw fittings cannot be used in Rapidwall without special fixings or cavity filling materials such as timber or steel closure studs, backing plates and solid concrete grout filling.

By pre-planning critical load fixtures prior to the construction stage, cavity filling installation procedures will allow conventional fastener systems to be installed.

This is only necessary for heavy weight fixtures and loads exerted by cantilever hand basins, troughs, brackets, wall plates, industrial cabinets and the like.

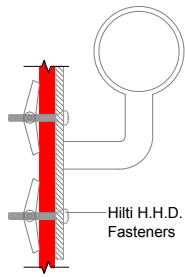
In general, light and medium weight fixtures can be attached with a variety of hollow cavity wall fasteners. Fixing into a rib, although acceptable, should be avoided where possible. If this is not possible use Hilti HSP self-drilling zinc or plastic anchor.

Chemical injection anchor systems can also be used to carry medium to heavy loads in situations where walling or building work has been completed.

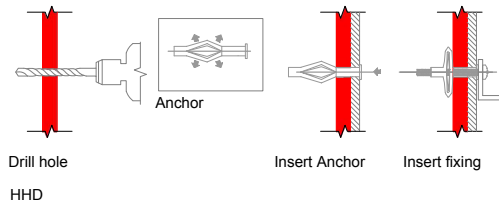


### HEAVY WEIGHT FIXINGS

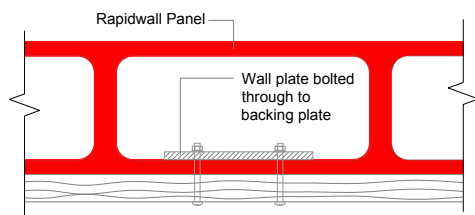




HAND RAIL DETAIL

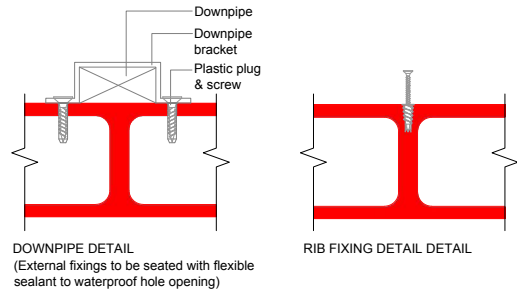
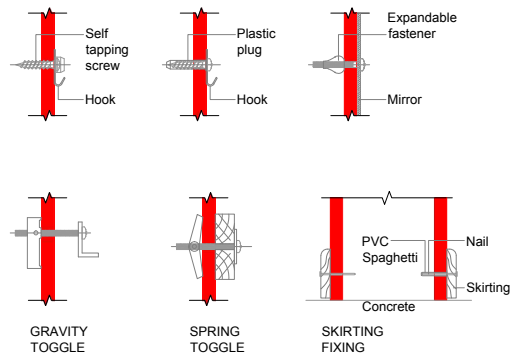


**MEDIUM WEIGHT FIXINGS (hilti or EQ)**



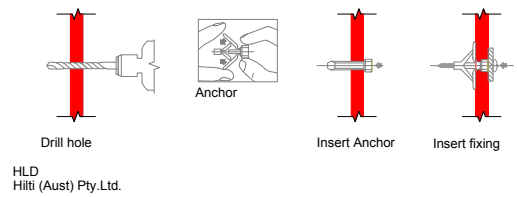
WALL PLATE DETAIL

**HEAVY WEIGHT FIXINGS**



DOWNPIPE DETAIL  
(External fixings to be seated with flexible sealant to waterproof hole opening)

RIB FIXING DETAIL DETAIL



HLD  
Hilti (Aust) Pty.Ltd.

**LIGHT WEIGHT FIXINGS (Hilti or EQ)**

## CONCRETE FILL



The certifying engineer will determine whether the cavities of Rapidwall need to be filled with concrete to meet the structural requirements of the building.

Done correctly, the pouring of concrete into the Rapidwall cavities is a simple process but does require an understanding of all the elements involved.

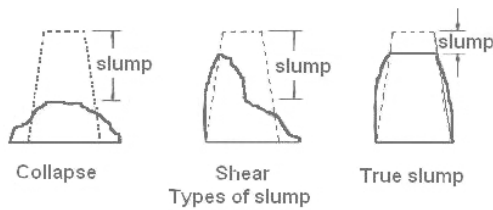
### Concrete Mix

First determine the composition of concrete mix based on the available material in your particular location that has the same performance characteristics as the ideal basic mix as detailed below.

Local raw materials could alter the performance of the concrete, therefore it is important to access and seek advice from local suppliers prior to cavity-filling.

To reduce the pressure on the wall during the filling and setting procedure we have found the following to be important:

- ▣ Aggregate size and shape:
  - 7mm crushed aggregate recommended. 10mm aggregate maximum.
  - Aggregate greater than 7mm use more water to prevent blockages, segregation at the pump or in the hoses.
  
- ▣ Sand:
  - Washed concrete sand recommended.
  - Sand ratio should be higher than standard mixture. This will give better flow and better self-supporting properties which is desirable for the filling of Rapidwall.



Concrete product code	S32 7mm Grano	S20 7mm Grano
Concrete mix description	Rapid Crete 32	Rapid Crete 20
Strength Grade (MPa @ 28 days)	32	20
Max aggregate size (mm)	7 - 10	7 -10
Nominal Slump (mm) +/- 20	70	80
Nominal Shrinkage @ 36 days (micron)	N/A	N/A
Early age compressive strength (MPa)	N/A	N/A
Cement content kg/m <sup>3</sup>	335	240
Flash Content kg/m <sup>3</sup>	0	0
Fumed Silica content	0	0
W/C Ratio	0.53	0.53
Water reducing Admixture	Grace or isocrete	Grace or isocrete
Crushed 7mm Aggregate	Approx. 1000kg	Approx. 1000kg
Washed concrete Sand	Approx. 800kg	Approx. 900kg
Mix Type	Special class	Special class
Concrete density (kg/m <sup>3</sup> )	2100-2200	2100-2200

#### Admixtures:

- Admixtures, (super plastizers) can be included to improve the flow properties and reduce water demand of the concrete mixes.
- These additives are normally added in the ratio of 300 - 400ml per 100kg of cement in the concrete mixture. The concrete supplier must comply to the addition rates specified by consistency reducers manufacturer.
- Site environment will determine if cure retardant should be added to the mix. Concrete suppliers to either supply the retardant or use an approved additive for the mix. Ideally the concrete should be set 1 hour after placement.
- Admixtures can also have other benefits such as foaming or early setting.

#### Slump diameter of concrete:

##### CAUTIONARY NOTE:

- The recommended slump is 70mm +/- 20mm. This is critical as the additional hydrostatic pressure caused by a higher slump, will be displaced on the panel and this could cause surface cracking or a blowout.
- The lower the slump the less hydrostatic pressure exerted on the Rapidwall cavity. However, the mix should be sufficient to provide full compaction with minimal hand tamping so honeycombing of the concrete can be eliminated.
- Never use a mechanical concrete vibrator to compact concrete within cavities.
- With a correct admixture formulation this can be achieved successfully.

## Concrete Pumps

Choosing the right pump for the job will generally be decided by the site, type of project or availability.



## Types of concrete pumps.

### Trailer Pumps

- Good flow rate, ideally suited to Rapidwall core-fill.
- Ideally suited for high-rise developments. Pumps lifted by crane.
- Small pump, not self propelled, towed behind a vehicle to site.
- Bulk concrete fed from either a concrete kibble or a boom pump.

### Boom Pumps

- Remotely controlled articulated robotic arm comprising of the and hose fitting.
- Flexible hose attached to boom for concrete placement.
- Two types of boom pumps: Peristaltic or 'hose pump'.
- Hose concrete pumps used for multi-storied buildings and civil engineering work. High flow and high pressure. Flow which can be difficult to control because of pulsing.
- Peristaltic pumps generally have a more consistent flow rate. This minimises flow surges which will in turn result in less product waste and with less pressure and potentially, less panel damage.

### Line Pumps

- Mounted on truck or trailer and are commonly referred to as a line pump or trailer-mounted concrete pump.
- Line pumps normally pump concrete at lower volumes than boom pumps and are used for smaller volume concrete placing applications.

## Concrete Pour



Depending on the self-supporting properties of the concrete mix a single wall panel can be filled by pouring 200-300mm of concrete into each cavity by walking along the panel and repeating the process until the required cavities are filled to the top. Once sufficient experience is gained and the process becomes familiar the cavities can be filled to one third of their capacity taking care that no blow outs occur.

If there has been any recent rain or water ponding on the slab, prevent any possible blowouts by ensuring the bottom of the panel is not wet. If the bottom of the panel is wet consider postponing the pour if possible. If it is not possible to delay the pour introduce smaller quantities of concrete to the appropriate cavities (200mm to 300mm) to allow some gelling. Then build up to the required amount in the second or third passes. In dry weather a wet panel will dry within a day or so.

If two panels are to be placed, one on top of another, to raise the height of a wall ensure that the concrete hose is inserted approximately two thirds of depth of the overall height into the panel cavity.

This will reduce the amount of force exerted to the base of the panel when the concrete impacts the slab.

As previously outlined it is recommended that the base of the panel be restrained on both sides.

Ensure that the window and door openings are properly restrained and screwed off (every 200mm) before filling with concrete.

The ideal hose size is 50mm hose as this will fit into the cavity and is best suited for the style of the recommended concrete mix.

### NOTE:

If using a Boom Pump, 5 to 10 meters of pipe needs to be left horizontal on the pouring deck to reduce the pressure generated by the column concrete in the boom itself.

This will also avoid concrete continuing to flow into the cavities after the pump is stopped.

When ordering concrete it is important to leave an appropriate amount of time between deliveries to allow for the efficient unloading of each truck load.

When the concrete truck arrives on site, a member of the installation team needs to review the delivery slip for compliance to engineer's requirements for strength and the properties contained within this chapter before allowing the concrete to be pumped.

The installation leader must also ensure that concrete is not modified by additional amounts of water, as this will increase the slump of the concrete and reduce its ability to be 'self supporting'.



*Reinforcement bars inserted ready for upper walls*

The installation leader also needs to beware if test cylinders are also required for quality assurance purposes.

The expected initial truck unloading rate is approximately 4 – 5 m<sup>3</sup>/hr. This rate is normally suitable for filling the first third of the panel being poured, when the bottom of panel has the most force placed on it.

After this initial fill has been completed it is possible to increase the pumping rate slightly.

Do not try to complete any part of the panel installation process during the cavity-fill.

Have at least three personnel allocated for the pour day; one person to work with the pump hose operator and two to work on the slab level to monitor the panel.

The person working with the pump operator will need to monitor the consistency of the concrete (70mm slump), the setting of the pump and the amount of concrete that is filled into each cavity.

The person on the slab will be monitoring the panel itself sighting the panel at all times. Look at the panel for cracks and take appropriate corrective action. Listen for and feel the height of the concrete.

If the panel cracks stop the pouring immediately into that cavity and move to the next cavity. If cracking reoccurs skip a couple of cavities and put in less concrete into each cavity.

Initially, best practice is to fill just the bottom 300mm to 500mm of the panels.

If panel cracking occurs after the initial base has been filled then skip cavities or reduce the amount filled again.

## Set Pour Check list

It is important to run through the check list and the procedures that follow to ensure all elements of the walls have been checked and prepared correctly prior to attempting to pour concrete fill.

### Reinforcement

Highlight or transfer all steel locations from the panel face onto the slab for ease of reference during the pour.

Have all steel cut and placed in a convenient location for placement during the pour.

Install all full length steel if any has been allocated by the Engineer or builder (it is possible to install full length deformed bar for ease of construction).

### Concrete compaction

The recommended concrete mix reduces the need for compaction however, where an individual cavity has conduits, pipes, power points, additional reinforcing and the like, additional "soft approach" compacting as described below may be required.

### Hand Tamping

Use a piece of deformed bar longer than the panel height. Having a firm grip on the bar and with an up and down action gently agitate the concrete in that cavity to ensure all air pockets have been eliminated.

During this process be mindful of any obstructions in the walls i.e. conduits, power points, light switches and the like and avoid striking or damage.

Finish concrete flush to the top of the panel or opening.

It is important to not allow cold joints on the concrete core-fill.

Clean up any spills on walls with water and remove any droppings from the slab prior to the concrete setting. Concrete splatter is difficult to remove from Rapidwall once the concrete is set.

**Important note:** Under NO circumstances must a concrete vibrator be inserted into a cavity to compact the concrete.

- All blocking installed at the bottom of the panel.
- Panels are plumb and true and stayed.
- All metal studs are installed where required and screw fastened at 200mm intervals.
- All corners and intersections are screwed-off.
- All window and door openings have been cut out.
- Ensure that adequate scaffolding is in place for each section.
- The correct concrete has been ordered.
- Correct strength of concrete with an ideal slump 70mm.
- Check with the operator that the boom will reach the whole job.
- Concrete pump must have a 50mm hose for concrete placement.
- If a Boom Pump is to be used at least a 10 m hose is required from vertical boom.
- If loose pour, attach funnel inlets on top of the Rapidwall panels.
- Ensure the concrete pump has been booked with enough time to set up before the first load of concrete is programmed to arrive.
- Volume of concrete based on all area minus all openings ( $0.086\text{m}^3$  per  $\text{m}^2$  of wall).
- Check that all required plumbing and electrical conduits have been installed in the cores.
- Confirm with site traffic managements, that trucks will be entering site on the day of the pour.
- Check that sufficient approved scaffold planks and trestles are available and installed and there is sufficient freedom of movement.

## INSULATION FILL



To increase the insulation properties of the wall or roof additional insulation can be inserted internally within the cavities or to the external face of the Rapidwall panel.

### Insulation types fitted in cavity:

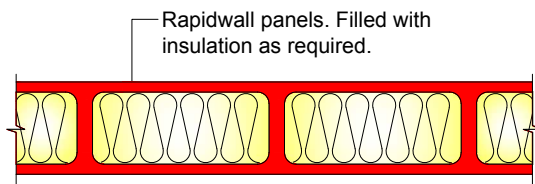
- Fibreglass/Rock Wool
- Polyfoam boards
- Natural Sheep Wool
- Cellulose Insulation
- Injected foam

### Insulation Cavity-fill Method

- Check if design requires starter bars and ensure all are installed before panel is installed. Refer to Sections 7-10.
- After Rapidwall panels are installed ensure all openings are blocked with metal or timber studs.
- Check that all services are complete.
- Erect scaffold or trestles as required.
- Where there are starter bars it is recommended that the bottom of the cavity be filled with 200 to 300mm of concrete.
- Clean off excess concrete before it sets completely.
- Type of insulation used will determine the technique used.
- Cavity needs to be fully filled regardless of the type of insulation used.

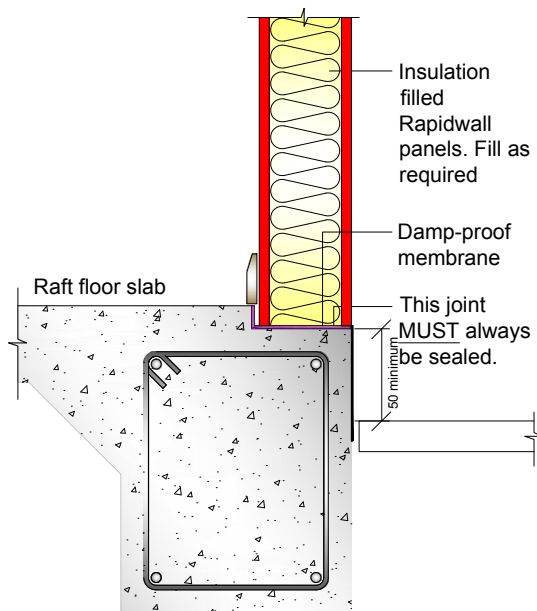
Note: For every 1% of the surface area not covered by insulation a 5% loss in the overall insulation effectiveness will result.





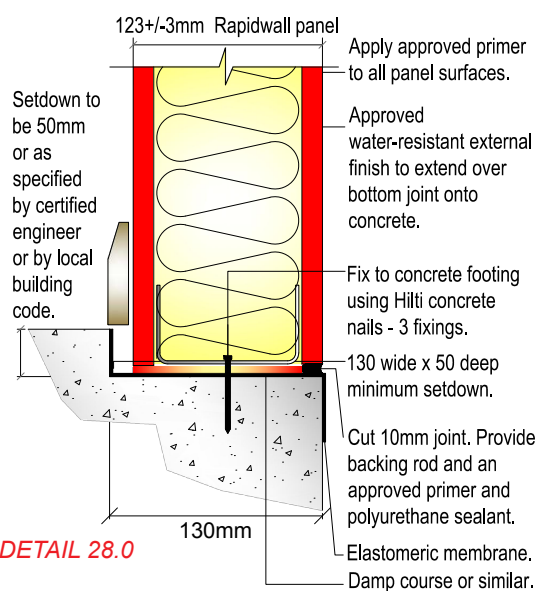
DETAIL 27.0

### Insulation filled Rapidwall - Plan



DETAIL 27.0

### Insulation filled Rapidwall - Section



DETAIL 28.0

### Insulation filled Rapidwall - Sections

#### □ Fibreglass, Rock Wool, Sheep Wool and Polyfoam Insulation:

All are installed in a similar manner. Thickness of insulation should be a few mm smaller than the depth of cavity (94mm). Cut the insulation into strips to fit the width and height of the cavity, approximately 230mm wide. Fit the insulation into the cavity by 'poking' down into the cavity using a flexible rod, often a piece of joining strip removed from 'yellow' tongue flooring.

□ **Cellulose Insulation:** This is 'blown' into the empty cavity using specialised equipment. The insulation material needs to be kept dry, if not the material has been known to 'pack down' in the cavities.

□ **Injected foam Insulation:** such as "Ecofoam" is installed in a traditional manner. Drill one or two holes into the outer skin, place the pipe into the hole and inject the foam into the cavity. The foam expands to fill the cavity. Once complete skim over the hole with patching compound and sand. Finished with an appropriate coating system.

#### Insulation fitted Internally or externally:

□ Polyfoam boards: polystyrene or polyurethane.

- Internal boards can be fitted between battens with plasterboard sheet fixed to battens. Alternatively a composite insulation/plaster board panel can be directly fixed to the panel.

- External boards can be directly fixed to the panel and cement and acrylic renders can be applied over the foam board. If an alternative cladding is required such as timber or metal panelling the insulation can be fixed directly to the panel or between battens used for the cladding. Designed to engineers recommendations.

## SAND FILL



*Hopper proposal for Sand or concrete fill of Rapidwall panels.*

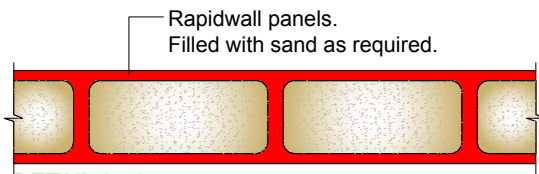


*Rapidwall fence preparation for filling with sand.*

Sand fill is an inexpensive and simple solution for domestic dwellings and also for Rapidwall fence.

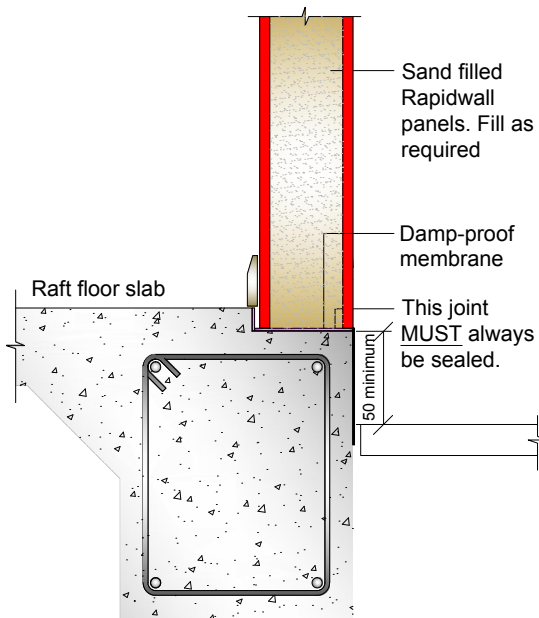
Walls used for dwellings and the like should be filled with stabilised sand. Rapidwall fence only requires coarse sand cavity-fill so it is free draining .

- ❑ **Coarse sand:** Clean and free from contaminants of any kind especially rubble, dirt, clay, corrosives, chemicals and industry by-products as these could adversely affect the integrity of the panels.
- ❑ **Stabilised Sand:** Coarse sand mixed with one of the following; 1- 2% cement, up to 5% of plaster or any other type of binder that is compatible with sand.
  - If mixing on-site, ensure the correct ratio of binder is added to the sand.
  - The mixture needs to be dry to ensure the cavities will be fully filled.
  - Stabilised sand will absorb moisture in the atmosphere over time and harden. If a hole is drilled into the wall in the future no sand will escape.
- ❑ **Hoppers:** used to fill cavities with sand.
  - Construct from any durable material: Form-ply or sheet metal are ideal.
  - One hopper should not be more than four cells long.
  - Several hoppers can be setup side by side to speed up the process.
  - Hoppers should be able to be moved by hand.
  - Hoppers should be constructed to provide clear access to the cavities and have angled tops or funnelling to induce the flow towards the cavity.

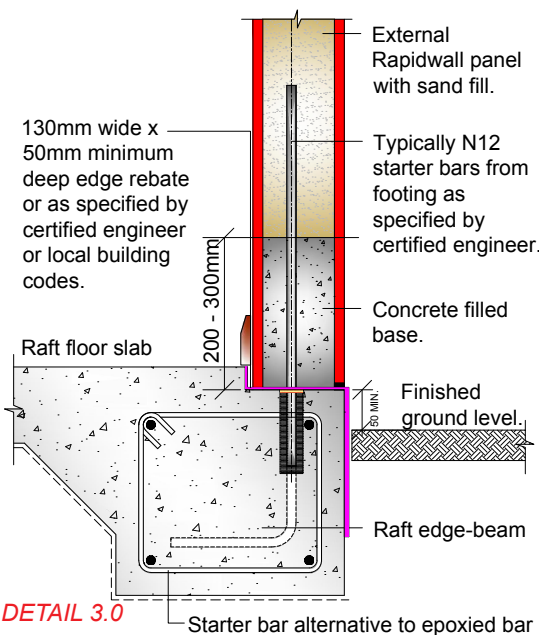


DETAIL 27.2

### Sand filled Rapidwall - Plan



DETAIL 27.2



DETAIL 3.0

### Sand filled Rapidwall - Sections

### Sand Cavity-fill Method

- ❑ Check if design requires starter bars and ensure all are installed before panel is installed. Refer to sections 7-10.
- ❑ After Rapidwall panels are installed ensure all openings are blocked with metal or timber studs.
- ❑ Check that all services are complete.
- ❑ Erect scaffold or trestles as required.
- ❑ Where there are starter bars it is recommended to fill the bottom of the cavity with 200 to 300mm of concrete.
- ❑ Clean off excess concrete before it sets completely.
- ❑ Rest the hopper on top of the panel and pour the sand into it by way of bucket, shovel or even directly from the site plant, 4 in 1, bucket.
- ❑ Fill each cavity to the top before moving onto the next empty cavity to be filled.
- ❑ Repeat the process until all the required cells are full.
- ❑ Soft approach compact with deformed bar where required.
- ❑ All permanently exposed top edges need to be capped to prevent water entering the panel cavity.

Note: Always undertake a risk assessment on work methodology and scaffolding to ensure the safety of all people and property prior to carrying out work.

Note: Weight bearing fixtures such as handrails should not be attached to a panel that is cavity-filled with sand.

Note: Sand filled Rapidwall provides many of the qualities of a solid wall but does not have the load bearing capacity of a cement filled cavity.

# RAPIDFENCE INSTALLATION

The unique qualities of Rapidwall panels make it ideal for use as a fencing system. Strong, fire, weather and insect resistant, a Rapidwall fence construction is ideal for residential, commercial and industrial applications.

There are three primary methods of installing Rapidwall fencing:

- ❑ Above ground.
- ❑ Into ground.
- ❑ Within precast concrete pillars.

The method chosen should take into consideration the design engineers requirements, the local building regulations and the aesthetic appeal.



## General materials

- ❑ Appropriate quantity of materials such as: concrete, sand cement, sand, threaded rod or reinforcement rod.
  - ❑ Fence capping to suit (nominally 125x35 hip rafter galvanised steel channel capping).
  - ❑ Patching compound.
  - ❑ Circular saw with appropriate blade for cutting Rapidwall panel if required.
  - ❑ Sealer primer
  - ❑ Decorative finishes as required: Primers, paint or texture coatings.
- Note:** If Rapidwall is used below ground it must be fully water tanked.
- ❑ Check soil conditions, underground services, overhead restrictions and access.
  - ❑ Order Rapidwall panels to required size.
  - ❑ Order and deliver other materials to site as required.
  - ❑ If specific lifting equipment is required check availability and book.
  - ❑ Locate and peg fence boundary location using, if necessary, surveyed land map.
  - ❑ Apply sealer primer to all exposed surfaces prior to erecting if this has not previously been done before delivery.

## Finishing panels

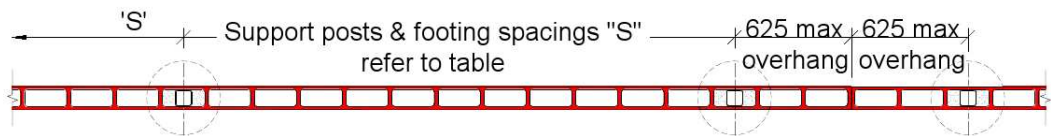
- ### Pre-panel Installation
- ❑ Consult engineer and obtain relevant design calculations and drawings for the type of fence to be erected.
  - ❑ Obtain local authority approval.
- ❑ Seal construction joints between panels.
  - ❑ At ground level apply a 150mm strip of bitumous paint to the panel where the Rapidfence and ground surface come into contact. Apply prior to any primer, coating or paint.

- ❑ Decorative finishes can be applied as required.
- ❑ Primers, paint or texture coatings to be applied in accordance with manufacturer's specifications.



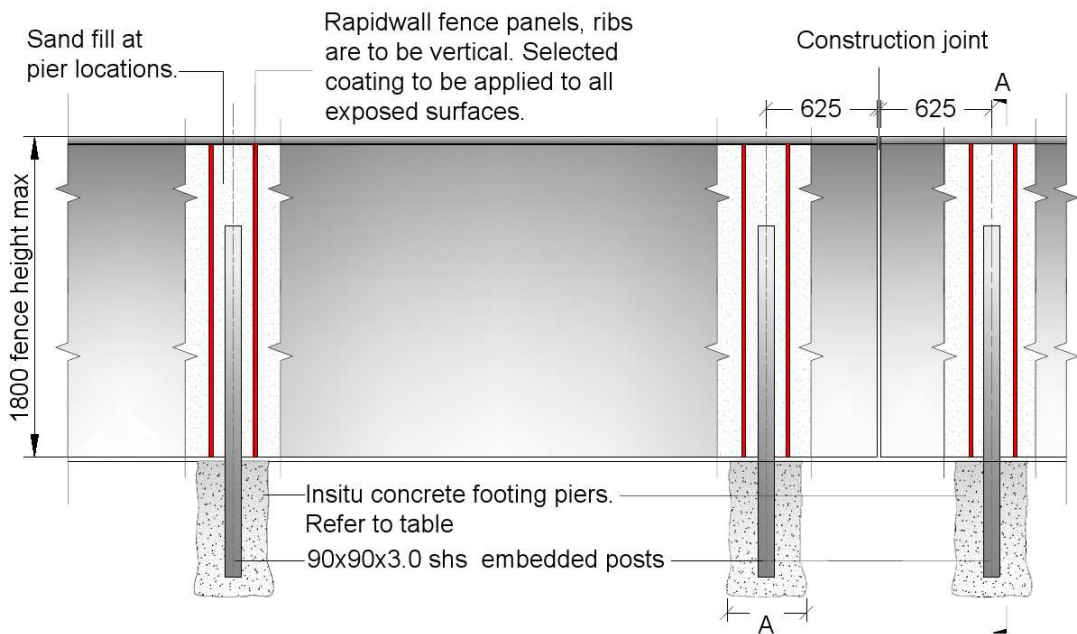
## Rapidfence Type 1

Above ground Post and Pier



Plan

DETAIL 41.0



Elevation

DETAIL 41.0

Fence Height H (mm)	Terrain Category	Pier spacing S (mm)	Pier Member	Footing depth D (mm)	Footing area A x B (mm)
1800	TC1	2000	90SHS3	1000	300 x 300
	TC2	2250		900	300 x 300
	TC3	2500		900	250 x 250
	TC4	2500		900	250 x 250

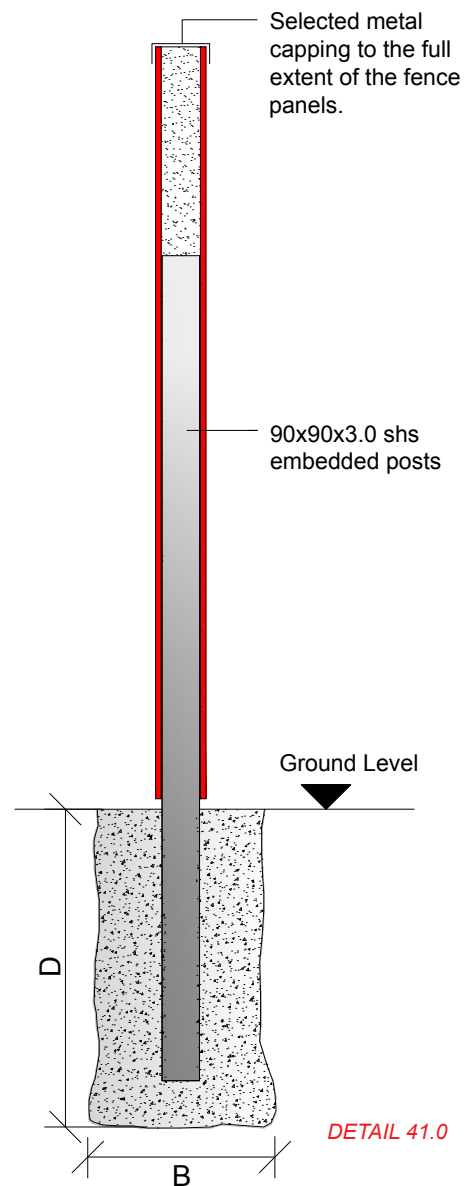
### Design detail table

#### Materials

- ❑ Post hole digger.
- ❑ Galvanised steel hollow section pipe to engineers specifications (nominally 65x65 3.0).
- ❑ 20 MPa concrete.
- ❑ 10:1 sand cement mixture.
- ❑ 150mm wide cement sheeting or similar.
- ❑ Expansion joint sealer.

#### Erection method

- ❑ Dig post holes to engineers required depth. Insert galvanised steel posts and pour cement to top of hole. Leave at least 72 hours prior to fence erection.
- ❑ Lower Rapidwall panel over galvanised steel posts, level, centre align.
- ❑ Fill cavity at post location with 10:1 sand cement mixture.
- ❑ Sand Fill remaining cavities if required:
  - 150mm wide cement sheeting to be used for temporary cavity base if required.
  - Bottom 200mm to be filled with 10:1 cement mixture to avoid sand escaping. Top of cavity to be filled with sand, refer to Sand Fill section.
- ❑ Fit metal capping over entire length of Rapidfence panels.



Section A-A

## Rapidfence Type 2

Into ground

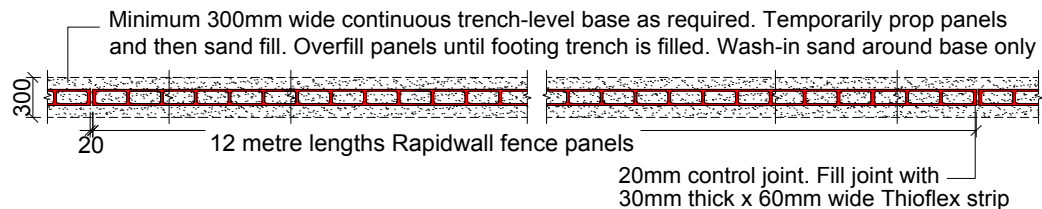
### Materials

- ❑ 300mm wide trench digger.
- ❑ 30mm thick x 60mm wide Thioflex strip for control joint.
- ❑ Suitable material for temporarily propping panel prior to sand filling.
- ❑ Sand: see Sand Fill Section.
- ❑ 150mm cement fibre sheeting.
- ❑ Level bottom of trench with sand and or 150mm wide cement fibre sheet packers and compact. Recheck levels.
- ❑ Lower Rapidwall panel into trench, centre align and temporarily prop.
- ❑ Fill control joints with 30mm thick x 60mm wide Thioflex strip.
- ❑ Lower next panel.
- ❑ Fill all cavities and trench to top.

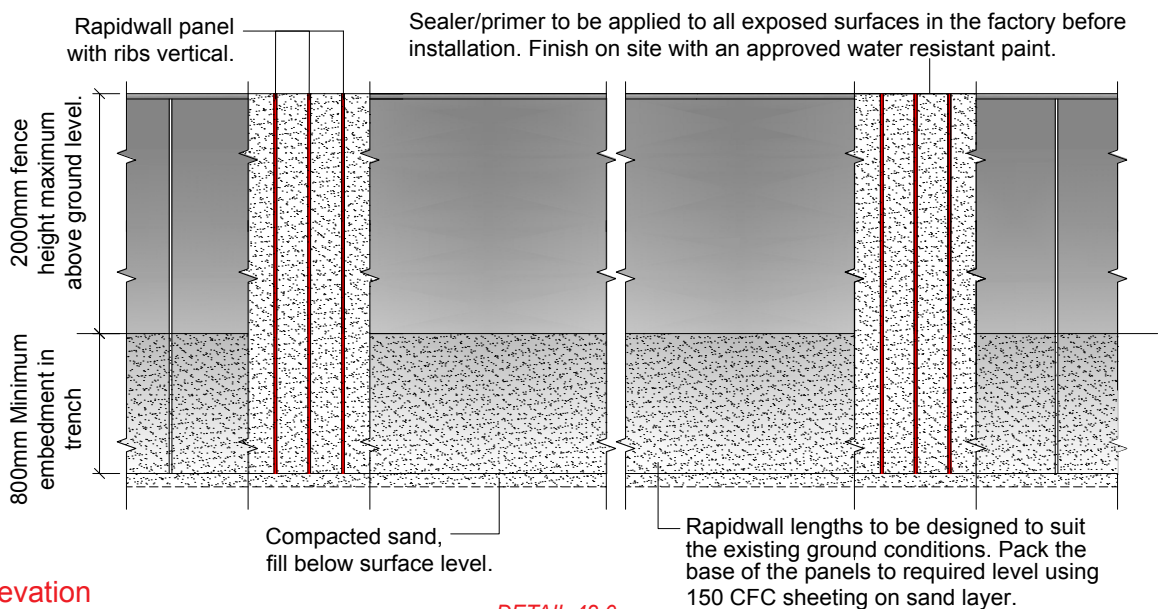
### Erection Method

- ❑ Dig 300mm wide trench and minimum of 800mm deep or in accordance with engineering specifications.
- ❑ Wash in sand at base of trench only. Compact.
- ❑ Fit metal capping over entire length of Rapidfence panels.
- ❑ Finish as required.

Plan

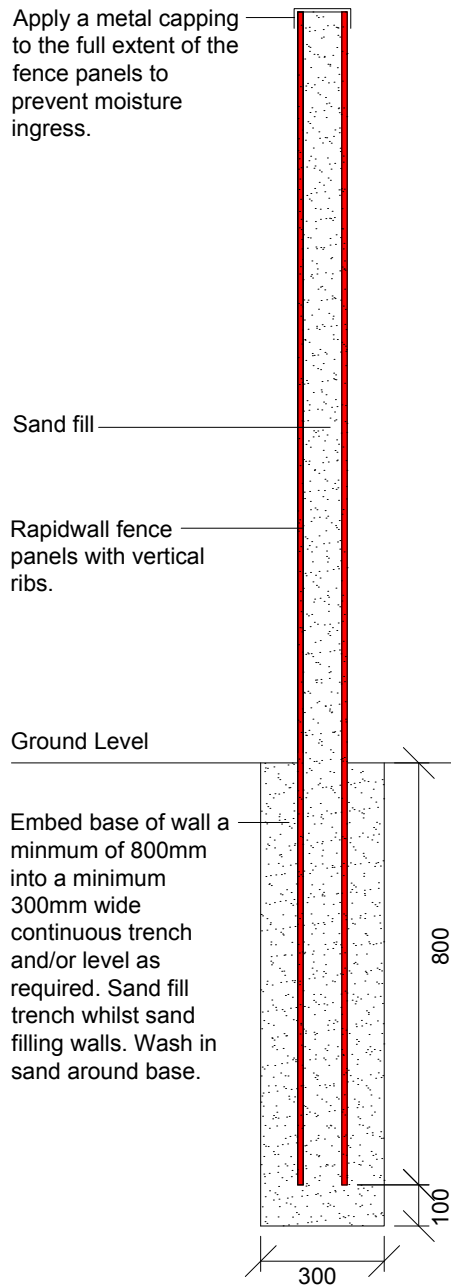


Elevation



DETAIL 42.0

## Rapidfence Type 2 (cont.)



DETAIL 42.0

## Section A-A

## Rapidfence Type 3

Above ground horizontal panel

### General Construction: horizontal rib pillar construction

- ❑ Calculations are for built up residential urban streets in non-cyclonic areas.
- ❑ Maximum height of Rapidfence is 2400mm above ground level. Smaller height fences can be constructed using the tables for shielded and non-shielded sites.
- ❑ Precast concrete pier uprights to have concrete strength  $f'c = 32\text{MPa}$ .
- ❑ Piers must be founded in firm natural soil.
- ❑ Fences are assumed to have returns at each end.
- ❑ Required Rapidfence panel joints and step downs to be located at pillar positions.
- ❑ Insitu concrete, precast or timber base plinth can be installed if required.
- ❑ Engineer to be consulted if any of these design elements cannot be met to check adequacy of proposed fence and footings.

SHIELDED: non-exposed areas, i.e. areas shielded by adjacent structures.

Rapidfence height mm	1800	2100	2400
Concrete Pier diameter mm	250	250	250
Concrete Pier depth mm	900	1100	1200
Reinforcement bar diameter	Y16	Y16	Y20



NON-SHIELDED: slightly exposed sites, i.e. open areas or street corners where there is little or no shielding from adjacent structures.

Rapidfence height mm	1800	2100	2400
Concrete Pier diameter mm	250	250	250
Concrete Pier depth mm	1100	1250	1300
Reinforcement bar diameter	Y16	Y16	Y20

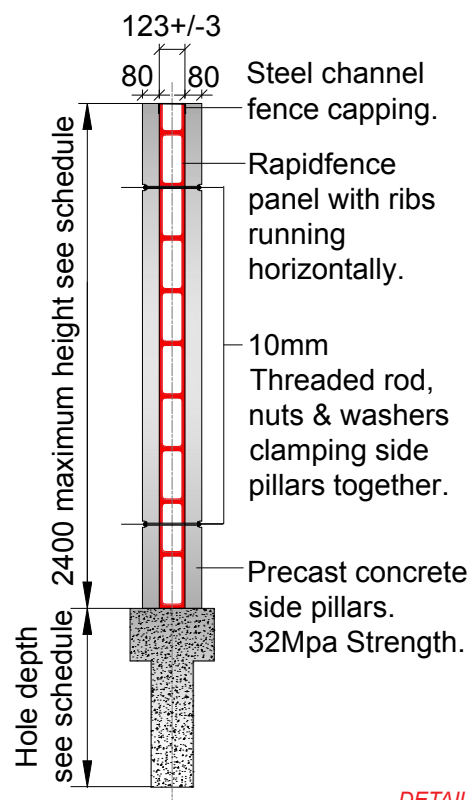
### Materials

- ❑ Post hole digger.
- ❑ 32MPa precast concrete pillars in various profiles as required.
- ❑ 20MPa concrete.
- ❑ 10mm threaded rod, nuts and washers.
- ❑ Reinforcement rod

### Erection Method

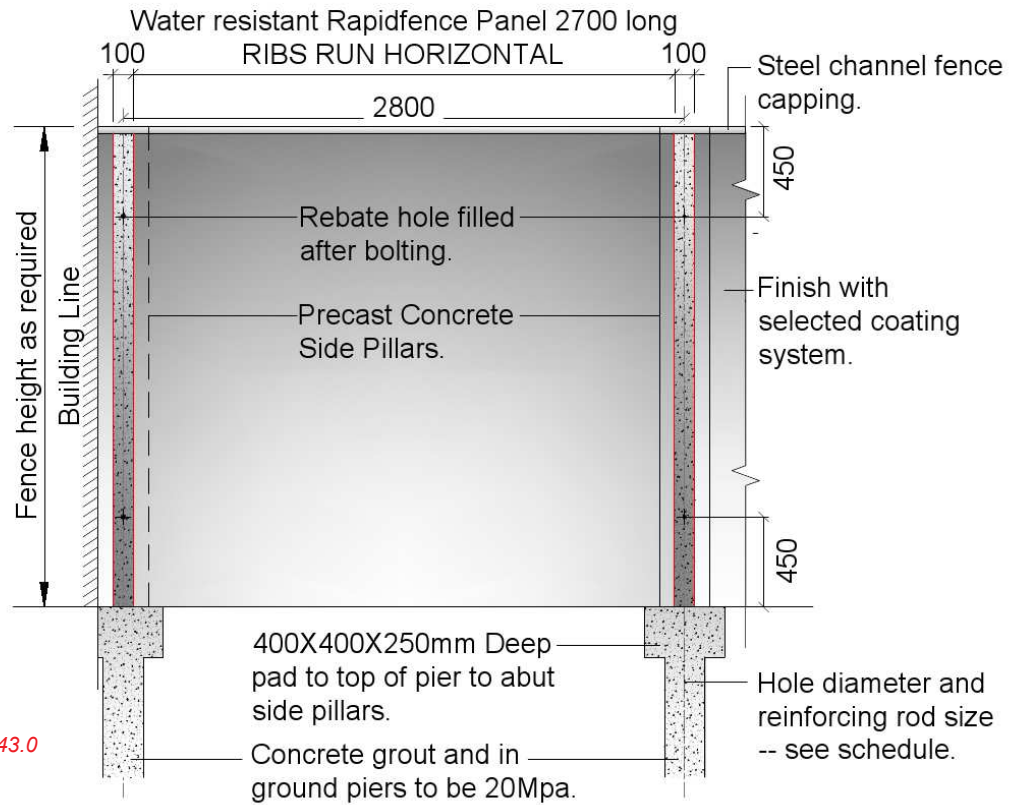
- ❑ Dig post holes to engineers specifications.
- ❑ Insert reinforcement rod to extend from concrete piers to full height of concrete pillar, or as detailed by engineer.
- ❑ Pour 20MPa concrete into piers. Leave at least 72 hours prior to fence erection.
- ❑ Install pillars as per engineers requirements.
- ❑ Lower Rapidwall panels into the slots of the pillars to desired depth. The Rapidwall panel can be installed vertically or horizontally if pillar space is equal or less than 3m. Align next panel to within 50mm of the centre of the concrete pier.

- ❑ Align panels and level off with packers between piers and underside of Rapidwall panel safely. If necessary fasten and secure the Rapidwall panel with stainless steel angles on the top and bottom. Additional fixing is only required if pillar slot is too wide.
- ❑ Prime and fill with polyurethane all gaps between pillar and Rapidwall panel.
- ❑ Fit metal capping over panels between pillars and seal.

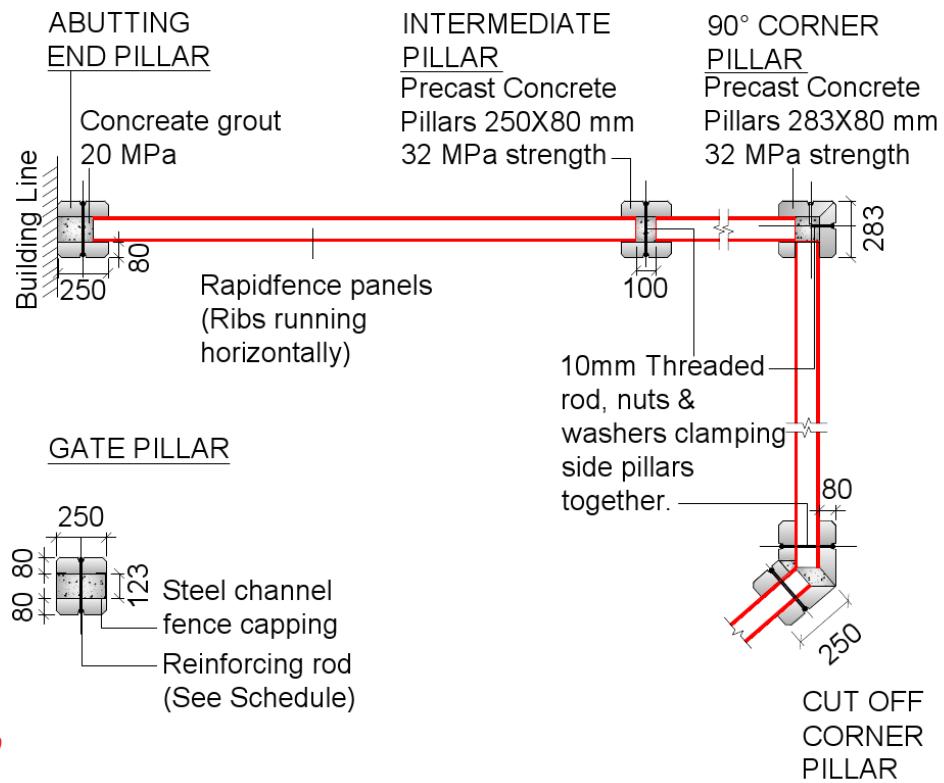


DETAIL 43.0

Rapidfence Type 3 (cont.)

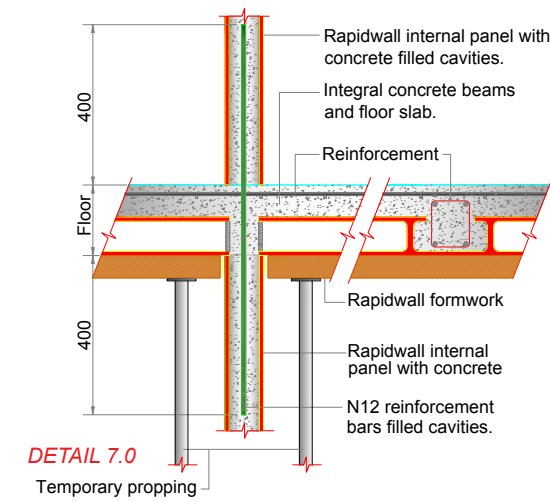


DETAIL 43.0



DETAIL 43.0

# RAPIDFLOOR OVERVIEW



A Rapidfloor consists of a Rapidwall panel with a concrete slab above.

The Rapidwall panel is laid horizontally and propped from underneath. Sections of the upper face cavities are cut away, reinforced with steel, in accordance with engineers specifications and concrete poured to form beam and new level upper face of floor.

The Rapidfloor can be used for all suspended concrete floors when concrete filled Rapidwall is used, or other similar structural walls.



*Underfloor section of Rapidroof*

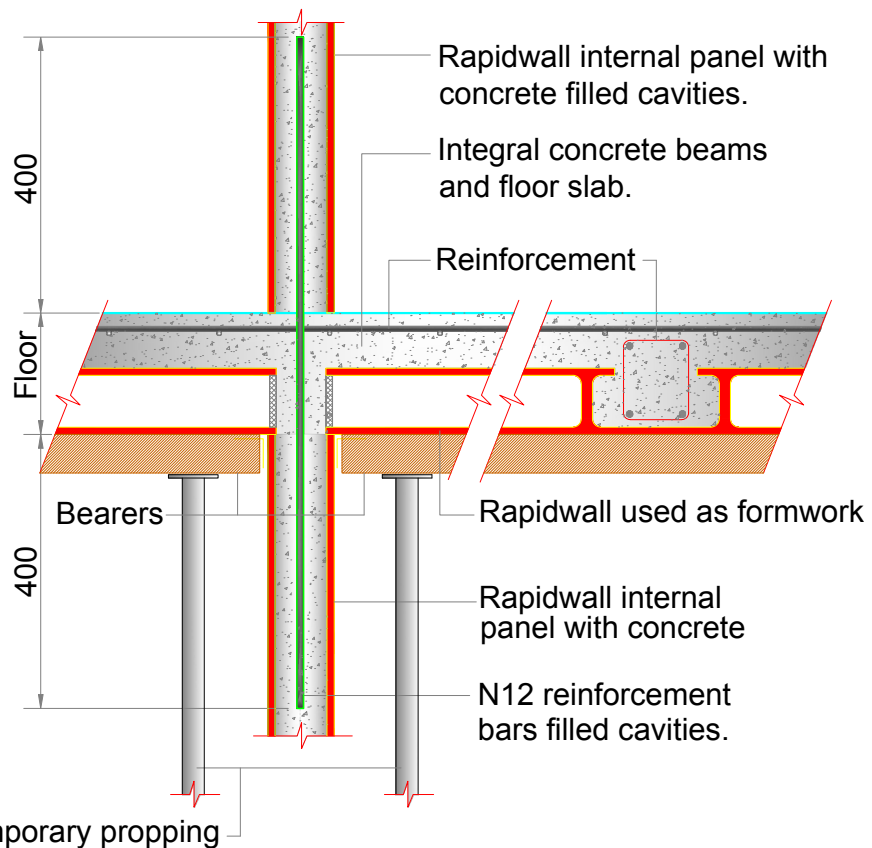


*Display section showing Rapidfloor construction*

## Benefits

- ❑ Panel is used as permanent formwork that becomes the finished ceiling.
- ❑ Panel cavities can be used for services.
- ❑ Cavities can be used to form beams with reinforcement specified by engineer and then filling with concrete.
- ❑ Panel easily cut to accommodate fittings.
- ❑ Quick and easy installation.
- ❑ On-site impact minimised.
- ❑ Faster to install than in-situ form ply.
- ❑ Fewer supports needed than traditional formwork systems.
- ❑ No excessive grinding to complete the substrate for example when an in-situ slab is stripped.
- ❑ Easy to add additional beams.
- ❑ Cost savings in steel and concrete when compared to conventional slab design.

## RAPIDFLOOR INSTALLATION



DETAIL 7.0

Concrete filled Rapidfloor Option A

A Rapidfloor can be used on any standard suspended poured concrete floor when used with concrete filled Rapidwall.

Depending on seismic conditions and local engineering practices the tie in between the Rapidwall and Rapidfloor can differ substantially to the details given in this section. Please request details from local Rapidwall supplier

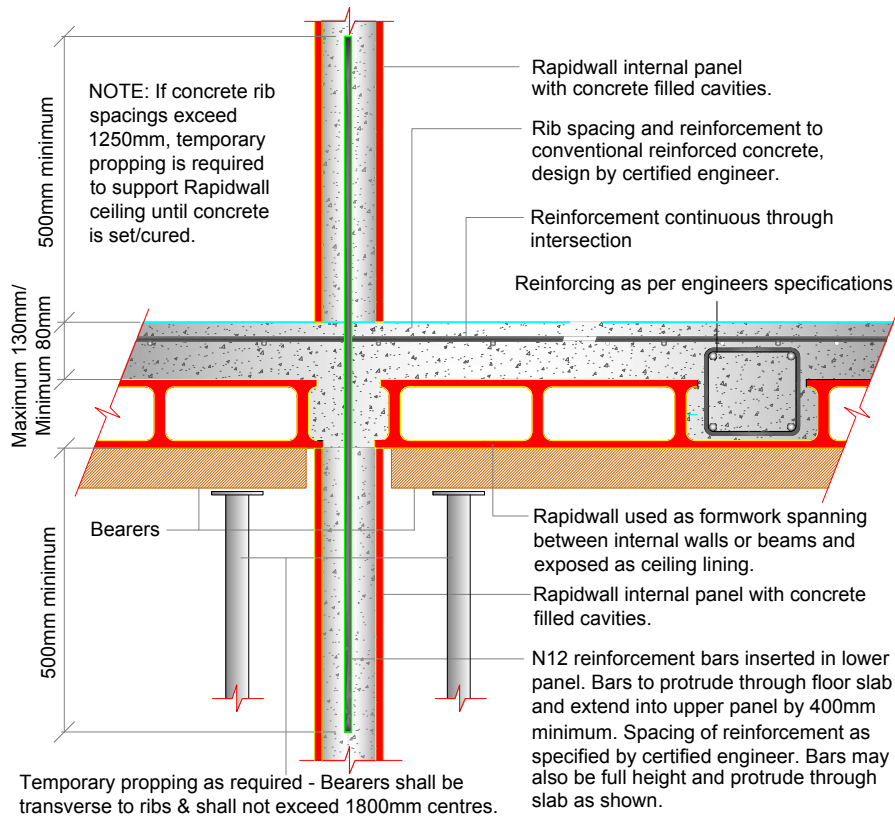
### Preparation

- ❑ Panel positions needs to be designed so that all floor panel cavities line up with each other as they are used to form mini-beams that are the size of 1 cavity.
- ❑ If two or more panels are required for a room they can be laid either side by side or end to end, each joint has a different fixing and require shoring up.
- ❑ Depending on the floor span the structural engineers decide on tie in with the walls, spacing and height of the mini beams.
- ❑ It may be possible to pour the slab and beams at the same time as the concrete wall fill. Consult the engineer as this would speed up installation.
- ❑ Standard construction method is based on the walls being filled first with concrete and allowing to fully set before pouring the slab and beam.
- ❑ Check that floor props to be used have the correct loadings and are in good working order.
- ❑ Ensure the following elements are available:
  - Rapidfloor panel, Reinforcement for the slab, Concrete, Additional materials, Personnel and equipment, Live and dead loads during the pour.

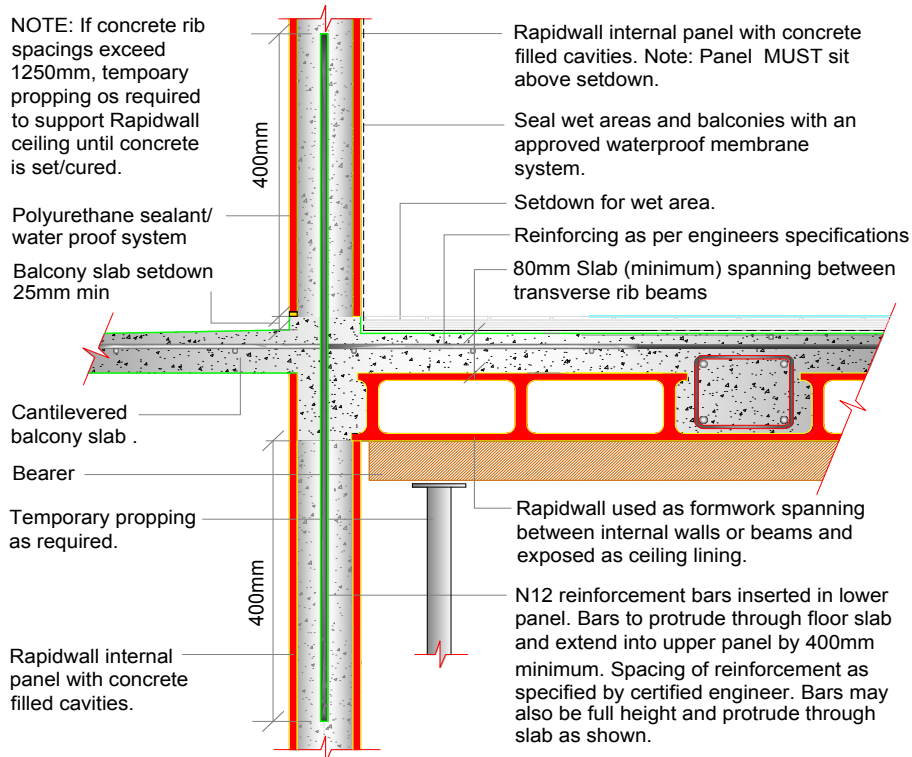
- ❑ Have available:
  - A hole saw and a soft sling.
  - A spreader bar to go underneath the panel to support the load when lifting the panel horizontally. The spreader should not flex under load.
- ❑ Remove as many wall props as possible to simplify the installation of the Rapidfloor supports and allow space for shoring up at panel joints.
- ❑ Using Rapidfloor setting out drawings mark position of Rapidfloor on adjacent walls, floor slab below and permanent working platforms.
  - Pay particular attention to critical locations such as where two panels meet without a supporting wall below joint.
- ❑ Mark the position of the props, position at a maximum 1.5m centres.
  - A prop cannot be placed directly under the cut out section which forms a beam instead it needs shoring up.
- ❑ To spread load on props use structural timber sections laid at right angles to cells.
- ❑ Props not bearing on a concrete slab require Sole plates.

### Positioning

- ❑ Lift and position Rapidfloor panels using sling and spreader bars as described in Lifting and handling Section.
- ❑ Once in position install props and shoring in the correct locations and tighten, ensure panel is level and in the correct position.



### Concrete filled Rapidwall and floor Option B



### Concrete filled Rapidwall and floor with balcony

## Shore up procedure

- ❑ Structural timber bearer to be used to support the Rapidwall floor panels in perpendicular direction to the cavities. The timber bearers are placed to support the panel next to where it sits on the Rapidwall wall panel and then every 1.5m apart or where two panels meet. Screw up props underneath and check levels and lock off when correct.
- ❑ Ensure the panel joints are perfectly flush otherwise additional grinding and patching will be required to return the ceiling to an even plane.

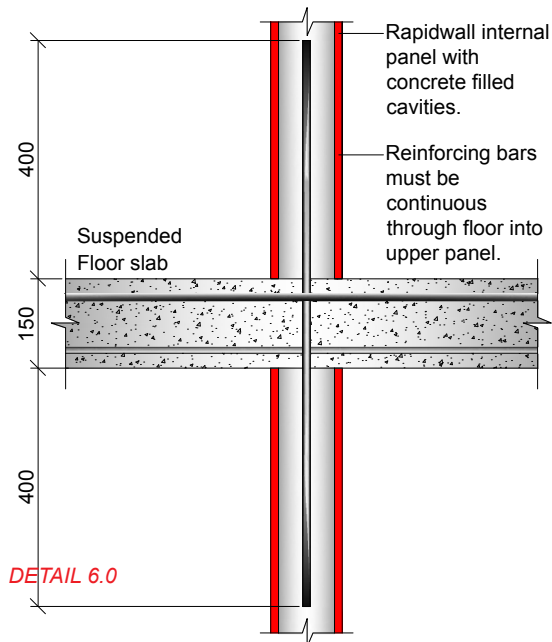
## Beam and Slab preparation

- ❑ Once Rapidfloor panels are in position and all checks completed the mini beams can be formed.
- ❑ Using the engineers plans mark position of beam on upper face of panel, 20mm in from the rib face.
- ❑ Clearly define the section that will be removed by marking with an 'X'.
- ❑ Cut out and remove each section as marked. Once removed a lip either side of the rib is left helping to key the panel to the slab.
- ❑ Once all sections have been removed, blow or vacuum out all the dust created from the cutting.
- ❑ Block the cavities ends that have not been cut out so that they do not fill with concrete during the slab pour.

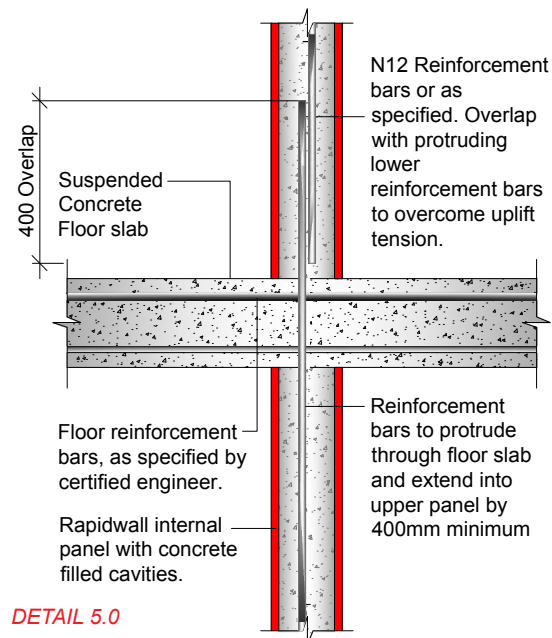
## Final Slab Preparations

- ❑ Repair soft sling lifting holes after all beams sections have been cut-out.
- ❑ If the panel needs to be brought back to its original fire rating ensure appropriate products are used.
- ❑ Repair method
  - Cut a piece of metal stud or flat plate large enough to cover the hole and screw into position.
  - Ensure the stud or plate will not cause any obstruction and is not higher than the bar chairs that will later be inserted and used to support the steel formwork.
  - Cut a piece of left over panel to the size of the hole and affix to the stud or plate with cornice cement or glue.
  - Ensure filler piece is flush with ceiling surface.
  - Any gaps between hole and filler piece should be filled with cornice cement or base coat plaster for a smooth finish and to prevent concrete leaking.
  - Insert all steel mesh and tie rods as per structural engineer requirements

## Internal Concrete Slab to Rapidwall without Rapidfloor



## Continuous reinforcement - Section



## Non Continuous reinforcement - Section

## Pouring the Slab

Pouring a Rapidfloor is no different to pouring a convention slab.

- ❑ Check tolerances between all panel junctions and panel to panel areas.
- ❑ All cavity ends that are not part of a beam, should be blocked.
- ❑ All gaps should be either permanently or temporarily blocked using foam, plaster, mastic, silicone or formwork depending on gap size.
- ❑ Do not stand on the panel edges or the cut-out cavities.
- ❑ After all checks are made slab can be poured.
- ❑ Slab concrete should have a slump of 80. The standard allowable tolerance is a margin of +/- 20mm. See slump testing procedure below.
- ❑ The slump of the slab is the responsibility of the engineer.
- ❑ When vibrating the slab ensure needle end has a rubber tip attached to reduce damage if or when the vibrator comes into contact with the panel.
- ❑ Ensure that the edges are vibrated well but avoid contact with the Rapidfloor panel.



## Procedure for Testing Concrete Slump



Equipment:

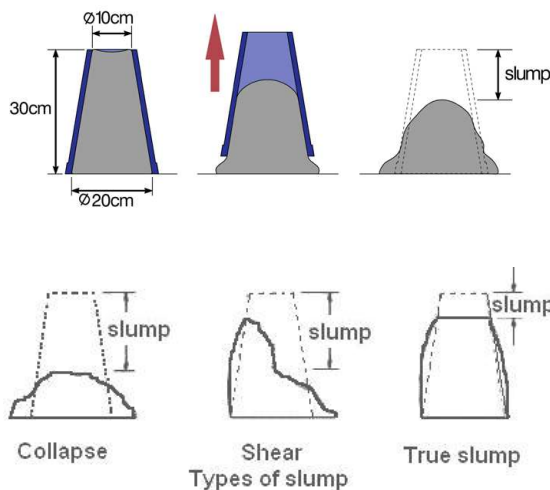
Abrams cone

Sheet of metal

Trowel to mix or work concrete.

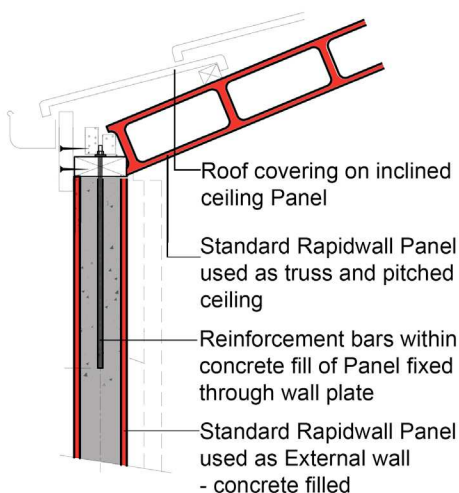
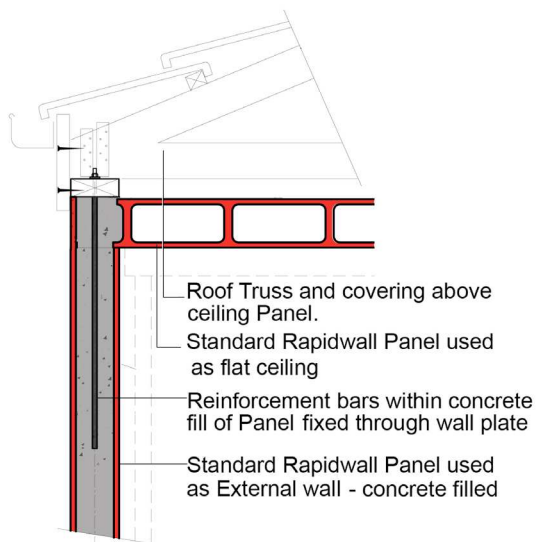
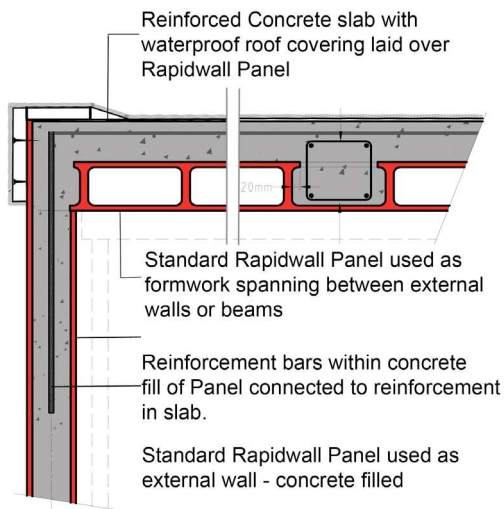
Steel tamping rod: 15mm diameter with rounded ends.

Tape measure.



- ❑ Use an Abrams cone or slump cone with a height of 300mm, a bottom diameter of 200mm and a top diameter of 100mm.
- ❑ Placed the cone on a metal sheet that is wet but has no standing water.
- ❑ Fill with fresh concrete in three stages, tamper each fill 25 times using the rod in a circular motion, for the first layer do not touch the sheet metal base. For subsequent layers do not pass through to the next layer by more than 25mm.
- ❑ If the concrete falls below the top of the cone repeat the process of adding more concrete until cone is full.
- ❑ Strike off concrete flush to the top of the mould and use the rod in a rolling motion to make flush.
- ❑ Carefully lift mould vertically so as not to disturb the concrete. This should take 3-7 seconds.
- ❑ The Concrete slumps, measure the height of slump to the nearest 5mm.
- ❑ Turn the cone upside down next to the sample and place the rod on top of the cone. Measure the distance from underside of the rod to the centre of the slumped concrete. A measurement of 50mm denotes a 50 slump.
- ❑ Only measure a true slump as shown to the left.
- ❑ If the slump is shear or collapsed repeat the procedure, A collapse slump is an indication of too wet a mix. or that it is a high workability mix, for which slump test is not appropriate.

# RAPIDROOF OVERVIEW



A Rapidroof consists of a Rapidwall panel laid either on a pitch without rafters or trusses or laid horizontally with a concrete slab above or with Trusses.

A Rapidroof can be filled with insulation for additional thermal performance. In all cases, a protective barrier, such as galvanised roofing or tiles must be laid over the weather exposed upper surface.

The Rapidroof is particularly suited to areas susceptible to fire and termites.

## The flat roof:

A flat roof is laid in the same way as the Rapidfloor. However additional structure and roof covering is required.

- A reinforced concrete slab is required for the structure.
- Appropriate care needs to be taken to prevent the slab leaking as Rapidwall is not classified as a water barrier.
- Roof covering can be either:
  - A crystalline waterproofing additive in the cement or, waterproof the surface and cover with a durable surface to walk on and to protect the waterproofing from UV breakdown.
  - A flat metal roof fixed on top of a flat Rapidroof surface, profiles such as Trimdeck.

## The pitched roof:

A pitched roof can have the panels laid on the required pitch replacing rafters and trusses or laid in the same way as the Rapidfloor and have trusses above.

- Trusses can be attached to form a pitched roof.
- Standard roof battens are fixed to the panel after which the roofing iron will be affixed to the battens as per normal construction practices.

# RAPIDROOF INSTALLATION



The idea of a Rapidwall roof is a sound concept and has practical merits where the house is in an area susceptible to bush fire, termites or if a lower pitched roof line desirable.

Since the roof panels are exactly the same as the wall panels they will have the same fire ratings as the hollow wall panel.

It is possible to build a house, more resistant to bush fires, compared to a standard brick veneer constructed house.

Where the roof panels will have no rafter or trusses fixed to them it will be necessary to lay the panels on the required rake or slope.

These panels will be installed in the same manner as the Rapidfloor panels previously described.

After these roof panels have been installed standard roof battens will need to be fixed to the panel after which the roofing iron will be affixed to the battens as per normal construction practises.



## Horizontal roof panels

- ❑ Form a flat ceiling internally, the same as Rapidfloor.
- ❑ Can have a flat or pitched roof above.
- ❑ Pitched roofs require trusses to be attached.
- ❑ Flat roofs require a reinforced concrete slab, as described in the Rapidfloor section.
- The roof can be used as a roof terrace and have any covering a standard flat concrete roof would have.
- Ensure the roof has a durable surface to walk which is waterproof and prevents UV breakdown.
- Care needs to take to prevent the slab leaking as Rapidwall is not classified as a water barrier.
- A crystalline waterproofing additive can be used in the cement





## Wall Top Plate

A top plate needs to be installed on top of the upright Rapidwall panels.

- ❑ To distributes the bearing load of the trusses and the roofing.
- ❑ To provides a fixing for the trusses using conventional methods i.e. nails and fixing plates.
- ❑ methods to be compliant with local standards for wind loadings.
- ❑ If uplift exceeds the weight of the panel at  $44\text{kg/m}^2$  the connection must be fixed to the supporting slab.
- ❑ Any required support beams should be supported by columns.
  - Form by filling the wall cavity below the beam with concrete, this will transfer that load directly to the slab or footings.
  - Or install internal/external columns if the design requires.

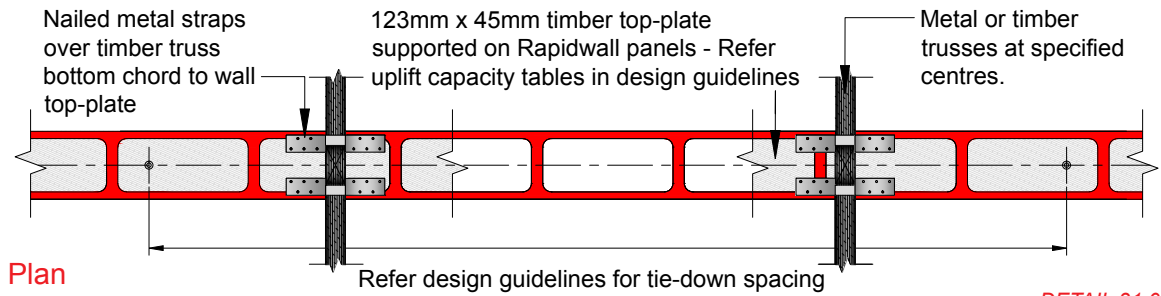
### Recommended fixing/tie down methods

- ❑ The Standard Method: directly fix into the concrete cavity fill.
- ❑ The Hollow Method: direct fixing through a non concrete filled cavity to the concrete slab.

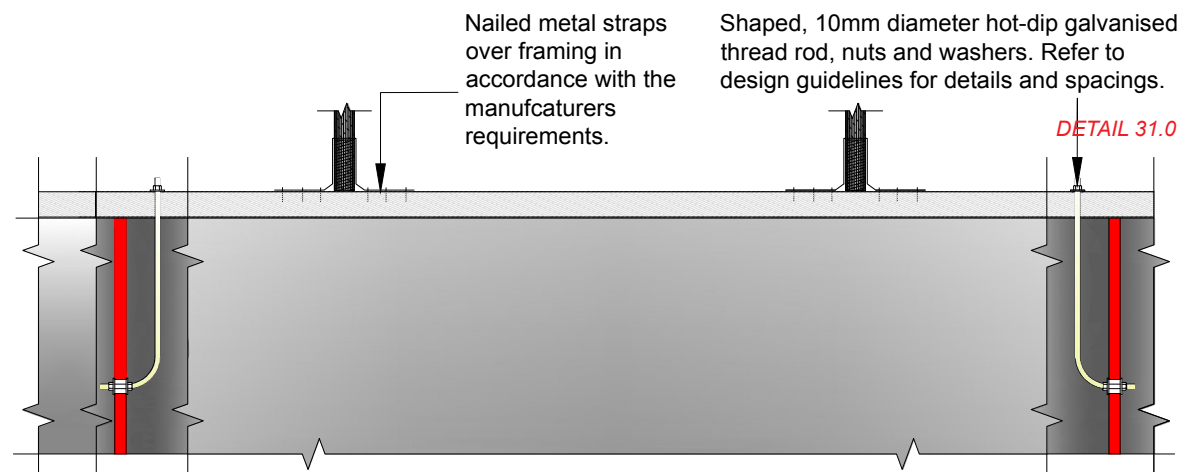
### Alternative methods

- ❑ Directly fix to the Rapidwall panel.
- ❑ Fix to a supporting bar that is fixed into the panel.

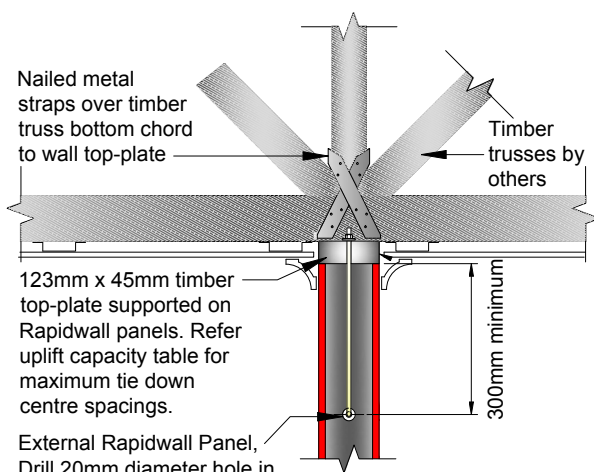
## Roof tie down details



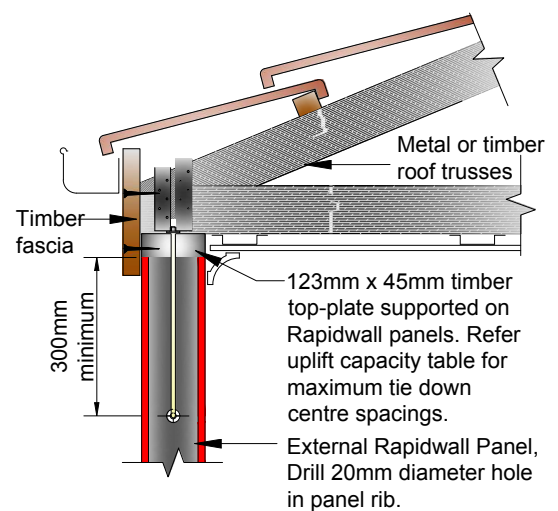
DETAIL 31.0



## Longitudinal section



DETAIL 30.0



DETAIL 31.0

## Typical cross sections

## The Hollow method

If the cavities are to be left hollow or filled with sand or insulation instead of concrete the hollow fixing system should be used.

A threaded rod is securely fixed to the floor slab below and passes up through the cavity and is secured to the top plate with a washer and nut.

- ❑ Prior to lowering the walls onto the slab a Loxin™, Dynaset™, TRDAC Tie Down Anchor or Chemset™ or other suitable fixing method should be fixed in the slab and positioned in the centre of the cavity.
- ❑ Lower the panel to within approximately 100mm of the slab and place temporary safety blocks under each end of the panel.
- ❑ lower the threaded rod through the cavity from the top and screw or tied into the fixing.
- ❑ Engineer to determine number of tie downs, size of rods and fixings
- ❑ Once all rods are secured remove the safety blocks and fully lower the panel onto the slab.
- ❑ Position timber top plate and tighten nuts over washers.
- ❑ Ensure top plate is positioned properly to have an even bearing on the panel.
- ❑ Timber top plate to be same width as the panel : 123mm
- ❑ As a rule of thumb, the thread should extend a third of the width of the nut past the top of the nut.
- ❑ Complete wall installation including any fill, top plate can temporarily be removed when filling, ensure rod remains centred and vertical and secure plate into position after cavity has been filled.

## The Standard method

In this method the timber top plate is securely fixed to the concrete cavity fill that has been finished flush with the top of the panel.

Panel to be same width as concrete.

There are two recommended methods.

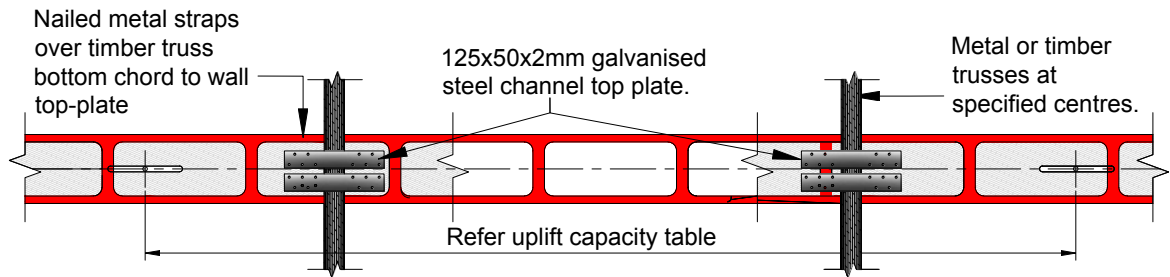
### Fixing anchor method

- ❑ Use a standard fixing anchor such as TRDAC Tie Down Anchors or CHEMSET™.
- ❑ Follow manufacturers guidelines for fixing anchor through timber top plate and securing into the set concrete.
- ❑ Anchor should be fixed in the centre of the filled cavity.

### Threaded rod method

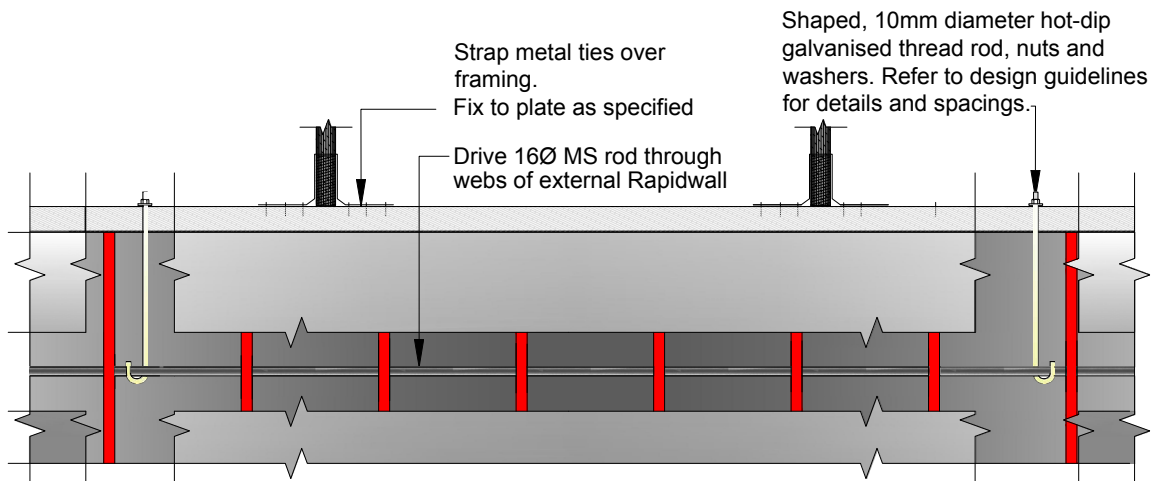
- ❑ Use a threaded rod, minimum length: 600mm, nominally 12mm. To engineers requirements.
- ❑ Bolt a 50 x 50mm structural washer between 2 Nuts at one end of the threaded rod.
- ❑ On the other end wrap PVC tape around thread to just below the concrete level. This will protect the end from concrete contamination which could later hinder nut placement.
- ❑ After the concrete is poured into the cavity insert the end of the threaded rod, with the washer and nuts attached, into the wet concrete to the correct height above the panel.
- ❑ Agitate the threaded rod in vertical motion and tamp down to ensure correct concrete compaction around the thread.
- ❑ Once the concrete is set drill a hole in the centre of the top plate, place over rod and fix into position with washer and nut.

## Roof tie down alternative details



Plan

DETAIL 32.0

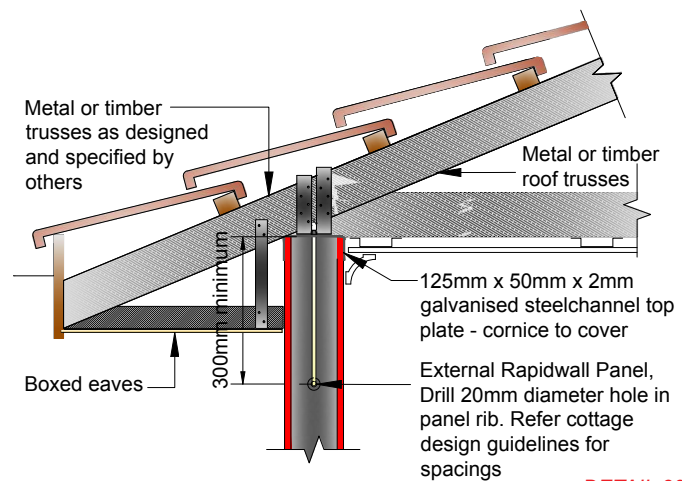


Longitudinal section

DETAIL 32.0

### Gauge to Millimetre Conversion Chart

Self Tapping Screw Gauge	Size (mm)
4	2.9
6	3.5
8	4.2
10	4.8
12	5.5



Cross section

DETAIL 32.0

## Roof Battens

Timber or metal battens can be used with Rapidroof, it is recommended that metal battens be used due to Rapidwall panels having consistent tolerances.

### Metal battens

- ❑ Manufactured to a consistent size and quality with minimal size variation.
- ❑ More economical and easier to work with than timber.
- ❑ Easier to transport, store and handle on site.
- ❑ Will not rot and is not susceptible to termites.
- ❑ A metal roof batten is a steel section made from hi-tensile grade steel to complying with AS1397-2001 G550/AZ150.

### Types of metal batten available

- ❑ Minimum base thickness of 0.55BMT only for use in non-cyclonic regions.
- ❑ Minimum base thickness of 0.75BMT required for cyclonic regions.

### Installation of Battens

- ❑ Consult the engineer and batten manufacturer for the correct batten and fixings to be used both for wind rating and environmental reasons.
- ❑ Fix battens to Rapidwall with a proprietary fixing system for use with a hollow product.
- ❑ Two suitable products are WALLMATE™ and a Metal TOGGLE™.
- ❑ Ensure correct battens, grade and thickness have been delivered.

- ❑ Mark out and chalk a line for each batten. Comply with manufactures and engineers specifications for edge offset and spacing.
- ❑ Pre-drill the battens at the required centres to line up with the cavities, not the ribs.
- ❑ Lay out battens and drill pilot hole through the battens into the panel. Ensure that it is perpendicular to the surface of the panel.
- ❑ Complete one run at a time. Use a batten as a guide to avoid going off-line.
- ❑ Tighten all screws but do not over tighten or strip them from their positions.
- ❑ Once all battens are installed the roofing may be installed in accordance with standard practices.

### WALLMATE™ fixing

- ❑ Pilot hole needs to be large enough for an 8 gauge screw to pass through easily.
- This will ensure that the WALLMATE™ will fix flush to the surface and provide maximum hold within the panel.
- ❑ After all WALLMATE™ fixings have been fitted, screw fix all the battens to them using a 8g screw.

### Metal TOGGLE™ fixing

- ❑ Use the 100mm long toggles.
- ❑ Pilot hole needs to be large enough for a 3/16 screw or 4.8mm screw to pass through easily.
- ❑ Drill a hole large enough to allow the TOGGLE™ body to easily pass through.
- ❑ Insert the TOGGLES™ two at a time, down the length of the batten and fix.

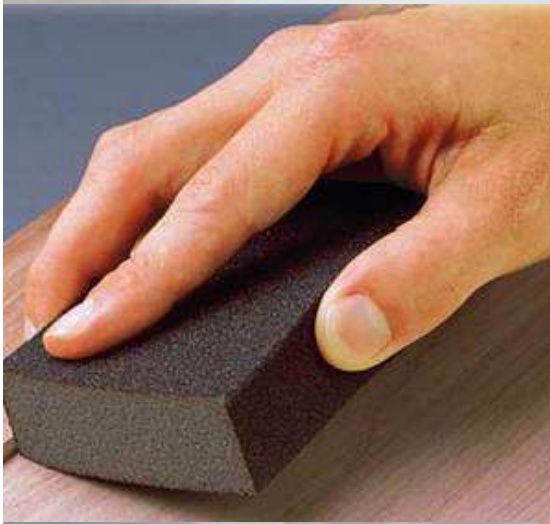


## Preparing Panels for Finishing

Rapidwall is manufactured from glass reinforced plaster; finishing and repair work is similar to working with plasterboard, the same tools can be used.

Rapidwall, like other building products, can suffer damage during the construction process due to transportation, site handling, installation, core-filling or by other trades. Before installing external

There are many primers, paints and texture products available on the world market. Below are two product systems which have performed well in the Asian region. If systems from other companies are to be used the company must test them on Rapiwall and provide a written guarantee prior to use. Mixing a system from one company with a system from another company is not recommended.



*Giraffe Dustless Pole Sander*

### Preparation:

- ❑ Determin extent of preparation and repair work required.
- ❑ Preparation is critical. The better the substrate preparation the easier it is to apply patching compounds resulting in a better finish.
- ❑ Clean and dry Rapidwall panel: free of contaminants; splashes of plaster, mortar and silicone compounds or the like.
- ❑ Primer sealers:
  - Apply an approved primer sealer in accordance with the manufacturers recommendations. This is critical to ensure a proper bond between the panel and patching compounds, cornices or reveals.
  - All external edges and surfaces must be primed or sealed with either Astec Rivet or Euromix Sealer Primer or other approved products. The best primer sealer products are solvent based
  - Priming is required:
    - Before installing external angles and sealing holes in the panel caused by lifting or prop bolt holes.
    - Before applying any external patch products.
    - After grinding a rebate.
    - Between panels that form a expansion joint.

### Approved External Primers

**Astec Rivet:** Solvent based sealer/binder that penetrates the panel surface allowing for good adhesion to occur between the patching product and the panel. Others primers are available from Astec are epoxy or waterbased and tested with Rapidwall.

**Astec Epi-tec Primer:** Water based two pack epoxy primer. This is lower in odour and has the advantage of easier clean up.

**Euroset Euromix®:** Solvent based sealer/primer penetrates the surface to provide good adhesion between the panels and the patching product.

### Sanding

The better the joint or repair, the less sanding required. Use sanding grit grades of between 180 and 220.

Wait until the base/patching coat has completely dried before sanding.

If wall surface is not to have a finish coat but to be painted ensure base/patching coat is feather out at the edges so the joint will not be seen under the paint.

#### Sanding Equipment

##### ❑ Pole Sander

- This is an aluminium plate that holds the sanding paper securely with clips either side of the head and attached to a pole. They have a gimballed joint on the sanding head to keep the sandpaper flush against the wall surface. This is the minimum that should be used to sand the walls but is far more work intensive than a Giraffe Sander.

##### ❑ Dustless Pole Sander

- This is similar to a standard Pole sander with the added feature of a vacuum attachment to the head which minimises the dust created from sanding.

##### ❑ Giraffe Sander with vacuum.

- Have a universal joint head so it will stay in contact with the wall surface during use. Use perforated sanding pads that minimize clogging and allow for easy dust collection. Ensuring a relatively dust free work environment and a quick and consistent finish. The sanding disc pad must be cushioned to ensure the sander does not cut grooves which can happen with non padded discs.

##### ❑ Hand Sander

- These have a heavy duty plastic handle with either a plastic or solid aluminium plate with screw fitted metal clamps at each end to securely hold the sand paper. There is dense neoprene foam on the underside that creates an even contact with the surface being sanded. These are good for large areas or patch repairs where the Giraffe Sander is unnecessary. These are a good alternative and should be part of any plasters patching kit.

##### ❑ Sanding Sponge Pad

- The sanding sponge is made of a foam block that is wrapped in sandpaper on four sides. The blocks can be used to sand flat and contour surfaces while being wet or dry. The sanding sponges are disposed of after several uses or when there is no longer texture on the block. Used to sand patched areas.

##### ❑ Foam Sanding Angle Pad

- The same as the Sanding Sponge but used for internal corners. It has a bevelled edge to ensure sanding one side of the corner at a given time. This will avoid over sanding the other side and exposing the paper tape which would mean restarting the corner finish coating from the beginning.

## Repairing Panels



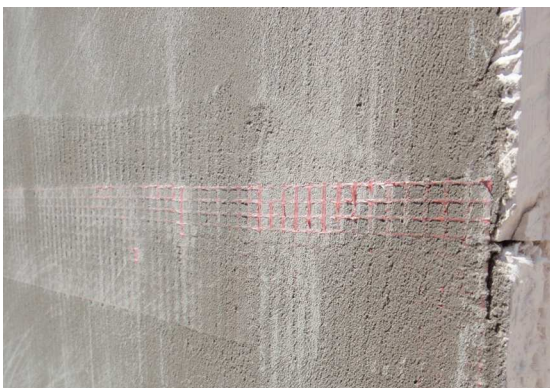
*Repair to mid section of crushed panel*



*Repaired section of panel showing fibre glass tape, patching plaster and primer*



*Section of joined panels showing fibreglass tape and corner bead*



*Wall joint showing embedded fibreglass tape*

### Panel Repairing types

- ❑ Non fill panel damage: Cut out and remove affected area.
- ❑ Concrete blowout: Grind flush affected section.
- ❑ Penetration through the panel: Services or fixtures can penetrate the panel skin or pass completely through the panel. The penetration is repaired by “wadding” around the opening.
  - “Wadding” is a stiff mixture of plaster and fibre glass rovings. When placed or packed around the penetration, the wadding sets and bonds to the panel and the service or fixture to provide a permanent fixing ready for final flushing or tiling.
- ❑ NEVER USE INTERNAL DRY AREA PLASTER PRODUCTS FOR EXTERNAL OR WET AREA APPLICATIONS.

### Repairing Non fill panels

Rapidwall non fill walls and ceiling are repaired in the same manner. Make good any damage or penetrations caused by installing the ceiling/floor panels and prepare them ready for painting.

- ❑ Equipment and Materials.
  - Clean buckets, Broad knives or Trowel, Mixing Board or Hawk, and Cornice Cement.
- ❑ Work on a small area at a time, cornice cement sets much faster than normal plaster.
- Mix only enough plaster required for the repairs.

## Approved External Patch products

### □ Repairs to large holes.

- Patch hole with a piece of panel and securely fix.
- Lightly grind back the area for repair so that the inserted piece is ground back below the surface of the panel.
- Patch first with cornice cement as this product is acceptable as a fire retarded product.
- Ensure it is flush to the panel surface to allow for one coat of base coat, preferably two.
- Apply plaster Finish or Top Coat by spraying technique as previously described.

### □ Repairs to small holes.

- If hole can not be patched with a piece of panel use some form of backing instead such as cardboard with a string attached. This will make filling easier as there will be stable backing against which to push the plaster.
- If there is exposed fibreglass try to force that up into the mix.
- Allow time to set between mix to avoid collapse of mixture.
- Don't leave excess on the panel face. When hole is nearly full fill out with Base Coat.
- Apply plaster Top Coat by spraying technique.

**Astec Armatex Prepatch Fine:** acrylic based patch product that is ready to use from the bucket. Requires approximately 10% cement by weight to be added. It will cover imperfections of 2 – 4mm and it can be feather out to 0.10mm. It is primarily used to remove fine imperfections only.

**Astec Armatex Prepatch Medium:** acrylic based patch product that is ready to use from the bucket. Requires approximately 10% cement by weight to be added. Covers imperfections of 2 – 3mm and it can be feather out to 0.35mm. This is the primary product used for general patching and can be applied by hawk and trowel. Can be spayed if entire surface is required to be covered.

**Astec Armatex Prepatch Course:** acrylic based patch product that is ready to use from the bucket. Requires approximately 10% cement by weight to be added. It will cover imperfections of 2 – 4mm and it can be feather out to 0.65mm. This is the primary product used for larger patching and can be applied by hawk and trowel. Can be spayed if entire surface is required to be covered.

**Euroset Euromix® Fine Coat:** acrylic based patch product ready to use from the bucket. Requires approximately 5 - 10% cement by weight to be added. It is used for repairing surface defects up to 2mm. Application is by hawk and trowel.

**Euroset Euromix® Patch Fine:** acrylic based patch product ready to use from the bucket. Requires approximately 5 - 10% cement by weight to be added. It is used for repairing surface defects up to 4mm. This is the primary product used for general patching and can be applied by hawk and trowel.

**Euroset Euromix® Patch:** acrylic based patch product ready to use from the bucket. Requires approximately 5 - 10% cement by weight to be added. It is used for repairing surface defects up to 6mm. Application is by hawk and trowel.

## Repair concrete blow in cavity

Where the panel has deformed due to the blowout it is important to deal the situation immediately or at the latest, before the concrete hardens.

The best time to undertake this repair is when the concrete has become firm or is still green.

- ❑ Remove all excess overburden or spilt concrete ensuring the area is clean.
- ❑ Determine the extent of the blowout by using a straight edge or spirit level flat to the panel face.
  - Slide the straight edge down the face and locate the deviation. This is similar in practice to the process used by carpenters when straightening timber stud frames.
  - Mark the extend of the deformation around the blowout with a pencil.
  - Use a straight edge on the ridge of the blowout and measure the deviation from the panel face.
- ❑ Deviations less than 10mm: grind back the skin using a special grinding machine and later finish flush.
- ❑ Deviations greater than 10mm: remove the panel skin.
  - Cut the section of deviated panel out by making cuts approximately 14mm deep, through the panel wall thickness.
  - Remove the panel section completely and discard.
  - Recheck enough of the panel has been removed by using the straight edge flush to the wall and remove more if necessary.

- Scrape or grind back the blown out concrete to below the internal surface of the panel.
- Completely clean the panel surface and remove all excess concrete before it sets otherwise the patching product will become grit laden at the repair stage.
- Leave the blowout section until the concrete is completely set. Protect from the elements.



*Repairing a concrete blowout*

## Patching concrete blowouts

- ❑ Applying the first Coat
  - Use Cornice Cement. Note that it will harden quickly so fast work will be required.
  - Mix up the Cornice Cement and using an old trowel, as it will probably get damaged slightly working over the concrete, apply the first coat to the exposed concrete. Fill the void at least half way to the flush face of the panel.
  - Ensure there are no voids, air bubbles or sagging cement.
  - Scrape and clean all edges before cement sets.
  - While setting, clean all equipment and prepare for second mix.
  - Leave to gel so its firm.
  - Mix a second batch of Cornice Cement, apply over the first coat. Fill to just below the panel face use either a wide trowel or a straight edge. leaving no trowel marks or at least only minor ones.
  - Clean up all the edges whilst the plaster is wet
  - Leave to fully dry.
  - Once dry, finish off the repair with Base and Finish Coats and required surface preparations.

## Repair a cracked panel corner

- ❑ If cracked section is still held to the panel by the fibreglass fibres. Reinsert metal stud. Screw loose piece to the stud.  
OR
- ❑ Install a metal stud along the crack line i.e. backing the crack and screw into it.  
OR
- ❑ Fill with concrete to give a strong support to the joint.
- ❑ If the piece has come completely away from the panel. Insert the stud; screw the piece to the stud. If the wall is to be left hollow, install the stud as you would a closure stud, ensuring the length of the stud extends well below the lowest point of the broken piece.
- ❑ In each case flush as required.

## Repair a crushed cavity mid-point of the panel

- ❑ If the panel is to be cavity-filled and only minor damage has occurred, brace the inner or outer section as required and fill the cavity taking care to avoid a blow out. Once concrete is set it will give a solid base from which to repair the panel.
- ❑ If a significant section has been damaged or is missing, bolt a section of structural ply through the panel and secure it, carry out the core-fill. Before the concrete has completely set, remove the ply and bolts. Remove any over filled soft concrete and make the area as clean and free of concrete as possible.

## Finishing Panel Joints

Rapidwall construction has butt joint, movement joint, internal and external corners as with traditional construction.

All joints to be finished flush.



### Joint Equipment & Materials

- ❑ Same as Plastering equipment: Mixing Drill and paddle, Jointing Application.

### Interior

- ❑ Paper flushing tape. Metal corner angles and bead accessories. Paintable acrylic sealants. Approved flushing plasters and skim coats.
- ❑ Paper tape joints produce stronger and more enduring results than those that are set with fibreglass tapes. Do not use fibreglass tape as it is known to crack.

### Exterior

- ❑ Fibreglass flushing tapes
- ❑ Rigid PVC or stainless steel corner angles and bead accessories are recommended, galvanised metal products are not recommended and have been shown to rust long term and cause external finishes to cleave off
- ❑ Exterior construction grade paintable polyurethane sealants
- ❑ Approved flushing plaster "setting" cements with water resistant acrylic bonding additive. (Do NOT use any other retarders or accelerators in the mixture)

## Internal Base Coat

- ❑ Used to tape joints and for 2nd coats.
- ❑ When taping in you will use more mix than when applying the 2nd coat.
- ❑ Setting time is between 45 and 60 minutes depending on the brand being used.
- ❑ To extend working time by up to 20 minutes add a small amount of citric acid (1/2 tea spoon) to the mix. Do not use too much. .
- ❑ Do not use Citric Acid in hot environments above 25 degrees centigrade, .
- ❑ When base coat starts to set it becomes un-workable quite quickly. As soon as this occurs, wash out remainder of base coat and start with a fresh mix.

## Internal Corners

Internal corners can be treated in the same manner as setting plasterboard internal corners.

### Methods

- ❑ Complete all wall joints first.
- ❑ Fill any holes or gaps greater than 5mm and scrape flat.
- ❑ Use a 75mm or 100mm scraper and an internal corner trowel.
- ❑ Once base coat has set but not dry use a scraper to remove any excess base coat material from the joint. Scraping back dry base coat is very difficult.
- ❑ Use an internal taping tool, also known as a Box to tape in an internal corner.
  - Experience with tool required.
  - Ensure angle is set correctly.

- ❑ Cut the paper tape to the required length before installing.
- ❑ Wet the back of the tape with a continuous layer of plaster and feather out the edges.
  - Apply enough pressure to squeeze out all the base coat from under the tape.
  - Use long smooth strokes for the best result.
- ❑ Do not over fill a joint on the first taping coat.
- ❑ Check for bubbles in paper tape.

## Repairing Bubbles in Paper tape

It is common for bubbles to appear in paper tape. They occur because the tape was not fully bedded to the base coat of plaster and is not fully bonded to the plaster.

- ❑ When the first coat of paint is applied the paper tape absorbs the moisture from the paint and swells causing it to lift away showing up as a bubble.
- ❑ Check for bubbles before leaving the job and at the latest after the sealer coat of paint has been applied.
- ❑ To repair cut around the outline of the bubble with a Stanley knife or box cutter ensuring you cut through the tape.
- ❑ Remove the delaminated tape, avoid lifting the laminated tape.
- ❑ Slightly depress the edges of the laminated tape using the handle of a scraper.
- ❑ Small sections of tape do not need to be replaced.
- ❑ Fill the removed section with cornice adhesive using a 3 coat system as described in patching a hole.
- ❑ Do not over fill each coat.



## Butt and Movement Joints

In the building design stage it may be possible to eliminate most if not all joints. It makes practical sense to have as few joints in the panels as possible as this reduces the time and cost associated with finishing.

Where this is not possible joints need to be prepared and repaired to achieve the most presentable finish.

There are several ways of dealing with a butt joint depending on the structure type that has been constructed with Rapidwall.

### Concrete filled cavities with cast in-situ slab above

- ❑ Structure reacts in a much more uniform manner to thermal variations than other construction methods thus possible to eliminate expansion or expressed joints.
- ❑ Where a joint is necessary it can be completely set over and then re-cut. This provides a very discrete joint and blends into the wall.
- Cut a 5-10mm groove with a masonry grinding disk into the panel and fill this cut joint with Sikaflex Pro polyurethane.

### Concrete filled cavities with standard roof trusses

- ❑ Metal or timber framed trusses are not as rigid as a slab and slight flexural movement in the panel joint may occur.
- ❑ It is therefore necessary to finish joints appropriately.
- ❑ Joints, or square set ceilings can be finished with a joint bead that is flushed in with Cornice Cement or Base Coat products and the expressed joint filled with Sikaflex for a clean finish.

- ❑ Alternatively, a recess can be created.
- ❑ Creating a recess – internal
  - Equipment required: Personal Protection Equipment (PPE), Tape, Pencil, Straight Edge, Grinder with Concrete Cutting Blade, Vacuum to attach to grinder
  - Preparation
    - The recess will need to be done once the panel installation is complete. Where the panels are cavity-filled remove the screws as they will limit the depth of the recess.
  - Recessing
    - Mark a plumb line 50mm either side of the butt joint this is the section that will be removed
    - Remove all screws that are within that area
    - Using a grinder with vacuum attached remove approximately 2 – 3mm of the entire butt joint

### Movement joints

Rapidwall panels have minimal thermal expansion or contraction compared to heavy weight building materials such as masonry and concrete. It is still important to provide movement joints to allow for overall structural movements and to accommodate articulated wall design.

- ❑ Interior joints can be formed using standard flushing angles.
- ❑ Exterior joints requires PVC flushing angles, heavy duty galvanised or stainless steel angles for long term corrosion protection.

## Movement joints

- ❑ Joints should be 10mm wide at a maximum of 6.0 metre intervals, or as specified by the architect in consultation with the engineer to suit building appearance.
- ❑ Joint materials: closed cell polyethylene, compressible filler strip or backing rod and sealed with construction grade paintable polyurethane sealant. Polyurethane does not necessarily stick to Rapidwall and therefore the area where the polyurethane will be applied must be primed first. Follow the manufacturers instructions.
- ❑ Exterior wall construction: Rapidwall panels abutting either vertically or horizontally (gables, wall panel on top of wall panel) are best detailed by expressing the joint rather than flushing and thereby risking cracking at this intersection.
- ❑ Ensure sealer primer is applied to the wall surface and is dry.
- ❑ Fix the PVC angle to the joint by using a suitable adhesive or stainless steel staples. Fit the angle after you have set the joints to form a uniform flat surface. It is also important that all joints are dry before fitting the angle.
- ❑ Use a broad knife to apply a light first coat of the course patching plaster approximately 200mm wide. Make sure it completely covers the fin of the angle.
- ❑ Feather the edge and do not allow any excess to harden.
- ❑ Leave to set and harden.
- ❑ Using a 300mm wide trowel apply the second coat of course patch plaster over the first coat.
- ❑ This coat needs to be wider to achieve a gradual blending in from the centre of the expansion joint.

## Setting Joints

- ❑ Mix the base coat with clean water to a toothpaste consistency. It should still stick to the trowel. If not add a small amount of the dry base coat and remix. Remember over mixing shortens the working life as does adding plaster constantly.
- ❑ First Coat and Tape:
  - Measure and cut to length all the required paper tape for each joint to be patched.
  - Using the small trowel or broad knife, fill the joint almost fully flush to the panel face.
  - Press the paper tape centrally into the wet base coat.
  - Trowel a small amount of base coat over the paper tape just to cover it and bed in the tape.
  - Remove any excess base coat from the edges.
  - Allow to fully dry. If needed lightly sand the first coat.
- ❑ Second Coat
  - Apply another thin coat of base coat with a wider trowel or broad knife approx 200mm wide. Cover the joint and spread beyond the first coat to widen the joint. This helps to blend the joint into the wall.
  - This layer needs to be left flat and tight as it will create more work when applying the final coat.
  - Remove any excess base coat from the edges.
  - Allow to fully dry.

## External angles beads

As previously outlined external angles must be stainless steel, high grade galvanised metal or PVC. Stainless steel is recommended. There are external angles in dry and wet area application.



NEVER USE INTERNAL DRY AREA PLASTER PRODUCTS FOR EXTERNAL OR WET AREA APPLICATIONS.

### Materials and equipment

- ❑ External Angle bead, Fibre glass tape, Stainless steel staples and staple gun, Board knife, 300mm trowel, Coarse patching cement, Bucket of water and scourer.
- ❑ External angles are to be fitted after the sealer primer has been applied. They can be either stapled or glued to the panels.
- ❑ Stapling: use only stainless steel staples to overcome corrosion and any adverse reaction between the angle and or the fixing method.
- ❑ PVC angles: provide fewer complications installing them. Fitted using stainless steel staples or glued to the panel using a readily available builder's adhesive.
- Less susceptible to damage, will not rust and is UV stable.
- ❑ All external joints to be set flush will therefore need to be ground out to form a recess for the external angle. As with internal joints the recess will first be reinforced with fibreglass mesh tape.
- ❑ Fibreglass mesh tape: only tape recommended for external use.

### Installation

- ❑ Install angles on the external corners at the same time as undertaking base coats.
- ❑ Consider the following items when installing: Vertical straightness, Vertical level, Square (where required) and setting

- ❑ Vertical straightness: use plumb weight and a straight edge, or chalk line. Do not check by eye.
  - A chalked line makes the fixing easier.
  - If a long level is not available use a 1200mm level in conjunction with a long aluminium box section or a 'straight edge' do not use timber.
  - Other factors may lead to the external angle not being true and correct.
  - Place the straight edge on both sides of the external angle bead to ensure both sides are straight.
  - ❑ Assuming the wall is plumb position the starting point of the external angle.
    - Hold a small off-cut of the angle at the top of the wall so it sits square and is equal to both sides of the panel.
    - Mark with pencil each side on the top and bottom of the wall and chalk lines between the marks.
    - Fix the bead inline with the marks to form a straight corner.
  - ❑ The angle bead can be difficult to fix straight: it will tend to pull in and buckle so the edge can't be filled.
  - ❑ If a lot of filling is required, the external angle bead should be pinched in so the outer edge can sit against the panel.
  - ❑ Do not push external angle on too tight. Ensure the angle is fully embedded with patching cement.
    - It opens the angle up causing the outer flange to stick out leaving no coverage on the metal and impossible to fill.
    - Hair line cracks can develop if filling is not sufficient.
    - Often external angle beads are open slightly at the ends.
  - ❑ Prior to installing slightly pinch each end the external bead to close it a little.
  - ❑ Use snips to cut the ends on a 45 degree angle, this prevents the angle bead opening up.
  - ❑ Ensure there is sufficient filling at the full length of the angle.
    - Use the edge of a trowel or straight edge to check the amount of filling and there is nothing protruding.
  - ❑ When two external angle beads are close together for example the end of a nib wall make sure both angles are square. This can be quite difficult if the end of the panel has had some damage.
    - Use a fixing method that will allow easy adjustment after installation such as the staple or pinning method used with plaster adhesive.
    - External angles can be filled wider than normal at the top or bottom when leveling the beads against the in-situ wall. If not filled correctly unsightly gaps or bows can occur at the top of architraves or under the cornice.
- External Angle in dry areas**
- ❑ For setting the angle beads apply the same technique used for joints.
  - ❑ Use a three coat system excluding any paper tape: Two coats of Base Coat and one coat of the Topping Mix.
  - ❑ When the angle is set up correctly and bedded in correctly, angle setting is relatively simple process.
  - ❑ Do not overfill, it is better to fill in several stages and don't leave excess plaster on the walls.



*Cutting external corner bead to size*



*Applying trim spray adhesive prior to installing corner bead*



*Affixing corner bead after application of trim spray adhesive*

### Preparatory work

- ❑ Remove any excess material with a scraper.
- ❑ Grind back each side of the external corners to a depth of up to 5mm to create a recess for the fibreglass tape and angle bead.
- ❑ Clean the surface of the recess and the adjoining panel.
- ❑ Use a soft haired broom or compressor blower, remove all dust and dirt.
- Ensure the panel is completely dry.
- Do not apply the coatings if rain is imminent.

### Install fibreglass tape

- ❑ Apply an approved sealer primer over the entire section of the rebated corner ensuring that the sealer primer extends least 50mm each side of the corner panel.
- ❑ Cut mesh tape to the same length of the corner to be covered. Put it aside.
- ❑ Apply a light coat of coarse patching plaster with a broad knife to one side of the rebate.
- ❑ While still wet, embed the mesh tape into the rebate.
- ❑ Repeat this process on the other corner of the rebate.
- Complete this process on all corners before commencing second coat.
- ❑ Once the first coat is dry, scrape away any trowel marks or excess plaster in preparation for the second coat.
- ❑ Apply a second coat of coarse patching plaster with a broad knife or 300mm trowel.

- ❑ Using either a straight edge or trowel check that the joint has no high spots or any excess plaster around the joint.
- ❑ When filling joints it is best for fill to be shallow rather than proud as it is easier to add the patching plaster than to remove it once hardened.
- ❑ Allow to dry.

TIP: During the patching process periodically dip your broad knife or trowel into the water and give it a quick clean with a scourer. Keeping tools clean and wet will result in a smoother patch.

### Install external angle bead

- ❑ Ensure corner and wall section is completely dry.
- ❑ Apply an approved sealer primer over the entire section of the prepared corner ensuring that the sealer primer extends at least 300mm each side of the corner panel.
- ❑ Select the appropriate width external angle bead that fully covers the corner detail.
- ❑ Fix to all corners using stainless steel staples or a suitable construction adhesive.
- Note: It is preferable to fit the corner beads after all other joints have been set.
- ❑ Using a broad knife, apply a light first coat of the course patching plaster approx 200mm wide making sure it completely covers the external angle.
- ❑ Feather the edge and remove any excess.
- ❑ Leave to set and harden
- ❑ Using a 300mm wide trowel apply a second coat of course patching plaster over the first coat.

- This coat needs to be wider to achieve a gradual blending in from the corners edge to the panel face.
- ❑ Leave to set and harden.
- ❑ Sand as required.

### Alternative method

It is possible to bed in the external angle instead of prefixing them as previously described. When done correctly this will save a lot of patching time but this is a difficult technique and is not recommended for inexperienced tradespersons.

- ❑ Ensure wall surface is completely dry and has had sealer/primer applied.
- ❑ Mark and chalk a line for the position of the angle.
- ❑ Apply course patching plaster every 250 to 400mm to both sides of the corner.
- ❑ Press the external angle into the wet patch product.
- ❑ Secure it into position by using adhesive tape.
- ❑ Check with a straight edge and a level if it is plumb.
- ❑ Carefully remove any excess and allow to set and to dry.
- ❑ Using a 300mm wide trowel apply the second coat of patching cement over the first to completely fill all remaining gaps.
- ❑ This coat needs to be wider than the first coat to achieve a gradual blending in from the corners edge to the panel face.
- ❑ Leave to set and harden.
- ❑ Sand as required.

## Finishing Panels



### Finishing

- ❑ The Rapidwall substrate must be sound, clean, dry, free of contaminants, splashes of plaster, mortar and silicone compounds.
- ❑ Good quality plaster based setting cements should be used and not powder or pre-mixed air dried compounds. The use of approved acrylic bonding additives in the liquid gauge plaster mixture at specified ratios will provide greater workability, water resistance, bonding and joint strength.
- ❑ All repairs must be completed prior to panel finishing.

### Finishing Standards

The Australian Standard 2589 notes: There are three 'Levels of Finish' available.

- ❑ Level 3 Finish is suitable in areas that do not require decoration.
- ❑ Level 4 is the generally accepted 'Level of Finish' for residential and commercial construction applications where flat or low sheen paints are used.
- Unless otherwise specified, a Level 4 Finish is the default finish for living areas.
- ❑ A Level 5 Finish shall be used where gloss or semi-gloss paints are used or where critical lighting conditions occur on flat or low sheen paints.
- Critical lighting conditions are defined as natural or artificial light projected across a surface at a low incidence angle. Under Class 4; in critical lighting conditions, surface imperfections may still be apparent.

## Finish or Top Coat

- ❑ To be used as a finish over joint compounds, Base Coat products and corner beads.
- ❑ Generally Finish Coat comes pre-mixed in a bucket. Mix before use and add a little water to bring the product back to a “toothpaste” consistency.
- ❑ Finish Coat can be applied by hand tools or sprayed.
  - Spraying is the preferred technique for Rapidwall panels.
- ❑ Note particularly
  - Finish Coat, Top Coat or All Purpose products are non plaster based and normally take longer to set and harden than plaster products. This makes them much easier to work with and easier to spread and therefore ideal to float over joints or large areas.
  - Once a Finish Coat is applied to Rapidwall or plasterboard, cornices or other reveals must NOT be stuck onto the Finish Coat as they will later crack or pull away.
  - To apply a cornice or reveal after a Finish Coat has been applied then the Finish Coat must first be sanded away and the appropriate adhesive applied.
- ❑ Apply finish coats after all preparatory work and before painting and follow the manufacturers’ instructions with regard to drying and curing times and before applying primers or paints.

## Accessories and add ons

Rapidwall is an ideal platform for designers and developers to express the individuality of a building with the addition of door reveals, quoins and plinths.

- ❑ Exterior profiles, once installed require texture or paint finishing to provide increased weather durability.
- ❑ Stone, slate, brick plinths and tile facings can also be installed to the wall panel along with roof tile, slate or iron roofing overlays to create a traditional look.
- ❑ Veranda’s, carports, garages, shade and porch hoods and pergolas become “add on” attachments, either as part of the original design or future planned extensions.

Important note: It is essential that every applied accessory is properly affixed with appropriate adhesives and waterproofed to prevent water ingress and to ensure that water does not cause the “add on” to delaminate from the panel.

## Fixings and fasteners

Fixing to the Rapidwall panels is similar to other types of cellular, drywall or plasterboard material.

Many brands and fastener types can be used and manufacturer’s recommendations should be followed for installation and allowable loading capacities.

The Rapidwall panel does not allow nail or screw fixings, without the use of void filling materials, such as timber or steel closure studs, backing plates and solid concrete or grout filling.

By pre planning critical load fixtures at construction stage, void filling installation procedures will allow conventional fastener systems to be installed. This is only necessary for heavy weight fixtures and loads exerted by cantilever hand basins, troughs, brackets, wall plates, industrial cabinets and the like.

In general, light and medium weight fixtures can be attached with a variety of hollow cavity wall fasteners. Fixing, through the rib, although acceptable, is not generally done because fixture installations are restricted to rib locations only. Chemical injection anchor systems can also be used to carry medium to heavy loads in situations where walling and building work has been completed.





## Plastering equipment and materials

- ❑ Broad knives 120mm, dry and wet area patching compounds.
- ❑ It is important to keep all the tools clean as dried or set cement on tools will draw moisture from the fresh wet mix, making it hard to spread smoothly.
- Have a sponge or a brush and a bucket filled with water handy to clean off the trowels while working.
- ❑ 3 Clean buckets. The mixing bucket should be cleaned thoroughly before every mix.
- ❑ Stainless Steel Trowels: 300mm and 600mm approx.
- A flat stainless steel finishing trowel is best: quite rigid but with the right amount of flex.
- A 300mm trowel is easy to control, primarily used for heavy base coat mixes.
- A 600mm trowel is more difficult to use but with practice will give the best result, primarily used for finishing.
- A light coat of WD-40 on the tools makes it easy to keep them clean.
- ❑ A 300mm wide floor scraper is used for flushing wall panels.
- This tool must never be used on floors as it would scar and damage the panel.
- ❑ Sanding block or plasterboard sander. Use a pole sander and sandpaper of between 60-120 grit to remove all minor faults and wall contaminants, such as concrete splatter, from the panel faces.
- ❑ For final sanding sandpaper with 200-240 grit is recommended.

## Dry Area Plaster mixing

When using plaster there are certain best practises that need to be adhered too as there are many ways to ruin a plaster mix.

- ❑ Only use plaster that has been kept in a dry environment and is not older than six months as it is not as reliable and may not set properly
  - The more the plaster is mixed the faster it will set
  - Adding dry plaster to mixed plaster will make it set quicker
  - Adding water to mixed plaster will make it set quicker
  - Adding dry plaster slowly to water and using a drill mixer helps with uniform consistency
- ❑ Citric acid or milk will make plaster set slower but is not recommended
  - Do not use citric acid in hot environments above 25 degrees centigrade.
  - Plaster sets by chemical reaction. Citric acid slows down this reaction. If you are working in an environment that makes the plaster “dry” rather than “set” the plaster will have no strength and could become powdery
- ❑ Water should be not too cold as the plaster will set prematurely. Neither should the water be too warm. Always follow the manufacturer’s recommendations.
  - In environments above 35 degrees centigrade or under roofs where the temperature can exceed 50 degrees, the plaster mix will dry out before it can set. It is common practice to add ice to the mixing water to reduce the temperature.
- ❑ Only use clean water that is considered drinkable. Dirty water or salt will make plaster set quicker or not at all
- ❑ To mix plaster use a clean bucket and fill one third with cool water.
- ❑ Add dry plaster to the water slowly, allowing it to soak up.
  - Pour in an amount of dry plaster that rises above the water level.
  - Mix the plaster with a paddle style mixer and heavy-duty drill at a low speed.
  - Using a raising and lowering action will help mix the plaster correctly.
  - When dry plaster is rising to the top and not being soaked up, this indicates that almost enough dry plaster has been added.
  - Give the mix a few stirs then add more dry plaster stirring each time to obtain the right consistency.
  - Once the right consistency has been reached continue stirring until the mix becomes creamy.
  - The required thickness will depend on the use, start with a consistency similar to toothpaste.
  - Over mixing will significantly shorten the workable time span.

### NOTE

If water or dry plaster is added after the initial mix, the plaster will set faster than normal. When plaster has started to firm DO NOT water it down as the set plaster will be powdery.



## Dry Area Internal Finishing

The finish coat depends upon the condition and the intended finish. if it is to be applied in one or two coats and to the 'A' or the 'B' face of the panel.

The finish coat provides a uniform, clean and tight finish with no visible marks on the wall.

The recommended technique developed for Rapidwall panels is a spray applied finishing coat smoothed over with a large 600mm trowel.

The benefits of using this technique is reducing waste, covering the surface faster and more evenly reducing the possibility of stroke marks left in the surface finish.

Premixed finishing or topping compounds are used for the consistency and fluidity of their mix . This aids the application process and is more convenient than preparing a mix from dry plaster.



## Finishing Equipment & Materials

- ❑ Hopper Gun: has a manual shut off valve attached which can be turned off when not in use.

Or

- ❑ Texture Gun and a twin piston compressor. This uses a lot of air and is less likely to overheat and fail.

- ❑ Step ladder.
- ❑ 3 Clean buckets.
- ❑ Broad knives 120mm.
- ❑ Stainless Steel Trowels 300mm and 600mm.
- ❑ Mixing Drill and paddle.
- ❑ Premixed finishing or top coat compound and Water



## Application of the Finish Coat

- ❑ Properly prepare panels: Scrape back and lightly sand. Complete all major patching. Base Coat all joints.
- ❑ Remove any excess materials and sweep clean the entire work area.
  - This is important for the hopper gun, using compressed air, will stir up any dust that could end up in the plaster.
  - Other materials could create a hazard, become damaged or covered in plaster.
- ❑ The pre-mixed finish coat requires mixing prior to used due to slight water separation.
  - Remixing will bring back the original manufactured consistency. If it is not at the desired consistency, add small amounts of water. The mix should be thick and flowable similar to thick cream.
- ❑ Use a plaster pump or pour a small amount of the mix into the hopper.
- ❑ Test on a small area: Expect to see a large splatter effect ranging in size from nail to screw head with a nail head size gaps in between.
  - Trowel this test section, one trowel wipe which should produce a smooth finish.
  - Make any required adjustments to the plaster mix and undertake subsequent tests until you are satisfied with the mix.
  - Apply the plaster to the wall. Large areas are covered quickly therefore adjusting the mix as you proceed is not ideal.
- ❑ Fill the hopper to three quarters full.
- ❑ Start spraying the wall from a corner.
  - Stand far enough from the wall so that you spray a consistent splatter of plaster.
- ❑ Spray an area approximately 2m wide and to the full height of the panel.
- ❑ Using the largest trowel skim the wall starting from the corner.
- ❑ When the first section is complete spray the next 2m section keeping the splatter ahead of the trowelled section.
- ❑ For the best results apply plaster wet on wet.
  - Add additional wet plaster to the newly trowelled area prior to it gelling.
  - This forms a consistent finish without streaks or drag marks which would be formed if troweled from dry to wet.
- ❑ Complete one wall at a time ensuring it is one continuous sprayed and plastered wall.
- ❑ Do not attempt to rework a drying surface..
- ❑ When finished leave to dry completely.
- ❑ Put any trowelled off plaster (seconds) into a clean bucket.
  - Never mix seconds with new mix plaster as this would accelerate the plaster setting time.
  - One person spraying and another one following with trowelling gives you the maximum speed of finished wall areas.



## External Finishing

### Exterior Coatings

- ❑ Although Rapidwall panels are highly water resistant it is still mandatory to provide a suitable waterproof coating to further prevent the long term weather abrasion effects.
- ❑ External finishing or repairs to the panel requires the use of a sealer primer or solvent based or epoxy primer that allows the patching product to bond the panel.
  - This is a critical step in the repairing of the panel and must be applied to every surface and edge of the panel externally.
- ❑ Currently there are several preferred manufactures of the sealer, primer, binder and external patching products for Rapidwall.
  - Astec Paints Australasia Pty. Ltd. , Euroset Trading Pty Ltd. Zydex in India and **Unitex??**
  - All these companies manufacture high quality products and have done extensive testing of their products on Rapidwall.
- ❑ Exterior finishes must have similar strength and elastic performance to that of the Rapidwall material to ensure thermal movements are compatible and cracking and crazing will not occur.
  - For this reason cement rich renders should not be used due to their high shrinkage when curing and rigid performance on setting.
  - The best products are Polymer of Acrylic based cement renders.

Many other paint companies have tested and specify their paint systems for use with Rapidwall. Should you have a preferred paint supplier have them test their product system on Rapidwall and provide you with a performance warranty or guarantee. Contact your local Rapidwall supplier for paint systems approved in your area.

The main requirements are:

- ❑ Paint system must be UV, mould and dirt resistant
- ❑ A primer sealer has to waterproof the Rapidwall panel and provide a key for paint or finishing coats to be subsequently applied. It is known that highly compacted concrete finishes require either roughening of the surface or primers to be used to ensure adherence of paints or renders. Most of these primer sealers used by the concrete industry are likely to be satisfactory for application to Rapidwall however testing must be undertaken by the manufacturer of the primer sealer and paint system.

### Skimming the Panel Surface

Although not necessary it is possible to skim the Rapidwall panel face where there is a need for a particular finish or desired texture.

In Australia, these products are available from either Astec Paints Australasia Pty. Ltd. or Euroset Trading Pty Ltd.

The performance of these skimming products is the same as any premixed polymer based rendering product and any competent tradesperson will have no difficulties applying them.

It is important to follow the manufacturer's recommendations and procedures.

### First Coat

- ❑ Tools: Aluminium hawk, 300mm trowel, Hard plastic float.
- ❑ Two skilled men: one to apply and one to float the product.

### Procedure

- ❑ Using a steel trowel at approximately 45 degrees apply the first thin coat of coloured polymer render to the entire surface. This will enable you to be able to apply a light layer ensuring that you don't put too much on.
- ❑ Work on a full hawk amount at a time.
- ❑ Once applied onto the wall go back over it with the trowel to gently remove any excess.
- ❑ Then apply the next amount and keep repeating that sequence.
- ❑ After the first amount has been applied a second person will need to start floating of the still wet area just completed.

Note: If render is peeling away from the surface or dragging when floated allow more time to gel. This could also be the result of excessive thickness so reduce the amount on the trowel.

### Second Coat

- ❑ Repeat the same process as the first coat. Option to apply a higher build finish as well as a Architectural texture finish. The technique will be the same.
- ❑ TIP: keeping your trowel clean and wet will prevent the trowel from leaving drag marks and will result in a flatter surface.



## Painting

Rapidwall panels provide an ideal substrate for both interior and exterior pain and texture coat finishes.

Acrylic water based top coat systems applied over paint manufacturers' recommended primer sealer coats produce excellent results.

General acrylic paint qualities such as bond strength, elasticity, UV light resistance, weather resistance, fungus resistance and texture thickness are all important performance qualities of the coating system selected.

The coatings must also have the ability to "breathe" and allow vapour permeability, while not allowing the ingress of water due to rain, particularly important for exterior wall applications.

Three companies have extensively tested and warrant their products for use with Rapidwall: Astec and Euromix in Australia and Zydex in India.

Ensure non approved system are suitable for use with Rapidwall.



- ❑ Internally: follow common practice for painting internal walls.
- ❑ Externally/wet areas: a solvent, epoxy or an approved primer sealer must be applied prior to the application of any final coating.
- ❑ Important note: If paints that do not require a primer sealer are to be applied a written guarantee from the manufacturer stating that they can be used with Rapidwall and without a primer sealer is required.
- ❑ Gloss or semi-gloss paint applied to the "B" side of the Rapidwall panel may require further sanding and skim coating to achieve a consistent level of finish similar to the "A" side.
- ❑ Refer to the Appendix for Euromix application guide and this would be the minimum requirement for any other manufacturer specifying their system for Rapidwall.

## Tiling

Tiles can be laid onto the panel face in the conventional manner.

### Wet areas

- ❑ Design and specifications must comply with the relevant government building standards.
- ❑ Details are simpler when using water resistant Rapidwall panel construction than other conventional materials such as plasterboard walling products.

### Preparation

- ❑ Remove any loose materials or overburden from the panel face
- ❑ Repair any large faults in the panel i.e. blowout
- ❑ Ensure no screws are left proud
- ❑ Seal any penetrations through the panel using wadding, for example; pipes or a bolt hole from a wall supporting prop.
- ❑ Wet areas: Apply an approved waterproofing/ tanking before tiling in wet areas. Most tiles or grouts allow water to penetrate through to the substrate. Use either a shower tray or an approved continuous membrane system. The membrane must be bonded to the floor and the Rapidwall face and turn up the wall to a minimum height of 150 mm above the floor level. The membrane may be carried up the full height of the tiling to provide extra protection.
- ❑ Apply sealant to the entire panel surface to be tiled and without a membrane, allow to fully dry.
- ❑ All non tiled wall areas in wet areas must have a suitable paint finish to provide moisture protection.

## Wallpaper

All walls should be sized prior to hanging wallpaper and normal decorating practice should be followed in conjunction with the manufacturer's instructions.

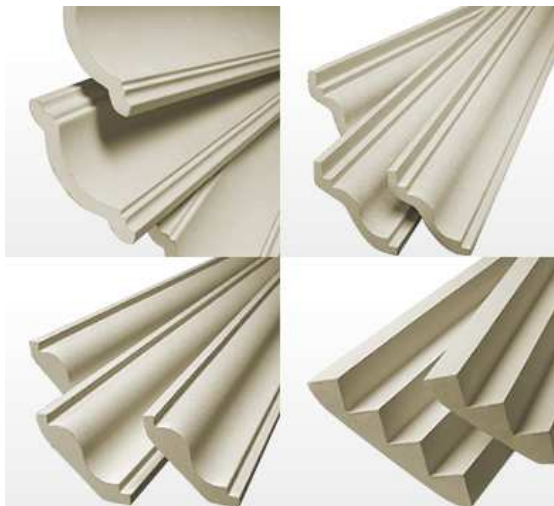
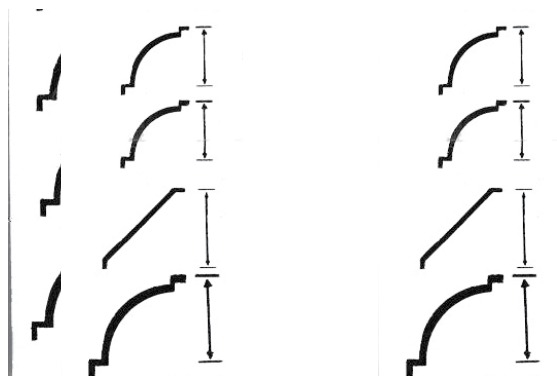
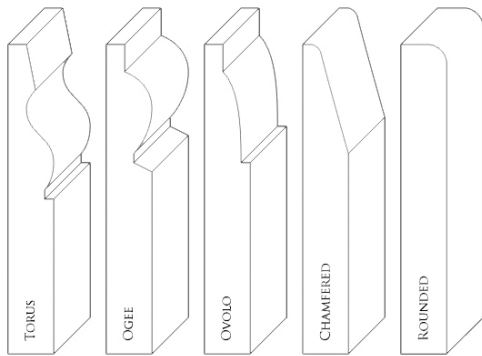
## External Wall Tiling

- ❑ Preparation: Remove any dust with a damp cloth. Prime the walls with 1 coat of Aba Solvent or equivalent tile adhesive manufacturer recommended Primer and allowing to dry for 15-30 minutes.
- ❑ Waterproofing: Superflex-3 Two Part Bathroom & Balcony or Barrierflex membrane. Apply 2 coats of membrane to the areas to be tiled and allow to cure for at least 48 hours before tiling.
- ❑ Tile adhesive: Standard quality pre-mixed flexible tile adhesives should be used. Barrierflex mixed as an adhesive or Aba Optima or equivalent products. Fix the tiles using a suitable sized notched trowel, ensuring 100% coverage of adhesive to the back of the tiles.
- ❑ Grouting: Aba Flexgrout Ultrasmooth mixed 50-50 with water and Aba Grout Booster.

## Internal Wall Tiling

- ❑ There are many other products on the market beside Aba products but they should be tested and warranted by the product manufacturer on their performance on Rapidwall.
- ❑ Preparation: Remove any dust with a damp cloth. Prime the walls with 1 coat of Aba Solvent Primer and allow a drying time for 15-30 minutes.
- ❑ Adhesive: Aba M.P.P. (Multipurpose powder) using a suitably sized notched trowel can be used directly over Aba waterproof membranes, no need to prime the membrane before tiling.
- ❑ Tile Types: Suitable for fixing all types of ceramic tiles, including Monocottura, Marble except Green marble, Granite, mosaics including glass mosaics, and fully vitrified tiles.
- ❑ Grouting: Use Aba Flexgrout Ultrasmooth





## Cornices and skirtings

Cornices are fitted in the conventional manner using cornice adhesive. Consideration should be given to installing a larger 90mm cornice to enhance the 2.7m high walls. Standard 55mm cornice can be used also or replaced with a shadow line/flushed wall/ceiling detail to create a contemporary clean appearance.

Skirting and architraves can be easily fixed to Rapidwall using construction adhesive or spaghetti and nails depending upon whether the cavity is concrete filled or hollow.

- ❑ Timber skirting: secured with cornice cements or construction adhesives with secret fix skew nailing or PVC spaghetti nail fixing to provide initial support until curing of the glue.
- ❑ Vinyl skirting and seamless floor coverings: secure with contact glue as per manufacturers recommendations.
- ❑ If a hollow cavity, an architrave will need to be screw fixed to the metal stud that closes the opening.
- ❑ Any area where adhesive is used will first need to have had a solvent based primer applied to the panel surface.

### Cornice materials and equipment

- ❑ Cornice: When ordering allow for 5 – 10% waste and one or two extra lengths if you are unfamiliar with cutting and handling cornice.
- ❑ Ladders and plank, Bucket, water and sponge and buckets for mixing cornice cement, Sharp hand saw, Cornice mitre box, Hammer and nails, Medium trowel and Hawk

- ❑ Cornice adhesive: Can be used for installing cornices, back blocking, taping joints or sticking sheets to masonry surfaces.
- It comes in different setting times, assess which is best for the size of the job or experience level. Subject to the age of the product and the ambient temperature, as a guide, the larger the number on the bag the longer the setting time.
- When mixing cornice adhesive, apply the rule that “the more you mix the quicker the set”.
- For quick set adhesive mix a small amount of the mix with cornice adhesive powder. Mix rapidly on a board. This will set in a few minutes.
- As cornice adhesive sets it can be made workable again for a very short period “worked back”. Add small amounts of water. Useful for finishing touch ups to mitres in cornice.
- Cornice adhesive when set gives a harder surface compared to Base Coat

### Preparation

- ❑ Set and sand all wall and ceiling joints prior to starting.
- ❑ Mark out the position of where the cornice is to be installed:
  - Different size cornices will determine the distance measured down from the ceiling. i.e for a 90mm cornice Measure and mark 90mm down from the ceiling.
- ❑ Chalk a line around the room using marks from the ceiling
- ❑ Tack in nails every few meters along bottom of the chalk line. These will be removed at the end of the job.
- ❑ Measure the exact wall length where cornice is to be installed. allow 1 – 2mm tolerance for external lengths
- ❑ Measure and Cut
  - Use a mitre box and hand saw to ensure a true angle.
  - Cut all cornices to length and mark them for ease of reference.
- ❑ Mix and apply Cement
  - Consistency should be sticky and that of toothpaste.
  - Place the cornice upside down onto a plank so that it is well supported.
  - Apply the cornice cement to the edges. This is generally referred to as buttering the edges and must be evenly done and along the complete length of the cornice.
- ❑ Installing the Cornice
  - Pickup and place the cornice on the nails so it's supported then gently press the cornice into place using the marks as a guide.
  - Fill in any gaps with cornice cement.
  - Remove any excess cement, clean the joints and the edges immediately with a wet sponge or rag.
- ❑ Note: Cornice cement is hard to sand so it is best to clean the joints while the cement is wet.
- ❑ If you are installing a large and heavy cornice you will need to nail or screw the cornice into place by screwing through the cornice to the wall and then fill over the nail or screw.

## Waterproofing

The base material that is used in production of Rapidwall® panels is Gypcrete® glass reinforced plaster, that has been modified by addition of waterproofing compounds and set control agents. As a result, the absorption rate of Rapidwall® panel becomes very similar to the absorption rate of concrete.

In a situation where both concrete and Rapidwall are used the two materials work together and there is no need to specially address the differential movement of two materials.

Most countries have their own waterproofing standard for structures however the measures outlined below must be adopted as the minimum standard.

The wet areas in a residential development will need to comply with Australian Standard AS3740-2004 Waterproofing of Wet Areas within residential buildings. It is necessary to check with local building standards before carrying out any works.

Generally a Rapidwall® structure will be a single skin construction which means no vapour barrier for the structure as with brick-veneer construction. Although Rapidwall has moisture resistant properties it is still necessary to fully seal shower walls and floors with a proprietary waterproof system. The shower tray membrane must carry up the wall sides a minimum of 150 mm above the floor level and bonded to the Rapidwall face. The membrane may be carried up the full height of the tiling to provide extra shower wall protection.

Waterproofing of Rapidwall® structures should be handled as an integral part of waterproofing and weatherproofing of the whole building. There are, however, several key issues that must be properly addressed in order to ensure a waterproof and weatherproof building, with little or no maintenance for the life of the structure. Those issues are addressed in this document:

- ❑ Protecting external surfaces of Rapidwall® panels;
- ❑ Correct installation of doors and windows; See also section 11 Openings
- ❑ Active and passive weatherproofing of the building;
- ❑ Waterproofing in wet areas (kitchens, bathrooms etc)

### Active and Passive Weatherproofing

Rapidwall®, as any other building component, should be afforded active or passive protection from the elements. The protection methods are usually built into the structure at the design stage and vary from country to country, depending on climatic and economic conditions and customs.

Passive Weatherproofing comprises designing building components, so that they protect each other from the elements. The most common passive weatherproofing methods include:

- ❑ Orienting the building so there are no openings that face prevailing rain bearing winds, or reduce opening sizes in those walls;
- ❑ Using roof overhangs to shield the wall/roof interface;
- ❑ Installing awnings over door and window penetrations;
- ❑ Protecting openings by balconies above;
- ❑ Designing external walls to slightly overhang the footings;
- ❑ Designing horizontal surfaces so that they fall away from slab/wall joints;
- ❑ Incorporating gravity overflows in drainage design, so that slab/wall joints do not get flooded in case of drainage blockage.

- ❑ Utilising below ground drainage to avoid build up of hydrostatic pressure against walls and wall/ floor interfaces (e.g. drainage cells and geotextile against basement walls).

Active Weatherproofing comprises use of waterproofing membranes and protective coatings, generally in addition to employing passive methods. This includes:

- ❑ Application of liquid elastomeric membranes between slab and wall and all openings like widows doors and the like.
- ❑ Installation of damp course membrane to give higher abrasion resistance to area between wall and floor slab.
- ❑ Application of protective coatings, as described earlier in this document.

### General Guidelines

Proper preparation in wet areas is essential. The following guideline will ensure that an effective waterproofing barrier is achieved.

AS 3740 - Waterproofing of Wet Areas within residential buildings

### Preferred Method; Shower Recesses

- ❑ Apply Rivet, Euromix® or a similar approved primer
- ❑ Seal all joints using approved sealants that have been approved for use with tile adhesives and waterproofing membranes that will be used
- ❑ It helps to scratch the Rapidwall panel slightly with a saw blade to increase the surface area.
- ❑ Use a bond breaker to create a “coved” corner detail this can be created by using items such as Abelrod, 50mm bond breaker tape or Davsil silicone sealant.
- ❑ Apply Rivet, Euromix® or a similar approved primer

- ❑ Puddle Flange must be used and ensure that the membrane is turned down onto or into the drain flange

- ❑ The Australian Standard (AS 3740 Waterproofing of Wet Areas within Residential Buildings) calls for the membrane to be applied under the screed to receive tiles.

- ❑ Install a sand cement screed that creates minimum of 1:80 fall to the waste. To check this using your level you should be measuring a 12.5mm fall over 1m.

Note: A slurry coat of with neat cement and an approved bonding product might be required to improve the adhesion of the screed when being applied over the membrane check with the membrane manufacturer what are their recommendations.

NB. It is essential that a membrane be laid over the screed.

All instructions by the manufacturer for mixing and applying must be followed for all products described within this guide.

- ❑ AS 3740 calls for the membrane to be applied up the wall to 1800mm or to the height of the shower rose, out to a width of 150mm.
- ❑ However, it is recommended that the entire wall is coated with the membrane, up to the height of the shower.
- ❑ Apply the membrane over the entire floor area.
- ❑ If enclosed by a shower screen, apply the membrane up over the hob, and at least 150mm beyond the outside edge of the hob. If unenclosed, apply the membrane up over the hob, and out to a 1500mm radius from the shower rose.
- ❑ Apply the membrane to the base of the wall, at least 150mm above the height of the hob.

## Shower-over-bath Enclosure

- ❑ AS 3740 calls for the membrane to be applied up the wall/wall junction 1800mm from the floor or to the height of the shower rose, out to a width of 150mm.
- ❑ It is recommended that the entire wall is coated with the membrane, up to the height of the shower rose.
- ❑ Apply the membrane 150mm wide at the base of the bath wall sheet.
- ❑ Apply the membrane 150mm wide over the vertical corners of the bath.
- ❑ Apply the membrane 150mm wide along the bath/floor joint. If the bath is enclosed with a shower screen, this will be sufficient. If the bath is unenclosed, continue applying the membrane over the floor, out to a 1500mm radius from the shower rose.

## Laundries and Sinks

Apply membrane to the wall area 150mm above a fixed vessel, and for the width or length of the vessel.

Various systems

As mentioned previously under paint systems, certain manufactures have tiling and waterproofing systems which, when used as recommended, will ensure the compatibility of products with each other. Ensure that in your country, you use only product ranges that have been tested and specified for use with Rapidwall.

NB. These two procedures have been supplied by Enviro-Tech in Queensland:

### Applied System 1

Waterproofing to one of the following:

- ❑ Aba Superflex-3 Two Part Bathroom & Balcony
- ❑ Aba Superflex Premixed Bathroom & Balcony
- ❑ Barrierflex mixed as a membrane.

## Enclosed Shower

- ❑ To the whole of the shower walls to a height of 1800mm.
- ❑ To the whole of the shower floor and up and over any hob or set-down.

## Unenclosed or Handicapped shower

- ❑ To the whole of the shower walls to a height of 1800mm and extended to a minimum width of 1500mm from the internal corner of the shower.
- ❑ To the shower floor a minimum arch of 1500mm from the corner of the shower.

## Preparation

- ❑ Remove any dust with a damp cloth. Prime the whole of the area to be waterproofed with 1 coat Aba Superflex Solvent Primer and allow a drying time of approximately 15 - 30minutes.

## Application

- ❑ Apply a 10mm bead of silicone to all internal wall and floor junctions, and with the finger form a cove.
- ❑ Apply a 300mm band of membrane to all internal corners, and while wet insert a 200mm wide band of Deckweb reinforcement mat removing any air pockets.
- ❑ Apply a 2nd coat of membrane to completely fill the mat. To complete the waterproofing apply 2 coats of membrane to the remainder of the walls and floor, allowing the 1st coat to dry before applying the 2nd coat.
- ❑ Allow to cure before tiling commences.

## Applied System 2

Document is designed to cover the correct installations and method procedures for Wet areas with MapeGum WPS.

### Preliminary Work

Ensure that all surface preparation work, including falls, levels, SHEETING AND PLUMBING is complete and properly constructed to enable the membrane or coating system to work as recommended and intended by the manufacturer. Ensure that the concrete substrate has been allowed to cure minimum 21 days and has a moisture content of less than 75% RH before commencing any installations.

### Acceptance of Substrate

Confirm and ensure that all substrate complies with relevant substrate standards for Waterproofing or coating Systems, this may include falls, spitters and, drainage outlets.

Ensure that all substrates are structurally sound against movement, deflection and have no visible defects.

### Surface Preparations

Remove all plaster, dust, debris, plaster snots from walls were membrane is to be installed by broom or vacuum and put into an empty bucket.

Prime all areas to be waterproofed with Mapei Primer G diluted 1:1 with clean water making sure to leave no puddles and allow drying as per data sheets and manufacturers recommendations.

### Caulking

Install PU caulking to all junctions, angles and tap fittings as per AS-3740 and tool off smooth.

### Angles and Hobs

Install water-stop angles to doorways and shower areas if required, or install hebel hobs if required as per directive from builder, making sure all are angles and hobs are square and level.

### Membrane Installation

- ❑ Install membrane to perimeter and walls
- ❑ Install two (2) coats of the Mapegum WPS 100 mm in both directions to all junctions, sheet joints and the internal corners of the shower 100 mm above the rose as per AS3740 making sure to sandwich 100 mm wide polyester fabric between coats and smooth off.
- ❑ Install one (1) thick coat to walls by roller were applicable to shower screens as not to see the Cement sheeting through the membrane.

NOTE THAT THE POLYESTER MAT TO BE INSTALLED IN SHOWER AREAS ONLY.

- ❑ Apply two (2) coats MapeGum WPS as per data sheets and manufacturers recommendations making sure to have a DFT of 1.0-1.2 mm to all floor areas making sure to lap membrane onto water-stop angles.
- ❑ Allow curing for 48 hours before tiling.

### Toilet Areas

Toilets are to be primed and PU caulked, water-stop angle to doorway and two (2) coats of MapeGum WPS installed 100 mm in either direction to all junctions and lapped onto water-stop angle.

### Completion

Clean up as work proceeds when required.

Leave all work in a sound condition, defect free, and remove make sure to remove all materials from site.

## Waterproofing procedures developed by Enviro-Tech:

This Document is designed to cover the correct installations and method procedures for waterproofing concrete reveals.

It should be noted that each country may have different products and procedures than those detailed below. However, a product or procedure is only acceptable if the manufacturer has tested such for use with Rapidwall and has provided written confirmation to that effect. See below an example of the required minimum documentation as given by the company, Mapelastic.

### Recommended Product: Mapelastic

#### Applied System 1

##### Preliminary Work:

Ensure that all surface preparation work, including falls, levels is complete and properly constructed to enable the membrane or coating system to work as recommended and intended by the manufacturer.

Ensure that the concrete substrate has been allowed to cure minimum 21 days and has a moisture content of less than 75% RH before commencing any installations.

##### Acceptance of Substrate:

Confirm and ensure that all substrate complies with relevant substrate standards for Waterproofing or coating Systems, this may include falls, spitters and, drainage outlets.

Ensure that all substrates are structurally sound against movement, deflection and have no visible defects.

##### Surface Preparations:

Remove all dust, debris, high spots and concrete snots from floors where membrane is to be installed by broom, vacuum or mechanical means and put into an empty bucket.

Grind any concrete external corners to form a 5 mm edge as for the membrane to roll over.

Prime all areas to be waterproofed with Mapei Primer G diluted 1:1 with clean water making sure to leave no puddles and allow drying as per data sheets and manufacturers recommendations.

##### Caulking:

Install a 12 mm wide Polyurethane (PU) caulking to all right angle junctions, and tool off smooth.

##### Membrane Perimeter Installation:

- ❑ Install one (1) coat of the Mapelastic Smart 100 mm in both directions to all right angled junctions and making sure to sandwich 100 mm wide polyester fabric or fibreglass mesh between coats and smooth off.
- ❑ Apply two (2) coats Mapelastic Smart as per data sheets and manufacturers recommendations making sure to have a DFT of 2.0 mm to all floor areas.
- ❑ Allow curing for 48 hours

##### Completion:

Clean up as work proceeds when required. Leave all work in a sound condition, defect free, and remove make sure to remove all materials from site.

## Applied System 2

### Preliminary Work:

Ensure that all surface preparation work, including falls, levels, SHEETING AND PLUMBING is complete and properly constructed to enable the membrane or coating system to work as recommended and intended by the manufacturer.

Ensure that the concrete substrate has been allowed to cure minimum 21 days and has a moisture content of less than 75% RH before commencing any installations.

### Acceptance of Substrate:

Confirm and ensure that all substrate complies with relevant substrate standards for Waterproofing or coating Systems, this may include falls, spitters and, drainage outlets.

Ensure that all substrates are structurally sound against movement, deflection and have no visible defects.

### Surface Preparations:

Remove all dust, debris, high spots and concrete spots from floors where membrane is to be installed by broom, vacuum or mechanical means and put into an empty bucket.

Grind any concrete external corners to form a 5 mm edge as for the membrane to roll over.

Prime all areas to be waterproofed with Aquaguard M Zero Primer and allow drying as per data sheets and manufacturers recommendations.

### Caulking:

Install a 12 mm wide PU caulking to all right angle junctions, and tool off smooth.

### Membrane Perimeter Installation:

- ❑ Install one (1) coat of the Aquaguard M Zero 100 mm in both directions to all right angled junctions and smooth off.
- ❑ Apply two (2) coats of Aquaguard M Zero as per data sheets and manufacturers recommendations making sure to have a DFT of 2.0 mm to all areas.
- ❑ Allow curing for 24 hours

### Completion:

Clean up as work proceeds when required.

Leave all work in a sound condition, defect free, and remove make sure to remove all materials from site.

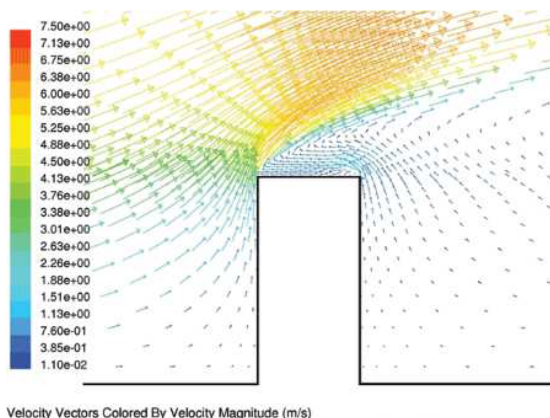


The purpose of these calculations is to determine the wind loads, propping arrangement design actions and details for the temporary propping of Rapidwall panels during construction.

For example:

- ❑ Wind loads calculated in accordance with AS/NZS 1170.2:2002
- ❑ Wind region: B.
- ❑ Terrain category: 2.

Number of Storeys	Storey Height m	Height (Hz) m
1-3	2.85	8.55
4-6	2.85	17.1
7-9	2.85	25.65
10-12	2.85	34.2
13-15	2.85	42.7



### Determine basic wind speed

In determining the base regional wind speed a decision as to what average recurrence interval shall be adopted for the design wind event must be made. Reference is made to both as AS/NZS 1170.2:2002 and the BCA which gives guidance as to the relationship between the importance level of a structure and the average recurrence interval for determination of wind loads. From the BCA an importance level of  $i$  and hence a maximum ari of  $i$ : 100 is appropriate for the temporary propping condition.

In considering this further the maximum length of time that a panel shall exist in the temporary state - ie prior to the floor above being cast and props removed - is 14 days or 3.84% of the year. Given the temporary and short duration of exposure a more appropriate wind speed would be one that has a 5% chance of being exceeded in a year. This correlates to an average recurrence interval (ari) of 1:20.

- ❑ Adopt ari of 1:20
- ❑ Hence from table 3.1

$$V_u = v_{20} = 38\text{m/s}$$

Rapidwall load bearing structures can, conceivably be up to 15 stories high, so, for the purposes of these calculations the temporary propping arrangements shall be determined with reference to the following groupings.

## Arrangement of temporary props

The arrangement of the temporary props and the design model adopted for determining the maximum allowable prop spacing are as shown in the figures below.

50 X 2.5 Shs prop 3.68M fixed length.

E

E

S

S

Bw panel beam width

Panel spans sideways into "panel beam" on prop line

Base ultimate bending capacities for unfilled rapidwall, as per the rapidwall engineering manual are

- Ribs running parallel to the spanning direction.

$$M_U = 1.6 \text{Knm/m width}$$

- Ribs running perpendicular to the spanning direction.

$$M_U = 0.7 \text{Knm/m width}$$

The above data was developed from extensive testing of the rapidwall product. A 30% overstress allowance at ultimate shall be made as the design wind load is a wind gust with a maximum duration of 2 to 3 seconds.

## Development of generalised formulae for temporarily propped rapidwall

- Determination of maximum free end overhang "e".

For the cantilevered free end the design bending moment is given by:

Note that the cantilever span is running perpendicular to the ribs.

- Determination of the maximum prop spacing "s1" - rapid wall spanning sideways between prop lines.

For the rapidwall panel spanning perpendicular to the ribs with a minimum of 4 props the design bending moment is given by:

- Determination of maximum prop spacing "s2" - panel width supported by panel beam spanning along prop line.

C

L

$$\text{Now } \square \mu = 1.3 * 1.6 * Bw = 2.08 Bw$$

Where bw = the adopted width of the rapidwall "beam panel"

Equating m1 to  $\square \mu$

Equating m2 to  $\square \mu$

The maximum value for s2 is given by the minimum of s2.CanIn.Ever and s2.Backspan

## Aerodynamic shape factor

Rapidwall elements in the temporary propped state are classified as free standing walls or hoardings and the relevant aerodynamic shape factor can be determined from section d2 as 1170.2 - 2002.

- Now:  
 $H/c = 1$   
 $B/c = 1$  this is the minimum value for  $b/c$  and will always give the maximum value of  $c_p$   
Net porosity factor = 1 therefore  $k_p = 1.0$

Tensile capacity of rapidwall  $\square_{nt} = 28.8\text{Kn} / \text{m width} > \text{net tension}$  therefore panel is safe to carry tension load.

## Determine the axial capacity of the 50x2.5 Shs prop

- $N^*c = 7\text{kn}$
- $N_s = 145\text{kn}$   
section capacity ok
- Check member capacity.
- $K_e = 1.8$  (Pinned at the slab and partially free to translate at the head)  $l_e = 6.05\text{M}$
- For the 50x2.5Shs
- $R = 19.5\text{Mm}$  and  $f_y = 350\text{mpaa}$   
hence  $n = 367.5$
- $C = 0.0578$  Refer table 6.3.3(3) As4100 -1998
- $N_c = 0.0578 * 145 = 8.38\text{Kn} > n^*c$   
ok
- Prop head and base fixings
- $F_b = 5.6\text{Mpa}$

From the Rapidwall Manual the uniaxial tensile strength of the Rapidwall Panel

- $N_t = 28.8\text{kn/m}$ .

## Determine Prop Head Through Bolt Size

- $V^*\text{head} = 3.8\text{kN}$  prop head vertical load refer sheet 4  
  
100SQ x 6  
BACKING PLATE  
PROP HEAD BOLT  
PROP HEAD  
 $ae$   
PANEL BASE BOLT  
100 x 6 EA  
For bearing failure of the panel
- Adopt 1M20 Bolt

## Determine Prop Base Fixing Bolt Size and Layout

- $V^*\text{base} = 1.4\text{kN}$  panel net tension refer sheet 4
- For bearing failure of the panel Adopt 1M10 Bolt  
  
Checking tear out of the bolt through the bottom of the Rapidwall panel face
- Adopt 2M10 Bolts

## Check Fixing to Slab

- Try Ramset M10 Dynabolt with 55mm Embedment
- $N^*t = 1.4\text{kN}$   
  
According to the Ramset Manual for an M10 Dynabolt in 20MPa concrete  $\square_{Nt} = 6.1\text{kN}$   
  
The actual strength of the concrete at installation shall be approximately 7Mpa
- Reduce anchor capacity by ratio 7/20
- $N_t = 2.1\text{kN}$   
  
Adopt M10 Dynabolt with 55mm embedment

## Health & Safety

### Incident Report Form

At the time this report was written these web address were correct.

#### Queensland

<http://www.deir.qld.gov.au/workplace/incidents/incidents/notify-form/index.htm>

#### New South Wales & Australian Capital Territory

<http://workcover.nsw.gov.au/forms/Pages/IncidentNotificationForm.aspx>

#### Victoria

<http://www.worksafe.vic.gov.au/wps/wcm/connect/wsinternet/worksafe/home/forms+and+publications/forms/incident+notification>

#### South Australia

<http://www.decs.sa.gov.au/docs/documents/1/ed155.pdf>

#### Tasmania

[http://www.wst.tas.gov.au/safety\\_comply/accidents#notice](http://www.wst.tas.gov.au/safety_comply/accidents#notice)

#### Western Australia

[http://www.commerce.wa.gov.au/WorkSafe/Content/Services/Report\\_an\\_accident\\_or\\_incident/](http://www.commerce.wa.gov.au/WorkSafe/Content/Services/Report_an_accident_or_incident/)

#### Northern Territory

[http://www.worksafe.nt.gov.au/corporate/incident\\_notification.shtml](http://www.worksafe.nt.gov.au/corporate/incident_notification.shtml)

None of the three basic components of Rapidwall - plaster, fibre glass rovings and water presents a health hazard. Plaster, the basic ingredient of Rapidwall, has long been used as a filler in medicines and is a major component of toothpaste.

The glass rovings component of Rapidwall is non respirable.

The chemicals used are used in small volumes and present no health hazard in the finished product.

### WORK METHOD STATEMENT

For the supply, transportation and installation of prefabricated rapidwall panels

“Project name”

PROJECT ADDRESS

Country or region:

Local authority details:

## WORK METHOD STATEMENT

### TABLE OF CONTENTS

Every country and region has their own work method statement which may vary from those outlined below. Please ask the Rapidwall supplier in your region to provide you with the relevant work method statement which should have at least the following points listed and detailed.

#### SECTION A

##### SAFETY

##### ABOUT RAPIDWALL

What is Rapidwall  
About Rapid Building Systems  
Group Operations

#### SECTION B

##### MATERIAL SAFETY DATA SHEET

Identification and description  
Health Hazard information  
Precautions for use  
Safe Handling

#### SECTION C

##### RAPIDWALL CUTTING

Openings  
Cutting and Transportation

#### SECTION D

##### STILLAGES

Loading

#### SECTION E

##### STILLAGES

Testing

#### SECTION F

##### TRANSPORTATION

Stillage Selection  
Stillage loading  
Site handling of stillages  
Load tests

#### SECTION G

##### INSTALLATION

Stages  
Formwork  
Concrete placement  
Quality assurance handover  
Quality assurance final inspection

#### SECTION H

##### PROJECT SPECIFICS

Cranage  
Erection

#### SECTION J

##### APPENDICES

Employee letter  
Safety Data

## SECTION A: SAFETY

### 1.0 SAFETY INCIDENTS

#### 1.1 Incident types, notification and recording

For any Serious Bodily Injury, Work Caused Illness or Dangerous Event, the Employer, Builder and Workplace Health and Safety (WHS) must be notified within 24 hours. In the event of a death at the site immediate notification is required by telephone or facsimile. A record of any of the above events must be completed within three days on the Incident Notification Form 3 by the Subcontractor and a copy given to the Builder.

The incident scene must not be interfered with, except to save a life, relieve suffering or prevent injury to persons. Approval from a Workplace Health and Safety Inspector or police officer must be obtained before cleaning up or otherwise altering the scene of the incident.

#### 1.2 Medical Treatment

A Subcontractor may choose to arrange with a local doctor to treat injured or ill workers. This may be one way of providing first aid. If working outside the doctor's operating hours, it is the Subcontractor's responsibility to arrange suitable alternative emergency medical services prior to commencement of work.

#### 1.3 Emergency plan

All workers must know the emergency plan for the site. In the event of an emergency, simply ring 000. When you call the emergency number, be prepared to give the site address, the nearest intersection, and the nature of the emergency. Once this is done, immediately contact the Builder and advise them of the situation.

#### 1.4 First Aid

The details of any incident that requires first aid treatment must be recorded and provided to the Builder.

### 2.0 General Induction

Rapidwall Supervisors must ensure that they and their workers hold evidence of a general safety induction (i.e. a "blue card") before they start work on the site.

### 3.0 Work at Heights

All workers intending to perform work where a person could fall less than three meters during construction must identify and control hazards which could cause death or injury.

Examples of hazards include:

- Vertical reinforcing steel / starter bars;
- Edge of a rubbish skip;
- Pallet of materials, block, bricks, timber etc;
- Other objects, i.e. picket fence;
- Un-sheeted floor bearers and joists.

All workers intending to use edge protection, fall protection covers, travel restraint system, fall-arrest harness system or industrial safety net must ensure the selected control measure is capable of withstanding the impact of a person falling onto it. They must also ensure a competent person installs and maintains it and workers are instructed in its use and maintenance.

Note: Where fall-arrest systems are used there must be adequate clearance and anchorage points must have adequate capacity. There must also be a Work Method Statement relating to rescue procedures. A second person (stand by person) is also required when a safety harness is being worn.

#### 4.0 Ladders

All workers intending to use a ladder, i.e. stepladder, single ladder or extension ladder must:

- 4.1 Ensure that while gaining access, or while undertaking work, the worker has at least two hands and one foot, or two feet and one hand on the ladder at all times;
- 4.2 They must also be fully on the ladder when climbing or while the person is leaving the ladder;
- 4.3 Ensure the maximum length of a single ladder is not more than 6.1 meters and the maximum length of an extension ladder is 7.5 meters (or 9.2 m for electrical workers);
- 4.4 Be checked and maintained before and after use to ensure their effectiveness of preventing a person from falling;
- 4.5 Be secured top and/or bottom to prevent movement;
- 4.6 Be of an industrial rating of at least 120 kg;
- 4.7 Not be used to support a greater weight for which they were designed;
- 4.8 Be placed so the angle between ladder and horizon is at least 70° but not more than 80° or a ratio of 4 vertical to 1 horizontal. The ladder must also be placed on a solid level sound base;
- 4.9 Extend at least one meter above the surface if used as a temporary means of access;
- 4.10 Not be placed within three meters of any power lines unless you are an authorized person;
- 4.11 Not be used in a confined space until the Subcontractor has provided the Builder with a copy of the relevant Work Method Statement.

#### 5.0 Trestle Ladders

All workers intending to use trestle ladders to support a work platform must, before work starts, ensure:

- 5.1 Each hazard that a person may fall onto and which could cause death or injury is identified assessed and controlled;
- 5.2 Edge protection is erected along the length of the platform where a person could fall at least three meters from the platform or a lesser distance if identified hazards cannot be removed. Hazards would include reinforcing steel, stacks of bricks etc. under and adjacent to where the trestle ladders will be set up;
- 5.3 Trestle ladders are secured to prevent them moving;
- 5.4 The platform must be at least 450 mm wide at any height (two planks);
- 5.5 The platform is to be unobstructed along its length and the platform no higher than 2.4 meters.

#### 6.0 Falling Objects

All workers working at height shall prevent the fall of materials, plant or any object onto workers, other people, the public, or into adjacent properties. This may be achieved by installing containment sheeting, lanyard or a catch platform, creating an exclusion zone, closing a footpath or road or adjoining area if approved by the local authority or owner in writing.

#### 7.0 Common Plant

Common plant is to be used as per the manufacturer's and supplier's instructions. Persons who will use the common plant must be instructed and trained in its use and any damaged or defective common plant is to be reported to the Builder or their contact person for rectification.

See the Builder obligation sheet for details of supplied common plant. Subcontractors must ensure common plant provided by the Builder is safe for the purpose it is provided for before commencing each day's work.

## 8.0 Public Protection

Workers are to ensure:

- 8.1 Nothing is stored or placed outside the site boundary or fence unless the Builder has approved it in writing;
- 8.2 Any barricade or scaffold provided by the Builder is not to be modified, relocated or dismantled without a suitable ticket and the Builder's prior approval;
- 8.3 The last person to leave the workplace secures the workplace by ensuring the barricading, if supplied, is fully closed, any signs erected are visible and no hazards exist for any one passing by the site.

## 9.0 Safety Signs

Workers must ensure they follow the directions of any safety signs on the site.

## 10.0 Housekeeping

Workers are to ensure:

- 10.1 The means of access onto and around the site are safe and clear;
- 10.2 All materials are stored in the appropriate areas as agreed with the Builder;
- 10.3 All rubbish is cleaned up daily (see workplace plan for disposal location);
- 10.4 All work areas are kept clean;
- 10.5 Bottles, cans, eating areas are cleaned up after meal or breaks;
- 10.6 Any protruding objects that are a hazard are made safe (eg bending over or removing exposed nails, capping vertical reinforcing bars).

## 11.0 Amenities

Workers must:

- 11.1 Keep toilet(s) provided by the Builder clean and tidy at all times;
- 11.2 Use the washing facilities only to wash your face, hands etc. not to clean equipment or gear;
- 11.3 Keep lunch/crib areas clean and free of rubbish, tools, equipment etc;
- 11.4 Use a personal cup or container to drink from and keep it clean.

## 12.0 Electrical

Workers must:

- 12.1 Ensure electrical leads and plugs are a minimum of 10 amp heavy duty leads;
- 12.2 Ensure electrical leads are protected from damage from vehicles, plant or liquids;
- 12.3 Keep a minimum three meter clearance any direction from overhead power lines;
- 12.4 Ensure all electrical equipment is checked to be tested and tagged every three months and a current tag fitted within 300mm of the male plug;
- 12.5 Ensure electrical hand tools are connected to a Residual Current Device (RCD) provided in the switchboard by the Builder or connected to a portable RCD, supplied by the Subcontractor. The portable RCD must be tripped each day before use and checked annually by an electrician
- 12.6 If a lead or tool is damaged, irrespective of it having a tag, remove it from the site and have it repaired.

## 13.0 Lone Workers

Workers are not to work alone in the workplace unless agreed to by the Builder



#### 14.0 Persons on the site

All persons on the site must:

- 14.1 Follow Health, Safety and Environmental directions of the Builder;
- 14.2 Follow Work Method Statements as provided, signed and dated by themselves.
- 14.3 Comply with the site rules;
- 14.3.1 Not start work at the workplace until they have provided evidence of having successfully completed a general safety induction to the Builder and been inducted to the project site by the builders representative
- 14.3.2 Not be at the site under the influence of illegal drugs or alcohol;
- 14.3.3 Not wear jewellery if it can cause a hazard to the worker, ie a ring on a finger that could be caught in a load being lifted;
- 14.3.4 Not bring glass bottles or jars on site at any time.
- 14.3.5 Not use mobile phones when carrying out hazardous tasks such as using electrical tools, involvement when lowering panels to the deck etc.
- 14.3.6 Be aware safety is everyone's responsibility and all workers are encourage to report unsafe practices or environments no matter how minor to their supervisor or a suitable Builders representative

#### 15.0 Clients, Consultants etc.

If clients and / or consultants are visiting the site and do not have a General Induction card, after approval to enter the site from the builder a person with a General Induction card should escort them at all times whilst they are at the workplace.

#### 16.0 Delivery People

If delivery people do not hold a general safety induction card they should be escorted or supervised by someone with a general safety induction card.

#### 17.0 Prescribed Activity/Occupation

No person is to undertake a prescribed activity or occupation unless they have the relevant qualifications and proof, (i.e. ticket) and has had the qualifications recorded by either their employer(s) or the Builder.

#### 18.0 Fire Extinguishers

All workers shall carry complying fire extinguishers when undertaking hot works, i.e. welding, oxy cutting etc.

#### 19.0 Personal Protection Equipment (PPE)

When issued with PPE the worker must ensure their own PPE is in good working order. Failure of any PPE should be reported to the Rapidwall Supervisor immediately.

- 19.1 When preparing to operate electrical tools the worker must ensure a stable work platform is available and ensure ear and eye protection at all times.
- 19.2 Hard hats are to be worn at all times unless the builder advises certain areas are exempt. Wherever self-erector, tower and or mobile cranes are in use hardhats must be worn. If in doubt always wear your hardhat.
- 19.3 Steel tip boots are to be worn at all times, no exceptions.
- 19.4 When installing Rapidwall panels eye protection must be worn at all times, no exceptions.
- 19.5 When cutting, sanding, drilling etc Rapidwall panels a P1 or greater safety mask / respirator and eye protection must be worn, no exceptions.
- 19.6 Eye and hand protection to be worn when applying Euroset or similar external primer/sealer, no exceptions.
- 19.7 Eye protection to be worn when applying Euroset or similar external patch products, no exceptions.
- 19.8 When exposed to sunlight for extended periods, sunscreen and a hardhat sunbrim must be worn.

## SECTION B: ABOUT RAPIDWALL

### 1. INTRODUCTION

The provision of walls for habitable enclosures in commercial buildings, and residential buildings in particular, is the central activity in what is the biggest industry in the world, the construction industry. The development of structurally safe, fast, cost-effective and environmentally sustainable walling systems is essential to house the large and growing populations of the world, particularly those of third world countries.

Rapidwall was developed and has been in use in Australia since 1992. Since its inception several thousand houses and over 50 multi-storey apartment blocks have been constructed using Rapidwall. Developed in South Australia by Rapid Building Systems Pty Ltd. Rapidwall is one of a few products approved under the Chinese building code as being able to satisfy the strict selection parameters for wall construction in China.

The Government of India has arrived at a similar conclusion in regard to the use of Rapidwall. BMTPC has approved the Rapidwall design manual for the whole of India.

Please seek advice from your local Rapidwall supplier regarding local approvals of Rapidwall.

### 2. WHAT IS RAPIDWALL

Rapidwall is a revolutionary, cost effective prefabricated walling product with broad construction applications from load-bearing walls in individual domestic cottages and multi-story residential buildings and formwork/ceilings for suspended concrete floor structures.

Rapidwall is manufactured in a moulding process using glass-fibre reinforced water-resistant gypsum plaster. All panels are 12 metres long and can be produced in heights from 2.5 metres up to 3 metres. The panels have a cellular structure and are 123 millimetres thick.

The formed cells can be used to accommodate building services such as plumbing and electrical conduits or can be filled with insulation for increased thermal performance or concrete for increased structural capacity.

### 2.1 The attributes of Rapidwall

- ❑ Manufactured on a production-line generally in a single size and then cut to size. Unlike precast concrete panels, each of which is usually cast as a one-off detailed panel with windows and doors.
- ❑ A single 36 square metre Rapidwall panel is manufactured in one hour, compared to about 24 hours for an equivalent precast-concrete wall panel.
- ❑ A 12 metre by 3 metre by 123 millimetre concrete panel would weigh 10.5 tonne compared to 1.5 tonne for the equivalent Rapidwall panel.
- ❑ As a load-bearing walling element Rapidwall has an installed cost of about 70% of that of precast concrete.
- ❑ Depending on the wall layout, a Rapidwall panel when concrete filled on site can support between twelve and twenty storeys thus eliminating the need for columns and floor beams.
- ❑ The finish of Rapidwall is superior to an equivalent off-form, precast-concrete or in-situ wall panel.
- ❑ Rapidwall can be made from naturally occurring gypsum or from waste flue-gas gypsum or phosho-gypsum;
- ❑ Rapidwall has a lower embodied energy than all other walling products. Embodied energy is the total energy consumed by the product from the point of extraction of the raw material to the manufacture of the panel, to its transportation to a site and to its final installation on a building project.
- ❑ Rapidwall panels are 100% recyclable wherein they can be re-processed through a calciner and recast into new Rapidwall panels.

- ❑ A single B-double truck can transport up to 900 square metres of Rapidwall compared to 125 square metres for 123 millimetre thick precast-concrete and 190 square metres of 140 millimetre thick concrete hollow blockwork.
- ❑ In suspended timber floored housing construction, unfilled Rapidwall is load-bearing up to three storeys.
- ❑ In cottage construction utilising suspended concrete floors, unfilled Rapidwall is load-bearing up to two storeys.
- ❑ When used as load-bearing shear walls Rapidwall exhibits ductile qualities that make it safer than masonry in earthquake prone structures.

## 2.2 The Rapidwall Benefits in Summary

- ❑ Greater speed of on-site construction
- ❑ Lower on-site labour requirements
- ❑ Simpler methods of on-site fixing
- ❑ Excellent modulation capabilities
- ❑ Load bearing for multi-storey construction
- ❑ Lightweight
- ❑ Good thermal and fire resistant qualities
- ❑ Lowest embodied energy
- ❑ Produced from cost effective and naturally abundant raw materials
- ❑ Can be produced from waste products
- ❑ 100% recyclable
- ❑ Low transportation and crange costs

## 2.3 Specific Applications

- ❑ Load-bearing walls in multi-storey apartments
- ❑ Firewalls
- ❑ Roof panels
- ❑ Lost formwork for suspended slabs, thereby providing ceilings
- ❑ Fencing
- ❑ Domestic housing construction, single and double storey
- ❑ Townhouses
- ❑ Shops
- ❑ Offices
- ❑ Resorts
- ❑ Hospitals
- ❑ Factory buildings
- ❑ Cinemas and sound studios

## 3. About Rapid Building Systems

The Rapidwall technology was developed and is owned by Rapid Building Systems Pty Ltd who, in addition to licensing its application, design and sell the associated manufacturing equipment necessary to produce the wall panels.

Rapid Building Systems Pty Ltd also designs, builds and sells the Rapidflow Calcination Plants used for the manufacture of the high quality Rapidflow plaster used in the manufacture of the Rapidwall panels.

Plant manufactured by Rapid Building Systems includes:

- ❑ Rapidwall casting-beds and associated core-pullers and dispensing crabs
- ❑ Rapidryer ovens used to fast-cure Rapidwall panels;
- ❑ Rapidflow Calcination Plants.

#### 4. PRODUCTS & SERVICES

- ❑ Licensed Manufacturing using the patented Rapidwall Technology
- ❑ Licensed Construction using the patented Rapidwall Technology
- ❑ Design & Installation of Rapidwall Manufacturing Plants
- ❑ Design & Installation of Rapidflow Calcination Plants
- ❑ The manufacture and packaging of high-grade gypsum plasters for the general construction and mining industries
- ❑ Building project and or construction management for new Rapidwall and Rapidflow plant installations
- ❑ Structural engineering design services to developers and Architects wishing to use Rapidwall in their constructions

#### 5. CONTACT DETAILS

##### Head office and international operations

Rapid Building Systems Pty Ltd  
200 Kensington Road, Marryatville  
South Australia 5068  
T: + 61 8 8363 4544  
email: office@rapidwall.com.au

##### Rapidwall and Rapidflow plaster Manufacturing.

RFC Plaster Pty Ltd  
35 Willowmavin Road,  
Kilmore, Victoria 3764  
T: + 61 3 5782 0534  
F: + 61 3 5782 0531  
admin@rapidwall.com.au

## SECTION C: MATERIAL SAFETY DATA SHEET

### MANUFACTURER:

Rapidwall Australia Manufacturing Pty Ltd  
35 Willowmavin Road Kilmore VIC 3764  
T: + 61 3 5782 0534  
F: 03 5782 0531  
Licensor: Rapid Building Systems Pty Ltd  
200 Kensington Road  
Marryatville South Australia 5068  
T: + 61 8 8363 4544

### IMPORTANT NOTICE:

The Material Safety Data Sheet contained herein is prepared and issued by Rapidwall Australia Manufacturing Pty Ltd in accordance with guidelines of Worksafe Australia. In countries, other than Australia, users of this document must refer to the MSDS issued by the local manufacturer to comply with local rules and regulations.

Accordingly the information contained herein must not be altered, deleted or added to in any respect. In the event of a change in product specifications and/or the guidelines and regulations of Worksafe Australia or the local country authority, Rapid Building Systems Pty Ltd, or the local manufacturer will issue a new MSDS Rapid Building Systems Pty Ltd will issue a new MSDS.

Rapidwall Australia Manufacturing Pty Ltd will not accept any responsibility for any changes made to its MSDS in content by any person not authorised to do so.

## 1. IDENTIFICATION

Product Name	Rapidwall®
UN Number	None allocated
Trade Name	Rapidwall®
Dangerous goods class	None allocated
Subsidiary risk	None allocated
Hazchem code	None allocated
Poisons schedule number	Non scheduled
Use	Rapidwall is used as a lightweight-partition walling panel, as permanent wall formwork for load bearing concrete walling and as formwork for suspended concrete slabs. The same ingredients are also used to manufacture reveals, corner moulds and quoins for decoration.

### Note:

The quartz content of plaster is less than 0.1% and it does not contain asbestos or asbestos fragments.

## 2. PHYSICAL DESCRIPTION

Appearance	Off white panel
Odour	Slight plaster odour
Melting point	1450°C plaster, 1200°C fibreglass strand
Flammability	Not flammable
Specific gravity (water=1)	1.0 (approximately)
Molecular weight	136.14 (plaster)
Auto ignition temperature	Does not auto-ignite
pH	7.5-8.5

### Ingredients

Chemical Entity	CAS No	Proportion
Calcium sulphate hemihydrate	7778.18.9	>94.8%
Calcium sulphate dihydrate	10101.41.4	<1%
Fibreglass Strand	-	2.0%
Water Repellent	-	3.0% - 4.0%

### 3. HEALTH HAZARD INFORMATION

#### 3.1 Acute Health Effects

**If swallowed:**

Unlikely under normal conditions of use, but swallowing the dust may result in abdominal discomfort.

**Eyes:**

The dust may irritate the eyes causing watering and redness.

**Skin:**

The dust, particularly in association with heat and sweat, may cause irritation but it is not absorbed through the skin.

**If inhaled:**

The dust may cause irritation of the nose, throat and lungs resulting in excess mucus and coughing. The fibreglass strand is not respirable.

#### 3.2 Chronic Health Effects

**If inhaled:**

Repeated exposure to the dust may result in increased nasal and respiratory secretions and coughing, but not irreversible health effects.

#### 3.3 First Aid

**If swallowed:**

Give copious amounts of water to drink.

**Eyes:**

Flush thoroughly with flowing water for at least ten minutes. If symptoms persist, seek medical attention.

**Skin:**

Wash thoroughly with soap and water.

**If inhaled:**

Remove to fresh air.

**Advice to a Doctor:** Treat symptomatically.

### 4. PRECAUTIONS FOR USE

#### 4.1 Standards

##### 4.1.1 Worksafe Australia Exposure Standard:

There is no specific standard for plaster but the calcium sulphate standard should apply.

Calcium sulphate: 10 mg/m<sup>3</sup> time weighted average (TWA)

##### 4.1.2 Rapidwall Recommendation:

Keep exposure to dust as low as practicably possible.

##### 4.1.3 Engineering Controls, Housekeeping and Work Practices:

General room ventilation should be adequate, but local mechanical ventilation may be required if dust is generated, particularly in confined spaces. Work practices should minimise the release of, and exposure to dust.

Work areas should be cleaned regularly by wet sweeping or vacuuming.

##### 4.1.4 Personal Protective Equipment:

If engineering controls and work practices are not effective in controlling dust, then personal protective equipment may be required in the form of respiratory masks.

##### 4.1.5 Skin Protection:

Loose comfortable clothing should be worn at all times. Prolonged direct skin contact should be avoided by wearing long sleeved shirts and long trousers, a cap or hat, and gloves.

##### 4.1.6 Eye Protection:

Ventilated non-fogging goggles should be worn when working in a dusty environment.

#### 4.1.7 Respiratory Protection:

An approved particulate respirator conforming to Australian Standards AS1715 and AS1716 should be worn when working in a dusty environment.

Respirators should be correctly fitted, maintained in good condition, and kept in appropriately marked and clean storage cabinets when not in use. Filter papers and cartridges should be replaced regularly in accordance with the manufacturers' guidelines and in accordance with Australian Standards AS1715 and AS1716.

#### 4.1.8 Flammability and Thermal Decomposition:

Rapidwall is non-flammable. Avoid any build up of dust and keep all storage and work areas well ventilated and clear of dust.

### 5. SAFE HANDLING

#### 5.1 Storage and Transport:

This product should be stored and transported in appropriately designed transport- stillage frames by suitably qualified transportation personnel or transportation contractors.

No other special transport requirements are necessary.

#### 5.1 Spills and Disposal:

Bagging, wet sweeping and/or vacuuming should be used to clean-up dust and waste from Rapidwall® production and processing. Waste should be placed into containers and disposed of as trade waste in accordance with local waste disposal authority guidelines.

#### 5.3 Fire/explosion hazard:

Not applicable.

### 6. CONTACT POINT

For further information on this product please contact:

Rapidwall Australia Manufacturing Pty Ltd

35 Willowmavin Road Kilmore VIC 3764

T: + 61 3 5782 0534

F: 03 5782 0531

### 7. DISCLAIMER

Whilst the information contained in this document is based on data that, to the best of knowledge of Rapid Building Systems Pty Ltd, was accurate and reliable at the time of its preparation no responsibility can be accepted for any errors and omissions.

The provision of this information should not be construed as a recommendation to use any of our products in violation of any patent rights or in breach of any statute or regulation. Users are advised to make their own determination as to the suitability of this information in relation to their particular purposes and specific circumstances.

Since the information contained in this document may be applied under conditions beyond our control, Rapid Building Systems Pty Ltd can accept no responsibility for any loss or damage caused by any person acting or refraining from action as a result of this information.

## SECTION D: RAPIDWALL CUTTING PROCEDURE

### 1. GENERAL

Rapidwall panels are generally manufactured in one size only and transported in bulk to a Rapidwall cutting facility where they are cut and shaped to specific dimensions prior to transportation to a building site.

The panels are cut on a docking table using a saw fitted with a dust-extraction system specifically designed for the purpose. Following the preparation of construction drawings by the building designers, shop fabrication drawings are prepared for each panel indicating overall dimensions and the size and position of cut-outs for doors and windows and rebates for suspended floors.

### 2. OPENINGS

At the discretion of the trained cutting staff and to prevent panel damage during long distant transportation, some door and window openings in Rapidwall must be only partially cut-out. Instead 200 millimetres of each corner of the opening is left uncut to be concluded on the building site after installation of the Rapidwall panel.

Because of the likelihood of damage during transportation, door openings in particular are generally not be fully cut. Whilst small window openings can be fully cut-out in the factory, larger window openings, or window openings near a panel edge, should also be left uncut at their corners to ensure the panel does not crack during transportation.

Rapidwall panel openings should remain only partially cut in the following situations:

- 2.1 If the opening height is greater than 50% of the height of the panel
- 2.2 If the opening width is greater than 50% of the width of the panel
- 2.3 If the opening is closer to any panel edge than 15% of the panel height or width as appropriate.

### 3. CUTTING AND TRANSPORTATION

After cutting to the required dimensions the Rapidwall panels are loaded onto a stillage specifically designed for the purpose and transported to the construction site.

The following procedures should be adopted in the process of cutting and transporting Rapidwall panels:

- 3.1 Obtain from the client the building-project specifications and plans and elevations, a panel layout drawing, construction schedules and the site location plan.
- 3.2 Obtain the construction starting point (grid reference on plan) to determine the requirements for the initial and subsequent panel batches to be delivered.
- 3.3 Prepare a draft Stillage Dispatch Sheet in accordance with Table 1 and send the draft and then the final copy to the client for their approval in writing prior to commencement of cutting.
- 3.4 Prepare Stillage Packing Sheet, as shown in Table 2 and allocate a stillage in the factory.
- 3.5 The operator must determine which panels should be grouped for the most economical cutting from the full-sized stock panels. This may require that several stillages must be loaded at the same time.
- 3.6 The operator programs the saw for cutting the panel to length and height and then the openings.
- 3.7 Remove the cut Rapidwall panel from the saw frame and place it in the assembly racks to be fitted with metal closure studs and the removal of openings as appropriate.
- 3.8 Load the processed panels into the transportation stillage.
- 3.9 Lash the completed stillage in preparation for transportation to the building site.

For the operation of the cutting saw refer to Appendix B: Rapidwall Autosaw.



**TABLE 1: STILLAGE DISPATCH SHEET**

Project Title			
Dispatch no		Dispatch address	
Panel location (level)		Dispatch date	
Stillage no		Total weight	
Reference shop drawing no:			
From		Date	Signature

Panel ID	Number of panels	Length (mm)	Height (mm)	Opening	Dist. rib L.H. end	Remark

Client endorsement:

Date:

Note: 'Dist. rib L.H. end' denotes the distance of the first rib to left hand end (looking from Side A).

**TABLE 2 STILLAGE PACKING SHEET**

Client:

Project:

Data and Factory QC Checking						
Production Date	Sheet No.	Sort Order	Panel No.	Spec. Length	QC Length	Spec. Height

On Site check							
QC Height	Left	Right	Rebate Details	Openings	Length	Height	Windows Doors etc.

Total Length:

Average Height

Note: Approximate weight of Stillage: 300kg

## SECTION E: STILLAGE LOADING PROCEDURE

There are two stillage sizes. One takes five panels, the other takes eight panels.

Date: 30/03/2010

### Five Panel

- ❑ The five panel stillage should be used for panels that exceed six metres in length. The maximum weight to be carried and for which a five panel stillage has been tested is 4500kg.
- ❑ All stillages must be tested every six months with a weight of 4500kg. This is to be recorded on the stillage testing form and the weight, date and number of the stillage painted on each part of the stillage.
- ❑ Before the stillage is loaded with panels ensure that two legs and a cross head are placed on one side of the stillage. The stillage is then laid back against an upright with sufficient strength to support the weight of the panels and stillage, at an angle of no greater than 10 degrees. A wooden or steel plank at least 50mm thick is to be placed under the stillage to balance it.
- ❑ When the five panel stillage is being loaded ensure that the longest panels are placed in the middle of the stillage and the shorter panels are loaded from outside in. This reduces the chance of the panel being caught in wind drafts and potentially breaking (see diagram below). Ensure that the panels that lean against the two upright posts on both sides are tall enough to cover the cross head and wide enough to cover the distance between the two legs.
- ❑ When stillages are delivered to site ensure the stillage is level and the four outrigger legs are inserted into stillage base to avoid the stillage toppling in high wind conditions.

### Eight Panel

- ❑ The eight panel stillage should be used for panels that measure six metres in length and under. The maximum weight to be carried and for which an eight panel stillage has been tested is 6500kg.
- ❑ All stillages must be tested by the Rapidwall manufacturer every six months with a weight of 6400kg.
- ❑ Before the stillage is loaded with panels ensure that two legs and a cross head are placed on one side of the stillage. The stillage is then laid back against an upright with sufficient strength to support the weight of the panels and stillage, at an angle of no greater than 10 degrees. A wooden or steel plank at least 50mm thick is to be placed under the stillage to balance it.
- ❑ When the eight panel stillage is being loaded ensure that the longest panels are placed in the middle of the stillage and the shorter panels are loaded from outside in. This reduces the chance of the panel being caught in wind drafts and potentially breaking (see diagram below). Ensure that the panels that lean against the two upright posts on both sides are tall enough to cover the cross head and wide enough to cover the distance between the two legs.

## SECTION F: RAPIDWALL STILLAGE TESTING PROCEDURES

TEST METHOD	STILLAGE TESTING	No. 2.0-1
		Date: 23.05.2002
		Page: 1 of 2
Type: General – All Plants		Issue No: 2
Tester: F. Omahen	Ref. Corporate No.: ...	

TEST METHOD	STILLAGE TESTING	No. 2.0-1
		Date: 23.05.2002
		Page: 2 of 2
Type: General – All Plants		Issue No: 2
Tester: F. Omahen	Ref. Corporate No.: ...	

### 1. REQUIRED EQUIPMENT

- 1.1 Purpose built lifting device (spreader bar)
- 1.2 Appropriate lifting apparatus (fork lift)
- 1.3 Timing device (Stop Watch)
- 1.4 Measured Weights (4x1600kg)

### 2. PROCEDURE

All surface rust to be removed and surfaces treated with appropriate protection:

- 2.1 All Stillage bases and legs to be clearly identified using a numbering system.
- 2.2 Assemble legs to one side of Stillage (2).
- 2.3 Load measured weights evenly to Stillage base.
- 2.4 Assemble legs to other side of Stillage base (2).
- 2.5 Lock and secure all 4 legs in position.
- 2.6 Attach lifting device and check all lifting points are secure.
- 2.7 Suspend approximately 600mm from floor level for a period of not less than 2 minutes, appropriately timed and recorded.
- 2.8 Disassemble checking all components are in a sound condition.
- 2.9 Record clearly on Stillage legs date when tested.
- 2.10 Record clearly on Stillage base date when tested.
- 2.11 Appropriately record all testing, date, status i.e. pass or fail.
- 2.12 Testing to be signed off by team leader.
- 2.13 Report and record any required remedial action and ensure correction is carried out.
- 2.14 Observe Stillage status when returned from site. Record and maintain.
- 2.15 All Stillage testing to be carried out on a 6 monthly basis.
- 2.16 All Customers shall advise Rapid Building Systems of any damage incurred during transportation or whilst onsite and return to RBS to allow the appropriate remedial action can be carried out.
- 2.17 A Stillage which has failed the test must be clearly tagged, removed from circulation set aside for assessment by engineer to be repaired or discarded.

## SECTION G: RAPIDWALL TRANSPORTATION BY STILLAGE

Rapidwall panels are loaded in the upright position onto purpose built transportation stillages ready for loading onto a semi-trailer. Usually more than one stillage is placed on a truck. Up to 600m<sup>2</sup> of Rapidwall or 18 full size uncut panels can be loaded onto a semi-trailer and delivered at one time. A crane-truck can be used to deliver and unload stillages on suitable projects.

Lifting, loading and general handling of the Rapidwall panels can be achieved using conventional and affordable systems. Lifting of stillages can be completed using forklifts, cranes or truck cranes.

Individual panels can be moved, unloaded and installed by crane using Rapidwall lifting jaws designed to clamp the internal web of the panel. Being lightweight, small sections of Rapidwall can be moved and installed manually or by using a number of specially built trolleys, hand trucks or hand frames.

### 1. STILLAGE LOADING PROCEDURES

The procedure to be followed for panel transport by stillages is specified in this section as well as in the Operation and Maintenance Manuals.

#### 1.1 Selection of a Stillage

Selection of a stillages (5 or 8 panels per stillage) is generally dependent on the following factors:

- 1.1.1 Client requirements.
- 1.1.2 The panel length.
- 1.1.3 Safest handling.
- 1.1.4 Site conditions for unloading.
- 1.1.5 Total weight.

#### 1.2 Panel Loading Procedure

The following procedures are to be followed when loading panels into a transportation stillage:

- 1.2.1 Stillages are assembled and checked for any damage prior to loading panels.
- 1.2.2 Panels are loaded in sequence as approved by the client or client representative.
- 1.2.3 When loading of panels into the stillage is completed, install and lock the spacer bar to the top of the restraining legs to complete the loading.
- 1.2.4 Ensure all components of the stillage are accounted for;  
Stillages are loaded in conjunction with the transportation logistics personal and the truck driver who must position and tie-down the stillages and complete any safety checks prior to transporting the load. The Rapidwall manufacturer is not responsible for securing the stillages to the trucks. To ensure the safe handling of the panels and to minimise damage to the Rapidwall panels during loading and transportation to the building site, the following documentation must be completed during the loading of any Rapidwall stillages at the factory.
- 1.2.5 The forklift driver shall be responsible for this procedure:
  - 1.2.5.1 Prior to loading of any stillage onto a truck inspect each stillage to ensure all components of the stillage are in place.

1.2.5.2 Record and sign, at completion of loading, Stillage Loading Checklist shown in Table 1;

1.2.5.3 During loading of the stillages any damage that occurs to the panels must be recorded on the Stillage Loading Checklist;

1.2.5.4 At the completion of loading and before the driver ties down his load, issue the driver with a copy of the Transport Form Number for Stillage tie down Procedure;

1.2.5.5 The truck driver must initial the Stillage Loading Checklist to verify that a copy of form number was received and record any other relevant information;

1.2.5.6 At the completion of loading return the Stillage Loading Checklist to the production office. This shall then be properly filed and maintained with other documents including cutting lists.

## 2. STILLAGE SITE HANDLING

Loaded stillages, delivered to site, shall be placed on a level and stable surface. To avoid overturning, all stillages are provided with four (4) out-riggers stabilizing legs. All stabilising legs must extend through the stillage base and project 1900mm outwards and then secured in the stillage base using the locating pins.

For safety reasons the out-riggers must be utilized at all times when loaded stillages are not tied down to a truck or otherwise tied down when not on a truck.

## 2.1 Unloading Panels

The following procedures should be followed when unloading Rapidwall panels from a stillage:

2.1.1 Panels shall be taken from one side only to prevent panels falling against the legs.

2.1.2 Remaining panels shall be restrained by positioning and securing by rope a timber insert 1000 x 92 x 45mm into the nearest cell adjacent to the stillage legs.

2.1.3 When panels are removed from the centre of the pack the remaining panels on either side shall be restrained in a method similar to point 2 above.

2.1.4 Stillages left with unused panels shall have the spreader bars replaced or be secured by rope and left in place until the panels are required.

2.1.5 Eight-panel stillage legs, which are laterally adjustable, shall be moved against the remaining panels to restrain them.

2.1.6 All Stillage components shall be returned in good condition to the factory with the Stillage Component List as shown in Table 6.2 duly filled out and endorsed.

2.1.7 Rapidwall Panels shall not be erected in conditions where the wind speed exceeds 25kph.

### 3. STILLAGE LOAD TESTS

Stillages are often heavily loaded and severely handled on site and during transportation. To ensure the safety of the stillage and its adequacy for re-use, all stillages must be regularly tested every six months in accordance with the test procedures described in the laboratory manual. Damaged parts must be repaired or replaced, and then re-tested. Stillages that fail the tests must be rebuilt and retested or otherwise removed from use.

**TABLE 1: STILLAGE LOADING CHECKLIST**

	Quantity	Yes	No	Comments
Base				
Plywood Sheets				
Vertical Legs				
Cross Bars				
Stabiliser Bars				
Leg Holding Pins				
Stabiliser Holding Pins				
"C" Channel Cap				

**Noted Damage to Stillages:**

.....  
 .....  
 .....

Tie Down Procedure Issued to Driver:

Yes  No  Drivers Initials: \_\_\_\_\_

**Truck Drivers Details: -**

Name: \_\_\_\_\_

Company: \_\_\_\_\_

Address: \_\_\_\_\_

Tel: \_\_\_\_\_ Fax: \_\_\_\_\_ Mobile: \_\_\_\_\_

Ensure that the four 1900mm Stabilizing Legs are supplied and used on all Stillages.  
 Form No.

**TABLE 2: FIVE PANEL STILLAGE COMPONENT CHECKLIST**

**Stillage No..... Date ..... Site .....**

	Quantity	Yes	No	Comments
Base				
Legs				
Stabilizer Legs				
Locating Pins				
Heads				
Bolts & Nuts Legs				
Bolts Base				

Date Returned.....

Signed .....

**TABLE 3: EIGHT PANEL STILLAGE COMPONENT CHECKLIST**

**Stillage No..... Date ..... Site .....**

	Quantity	Yes	No	Comments
Base				
Legs				
Stabilizer Legs				
Locating Pins				
Heads				

Ensure that the four 1900mm Stabilizing Legs are returned on all Stillages.

## SECTION H: RAPIDWALL INSTALLATION

### 0. Preliminary requirements

- 0.1 Confirm delivery date, time and panel schedules.
- 0.2 Confirm method of placement of panels.
- 0.3 Ensure builder clears slab working area of any ponding water, rubbish, equipment and building materials.
- 0.4 Establish datum for floor and note floor levels to be + 5mm from specified reduced level.
- 0.5 Mark grid lines for set out from established survey grid provided by builder/client.
- 0.6 Position 'micky' pins in interior/ exterior corners and reference location points.
- 0.7 On a daily basis ensure that all equipment such as lifting jaws are in working order prior to the start of the day's work.

### 1. Stage One

- 1.1 Identify and mark panel numbers on floor set out.
- 1.2 Measure and mark floor slab to accommodate starter bars and transfer set out details from Rapidwall Panel Schedule to accommodate it.
- 1.3 Provide continuous blocking to floor slab on one side of wall only if required.
- 1.4 Set out and mark all door and window locations, unless pre-cut in factor.
- 1.5 Complete set out to enable 100% of Rapidwall panels to be erected in any given area.

### 2. Stage two

- 2.1 Drill holes in concrete at predetermined centres to accommodate starter bars.
- 2.2 Using a vacuum or compressed air, remove dust residue.
- 2.3 Place pre-cut dowel in each hole.
- 2.4 Place yellow safety caps over dowel (not required if done simultaneously with panel erection).
- 2.5 Remove each rod after mixing batch of epoxy (use Hilti Hit or Sho-Bond grout) placing epoxy in the hole, insert dowel and rotate to ensure firm embedment.
- 2.6 Ensure all unwanted dowels, rubbish and epoxy is removed from the work area.

### 3. Stage three

- 3.1 Determine method of lifting Rapidwall panels from the transport stillage. This is determined by the length of the panel and will either be the hydraulic or manual jaws.
- 3.2 Crane stillages directly from semi-trailer, and place in a location suitable for placement of panels and location of craneage.
- 3.3 Erect in place mobile scaffolding or ladder at work face and stillage for placement of hydraulic or manual jaws (maximum height 2.4m).
- 3.4 Reference to Rapidwall Cutting Schedules and stillage loading for order for placement of panels.



- 3.5 Attach jaws to panel required and extract from stillage and crane into position.
- 3.6 Position brace for Rapidwall panel vertical and temporarily secure to floor slab via a 10mm dia x 65mm dyna bolt (or similar), ensuring true plumb and alignment.
- 3.7 Props or cross wall at 4.0m maximum centres.
- 3.8 Ensure panel is level and shim where necessary to bring in to level plane.
- 3.9 Release jaws and repeat process.
- 3.10 Cut and place 92 x 35mm x 1.15bmt Rondo metal studs in junctions of adjoining walls.
- 3.11 Drill and place 150mm Hex Head 14 gauge screws at intersection of adjoining walls at 600mm centres.
- 3.12 On completion sweep and place all off-cuts and debris in waste bins provided.
- 3.13 Dismantle stillages and strap up to 5 stillages maximum, stacked one upon another for crange and removal to nominated storage area.

#### 4. Stage four

- 4.1 Cut and place door and window heads including temporary propping.
- 4.2 Place and secure all manual Rapidwall® panels as shown on working drawings.

#### 5. Stage five

- 5.1 Cut and fit 13 x 13 metal perforated angles to top of designated Rapidwall® panels using adhesive and 20mm clout nails. This avoids damage to edges of Rapidwall® panel when placing precast beams onto top of panel i.e. required for Ultrafloor or similar only
- 5.2 Provide continuous support to both sides at base of panel, and at intersection when filling Rapidwall panel with concrete in accordance with standard details
- 5.3 This also applies at internal/ external door openings and windows similarly where 120mm channel needs to be screwed off and supported prior to concrete placement
- 5.4 Repair or brace any damaged section of Rapidwall® as a result of installation/transportation prior to any concrete placement.

#### 6. Stage six

- 6.1 On completion (i.e. floor by floor basis) check all panels located in correct position and they are both true and plumb, and braced where necessary. With Ultrafloor check that installation of beams has not moved panels out of plumb
- 6.2 Check all openings i.e. door, window are in correct location and where required, braced and supported to receive concrete

## 7. Stage seven

### 7.1 Concrete Filling

- Brief pump operator as to required concrete strength, specified slump and expected volume of concrete to be placed.
- Agree responsibility for ordering next concrete truck and final quantity.
- Do not commence filling if other than light, discontinuous rain is likely.

### 7.2 First pour

- Fill panels to 0.5m checking continuously below to ensure over filling or panel damage is not occurring.

### 7.3 Second pour

- Fill balance of panel to full height provided first pour has reached initial set (i.e. min. 2 hours). If panel damage occurs, limit second pour to 1.5m and complete with a third pour.
- If rain occurs, then attempt to complete filling panels to full height within limitations outlined above. If complete filling is not possible, block panel openings to prevent ingress of moist.
- If necessary to prevent void filling with water, provide a 10mm drain hole immediately above concrete fill level.
- Wash down any concrete spillage before it hardens.

## 8. Stage eight

### 8.1 On completion of floors being constructed over Rapidwall panels, carry out the following:

- Remove temporary braces of walls, stack and relocate to the next level;
- Remove temporary supports from door and window openings after sufficient curing period where concrete filling has taken place;
- Remove all other temporary supports from walls and floor, and leave area clear for follow on trades.
- Note condition of walls, especially after concrete placement and notify relevant party to clean off concrete runs.

### 8,2 Quality check: Refer Rapidwall® Project Quality Plan.

**QUALITY ASSURANCE PROCEDURE PRIOR TO PLACEMENT OF FLOOR FORMWORK BY OTHERS**

Project No	Date
Building Identification	
Floor Level	
Exact Location of Construction Zone	Identifying Grids

**CHECK LIST PRIOR TO HAND OVER**

Item	Details	N/A	Complete	Incomplete
1	Rapidwall® panels installed as per approved floor plan.			
2	Rapidwall® panels have been properly braced including unsupported door openings (i.e. where no door frames exist, and channel and Acrow props are required).			
3	All wall junctions have been screwed off			
4	Formwork layout plan has been noted and all protective 15 x 15 angles secured to top edges of Rapidwall® panels;			
5	Removal of all cranable items, including stillages, to avoid them being trapped in rooms prior to placement of formwork.			
6	Hand-over construction zone to formworker.			

Comments:

Please print name

Rapidwall® Supervisor	Date
Signature	
Please print name	
Sub-Contractor Representative	
Signature	Date
Please print name	

## QUALITY ASSURANCE PROCEDURE PRIOR TO CONCRETE PLACEMENT

Project No	Date
Building Identification	
Floor Level	
Exact Location of Construction Zone	Identifying Grids

## CHECK LIST PRIOR TO HAND OVER

Date	Description
	Rapidwall panels have been properly braced
	Continuous blocking has been provided to base of walls
	Wall junctions have been positioned and screwed off properly
	Damaged panels have been locally reinforced
	Rapidwall panels for this section are ready for concrete filling
	Formwork has been cut back where required to gain access for filling
	Panels checked for plumb

Comments

Rapidwall® Supervisor	Date
Signature	
Please print name	
Sub-Contractor Representative	
Signature	Date
Please print name	

**QUALITY ASSURANCE PROCEDURE PRIOR TO FINAL HAND OVER**

**STAGE ONE: PRIOR TO SEAL-COAT**

**Building No.**

**Level No.**

All Rapidwall® panels have been inspected and are free of defects except as noted below.

The Rapidwall® panels in this area are ready for sealer coat.

Defects

Rapidwall® Supervisor	Date
Signature	
Please print name	
Sub-Contractor Representative	
Signature	Date
Please print name	

Distribution 1.	Rapidwall Company Name	2. Client's Representative

**QUALITY ASSURANCE PROCEDURE PRIOR TO FINAL HAND OVER**

**STAGE TWO: FINAL INSPECTION**

**Building No.**

**Level No.**

All Rapidwall® panels have been inspected and are free of defects except as noted below.

The Rapidwall® panels in this area are ready for sealer coat.

Defects

Rapidwall® Supervisor	Date
Signature	
Please print name	
Sub-Contractor Representative	
Signature	Date
Please print name	

Distribution 1.	Rapidwall Company Name	2. Client's Representative

## SECTION I: PROJECT SPECIFICS

Project name:

### 1. GENERAL

1.1 Main Contractor: Insert building contractor's name

1.2 Walling Subcontractors: -

Rapidwall Insert Rapidwall company name is contracted to Insert building contractor's name to supply and install the load-bearing Rapidwall for a residential project;

"Project name" at project address

Insert Rapidwall company name has entered into a subcontract agreement with Insert building contractor's name Pty Ltd to install Rapidwall in State where works are being carried out on this project. The business details of Insert building contractor's name are listed below:

ABN:	
TFN:	
C + BUS Superannuation:	
Incolink	
Long Service Leave	
Workcover	
Public Liability	
Union Registration	

### 2. CRANAGE

Crane and dogmen supplied by Builder/Rapidwall Australia Pty Ltd

### 3. RAPIDWALL ERECTION

#### 3.1 Work Platforms

In erecting Rapidwall® there is generally no need to access the exterior of the building. In the event of this being required the provision of an access device rests with Builder/Rapidwall Australia Pty Ltd. However it will be carried out in one of the following manner:

- External panel work during construction:
- If there is a need to connect Rapidwall® panels from the outside it will be done using a cage or bucket suspended from the site crane.
- External panel work during patching:
- This work will be completed once the building has reached full height. Access to the exterior if required will be by swinging stage provided by the builder.

#### 3.2 Panel Erection

At the time that the Rapidwall® installers move to a new floor level the safety handrails will have been supplied and installed by the builder. Access to the floor will be by man-hoist or stairs provided by the builder.

The panel erection sequence will involve the following:

- 3.2.1 The sector in which the Rapidwall® installers are working will be barricaded to prevent access by un-authorized personnel.
- 3.2.2 The foreman of the Rapidwall® erection crew will be responsible for ensuring all staff within the sector have the correct harnesses and lanyard equipment.
- 3.2.3 Signs will be posted on the barricades advising that entry to this sector of the project is prohibited unless they are suitably equipped with a safety harness.
- 3.2.4 In locations previously agreed with the project safety officer, a 'Safeline' system will be set up on the operating floor. Rapidwall® have a preference to ensure the line is at ground level to ensure minimum line movement hence reducing the risk of crane airborne-loads becoming entangled in the 'Safeline'.

- 3.2.5 Following a safety check by the Rapidwall® foreman of all personal in the restricted area, the hand rail in the area of the panel placement will be removed in a staged sequence to allow marking out.
- 3.2.6 Builder/Rapidwall dogman will attach the panel to be lifted to the lifting jaws. After clearance from the Rapidwall foreman receiving the panel, the builder's dogman will indicate to the Rapidwall® foreman that the load is safe to lift. As a line of sight will be maintained this can be done using hand signals.
- 3.2.7 If the crane operation is by remote control, such as with a 'Potain' type crane:
  - 3.2.7.1 The operator will be located on the floor near the Rapidwall® foreman who will be in charge of the lift.
  - 3.2.7.2 The lift will commence on the instruction from the Rapidwall® foreman who will be paying strict attention to the builder's dogman who will be indicating any problems with removing the panel.
  - 3.2.7.3 The panel will be placed using visual direction from the Rapidwall® foreman who will be in close proximity to the operator.
- 3.2.8 If the 'Potain' operator is positioned within the cabin of the crane then he will have line of sight with the Rapidwall foreman. Accordingly, the following sequence will be used:
  - 3.2.8.1 The lift will commence on the instruction of the Rapidwall® foreman who will be paying strict attention to the builder's dogman who will be indicating any problems with removing the panel from the stillage.
  - 3.2.8.2 Once the panel leaves the stillage the lift will be under the control of the Rapidwall® foreman. Either visual, whistle sound controls or radio will be used.
  - 3.2.8.3 The panel will be positioned in the normal way and propped.
- 3.2.9 Once landed the panel is secured into position using the purpose built 45 degree props. All the bracing and bolting to the panel will be done from the inside of the building.
- 3.2.10 If the panel is an external panel, the crane will not be released until the panel is braced to the satisfaction of the Rapidwall® foreman.
- 3.2.11 If the panel is an internal panel, and there is no danger to others within the site area, the panel may be released from the hook once the prop has been attached. Final alignment and plumbing of the Rapidwall® panel will take place whilst the hook returns to retrieve another panel from the stillage.
- 3.2.12 The aforementioned procedure is repeated until all Rapidwall panels have been erected.
- 3.2.13 At the completion of the operation the Rapidwall foreman will check that all exterior openings have either a Rapidwall® panel or a safety handrail in place.
- 3.2.14 Contact will be made with the site safety officer who will attend wearing the correct harness to satisfy himself that the area is again safe.
- 3.2.15 Once signed-off by the site safety officer that the work area is safe for the general workforce, the Rapidwall foreman will advise all those within the area that they may remove their safety harnesses.
- 3.2.16 The Rapidwall will instruct his personnel to stow the barricades and signage for the following operation.



## SECTION J: APPENDIX V/02-2004

Employee letter RE: Work Method Statement

I, (Name)..... have received a copy of the Rapidwall Work Method Statement, Version ....., Dated ..... on the (Date) ..... and will, as part of my responsibilities as a employee of (insert company name) read it in full and agree to faithfully comply with the instructions given herewith and those contained within the Rapidwall Installation Manual.

Should I require clarification any document or work practice I agree to first contact an authorised representative of Rapidwall Australia Pty Ltd before proceeding.

Employee Signature:

Date:

### SAFETY DATA

#### 1. Identification

- 1.1. Plasterglass panel composed of a gypsum plaster core reinforced by plasterglass strands.

#### 2. Use

- 2.1. Structural building panel for interior and exterior use.

#### 3. Ingredient

- 3.1. Gypsum 95.8%  
3.2. Fibreglass Strand 3.2%  
3.3. Water Repellent 1.0%

**Contains no asbestos**

#### 4. Health effects

- 4.1. If Swallowed: No adverse effects known.  
4.2. Eye Contact: Minor irritation.  
4.3. Skin Contact: Can irritate (largely confined to cutting, trimming and grinding operations)  
4.4. Inhalation: May cause minor irritation. Dust masks may be beneficial in areas where high dust levels occur.

#### 5. First aid

- 5.1. If Swallowed: Give plenty of water to drink.  
5.2. Eye Contact: Wash with running water using eye bath or wash bottle. If irritation persists, seek medical attention.  
5.3. Skin Contact: Wash with warm water and mild soap.  
5.4. Inhalation: Remove to fresh air. If any ill effect persists, seek medical attention.

#### 6. Advice to doctors

- 6.1. Treat symptomatically.

#### 7. Precautions for use

- 7.1. No special precaution necessary.

#### 8. Personal protection

- 8.1. None required for normal use. If cutting RAPIDWALL with an electric saw, a nuisance dust mask (eg. 3M brand mask 8500) is recommended and goggles advisable.

#### 9. Spills

- 9.1. No special precautions.

#### 10. Disposal

- 10.1. Dispose of as normal waste, subject to conforming to state legislation.

#### 11. Physical description and properties

- 11.1. Gypsum plaster core reinforced by fibreglass strands.  
11.2. Specific gravity (H<sub>2</sub>O=1.0) = 0.7  
11.3. Solubility in water = 0.2%  
11.4. Non flammable  
11.5. Non hazardous

#### 12. Fire

- 12.1. Core is non combustible. Extinguish local fires with water, CO<sub>2</sub>, etc. No special fire fighting procedures required.

## SAFETY PROCEDURES FOR ERECTION OF RAPIDWALL PANELS

### 1. Definitions

- 1.1. Rapidwall panel:
  - 1.1.1. Any 123 mm thick section of fibre reinforced plaster wall manufactured by Rapid Building Systems.
- 1.2. Lifting jaws: mechanical lifting clamps used to lift Rapidwall® panels.
- 1.3. Hand-trolley: steel 'A' frame on casters designed to move Rapidwall® panels across firm level surfaces.
- 1.4. Tec screws: metal fasteners with thread used to join two sections of wall panels together.
- 1.5. Spreader Bar: section of steel designed and engineered to lift a maximum weight over a specified length.
- 1.6. Steel Prop: 50 x 50 section of steel with a specially designed steel hook on one end and flat steel plate on the other end used to stabilise wall panels during erection stages.
- 1.7. Rapidwall transport stillage: specially designed steel transportation frame

### 2. Safety procedures

- 2.1. Rapidwall transport stillages must always be placed on level ground and where not possible, blocks must be placed to make sure the stillage (with panels) is totally level. Legs must be extended immediately to ensure continued stability of the stillage, extended legs must be propped up where necessary.
- 2.2. During erection of Rapidwall panels all work shall be carried out in a tradesman-like manner with particular consideration for the safety of all personnel.
- 2.3. Where Rapidwall panels are moved with the use of a hand trolley, wind conditions must be taken into consideration. Panels must never be left unattended on a hand trolley.

- 2.4. Only panels up to 4 m in length may be lifted with the use of a single lifting jaw clamped onto the centre rib of the panel.
  - 2.5. Panels in excess of 4 m in length shall be lifted with a minimum of two lifting jaws attached to a spreader bar.
  - 2.6. All panels lifted to 1.8 m above ground level or higher shall have a safety rope attached to stabilise and restrict the swing of panels.
  - 2.7. All personnel to remain clear of a panel being lifted and not stand underneath.
  - 2.8. A Rapidwall panel rib may only be used once for attaching a lifting jaw. It is the operator's responsibility to check, prior to inserting the lifting jaw, that the intended rib has not been previously clamped (this will be obvious by clear indentation marks from the lifting jaw clamping device). If a rib has already been clamped, the rib next to it, closest to the centre of the panel must be used.
    - 2.8.1. After inserting the lifting jaw, the clamp must be fastened by clockwise rotation of the tension screw to a torque of between 15 lb/ft<sup>2</sup> and 30 lb/ft<sup>2</sup>. Avoid over tightening as this may crush the rib and will cause excessive wear of the lifting jaw.
    - 2.8.2. Lifting jaws must be properly greased and maintained and must be kept free of rust. Lifting jaws must be inspected by a qualified person at least monthly. The grip plates must be regularly wire brushed to avoid plaster build up between the ridges.
    - 2.8.3. Panels must be supported at a minimum of 1 support per 4m of panel. Supports may consist of a tech screwed connection to a cross wall or corner, or a properly secure steel prop. Props must be left in position until the top of wall is braced and fixed to roof or floor members.
  - 2.9. Steel props must always be connected to the panel by placing the clamp over a rib.
    - 2.9.1. All steel props must be firmly secured to the floor.
  - 2.10. Panels must be safely secured, before lifting jaws are removed.
    - 2.10.1. The supervisor shall ensure that all erected walls are safely braced or propped correctly at completion of each work shift before leaving the site.
  - 2.11. When panels need to be cut on site, a dust mask needs to be worn of a minimum P2 standard.
    - 2.11.1. When cutting or sanding panels on site with the use of power tools, a dust mask needs to be worn of a minimum P2 standard, as well as suitable eye protection.
  - 2.12. A safety hard hat must be worn by all personnel on site during lifting and placing of Rapidwall panels.
  - 2.13. Before the end of each work shift, any off-cuts of panels are to be placed in a suitable container and all dust is to be wet swept or dry vacuumed and placed in a covered container.
  - 2.14. Dust and off-cuts are to be disposed of in accordance with the relevant local authority's waste disposal requirements and regulations.
- 3. Amendment (1) to Section (h)**
- Note: In the event of steel or timber studs being inserted into the cavity of a Rapidwall Panel, under no circumstances shall lifting devices be attached to these studs for lifting purposes. All lifting devices shall be attached to solid ribs of Rapidwall Panels.

## Appendix

### Euroset Finishes for Rapidwall

It is not possible for Rapidwall to test and specify the paint systems that are available in every region of the world. Should you wish therefore to use a particular supplier, obtain a Rapidwall sample from your local supplier and have your manufacturer undertake their own testing and prepare the specifications under which they will warrant their products for use with Rapidwall. This Appendix shows an example how an Australian company, Euroset, stipulates in detail specifications and product warranties.

This document provides general guidelines for the application of Euromix® Renders, Textures, White-sets and other finish coats over Rapidwall substrates. Intending users should also refer to the Rapidwall manufacturer's recommendations for the application of render and other finish coatings over their substrates.

The information contained in this guide is typical and does not constitute a full specification, as conditions and specific requirements will vary from project to project. All purchasers and intending users of the products covered in this document, must, prior to use, assess and control the risks arising from use of the products, as they relate to their project.

It is recommended that the products covered in this document be applied by building contractors and trades people with the appropriate skill, knowledge and experience to carry out those works, as may be necessary to meet the requirements of the project.

### General Preparation

Ensure that all elements to be coated have been constructed and fixed in accordance with the project plans / specifications and the Rapidwall manufacturer's recommendations - some items for consideration include:

- ❑ Where the panels have been filled with concrete ensure that concrete strength and moisture content are within the manufacturer's guidelines before commencing any coating. All migration of moisture through the panel to the surface must have ceased before commencement of coating.
- ❑ Walls should be straight, flat and plumb - all panel joints should be structurally sound with face surface levels on each side of the join aligned.
- ❑ Internal and external corners should be 'true' and well constructed (unlikely to move or otherwise come apart).
- ❑ Identify any surface irregularities in the substrate surface and agree the method and extent of any 'make good' with the project manager.
- ❑ Identify any areas of substrate that are affected by dust, loose / friable material or adhesion inhibiting materials – remove or otherwise 'make-good' contaminated areas.
- ❑ Locate expansion joints and control joints and agree coating treatment for these with the Project Manager.
- ❑ Identify areas where walls are not straight or where joins between floors are not flush – obtain agreement from project manager on treatment of such areas.
- ❑ Mask windows, doors, roofing, flooring and other building elements to protect them and to reduce clean up time.

## Sealer / Primer Coat

Before applying any Euromix® finish the surface of the Rapidwall panels must be coated with Euromix® Sealer/Primer (a solvent based binding primer), taking particular care to ensure that horizontal surfaces that may attract 'pooling' of moisture, such as parapet tops, sills, etc, are fully primed.

As Sealer/Primer is a clear liquid it may be helpful to slightly tint the product to make it easier to observe that a complete cover has been achieved.

Allow twelve (12) hours for the Sealer/Primer to dry before applying any following finishes.

## Repair Work (where required)

Once the external surface of the Rapidwall has been coated with the Sealer/Primer any surface imperfections can be repaired or made good using the agreed materials. Repaired areas should be re coated with Euromix® Sealer/Primer once they have dried. This application of Sealer/Primer is particularly important where paint or texture coat is to be applied directly over the Rapidwall surface (this is to ensure that the surface of the Rapidwall panel is of even porosity).

## Preformed Angles, Expansion Joints and Other Trims (where required)

Once the external surface of the Rapidwall has been coated with the Sealer/Primer and any surface imperfections have been repaired preformed corners and other trims can be fixed in position.

Apply Euromix® Patch Coarse onto the Rapidwall substrate surface then fix the required PVC Trims into position, ensuring that they are plumb and aligned with the appropriate wall surface. Once the Trims have been embedded in the Patch Coarse, apply a skim coat of Patch Coarse to finish off flush with the surface of the Rapidwall surface.

For internal corners lay Patch Coarse into the corner and then bed 55mm or 100mm wide alkali resistant fibreglass mesh tape into the corner. Once the fibreglass internal corners have been embedded in the Patch Coarse, apply a skim coat of Patch Coarse to finish off flush with the surface of the Rapidwall.

Work on starter trims, reveals, sills, joints and corners progressively to ensure that the Patch Coarse bedding coat does not set before the skim coat of Patch Coarse is applied.

Make sure that any excess compound is removed from all edges, while the material is still wet - Euromix® Patch Coarse cannot be sanded after setting. Allow at least 24hrs-curing time for Patch Coarse before applying any render or other coating. Note: cold and / or damp weather conditions may extend the curing time, for the Patch Coarse past the normal day (24hrs).

## Polymer Render Finish

After priming and preparing the Rapidwall as described in Section 1, above, the external surfaces can be rendered with Euromix® Patch Polymer Render, Astec Acrylic Render or similar as follows;

### Render Coat

Apply one (1) or two (2) coats (@ 1mm thickness each) of Euromix® Patch Coarse Polymer Render evenly over the surface of the Rapidwall substrate. The number of coats will be determined by the quality of finish desired and the extent of any surface repair required.

Follow the recommendations for the application of the Patch, as detailed in the Euromix® Patch Coarse PDS (Product Data Sheet). The Patch should be mixed with 5-10% cement to assist curing and increase weather resistance.

Allow minimum twenty four (24) hours drying time for each coat of the Patch.

The final coat of Euromix® Patch Coarse Polymer Render should be finished with a plastic trowel to achieve a flat, consistent finish (in a similar fashion to the treatment of most texture coatings).

### Paint Finish

Apply the chosen paint in accordance the manufacturer's recommendations, ensuring that the Euromix® Patch has cured adequately before commencing any coating.

## Acrylic Render Finish

After priming and preparing the Rapidwall as described in Section 1, above, the external surfaces can be rendered with Euromix® Render, as follows;

### Mixing Euromix® Renders

Euromix® Renders should be mixed with a water plus bonding agent (Euromix® Bond) mixture (called the 'gauge') by mechanical mixer or with a traditional concrete mixer. The required 'gauge' (the water / Euromix® Bond mixture) should be prepared in a bucket and then steadily added to the Euromix® Render powder until it is smooth and lump free (this mixture should hold a stiff peak on a hawk). If the mix is either too 'stiff' or too 'wet' it will be difficult to apply and finish – it is also likely that finished strengths will be low. Do not prepare more render than can be used within one (1) hour. In normal conditions @ 4 litres of 'gauge' is required for 1 bag (20 Kg) of Euromix® Render.

### The Acrylic Render Base Coat

Apply a first coat of Euromix® Render (mixed with a 'gauge' of 1 part Euromix® Bond to 4 parts water) to a minimum thickness of ~2mm with hawk & trowel.

Make sure all necessary expansion or movement relief joints are put in place.

The renderer should make certain he has the correct instructions from the builder, architect or engineer etc. as regards to the type and placement of these joints.

Expansion joints must extend through the rendered surface into the expansion joint provided by the builder on the substrate do not merely score the surface over an expansion joint when cutting them in after rendering

Do not render over an expansion joint as it will crack later in time. Expansion joints must stay flexible at all times.

Spillage and partially set material should not be re-tempered with water and should be discarded. Tools and equipment should be cleaned with water immediately after use.

### Acrylic Render Second / Finishing Coat

Once the first / base coat of render has dried (at least 24 hours in normal conditions)

prepare Euromix® Render or Skim with a 'gauge' of 1 part Bond to 18 parts water

Apply this to the required thickness (between 2 to 4mm), using a trowel and straight edge to achieve a true and level finish.

Then float with a polystyrene, wood or plastic floats to make the render ready for a troweled on acrylic coating.

Alternatively this coat of Skim or Render can be sponge finished after floating and made ready for the application of a suitable paint system.

### Acrylic Render Curing Precautions

Ensure adequate protection from the drying effects of direct sunlight, wind and low humidity or a combination of these elements.

Rapid drying of the surface can cause cracking, low strength and a friable render.

Do not apply Euromix® Render when conditions will be above 35°C, especially if windy.

Also do not attempt to apply Euromix® Render when the temperature is below 10°C or where the chill factor is high.

Ensure that the curing render is protected from rain, extreme frosts and other sources of excess moisture (e.g.; overflowing gutters and down pipes).

Acrylic Render Typical Drying Times (at 25°C at 50% Relative Humidity)	
Surface dry	4 hours
Recoat with Render	1 day
Applying Texture Coating	3 days – acrylic based systems
Applying Paint	3 days for water based paints.
	21 days for oil or alkyd based paints.

### Rendering Parapet, Fence, Pier (& other) Horizontal Surfaces

It is advisable to prepare horizontal surfaces in the following manner:

- ❑ Coat the horizontal face with a 'bedding coat' (1-2mm thickness) of Euromix® Render, mixed with a 1: 4 gauge (1 part Euromix® Bond to 4 parts water).
- ❑ After the surface has been covered with the bedding coat and while it is still wet, trowel in alkali resistant fibreglass mesh, ensuring that it is covered completely by the Euromix® Render.
- ❑ After this first coat of Euromix® Render has cured apply the following coats of Render and / or Skim (to achieve the specified / desired thickness and finish)
- ❑ in accordance with the guidelines above, ensuring that a slight, uniform slope is achieved to negate 'ponding' of moisture on the surface. This slope normally runs to the internal side of the building element and / or gutter.

## Texture Coat Finish

After priming and preparing the Rapidwall as described in Section 1, above, the external surfaces can be texture coated with Euromix® Texture, as follows;

### Level 2 Finish

Where a Level 2 Finish is required ('... a Level 2 Finish will follow the substrate surface and will show most structural and substrate imperfections and panel, block, sheet joins, particularly in glancing light..') it is necessary to first apply a 'scratch' coat (@ 1mm thickness) of Euromix® Patch Coarse evenly over the surface of the Rapidwall substrate to be texture coated.

Follow the recommendations for the application of Patch, as detailed in the Euromix® Patch Coarse PDS (Product Data Sheet). The Patch should be mixed with 5-10% cement to assist curing and increase weather resistance.

Allow minimum twenty four (24) hours drying time for the Patch before commencing any texture coating.

### Level 3 Finish

Where a Level 3 (or above) Finish is required ('...a Level 3 Finish will hide most substrate surface imperfections (and cladding jointers if used). Structural imperfections will be hidden or reduced, depending on their severity...') it is necessary to first render the Rapidwall substrate as outlined in Section 3, above.

### Texture Coating

Apply the chosen Euromix® Texture evenly with a trowel. It is recommended that the product be thoroughly stirred using a power stirrer prior to application. Do not apply if rain or frost is imminent or possible before the product has properly dried. The product should not be subjected to hydrostatic pressure and excessive rising damp.

Follow the recommendations for the use of the chosen Euromix® Texture, as detailed in the relevant PDS.

## Structural / Building Material Cracking

Movements in buildings and within / between the materials that they are constructed with are commonplace (causes include foundation settlement, seismic displacement and behavior of materials in relation to changes in temperature or moisture content). These movements usually result in visible cracking of the building claddings / linings (as well as other potentially more damaging modes of failure).

Sound building design and construction methods recognise the likelihood of structural and material movements and allow for them to be managed through the placement of control joints (often called expansion joints) and the use of design features that hide or may even highlight these control joints or the areas where cracking is likely to occur.

Any building movement that results in visible cracking of the building claddings / linings will also be sufficient to cause cracking of the decorative finish – this is the case for both potential new and pre-existing building movement cracking.

Euromix® systems will not hide cracking caused by structural movement and / or shrinkage / expansion of substrates caused by temperature and moisture associated movement.



## Acrylic Render Product Summary

**Product Name & Code:** Euromix® Render (EMRR) and Euromix® Skim (EMRSC)

### Product Description

Euromix® Render and Skim are high quality, pre-blended, acrylic modified cement based architectural renders. Contents include Portland cement, Fly Ash, Hydrated Lime, selected polymers and sand.

### Packaging

Dry packed in 20kg composite paper / plastic / paper bags

### General Use

When mixed with water and an acrylic emulsion bonding agent (Euromix® Bond), Euromix® Render and Skim provide a water resistant finish that is suitable for decorative rendering and patching over most substrates in interior and exterior wall and ceiling applications.

Euromix® Render is most suited to use as a base coat, where other finishing coats (renders, texture coats, etc) or architectural finishes (like tiles) are to be applied. It can be applied by hand or by machine, in layers ranging from 2mm to 6mm at a time.

Euromix® Skim is most suited to use as a top or finishing coat. Applied by hand, in one layer ranging from 2mm to 4mm thickness, Euromix® skim can easily be sponge finished.

### Appearance before application

In the bag and before the addition of water, both Euromix® Render and Skim appear as off-white / light grey mixtures of finely ground, cement like materials.

### Appearance after application

After application and drying Euromix® Render and Skim finish to a light grey colour.

## Render Product Features

### Pre-mixed

Saves time on site and reduces waste and material loss associated with traditional renders.

### Workability additives

The wet material 'flows' well on hawks, trowels and other tradesman's tools making it easy to apply and finish off.

### Engineered and factory controlled formulation

The proportions of cement, fly ash, lime and sand are consistently maintained at levels designed to give superior adhesion to most substrates when compared to conventional sand and cement renders (poor adhesion to the substrate often results in traditional renders becoming 'drummy' to the touch).

When used in accordance with the manufacturers recommendations Euromix® Render is less likely to display herringbone cracking than traditional site mixed renders.

### Drying time modifiers

Special modifiers in the mix ensure that the render can be over-coated 48 hours after application (in normal weather conditions), saving time on site and reducing associated costs, like those relating to scaffolding, when compared to conventional sand and cement renders.

### Specially formulated components

Enhances adhesion and water resistant properties when compared to conventional sand and cement renders.

### Rendering system

Euromix® Render and Skim have been designed for use as 'stand alone' renders or as components in a system where Euromix® Render is used as the base coat and Euromix® Skim is used to provide a finer textured finish as the topcoat.

## Render Performance Guidelines

### Weather:

Excellent weather resistance when top coated. Ultra violet resistant, Mould resistant and Acid rain resistant.

### Water:

Resistant to rain and condensation when top coated.

### Temperature:

Performs well, after hydration, in temperatures from – 4 to + 60°C

### Abrasion:

High resistance to abrasion.

### Solvents:

Sensitive to prolonged exposure to aromatic hydrocarbons, acetone and strong solvents.

## Some Key Render Product Properties

**Bulk Density:** 1700 – 1900kg/m<sup>3</sup>

**Specific Gravity:** 2.7

### Compressive Strength:

At 7 days: ≥ 5 MPa

At 28 days: > 8 MPa

### Coverage:

Over sound even substrate - 3.5-4.0 m<sup>2</sup> at average 3mm thickness

### Shelf Life:

1 year when stored under cover, above ground, away from heat and moisture.

## INTERNAL FACING RAPIDWALL SUBSTRATES

Euomix® internal coatings (including Proyalbi®, Proyal and paints) are designed for use as decorative finishes, they are not meant to be used in 'engineered' applications (where special strength, movement, hardness or other performance characteristics are required). Euroset recommends that Euomix® coatings be applied by skilled trade people who are experienced in rendering, plastering, texture coating or other relevant trades. Euroset accepts no responsibility for problems arising from faulty workmanship.

## Plaster Finish

A white set plaster finish can be achieved with the use of Proyalbi® Plus or Proyalbi® Fino. Intending users of Proyalbi® should have read the relevant Product Data Sheets before commencing any work with the material.

Ensure that the Rapidwall internal surface to be plastered is free of any contaminants that may inhibit adhesion of the Proyalbi® finish. Apply a first coat of Proyalbi® Plus or Fino Plus mixed with a 'gauge' of 1 part Euomix® Bond to 15 parts water. After this first coat has dried (allow 24 (twenty four) hours) subsequent coats can be mixed with water only and applied to achieve the level of finish required.

Before applying any Euomix® (or any other brand) paint finish the surfaces of the plastered Rapidwall they must be coated with Euomix® Sealer/Primer (a solvent based binding primer), taking particular care to ensure that horizontal surfaces that may attract 'pooling' of moisture, such as parapet tops, sills, etc, are fully primed. As Sealer/Primer is a clear liquid it may be helpful to slightly tint the product to make it easier to observe that a complete cover has been achieved.

Allow twelve (12) hours for the Sealer/Primer to dry before applying any following finishes.

## CONCRETE SUBSTRATE CONTROL SHEET

Reveal Areas:

Project Name:

Applicator Name:

Date:

INSTALLATION SCHEDULE	Y/N	INITIAL	COMMENTS
Concrete must be 28 days cured, smooth, and dry and free from all curing compounds			
Concrete must be smooth, clean, dry with falls away from panels..			
All divots and cavities filled with a Non-shrink repair mortar.			
Concrete surfaces must be stable and free from all latencies and curing compounds.			
5 mm radius to all external corners and edges to allow for membrane.			
Install Membranes as per data sheets			
Height levels of all areas where Rapidwall is to be place to be within +or- 5mm or additional packers must be used.			
SIGN OFF			

When substrate ready for waterproofing complete and send to waterproofing applicator.

SUBSTRATE REMEDIAL REQUIRED:

COMMENTS OR DAMAGED AREAS REPAIRED:



Rapid Building Systems Pty Ltd  
200 Kensington Road  
MARRYATVILLE  
South Australia 5068

ABN 48 054 779 930