



# INSTALLATION GUIDE

Quicker. Leaner. Smarter. Greener.

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## Disclaimer:

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# 1.0 The InsulLiving® System

## 1.1 Overview



The construction of a home using the InsulLiving® system will drastically cut time and costs for builders as well as providing an exceptionally efficient energy rating. The following guidance and instructions for designers and builders will clearly show how versatile and easy this system is to implement and the significant savings to be gained when compared with traditional construction techniques.

The InsulLiving® system is comprised of load bearing insulated wall panels called InsulWall®, fixed within proprietary bottom and top wall plates with SolarSpan® & InsulRoof® insulated roof panels fastened to the walls. The system provides a load bearing wall structure with a pre-finished metal internal surface allowing plastering, setting and painting and a similar finish to the external face allowing rendering and painting. With the addition of appropriate tie downs the walls offer structural bracing and load bearing capabilities similar to timber or steel framed construction.

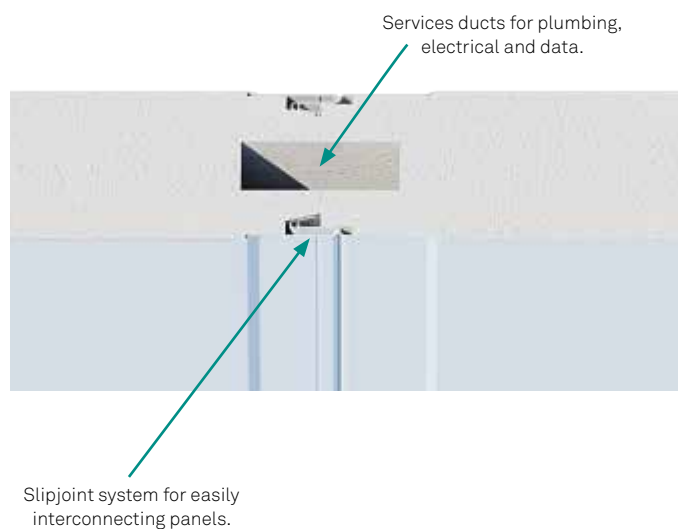
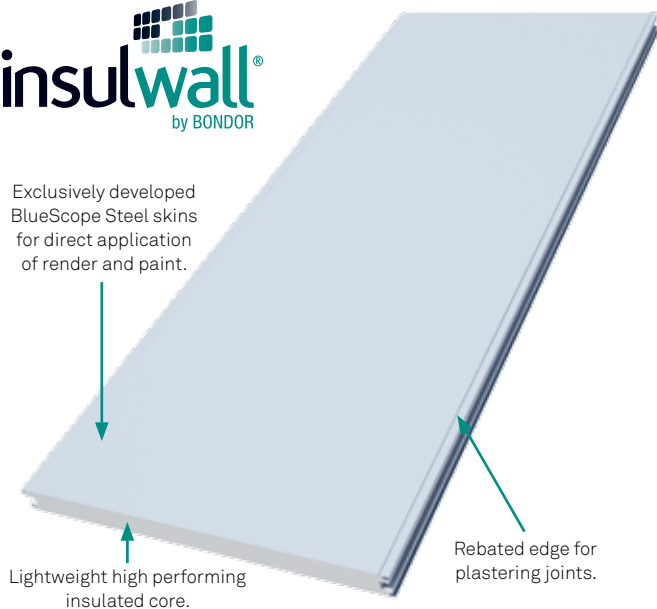
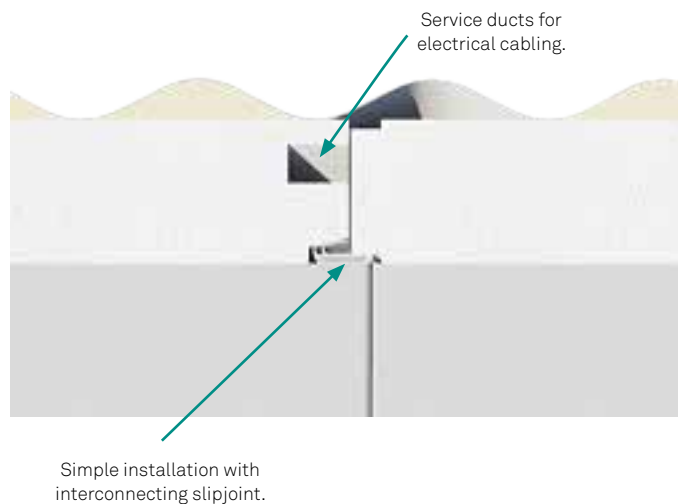
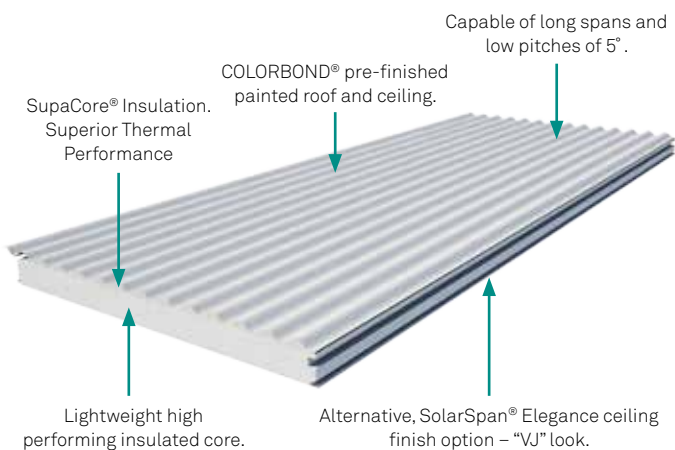
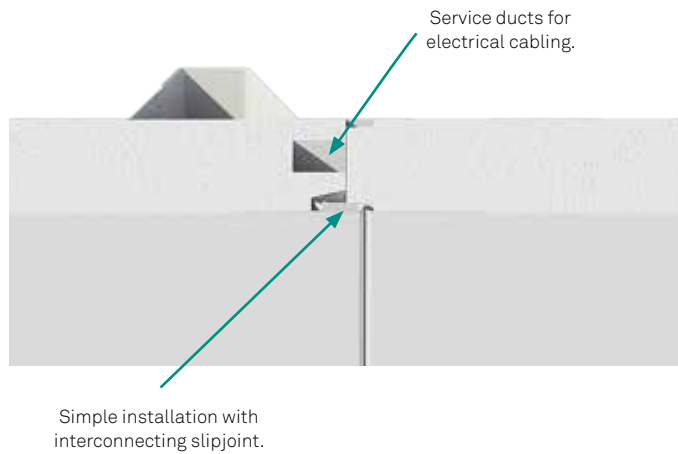
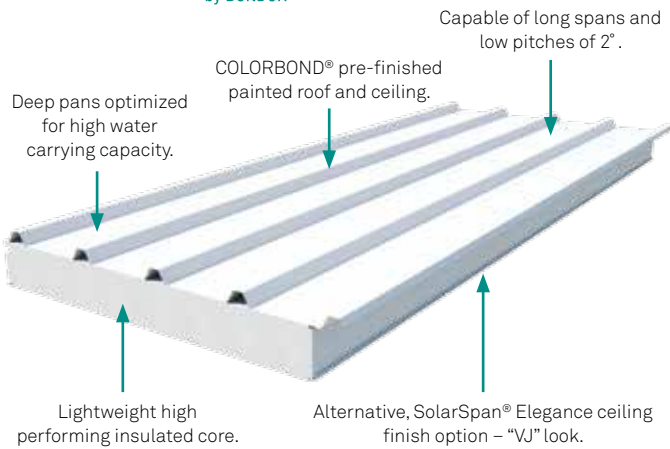
As the panels are modular in width i.e. width of 1200mm for walls and 1000mm for roofing, significant savings can be made by the careful location of windows and doors to minimize waste.

By using windows and doors to suit panel widths e.g. 1200mm or 2400mm, panel offcuts can be used over and under the window instead of cutting significant waste from a full sheet. The location of services can be optimized by utilizing the services ducts built into the edges of the wall and roof panels.



A fully engineered, BCA and CodeMark™ compliant Building System that is lightweight, straight forward and green.

## 1.2 The InsulLiving® System Components



## 1.2 The InsulLiving® System Components

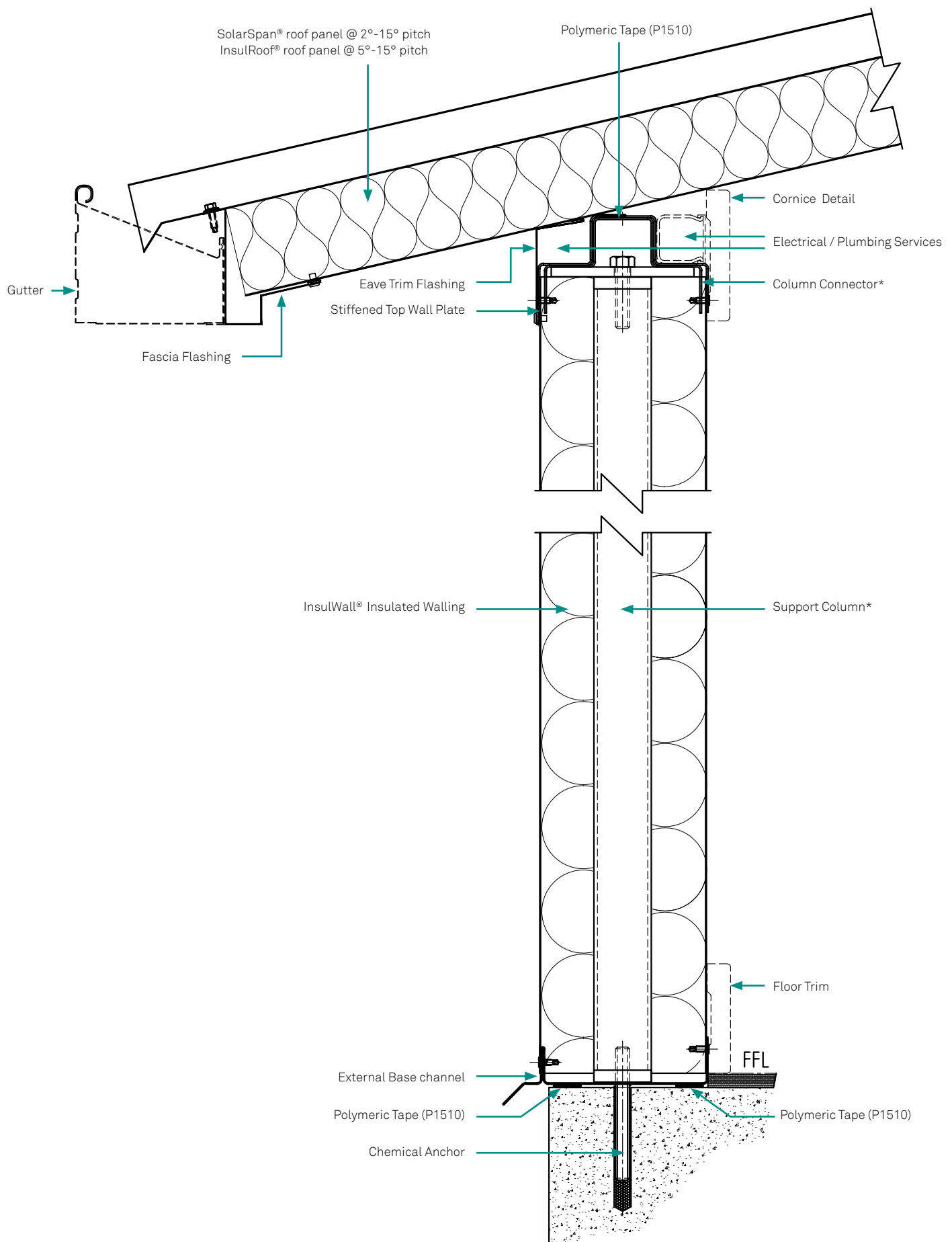


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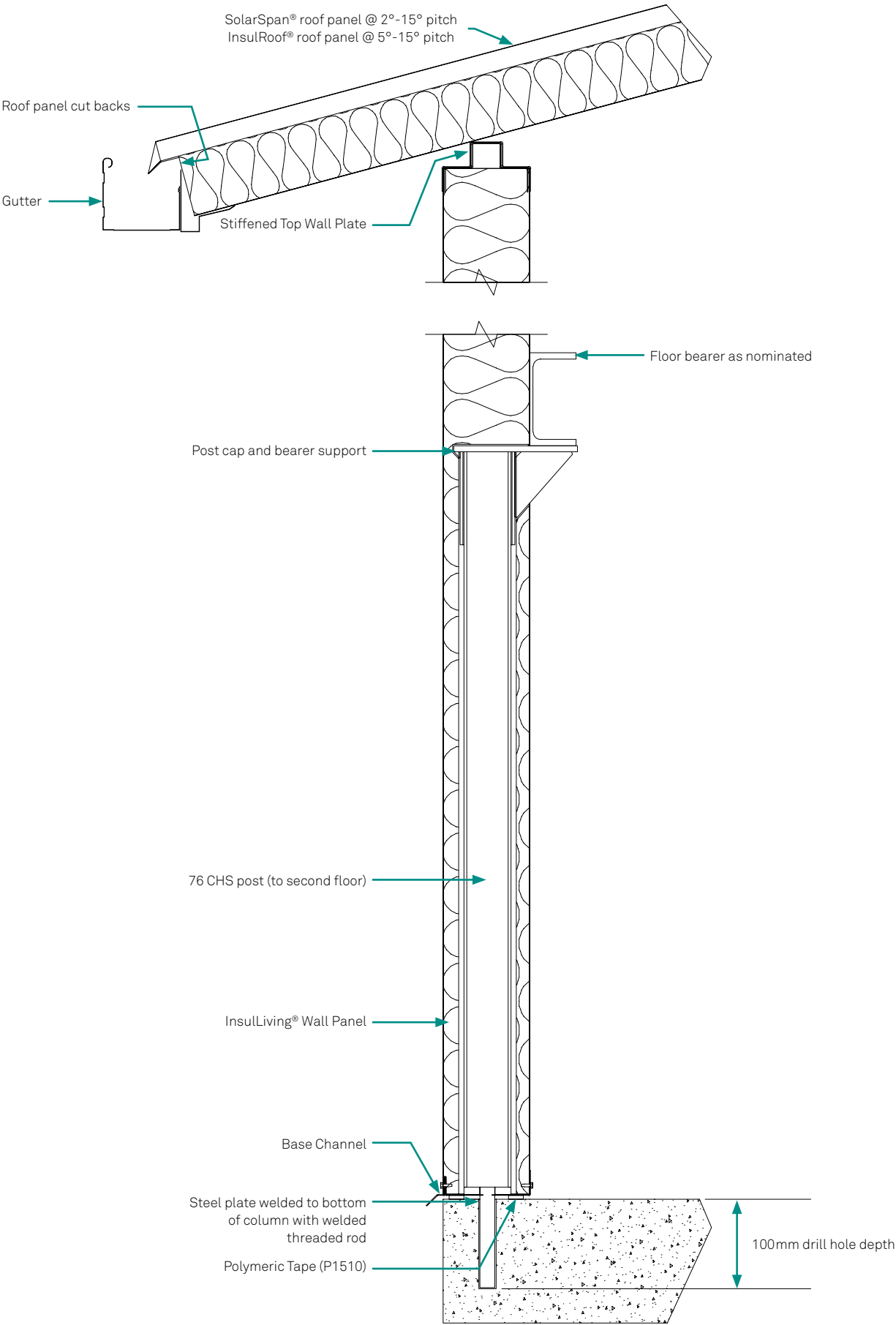
## 1.3 Typical Wall Section at Post Locations

### Single Storey



\*Optional components may be required depending on design and project specific engineering.

Two Storey



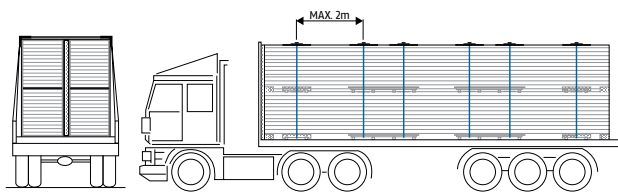
## 1.4 Packing and Handling Panels

### Packing for Shipment

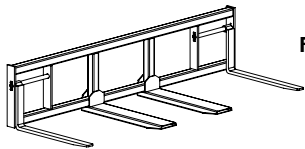
InsulWall®, SolarSpan® & InsulRoof® sheets are packed to a maximum pack height of 1.2m with the number of panels per pack, dependant on panel thickness, length and overall pack weight. SolarSpan® & InsulRoof® panels are manufactured with a protective film applied to the ceiling skin and panels are packed external sheet to external sheet to reduce pack height. InsulWall® panels can be marked externally on the polystyrene core with the panel # and/or length if requested.

### Delivery to Site

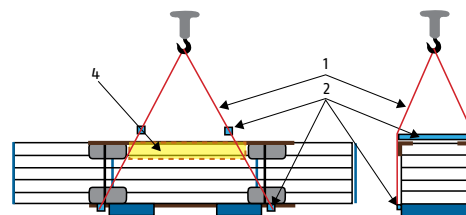
Panel packs should be secured using cargo straps spaced approximately every 2m with plastic cargo angles under the straps (refer to fig 1). Unloading remains the client's responsibility. For lifting panels >9.0m use of a slip on fork spreader is recommended (refer to fig 2). Refer to figures 3 and 4 for recommended steps to unload panels of less than and greater than 8m in length. Panels should always be kept dry and if placed on site, stored off the ground, slightly inclined, allowing adequate drainage and ventilation of the panel pack.



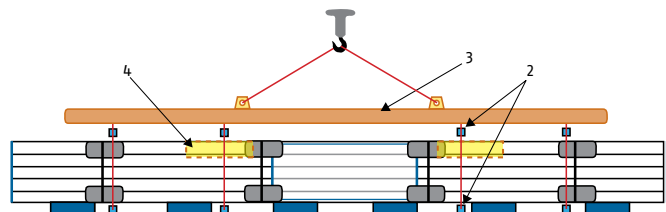
**Fig. 1.** Positioning of Panel Packs and Cargo Strap.



**Fig. 2.** Slip-On Fork Spreader.



**Fig. 3.** Unloading of Panels of < 8.0m: 1. Lifting Sling; 2. Sling Separator (Timber/Channels).



**Fig. 4.** Unloading of Panels of > 8.0 m; 3. Spreader Beam; 4. Strap-down Corner Angles.

### Safe Panel Handling (Erecting, Carrying, Positioning)

- Establish a safe working environment.
- Use lifting equipment wherever possible (crane, forklift, trolleys, pallet jacks, lifter, suction handling grips, etc):
  - Ensure operators are trained and competent in their use and licensed where applicable e.g. high risk work.
- Where manual handling is required:
  - Specific Personal Protection Equipment Requirements.
    - Safety Footwear.
    - Cut Resistant Gloves.
    - Cut Resistant Arm Guards.
  - Assess the weight of panel and ascertain number of persons required to lift panels into place and also position into base channel/angle.
    - Ensure a two man or multiple person lift is employed when lifting, carrying, standing up heavy or large awkward panels.
- Persons should be of equal height and build and have been trained in safe manual handling techniques:
  - Establish clear travel path free from obstacles or obstructions.
  - Use correct manual handling techniques.
    - Keep load close to you.
    - Back straight.
    - Bend your knees and use leg muscles.
    - Move your feet & never twist at the waist & establish stable footing.
    - When team lifting, ensure you have one person who gives instruction on the lift, etc.
  - Once erected ensure panel is secured and stable.
  - Ensure safe work practices are followed when using powered tools.

## 1.5 Full Equipment List

### Safety Gear

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- General Personal Protective Equipment (PPE) including: cut resistant gloves, safety glasses and ear muffs

### General Tools

---

- Impact drill with Phillips Head bit
- 12mm Electric/Battery Drill
- Rotary Impact Hammer drill
- Electric Hot Knife
- 230mm Electric Grinder
- Reciprocating Saw
- Plunge Saw
- 350mm Electric Drop Saw
- Dispensing Gun for Silicone
- Rivet Gun
- Multi-purpose step ladders
- Portable Vacuum/Air Blower
- Dispensing Gun for Epoxy Anchor
- Socket Set (Metric)
- Hand Tin Snips
- Spirit Level
- Chalk Line
- Builders Chisel
- Utility Knife
- Saw Horse Stools
- Conventional Broom
- Stepped drill bit over 14mm
- InsulWall® Safety Edge Blade for plunge saw

### InsulWall® Panel Tools

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- Electric Straight metal shears or air compressor alternative
- InsulWall® Cutting wire
- Glazier Suction Cup Handles
- Panel Clamp (optional)
- Rubber mallet and timber block (>140mm)
- Sheet Metal Grip Locking Pliers
- InsulWall® panel punch tool for Door/Window penetrations (optional)
- Straight Edge
- Temporary Bracing

### SolarSpan® & InsulRoof® Roofing Panel Tools

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- Roof Screw Gun
- SolarSpan® Turn-Up/Down Tool (See Bondor®)
- Multigrips (for turn-up/down on InsulRoof®)
- Plastic Paint Scraper

### Components

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- InsulWall® Wall/Ceiling Panel
- SolarSpan® & InsulRoof® Roofing Panel
- External/Internal Wall Base Channels and Washers
- Stiffened Top Wall Plates and Joiners
- Stiffened Top Wall Plate Post Connector
- External/Internal Wall Cappings
- Receiver Channel
- Angle Joint Stiffener
- 48.3x3.2mm & 76x4.5CHS Round Post (if required)
- Window/Door Frames
- Flashings
- Post to Bearer connections – two storey
- Polymeric Foam Tape (P1510) 24mm x 6.4mm x 10.5m
- Etch Prime/Cold Galvanising Paint
- Building Adhesive Sealant (similar to Sikaflex 11FC)
- Chemical Anchor kit, M12 x 150mm Threaded Rod
- M12 x 120mm Trubolt
- 3mm Plastic Spacers
- M12 50mm Threaded Bolt with Hex Head
- Powers 10-16x16 Flat Head Screw
- Flashing Screw Neoprene Class 3 10-16x16 Hex Head
- Roofing Screws with Neoprene Washer
- Stainless Steel/Stainless Steel 1/8" Diameter Rivet (73STSSTS4-4)
- 3.2mm diameter Stainless Steel Dome Head or Countersunk (recommended) Rivet

## 2.0 Wall Installations

### 2.1 Load Bearing, Non-load Bearing and Bracing Walls

InsulLiving® walls may be classified as load bearing, non-load bearing and or bracing as determined by engineering. This must be clearly marked on the engineering plans.

#### Load bearing & bracing walls

---

All external walls are load bearing. The walls parallel to the direction of the roof fall do not support the roof and are designed to take the lateral wind load. The external walls perpendicular to the direction of the roof fall take the roof load as well as wind load. Some internal walls may be designated by the engineer to support the roof load and/or as bracing walls.

Use stiffened top wall plate, chemical anchors and base channel washers for all load bearing and bracing walls. Chemical anchors and base channel washers are spaced at 1200mm max for load bearing walls. This must be reduced to 600mm max centres for bracing walls.

SolarSpan® & InsulRoof® roof must be tied down to load bearing walls, bracing walls and structural beams at all ribs in non-cyclonic applications, and at all ribs and pans in cyclonic regions.

#### Non load bearing walls

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Wall capping channel may be used on top of non-load bearing walls, however to accommodate cabling it is recommended to use the stiffened top wall plate for all walls. Please refer to the Top Wall Plate Fixing section of this manual for more information. Non load bearing walls are anchored down at 1200mm max centres using masonry mechanical anchors, no base channel washers required.

SolarSpan® & InsulRoof® roof is not to be fixed to non-load bearing walls.

## 2.2 Set Out and Plate Fixing

### Before you start

#### Safety Gear

- General Personal Protective Equipment (PPE) including: cut resistant gloves, safety glasses and ear muffs

#### General Tools

- Impact drill with Phillips Head bit
- 12mm Electric/Battery Drill & Stepped Drill Bit over 14mm
- Rotary Impact Hammer drill
- 230mm Electric Grinder
- Reciprocating Saw
- 350mm Electric Drop Saw
- Dispensing Gun for Silicone
- Portable Vacuum/Air Blower
- Dispensing Gun for Epoxy Anchor
- Socket Set (Metric)
- Hand Tin Snips
- Chalk Line

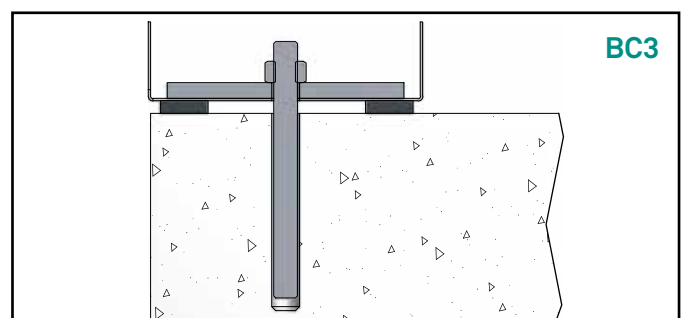
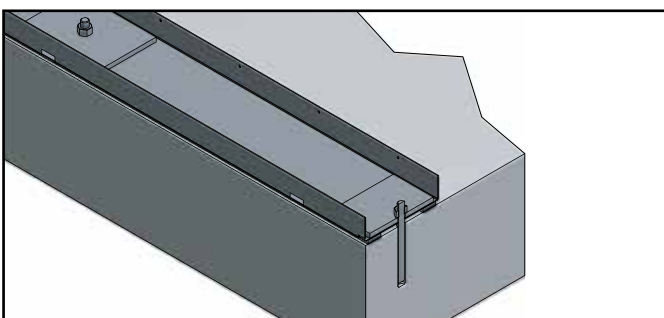
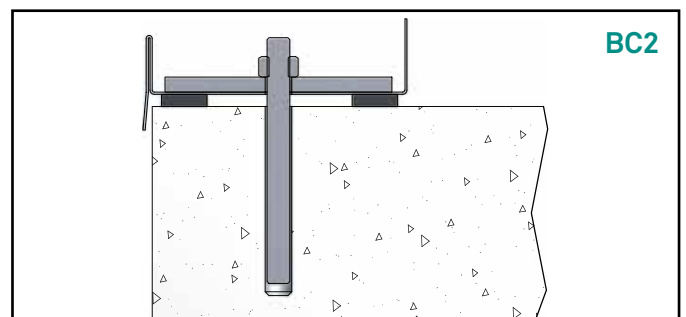
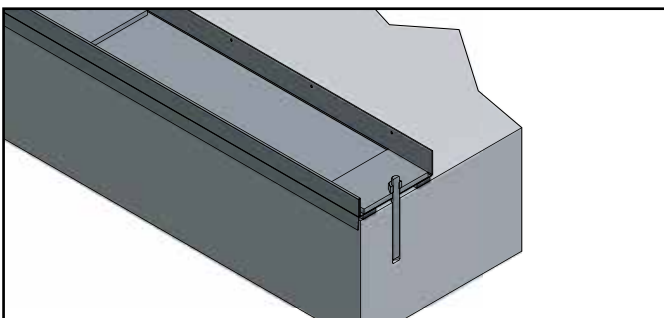
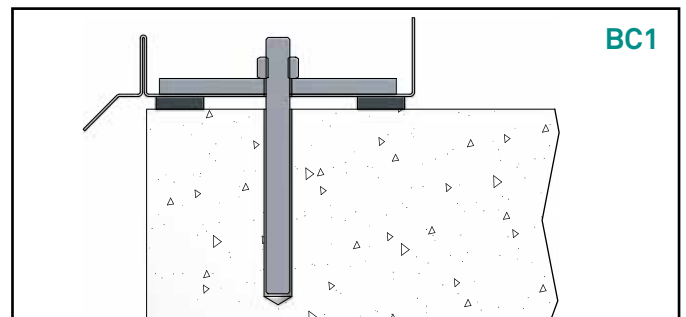
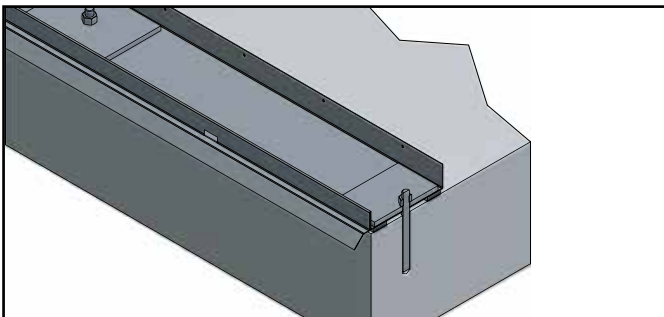
- Builders Chisel
- Utility Knife
- Saw Horse Stools
- Conventional Broom
- Rubber mallet and timber block (>140mm)
- Sheet Metal Grip Locking Pliers
- Straight Edge

#### Components

- External/Internal Wall Base Channels and Washers
- External/Internal Wall Cappings
- Polymeric Foam Tape (P1510) 24mm x 6.4mm x 10.5m
- Etch Prime/Cold Galvanising Paint
- Building Adhesive Sealant (similar to Sikaflex 11FC)
- Chemical Anchor kit, M12 x 150mm Threaded Rod
- M12 x 120mm Trubolt
- 3mm Plastic Spacers

As the InsulLiving® system is an engineered product it is essential that the base and slab are square and dimensionally accurate. Like all good building systems, quality commences at the foundation stage. As the wall base channels form an integral part of the wall structure, providing tie down, it is essential that they are fitted accurately and securely.

There are three different external base channel profiles available for the InsulLiving® system as shown below. The first option has been demonstrated throughout this manual (which incorporates a weep hole spacer as shown throughout this document), however the same principles apply to all three options. The external wall base channels are prefabricated with weep hole slots to allow for the drainage of any future possible water ingress, therefore it is important that the weep hole slots are kept clear.



## Step 1

With a clear slab, accurately snap out chalk lines indicating the position of all external and internal walls, doors and windows, base channel washers and any other fixings as per the approved project specific engineering.



## Step 2

Starting from a corner, lay out the external base channels. Mitre cut the channels to form the corner and cut the lengths of base channel to size. This is best carried out on a metal cut off saw with all cut edges coated with etch primer/cold galvanising paint. For internal wall base channels repeat this process.



## Step 3

Where holes are not provided in the base channel, prepare for drilling the base channel using the hold down washer as a guide. Determine the hole position and mark the base channel. Typically anchors are required at maximum 600mm centres for bracing walls, for all other walls anchors are required at maximum 1200mm centres. Pre-drill 14mm holes using a stepped drill bit.



## Step 4

Fix two strips of self-adhesive polymeric foam tape (P1510 24mm x 6.4mm(t)) to the underside around the perimeter of all internal and external wall base channels before fixing to the slab.



### Handy Tips

- It is important to use the polymeric foam tape (P1510) to form a tight seal between the base channel and the slab when bolted down.
- Pre-drill the internal face of the external base channel with panel skin fixing holes at 150mm centres for speedier panel stitching.

### Note:

|                               |                                                                            |
|-------------------------------|----------------------------------------------------------------------------|
| <b>Bracing Walls</b>          | Base channel washers and chemical anchors at max 600mm centres.            |
| <b>Load Bearing Walls</b>     | Chemical anchors and base channel washers at max 1200mm centres.           |
| <b>Non Load Bearing Walls</b> | Masonry mechanical anchors at max 1200mm centres, no base channel washers. |

## Step 5

Place the wall base channel into position, drill through the predrilled holes into the slab with a masonry bit in a rotary drill, clean out the hole and install the chemical anchors and M12 threaded rod.



### Handy Tips

- Refer to chemical anchor manufacturer 'setting times' before proceeding with Step 6.

## Step 6

Clean the wall base channel thoroughly then place the base channel washers where required onto the chemical anchors and tighten with a socket spanner. Insert the 3mm plastic spacers into the weep holes.



## Step 7

All joints where the wall base channel sections are butted together should be sealed with a construction grade adhesive which meets the below specification.

|                             |                                            |
|-----------------------------|--------------------------------------------|
| Application Temperature     | 5°C to 40°C                                |
| Shore A hardness            | 40-45                                      |
| Elastic Recovery            | >90%                                       |
| Tensile Strength            | 0.5 MPa approx.<br>@ 50% elongation (20°C) |
| Elongation at Break         | Over 450%                                  |
| Tear propagation resistance | 7 MPa                                      |
| Tensile Strength at Break   | Approx. 1.4 MPa                            |



### Internal Wall Base channel

Internal base channels are fixed in similar way to the external wall base channels. For bracing walls use chemical anchors and base channel washers at 600mm centres. For load bearing walls, base channel washers and chemical anchors can be spaced at maximum 1200mm centres. For non-load bearing walls masonry mechanical anchors (similar to Dynabolt or Trubolt) at 1200mm centres can be used instead of chemical anchors and no base channel washers are required. Refer to your project specific engineering for tie down and base channel washer requirements.



## 2.3 Erecting InsulWall® Panels

### Before you start

#### Safety Gear

- General Personal Protective Equipment (PPE) including: cut resistant gloves, safety glasses and ear muffs

#### General Tools

- Impact drill with Phillips Head bit
- 12mm Electric/Battery Drill & Stepped Drill Bit over 14mm
- Electric Hot Knife
- 230mm Electric Grinder
- Reciprocating Saw
- Plunge Saw with InsulWall® Safety Edge Blade
- Rivet Gun
- Multi-purpose step ladders
- Portable Vacuum/Air Blower
- Hand Tin Snips
- Spirit Level
- Chalk Line
- Saw Horse Stools
- Conventional Broom
- Temporary Bracing

#### InsulWall® Tools

- Electric Straight metal shears or air compressor alternative
- InsulWall® Cutting wire
- Glazier Suction Cup Handles
- Panel Clamp (optional)
- Rubber mallet and timber block (>140mm)
- Sheet Metal Grip Locking Pliers
- InsulWall® panel punch tool for Door/Window penetrations (optional)
- Straight Edge

#### Components

- InsulWall® Wall
- Receiver Channel
- Angle Joint Stiffener
- 48.3x3.2mm & 76x4.5CHS Round Post (if required)
- Etch Prime/Cold Galvanising Paint
- Building Adhesive Sealant (similar to Sikaflex 11FC)
- Powers 10-16x16 Flat Head Screw
- 3.2mm diameter Stainless Steel Dome Head or Countersunk (recommended) Rivet

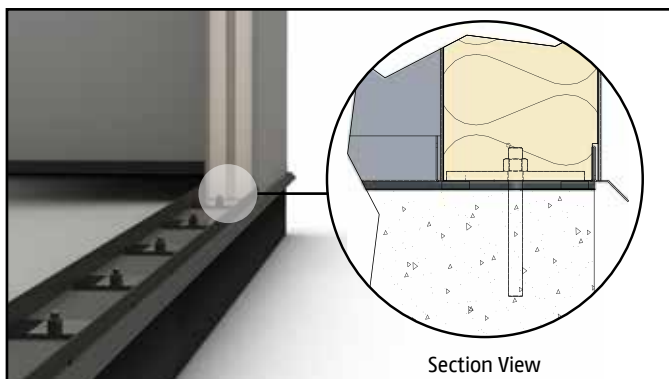
### Area Preparation

To maintain a clean site it is recommended to perform all cutting and preparation in a dedicated area close to the panel packs and slab. Surround the area with a tarpaulin or canvas wind barrier to contain any polystyrene offcuts and comply with local council regulations.

### InsulWall® Panel Preparation

#### External Wall Preparation

The outside skin on all InsulWall® panels used externally overlaps the outside lip of the external wall base channel. This provides a moisture barrier and maintains a flush and unobstructed surface for future rendering.



To accommodate the outside skin neatly over the external wall base channel outside lip, the following panel preparation is required.

## Step 1

If using a grinder, reciprocating saw or tin snips coat surfaces with cold galv, remove the male and female joints up to the end of the rebate 30mm high.

### Male Joint Notch Detail



## Step 2

Cut a 30mm slot into the polystyrene along the outside skin with either a hot wire cutting tool, reciprocating saw or grinder.



### Handy Tips

- If columns have been specified in your engineering, please refer to the structural columns section for panel preparation.

## Installing the First InsulWall® Panel

Erecting InsulWall® panels is a simple process. If the exact locations of structural columns are critical, you may need to start from these locations to align them with wall panel joints, however generally it is best to start with an external wall corner. Assemble the entire corner piece on the ground and then lift into position with the overlap on the outside lip of the base channel. The internal skin will fit inside the base channel. Take the time to ensure the panels are installed plumb in both directions.

Please note for internal walls both skins fit inside the internal base channel.



### Handy Tips

- Final minor position adjustments can be made by tapping the panel into position with a rubber mallet and timber block.
- Use temporary bracing to brace the first InsulWall® panel before continuing.

## Wall Corners

Wall corners are formed by mitring the two adjoining panels as per the following steps. It is suggested that the entire corner piece is assembled on the ground and lifted into position.

### Step 1

Remove the external skin overhang in line with the polystyrene insulated core on the two adjoining corner panels.

### Step 2

Turn the panel over and for a 45 degree angle, mark a measurement equal to the panel thickness from the edge of the polystyrene. Clamp on a straight edge as a guide, run the saw (preferably a Plunge Saw with safety edge blade) along the guide, set to just cut through the metal skin.

Use an InsulWall® wire cutting saw in a back and forth sawing motion to cut and separate the polystyrene insulation section from the panel. For a flush and fully insulated junction, scrape away the excess polystyrene with a piece of aluminium angle.



To provide a flush internal and external corner surface for future plastering, insert an angle joint stiffener under each skin as shown above.

1. First, cut a 50mm slot under the skin using a hot wire cutting tool or sabre saw.
2. Insert the angle joint stiffener under each panel skin.
3. Erect panels then rivet and secure with SS/SS 1/8" diameter rivets.



#### Handy Tips

- If additional bracing and tie-down has been specified by the approved engineering, please refer to the structural columns section.

#### Safety Tip:

If using a Cold Cut Saw ensure the edges are deburred using a deburring tool or file. The Plunge Saw with safety edge blade is the preferred tool for cutting InsulWall® (shown below).



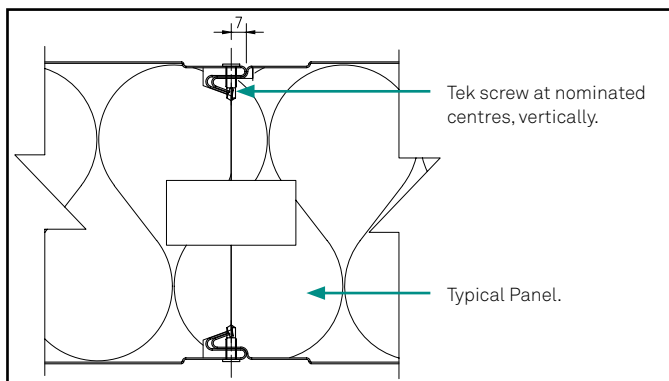
### Step 1

Using flat head metal fixing screws (Class 3 10-16x16 flat head) fix the InsulWall® panel skins to the base channel at 150mm maximum centres.



### Step 2

Fix all interlocking panels on the female side, 7mm from the edge of the panel at 300mm maximum centres.



### Alternative Panel Fixing Option

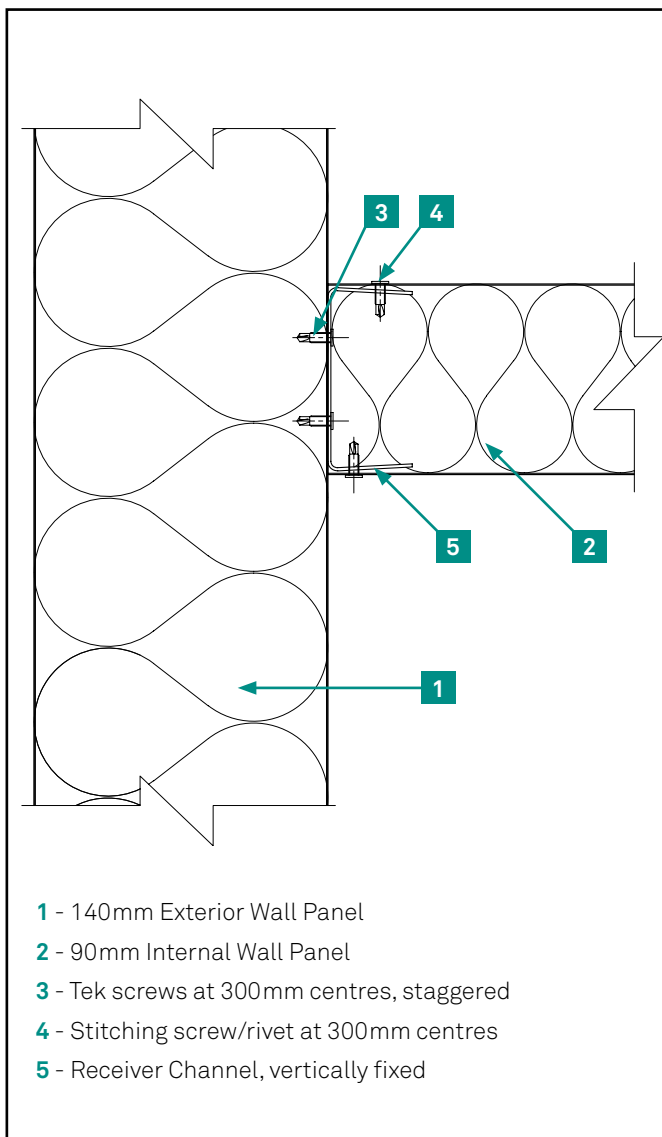
Alternatively, panel joints can be joined using a continuous 7mm bead of sealant/adhesive applied to each skin with a Class 3 10-16x16 flat head screw at mid height on the female side, 7mm from the edge of the panel. Adhesive to be cured as per manufacturer's recommendations.

#### Handy Tips

- If columns have been specified in your engineering please refer to the structural columns section for panel preparation.

## Buttress Wall

When butting internal or external walls to one another, fix a vertical receiver channel with metal fixing screws Class 3 10-16x16 flat head at 300mm maximum centres (in a staggered pattern), ensuring it is plumb. The receiver channel is then slotted inside the skins of the abutting wall, providing a smooth finish for the plaster setting of the internal corners.



## Control Joints

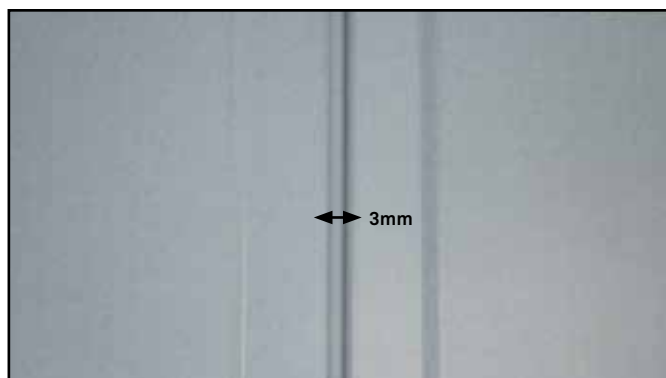
In long wall sections over 6.0m it is mandatory that at least one panel joint is assembled using the alternative panel fixing method.

### Control Joint Position Considerations:

1. Near the mid-point of a wall on a panel joint.
2. The side of a window or door opening coinciding on a panel joint.
3. Aligned with a concrete slab engineered control joint on a panel joint.

### InsulWall® Control Joint Preparation

1. Fix panel joints with a 3mm gap using a continuous 6mm bead of sealant/adhesive applied to each skin with a Class 3 10-16x16 flat head screw at mid height on the female side, 7mm from the edge of the panel. Adhesive to be cured as per manufacturer's recommendations.



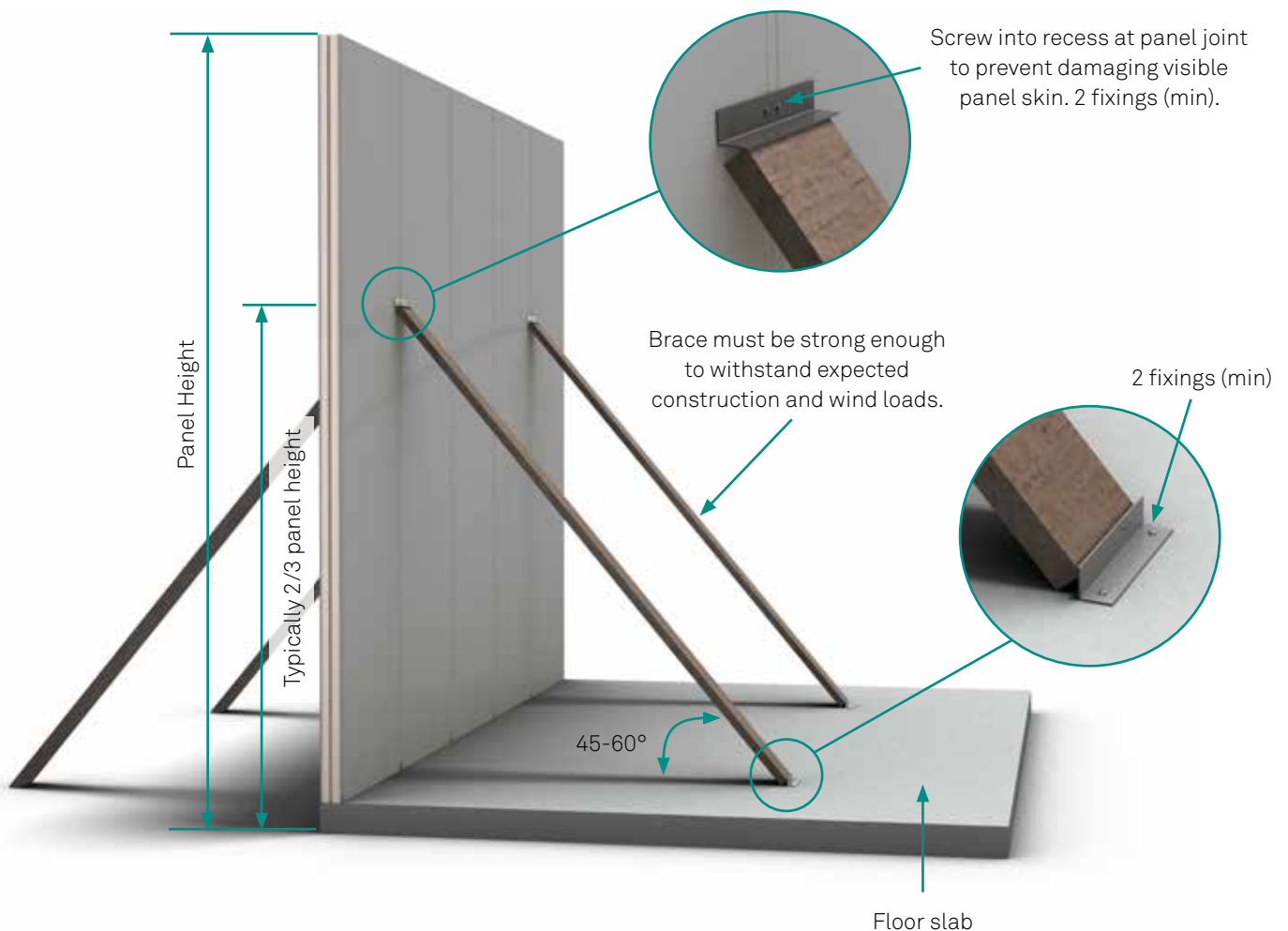
## 2.4 Temporary Bracing

Braces are temporary components providing additional stability and strength to prevent the panels from moving or falling during construction. Usually it is necessary to install temporary bracing after a wall panel has been positioned, until the remaining structure is in place and fully restrained.

Temporary bracing and propping systems must be designed to resist all expected loads, including construction and wind loads. During installation of the first wall, it is important to have at least one temporary support per panel. Temporary bracings must have a minimum of two fixings at each end and should be installed so that the fixings cannot be undone without the use of a tool. The ideal location of bracing points on a wall panel is at two-thirds of the height, measured from the base of the panel. To prevent damaging the visible section of the panel skin, the top ends of the brace can be fixed into the recessed area near the panel joints. The bottom ends of braces must be fixed to solid flat concrete or other surfaces capable of resisting the applied loads.

Where brace angles are outside the range of 45–60 degrees to the horizontal, the bracing design should be strengthened if necessary to provide adequate brace footing capacities. The direction of the applied brace loads, both in compression and in tension, must be taken into account.

After erection, braces must be checked at regular intervals to ensure they maintain the required capacity. Panels must remain braced or propped until they are adequately restrained or incorporated into the final structure. Prior to the removal of braces, it is important to inspect the structure to ensure that all elements affecting stability are securely fixed.



## 2.5 Structural Columns

### Before you start

#### Safety Gear

- General Personal Protective Equipment (PPE) including: cut resistant gloves, safety glasses, ear muffs and cut resistant arm guards

#### General Tools

- Rotary Impact Hammer drill
- Electric Hot Knife
- 230mm Electric Grinder
- Reciprocating Saw
- Multi-purpose step ladders
- Portable Vacuum/Air Blower
- Dispensing Gun for Epoxy Anchor

- Socket Set (Metric)

- Hand Tin Snips
- Spirit Level
- Conventional Broom

#### Components

- Stiffened Top Wall Plate Post Connector
- 48.3x3.2mm and/or 76x4.5CHS Round Post
- Post to Bearer connections – two storey
- Etch Prime/Cold Galvanising Paint
- Chemical Anchor kit, M12 x 150mm Threaded Rod
- M12 50mm Threaded Bolt with Hex Head

Structural columns will be positioned as per the project specific engineering and require the following additional components, preparation and installation steps. For more specific and detailed information regarding the structural properties and bracing values of this system refer to the InsulLiving® Technical Manual and your project specific engineering.

### 2.5.1 Single Storey

#### Step 1

To accommodate the structural column during InsulWall® installation, use a sabre saw, hot wire cutter or grinder to remove the unnecessary polystyrene from adjoining panels.



#### Step 2

Single Storey columns extend all the way to the top of the InsulWall® panel. Columns are located between panel joins, and the wall plate post connector will slot inside the top of the panel at the panel join. This requires trimming of the male & female joints of both adjoining panels.

#### Step 3

Install the first panel.

#### Step 4

InsulLiving® structural columns are prefabricated with a base plate and threaded rod assembly. Predrill holes into the base channel and slab as per base channel instructions. Inject chemicals into the cleaned hole and drop in the column and threaded rod assembly directly onto the base channel.



#### Step 5

Fit the second panel, enclosing the column.

#### Step 6

Then create a space for the top post connector centrally over the column by cutting a 120x120mm wide x 10mm deep into the polystyrene using a sabre saw or hot wire cutting tool.

#### Step 7

Install top post connector using an M12x50mm full thread hex head bolt. Note that the top post connector can also be used as a joiner as per Top Wall Plate Fixing section.



#### Handy Tips

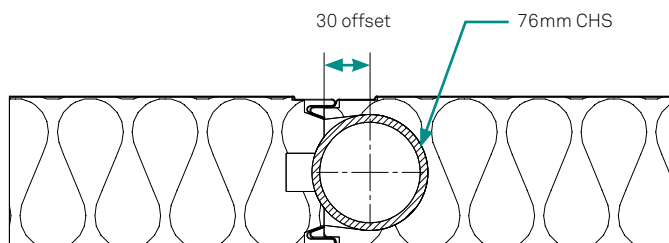
- For ordering purposes, the length of the tie-down columns should be 15mm shorter than the InsulWall® panel length at the column installation point.

## 2.5.2 Double Storey

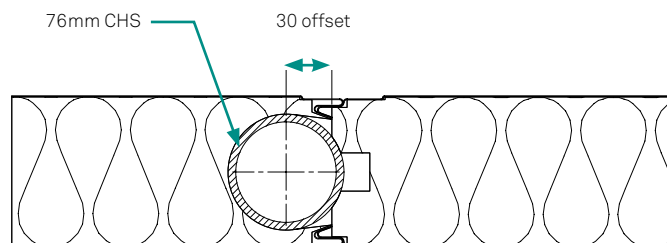
### Step 1

To accommodate the structural column during InsulWall® installation, use a sabre saw, hot wire cutter or grinder to remove the unnecessary polystyrene from adjoining panels.

When columns are inserted into the 90mm internal walls in two storey applications, the column needs to be slightly offset in the joint to avoid clashing with the male and female joints.



Column offset RIGHT top view



Column offset LEFT top view

### Step 2

In two storey applications, columns extend to the first floor location to provide an attachment interface supporting the first floor bearer and joist structural members.

Mark and cut the skin of the InsulWall® panel to accommodate the InsulLiving® Post to Bearer Connection for 90mm and 140mm walls as shown.

In determining the correct height for the first floor attachment points, it is important to consider the overall depth of the flooring system including flooring, joist, bearer and lower ceiling.



### Step 3

Install the first panel.

### Step 4

Fix the Post to Bearer connection on top of the column before installation. InsulLiving® structural columns are prefabricated with a base plate and threaded rod assembly. Predrill holes into the base channel and slab as per base channel instructions. Inject chemicals into the cleaned hole and drop in the column and threaded rod assembly directly onto the base channel.

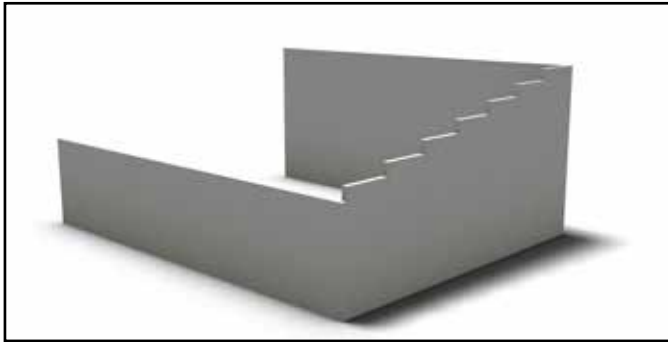


### Step 5

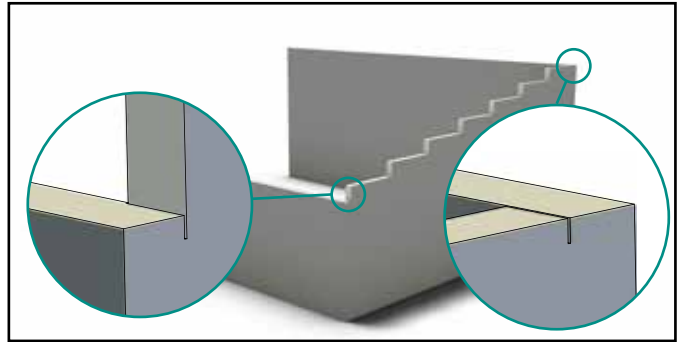
Mark and cut the skin of the adjoining InsulWall® panel to accommodate the InsulLiving® Post to Bearer Connection for 90mm and 140mm walls as shown, fit the second panel, enclosing the column.

## 2.6 Raking Walls

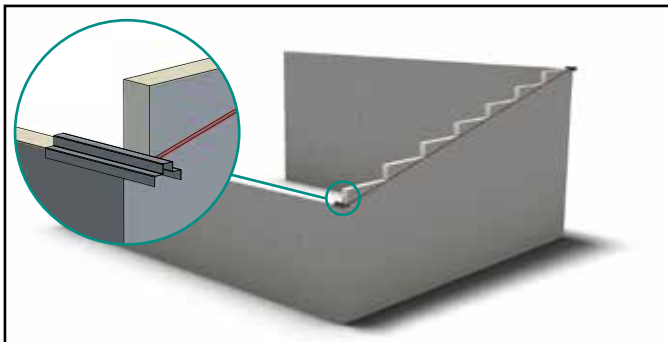
InsulLiving® system house designs are more likely to incorporate raking walls because of the use of SolarSpan® & InsulRoof® roof panels in skillion or gable roof configurations.



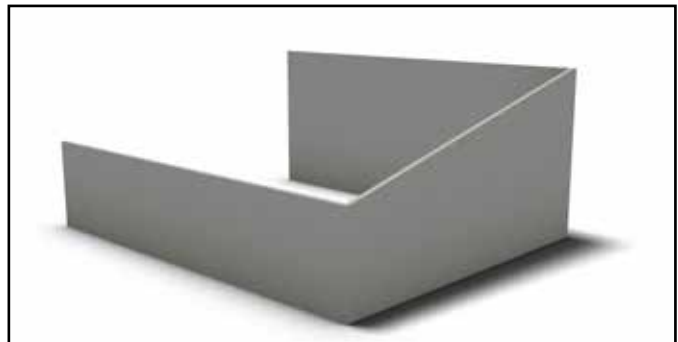
**Step 1:** Erect InsulWall® panels (stepped to reduce wastage).



**Step 2:** Square off low end of raking wall as indicated and cut 40mm -50mm deep slots to accommodate top plate flange for high and low walls.



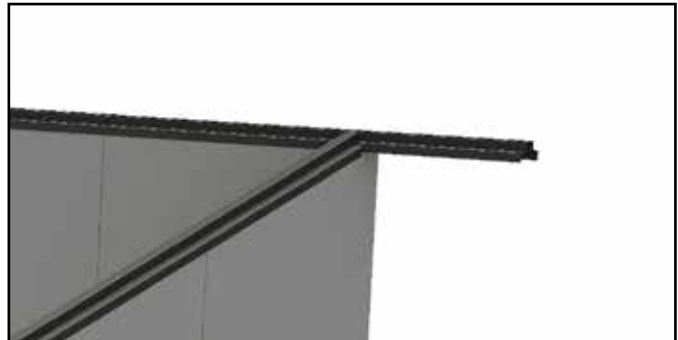
**Step 3:** Use top plate off-cuts as a guide to string a line and measure a cut line on both sides of the raking wall, making sure the raking top plate matches the top edge of those on the straight walls.



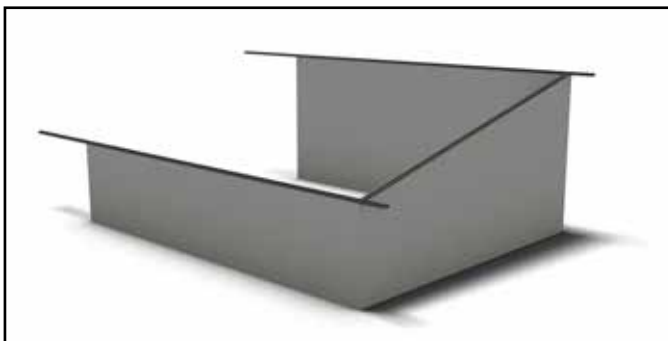
**Step 4:** Cut and trim the raking walls to suit.



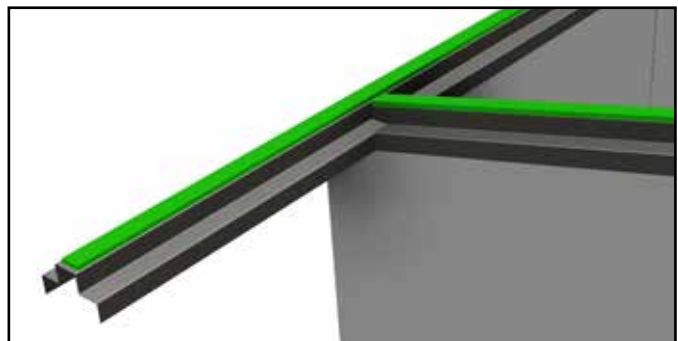
**Step 5:** Install high and low end top plates, overhanging to suit eave width.



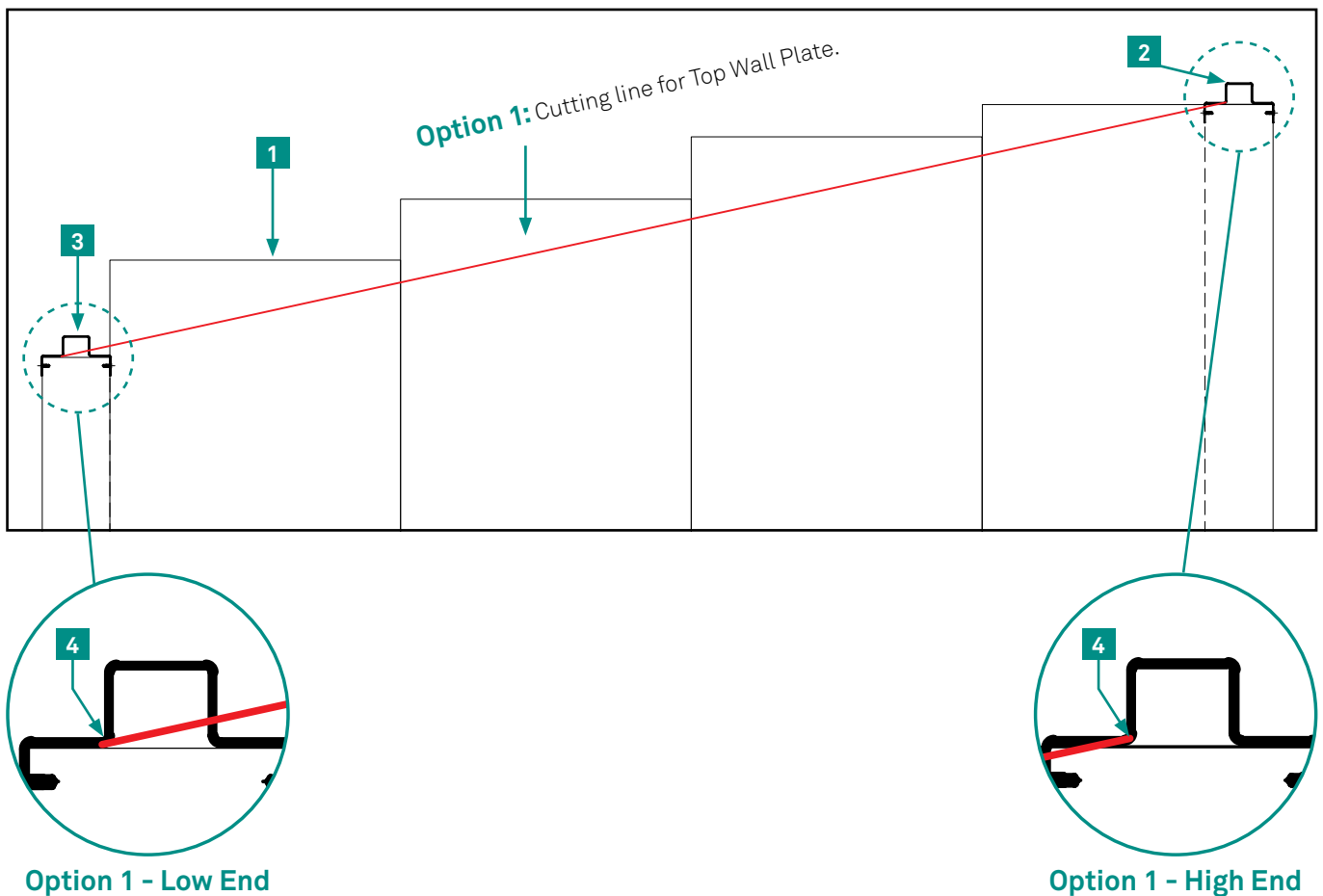
**Step 6:** Trim each end to suit roof pitch for better fit.



**Step 7:** Install raking top plate.



**Step 8:** Install foam seal on all top plates in appropriate location to contact SolarSpan® & InsulRoof® roofing.



- 1 - Exterior 140mm side wall, typical
- 2 - High wall Top Plate
- 3 - Low wall Top Plate
- 4 - Measuring Point

**Note:** - Accuracy is important to ensure SolarSpan® & InsulRoof® roof will contact all wall top plates.



#### Handy Tips

- Alternatively, a safer method is to cut InsulWall® panels from a template set out on the floor, then erect the panels.
- As these raked walls are not supporting roof loads there are two variations of top channel that can be used, namely the Stiffened Top Wall Plate or Wall Capping channel. The raking wall cut height will vary depending on the top plate used. If using Wall Capping, ensure the rake wall height is aligned with the top section of the high and low walls as shown above.

## 2.7 Top Wall Plate Fixing

### Before you start

#### Safety Gear

- General Personal Protective Equipment (PPE) including: cut resistant gloves, safety glasses and ear muffs

#### General Tools

- Impact drill with Phillips Head bit
- Electric Hot Knife
- 230mm Electric Grinder
- Reciprocating Saw
- 350mm Electric Drop Saw
- Multi-purpose step ladders
- Hand Tin Snips

- Spirit Level

- Chalk Line

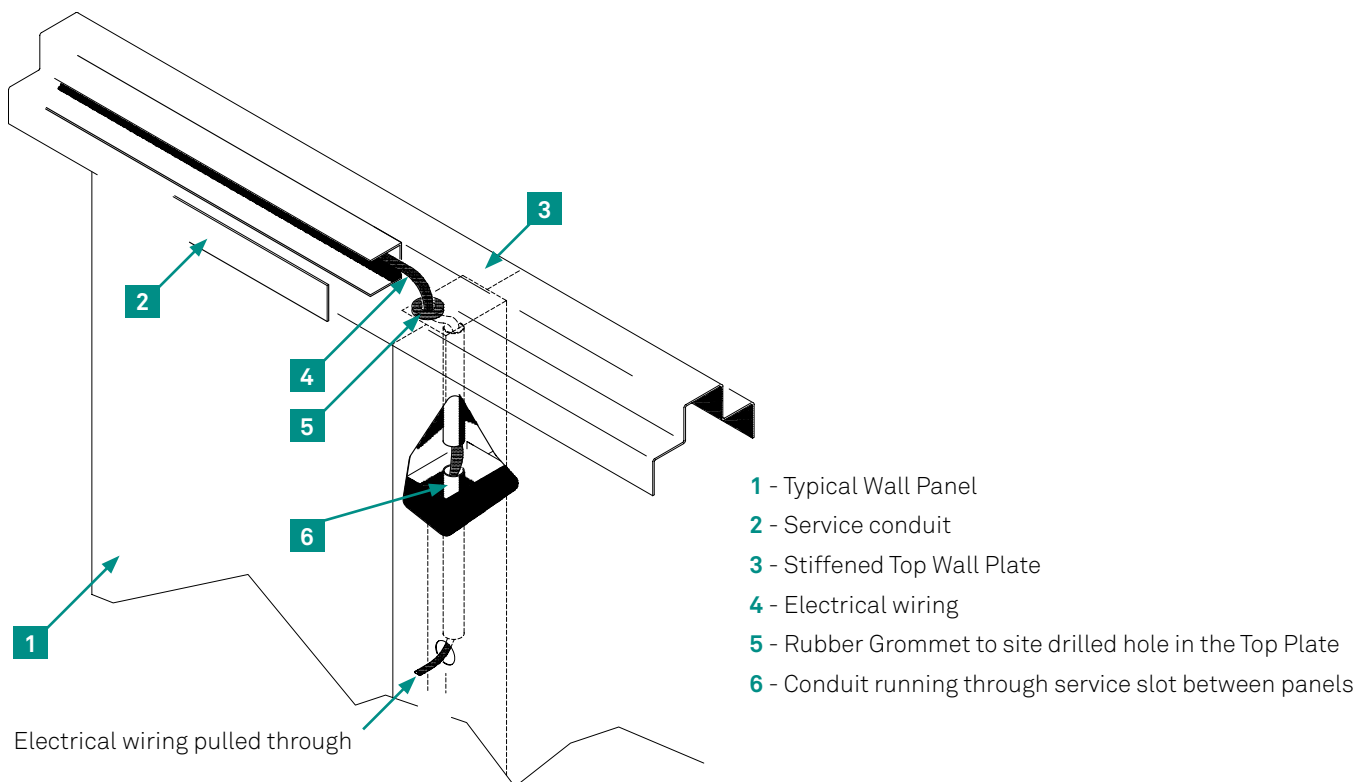
- Saw Horse Stools

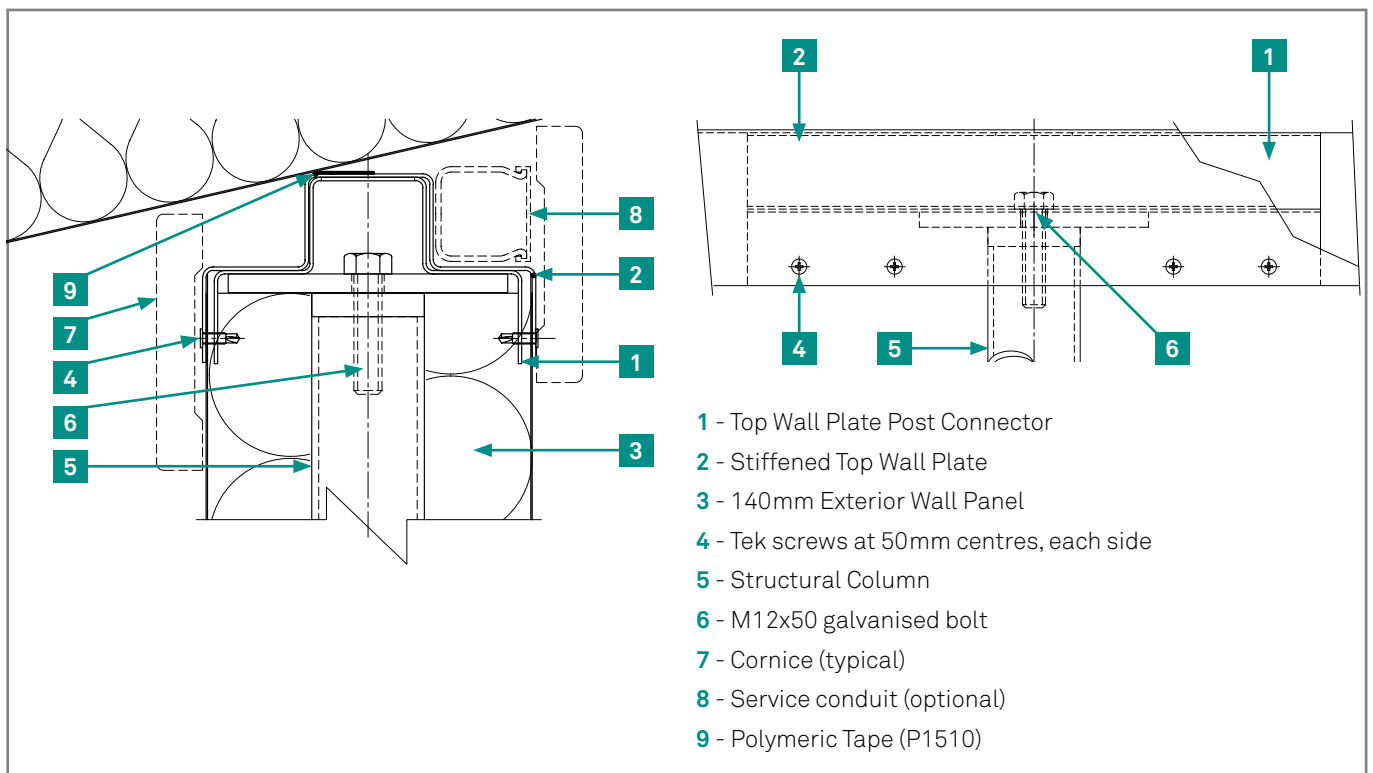
#### Components

- Stiffened Top Wall Plates and Joiners
- External/Internal Wall Cappings
- Polymeric Foam Tape (P1510) 24mm x 6.4mm x 10.5m
- Etch Prime/Cold Galvanising Paint
- Powers 10-16x16 Flat Head Screw

The stiffened top wall plates for load bearing walls are specially formed to concentrate the roof loadings centrally down the walls. The top wall plates come in different gauges depending on engineering requirements, and in many cases eliminate the need for lintels or beams over certain size clear spans and wall openings.

Wall capping channel may be used on top of non load bearing walls, although to accommodate cabling it is recommended to use the stiffened top wall plate for all walls. Plumbing, electrical and data services can be easily run along the shoulders of the top wall plates or through an optional 40x40mm PVC duct as shown below.



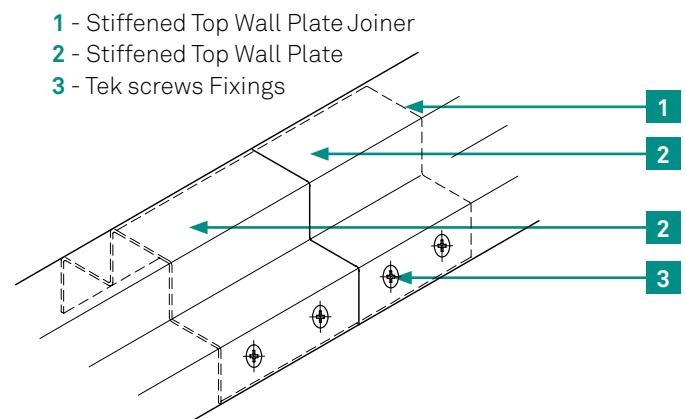


Fix Top Wall plates to column plate joiner with stitching screws 10-16x 25mm in from each end and at 50mm centres (4 screws).

Cut the Stiffened Top Wall Plate to length using a drop saw and predrill 3.6mm holes at 150mm maximum centres, 15mm from the bottom of the leg. Coat all cut edges with etch primer/cold/raising paint. All variations of Top Wall Plates fit externally over the panel and are screw fixed using a metal fixing screw Class 3 10-16x16 flat head. Stiffened Top Wall Plates must be butt joined over a Joiner plate which fits inside the panel skins and screw fixed 25mm in from each end and at 50mm centres (4 screws per side). Ensure screws penetrate right through to the Top Wall Plate Joiner.

The Stiffened Top Wall plates for internal walls are of a similar profile to accommodate standard size service ducts or plumbing pipes. These are simply cut and butted together unless they are bracing walls which should conform with the engineer's requirements.

To avoid scratching underside skin of the SolarSpan® & InsulRoof® panel and to create a thermal break and air seal, adhere polymeric foam tape to all top wall plates where contact with the roof will occur.



#### Handy Tips

- To save additional panel preparation ensure top plate joins aren't aligned with panel joins.
- Top Wall Plate Joiners are only required for load bearing and bracing walls. Other walls only require a butt join of Top Wall Plate or Wall Capping channels..

## 2.8 Wall Openings

### Before you start

#### Safety Gear

- General Personal Protective Equipment (PPE) including: cut resistant gloves, safety glasses and ear muffs

#### General Tools

- Impact drill with Phillips Head bit
- Electric Hot Knife
- 230mm Electric Grinder
- Reciprocating Saw
- Plunge Saw
- Dispensing Gun for Silicone
- Rivet Gun
- Multi-purpose step ladders
- Portable Vacuum/Air Blower
- Hand Tin Snips

- Spirit Level
- Saw Horse Stools
- Conventional Broom
- InsulWall® Panel Punch Tool

#### Components

- Receiver Channel
- Window/Door Frames
- Etch Prime/Cold Galvanising Paint
- Building Adhesive Sealant (similar to Sikaflex 11FC)
- Powers 10-16x16 Flat Head Screw
- Stainless Steel/Stainless Steel 1/8" Diameter Rivet (73STSSTS4-4)
- 3.2mm diameter Stainless Steel Dome Head or Countersunk (recommended) Rivet

### Handy Tips

- Wall base channels are not required where swing, sliding or bi-fold doors are positioned.
- Window and door openings are easy to cut out after the walls have been erected or pre-cut on the ground before erecting.

### Door or Window Opening Cut Out after InsulWall® installation

#### Step 1

Mark the required clear opening on one side of the panel



#### Step 2

Predrill through the steel skin at the corners.



#### Step 3

Use the InsulWall® centre punch tool to punch through both panel skins at the corners.



#### Step 4

Mark the other side of the panel, aligning with the newly punched holes.



#### Step 5

Cut the InsulWall® panel opening using a Cold Metal Cutting Saw or Plunge Saw with Safety Edge Blade on both sides.



#### Step 6

Cut around the opening using a Sabre Saw or Hot Wire Cutter to separate the cut panel.



## 3.0 Floor Installations (double storey applications)

### 3.1 Bearers

Structural columns are installed within the InsulWall® panels to support the floor bearers. Column spacing is governed by the floor load and bearer span, as determined by engineering. Columns are fitted with post to bearer connections protruding out of the InsulWall® panel to accommodate attachment of bearers. This provides the ultimate flexibility to incorporate any engineered flooring system into the InsulLiving® residential system.

In addition to being secured to the post connection, the bearers must also be fastened to the InsulWall® skin at regular intervals along their entire length as determined by engineering. Vertical slots must be provided in the bearers for this purpose to allow for deflection of bearers without transferring the floor load to the InsulWall® panels.

### 3.2 Joists

After bearers are fixed in place, the joists can be installed according to the manufacturer's recommendations. It is advisable to use a complete flooring system comprising of bearers, joists and other structural components from the same manufacturer, however it is possible to use any suitably engineered arrangement for the project. For example, open web joist designs might be considered for ease of installation of services to avoid the need for drilling through purlins or installing dropped ceilings.

When selecting joist spacing, locate joists directly beneath the parallel upper walls if possible. Alternatively extra rows of joists are needed under these walls so upper base channels can be securely fixed through joists.

### 3.3 Internal Upper Storey Walls

Once the second storey floor system has been correctly installed the upper wall base channels will be positioned such that they can be fixed through joists at 600mm centres (max). This is critical in ensuring adequate wall strength is provided throughout both levels of the building. After base channels have been installed, follow the same procedures as lower storey to assemble the upper walls.

The lower storey walls are not designed to take any load from upper floors. If an internal upper storey wall has been designated as a load-bearing wall, it is important to ensure this load is transferred down through flooring members and their supporting structural columns.



### 3.4 Flooring & Set Downs

Design and installation of flooring and set-downs is no different to traditional building methods. Any suitable flooring material can be selected and installed in accordance with the manufacturer's recommendations.

## 4.0 Roof and Ceiling Installations

### 4.1 Roof Beams & Lintels

Occasionally large spans and openings require the use of steel or timber beams and columns to assist supporting roof loads e.g. double garage doors and multi/bi-fold doors. The size and thickness of the beams or lintels should be assessed using the supplier's load tables or nominated by an engineer.

The panels are easily modified to accommodate a supporting column by using either a hot wire cutter or sabre saw to remove the polystyrene core. The panel can then be slotted around the column and capped, set and topped. Alternatively, with structural engineering approval panels can be installed horizontally to avoid the requirement for a lintel.



## 4.2 SolarSpan® & InsulRoof® Roofing

### Before you start

#### Safety Gear

- General Personal Protective Equipment (PPE) including: cut resistant gloves, safety glasses and ear muffs

#### General Tools

- Impact drill with Phillips Head bit
- Electric Hot Knife
- Plunge Saw with InsulWall® Safety Edge Blade
- 350mm Electric Drop Saw
- Dispensing Gun for Silicone
- Rivet Gun
- Multi-purpose step ladders
- Portable Vacuum/Air Blower
- Dispensing Gun for Epoxy Anchor
- Socket Set (Metric)
- Hand Tin Snips
- Spirit Level
- Chalk Line

- Builders Chisel
- Utility Knife
- Saw Horse Stools
- Conventional Broom
- Roof Screw Gun
- SolarSpan® Turn-Up/Down Tool (See Bondor®)
- Multigrips (for turn-up/down on InsulRoof®)
- Plastic Paint Scraper
- Electric roof Shears

#### Components

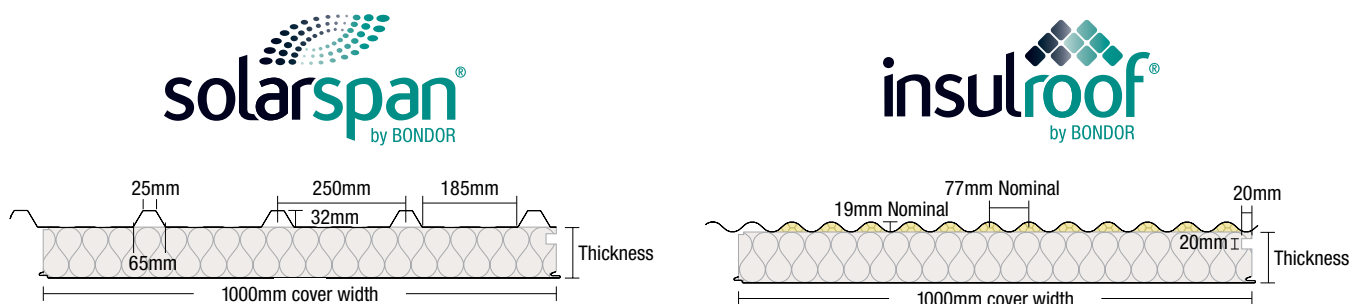
- SolarSpan® or InsulRoof® Roofing Panel
- Building Adhesive Sealant (similar to Sikaflex 11FC)
- Roofing Screws with Neoprene Washer
- Stainless Steel/Stainless Steel 1/8" Diameter Rivet (73STS4-4)
- 3.2mm diameter Stainless Steel Dome Head or Countersunk (recommended) Rivet

SolarSpan® & InsulRoof® combines roofing, insulation and ceiling in one durable, functional and attractive panel. This all-in-one roofing solution offers the potential to create the ideal indoor/outdoor living environment in any climate. SolarSpan® & InsulRoof® features a high tensile COLORBOND® steel top skin with an attractive roof profile, a polystyrene core, ranging from 50mm to 150mm thick, for insulation in all seasons and a flat or lightly profiled pre-painted COLORBOND® SURFMIST® finish underside.

SolarSpan® & InsulRoof® is an ideal product in association with InsulWall® and shares the simplicity and ease of use of the wall panels to create a building system which is fast, highly efficient and cost effective.

SolarSpan® & InsulRoof® roof panels have a 1000mm cover. SolarSpan® roof panels come in lengths up to 12m. InsulRoof® roof panels come in lengths up to 16m. The panel edge interlocks using a slip joint with a pre-routed services duct (20mm x 20mm) to accommodate electrical services i.e. conduit for lighting.

### SolarSpan® & InsulRoof® profile



### Skillion Roofs

The simplest roof type for design and installation purposes would be the skillion roof. Skillion roofs typically have a top and bottom overhang and are screw fixed to the top wall plates and/or roof support beams. Skillion roofs can be butted against an external or internal wall and supported by a receiver channel.

### Gable Roofs

Gable roof configurations are well suited to the InsulLiving® system where the only requirement differing from skillion type roofs is the provision of a ridge beam or central wall to support the sheets at the apex.

### Hip Roofs

A hip roof design although possible is not preferred as there is additional wastage and labour required.

Valleys are also inefficient with regards to labour, installation time and wastage.

## 4.3 SolarSpan® & InsulRoof® Design Overview

With a cover of 1000mm and the ability to order sheets to any given length (SolarSpan® max. 12m & InsulRoof® max. 16m), the layout and calculation of quantities are greatly simplified. Large spans and sufficient overhangs (cantilevers) are determined by wind zone and SolarSpan® & InsulRoof® panel thickness.

Refer to InsulLiving® Technical Manual for permissible spans in the required region.

### SolarSpan® & InsulRoof® Cut Back Options

SolarSpan® & InsulRoof® panels can be pre-cut with a longer top skin at one end or both ends. The cutback on the panel allows an overhang into the gutter at one end and if required an allowance for turn up at the ridge end for gable roofs.

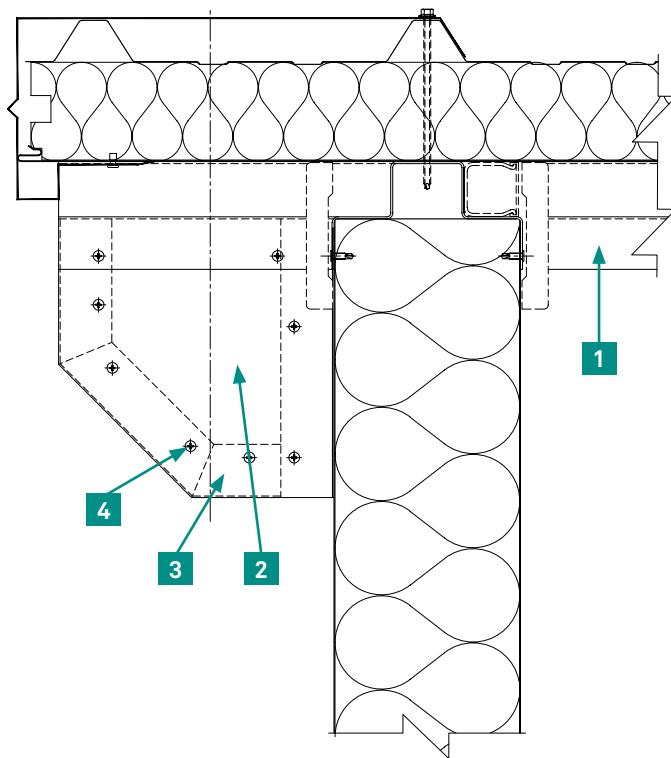
#### Handy Tips

- Specify with your SolarSpan® & InsulRoof® order a left hand lay cut back or right hand lay cut back roofs or a both end cut back.

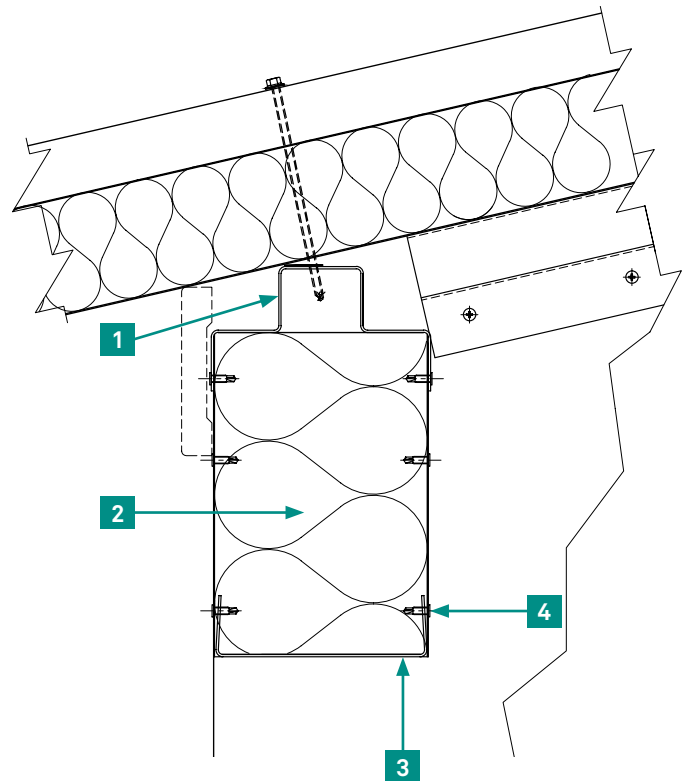
#### Design Notes

SolarSpan® & InsulRoof® should have support to within 250mm of the side of a full panel of SolarSpan® & InsulRoof®. For support past a house wall, an infill (outrigger) of up to 500mm can be fitted. (Refer below).

Exterior Wall to Roof Connection - Outrigger Side View



Exterior Wall to Roof Connection - Outrigger End View



- 1 - Continuous Top Plate over side wall
- 2 - Outrigger InsulWall® Panel
- 3 - Receiver Channel
- 4 - Tek Screw Fixings

## 4.4 SolarSpan® & InsulRoof® Installation

SolarSpan® & InsulRoof® panels up to 8.0m in length can be manually erected by a roofing crew on a low set single level dwelling. For higher installations, it is recommended that a mobile crane with the correct spreader bars or lifters be used. A specially designed suction lifter which lifts the panel in the centre and is highly effective for the installation of long sheets may be available for hire or purchase in some areas (speak to your local Bondor® representative).

Because SolarSpan® & InsulRoof® is a pre-finished product, care should be taken in the handling, storage and installation of the SolarSpan® & InsulRoof® roof panels. SolarSpan® & InsulRoof® roofing is a through fixed system suitable for roof pitches of 2 degrees or more. Our minimum 2 degrees pitch refers to the actual pitch achieved after supporting structure deflection. Installation must comply with roof plumbing and drainage standards found in AS HB39.



### Handy Tips

- Before installation of SolarSpan® & InsulRoof® panels, consider electrical rough-in requirements in the Electrical Services section.

## Step 1

Prepare the saw horse stools (or similar work platform) by taping soft material or polystyrene to the top of the stools. Lift the first panel from the pack, taking care to not drag and scratch the panel's pre-finished surface and place the panel roof side up on the prepared stools.

## Step 2

The first overlay rib on the first panel acts as side water proofing and should be left at full rib height.

## Step 3

Turn up all roof pans at the top end of the panel to full rib height. Use the SolarSpan® Turn Up/Down tool on SolarSpan® and use a shifting spanner or multigrips for InsulRoof® as per corrugated roofing.



## Step 4

Trim the corners off both overlay ribs at the top end and the underlay rib at the gutter end using tin snips. This will allow panel to lap properly once turned up at the top end and to stop capillary action of water tracking back along the underlay leg at the gutter end.



## Step 5

Turn the panel over on the stools and remove polystyrene from the gutter cutback end of the panel with a plastic paint scraper or similar.



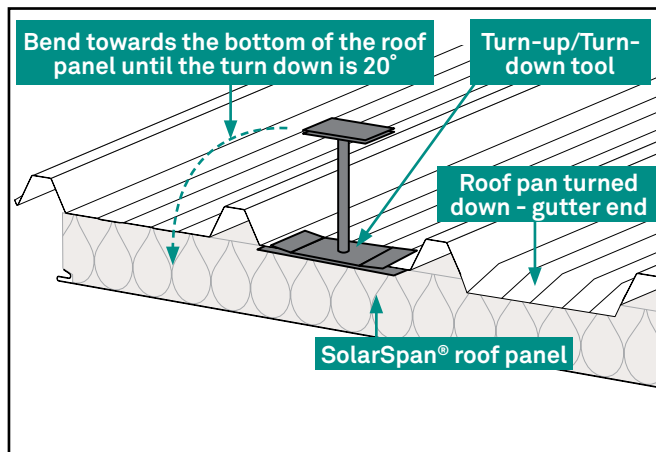
## Step 6

Peel back a small section of the protective plastic coating on the ceiling face, 20-30mm from the panel edges to allow unobstructed panel joining. Peel back enough of the protective plastic to clear the roof support at the gutter and/or support end. Remove the protective plastic completely at completion of the installation.



## Step 7

Turn the panel back over and turn down all roof pans at the gutter end. For SolarSpan®, Turn down pan approx. 20 degrees using the SolarSpan® Turn Up/Down Tool. For InsulRoof® corrugated insulated roofing, turn down pans slightly at 5 degrees using shifting spanner or multigrips without tearing the roof sheet or removing the Colorbond coating. Additional prevention of water regress on the roof underside can be achieved using a small bead of silicone under the pan, 10mm back from the end of the roof sheet.



## Step 8

To protect the ceiling side of the SolarSpan® or InsulRoof®, throw a soft blanket or similar over the supporting beams or top wall plates that the first panel will be in contact with.

## Step 9

Place the cutback end (gutter or low end) onto the covered support beam or top wall plate.

## Step 10

Square off the first panel to the critical line required (house or support beam) and fix roofing screws into two points on a rib to anchor down and hold the panel in position.

## Step 11

Prepare the second and subsequent panels as per first panel. Continually move the protective blanket covers over the supporting beams or top wall plates to protect each SolarSpan® & InsulRoof® panel's underside during installation.

### Handy Tips

- SolarSpan® & InsulRoof® panels may have sharp edges. Ensure installers wear Cut Resistant gloves when handling and installing.

## Step 12

It is important to do the SolarSpan® & InsulRoof® rough-in lighting and other electrical services as each panel is installed. Please refer to Electrical Services section of this manual before installing the second panel.

To install the second panel and subsequent panels, position a person at each end of the panel and place the overlay flap of the roof skin over the previously fitted panel and engage the male interlock into the female interlock of the ceiling side of the first panel. To be sure you are successful, the ceiling join should be a neat 'V' join, with little or no flat of the male interlock showing. Slide this second panel if necessary, to align with the first panel of the gutter end. Fix roofing screws into two points on a rib to anchor down and hold the panel in position. After fitting all SolarSpan® & InsulRoof® panels, finish screw off, ensuring a fixing through each rib into each supporting beam or Top Wall Plate of load bearing walls.

### WARNING

- Always consult your licensed electrician for advice on details for cable installation. Ensure all services are clear of the top wall plate centre cavity where roof fixing screws will penetrate.

## 4.5 Dropped Ceilings & Bulkheads

### Overview

A dropped ceiling is a design option in rooms i.e. bathrooms, WC's, laundries and walk-in wardrobes allowing the concealment of services such as plumbing, electrical and air conditioning.

InsulWall® 60mm panel makes an ideal ceiling material as the panels recessed edges provide a flush ceiling finish. This panel can easily span the usual size of these rooms, with thicker (90, 140mm) panel providing longer spans.

#### Handy Tips

- Refer to InsulWall® Technical Data Sheets for span tables and Bondor® Technical Services for assistance.

### For a dropped ceiling with a modern shadow line finish:

#### Step 1

Mark a level line on the walls for the positioning of the ceiling angle.

#### Step 2

Fix steel angles with the shadow line recess around the perimeter of the room with steel fixing screws at 150mm maximum centres into the InsulWall® panel walls.

#### Step 3

Cut the ceiling panels to size, drop into the ceiling angle and rivet or screw into place.

#### Step 4

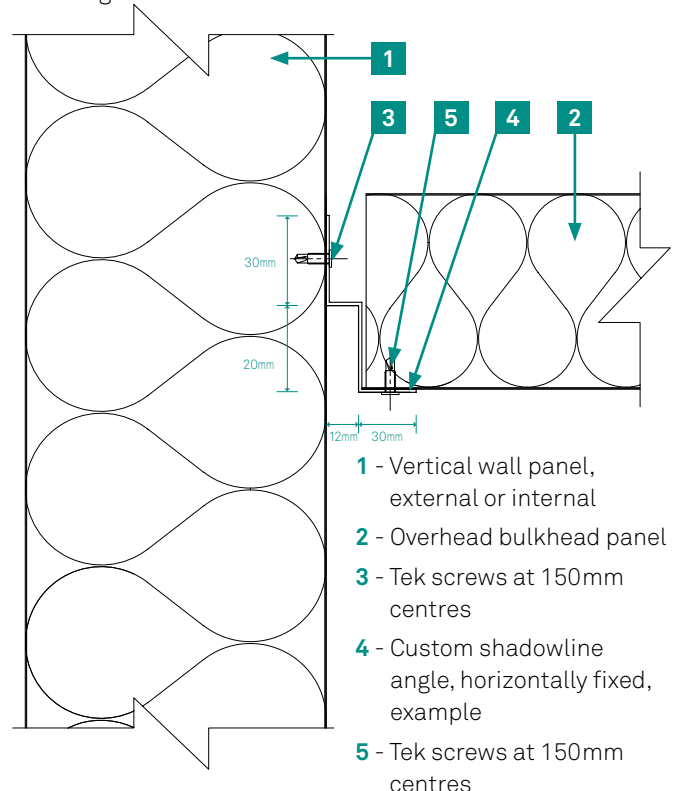
The joints and edges are then plaster set in the usual manner and if required, proprietary man holes can be inserted into the panels.

#### Design Notes

An alternative method for producing a flat ceiling would be a proprietary suspended ceiling system.



Flashing Size: 3 x fold 92mm - 30 x 20 x 12 x 30mm



## 5.0 Flashings, Gutters & Roof Penetrations

### 5.1 Flashings

InsulLiving® flashing options are available to suit the residential application of SolarSpan® & InsulRoof® which include a series of fascia flashings and barge profiles.

#### Fascia

The SolarSpan® & InsulRoof® fascia flashing provides a vertical face for fixing concealed gutter brackets and enough vertical surface to allow sufficient fall to downpipes. Screw fix or rivet the top lip of the fascia flashing to the underside of the overhanging roof skin and the bottom lip of the flashing to ceiling face of the SolarSpan® & InsulRoof® panel.

#### Side and Rear Barges

For skillion roof designs side and rear barge flashings will be required. A few recommended design options are available from the set of InsulLiving® flashing drawings. It is recommended that the side barge flashings cover two of the SolarSpan® & InsulRoof® ribs.



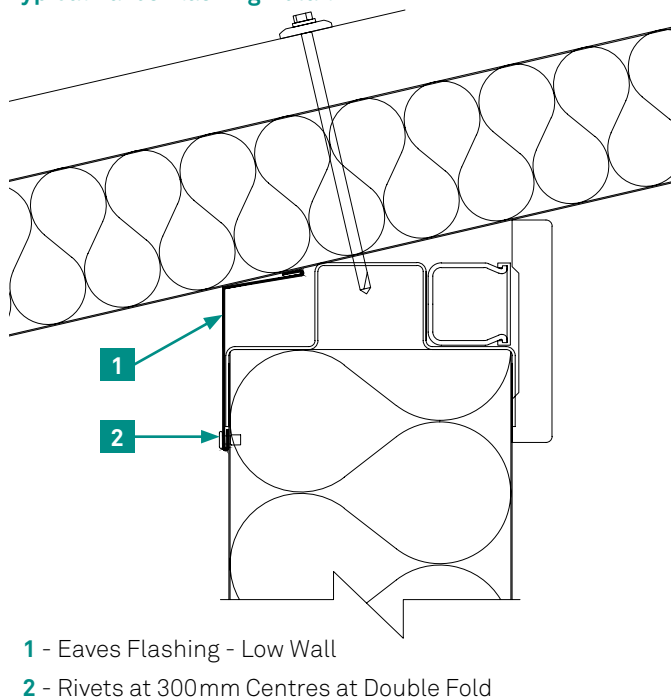
#### Ridge and Apron Flashings

Suggested flashing design options to suit ridge capping for gable roofs and apron flashings for parapet walls are available from the set of InsulLiving® flashing drawings.

#### Window Flashing

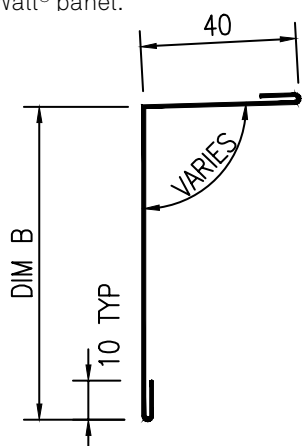
Windows and door openings positioned on exposed walls should incorporate a standard window flashing to prevent water ingress.

#### Typical Eaves Flashing Detail



#### Eave Trim Option

A design option for finishing off the exterior between InsulWall® and SolarSpan® & InsulRoof® can be an eave trim flashing, which is riveted to the top of the InsulWall®. It is recommended that a COLORBOND® Surfmist® flashing material be used to match the SolarSpan® & InsulRoof® underside. Alternatively, a timber or similar moulding for external use could be used and fixed to the InsulWall® panel.



#### Handy Tips

- Where flashings run perpendicular to the roof, the flashing should be scribed over the SolarSpan® & InsulRoof® roof profile to prevent water ingress.

### 5.2 Gutters & Downpipes

Gutter and downpipe design should carefully consider drainage capacity in accordance with Australian standard HB39. Gutters are fixed to the SolarSpan® & InsulRoof® fascia flashings with concealed gutter brackets. If additional gutter support is required for larger carrying capacity please contact Bondor® Technical Services for design advice.

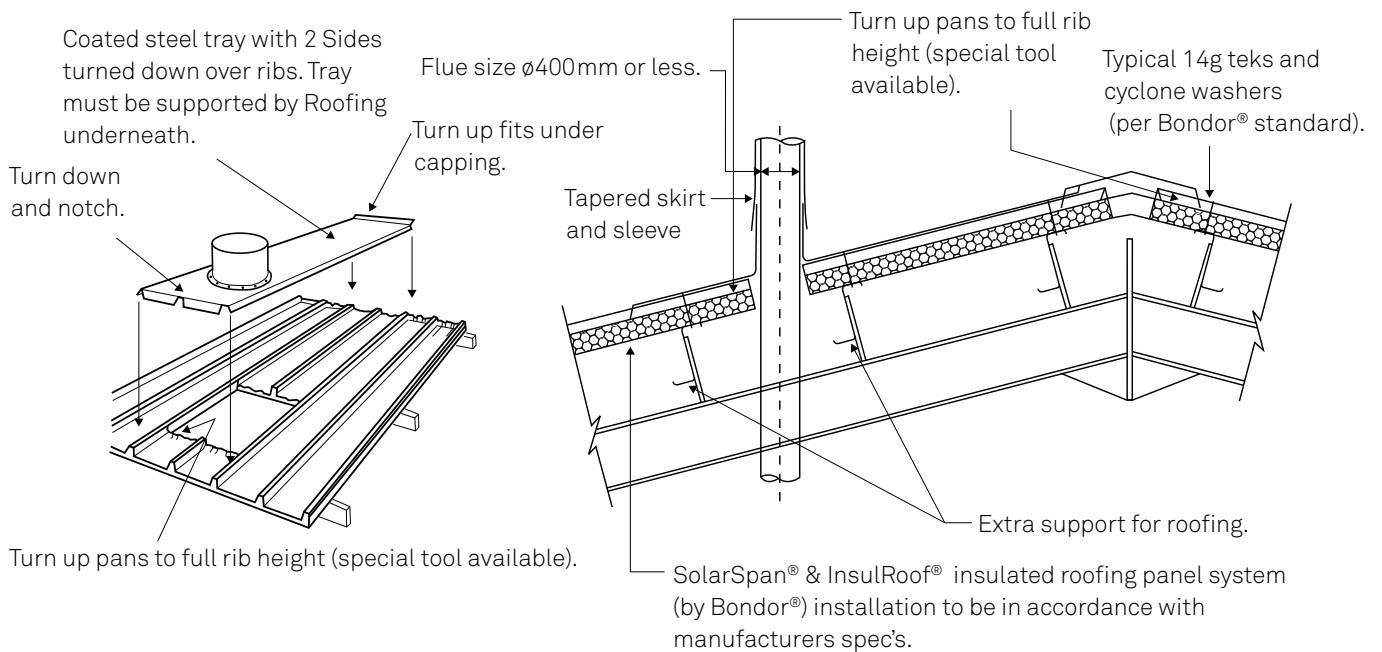
## 5.3 Roof Penetrations

### SolarSpan® & InsulRoof® Roof Penetrations

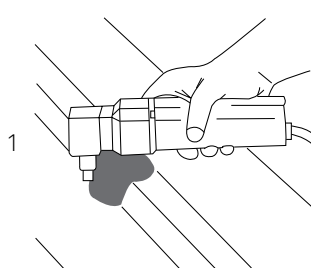
#### Typical SolarSpan® & InsulRoof® Penetrations

1. Sewerage Breather
2. Services for external lights
3. TV Antenna cabling

#### Penetration Fitment Detail

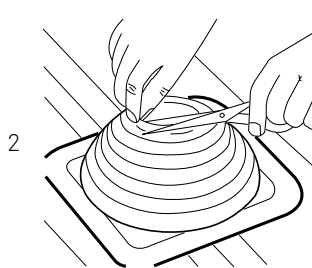


#### Flexible Flashing Fitment



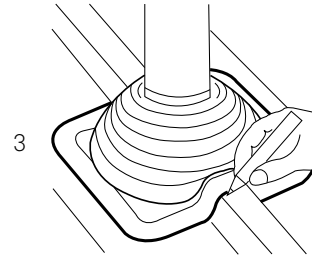
1

Prearrange the hole for the pipe. Muffs must always be placed on top of the profiled sheet top in order to permit the water flow.



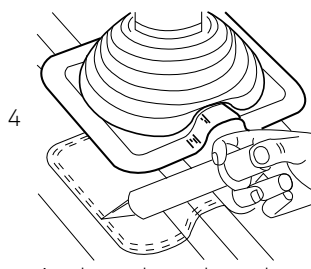
2

Adapt the muff to the pipe. Cut the opening so as to be at least 25mm smaller than the pipe diameter in order to overlap the pipe at least 20mm.



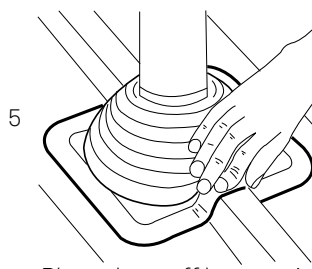
3

Fold up the muff on the pipe, eventually using white liquor (soap) adapt the muff to roof profile and mark out the contour.



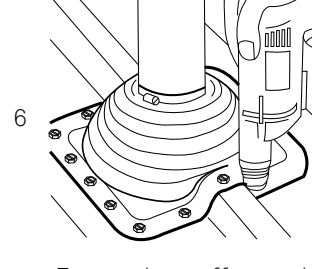
4

Apply sealant along the trace.



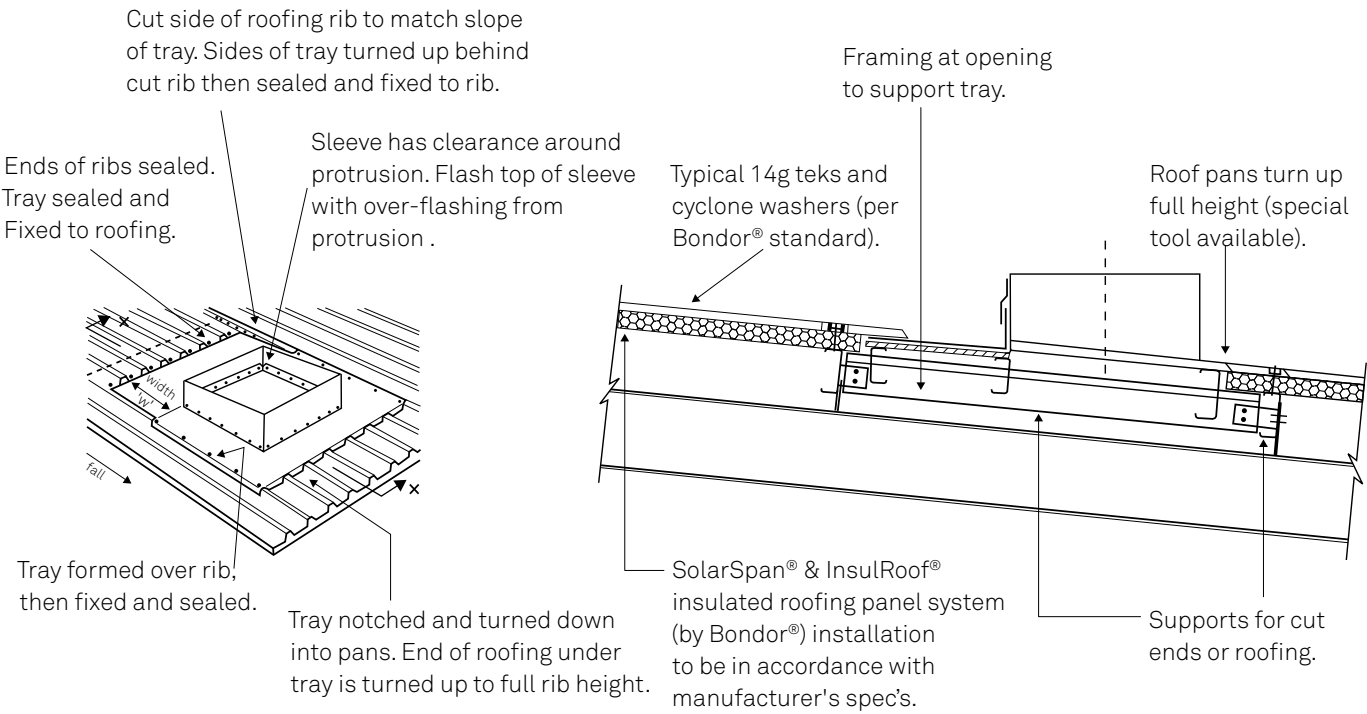
5

Place the muff by pressing it to the roof surface.



6

Fasten the muff on to the SolarSpan® & InsulRoof® external profiled sheet (distance between screws equal to 50mm); then install the collar.



## 6.0 Services

### 6.1 Electricals

The InsulLiving® system has been designed with careful consideration in providing many options for running electrical and data services around the home. Services can be run inside pre-routed service ducts within InsulWall® and SolarSpan® & InsulRoof® as well as along the shoulders of the specially designed top wall plates.

#### 6.1.1 InsulWall® Electrical Services

For installation efficiencies, designers should consider where possible using service duct every 1200mm inside InsulWall® panel joins. Alternatively, drilling holes through the InsulWall® polystyrene core is possible using an extended drill bit, as per electrical installation shown in the Top Wall Plate Fixing section of this manual.

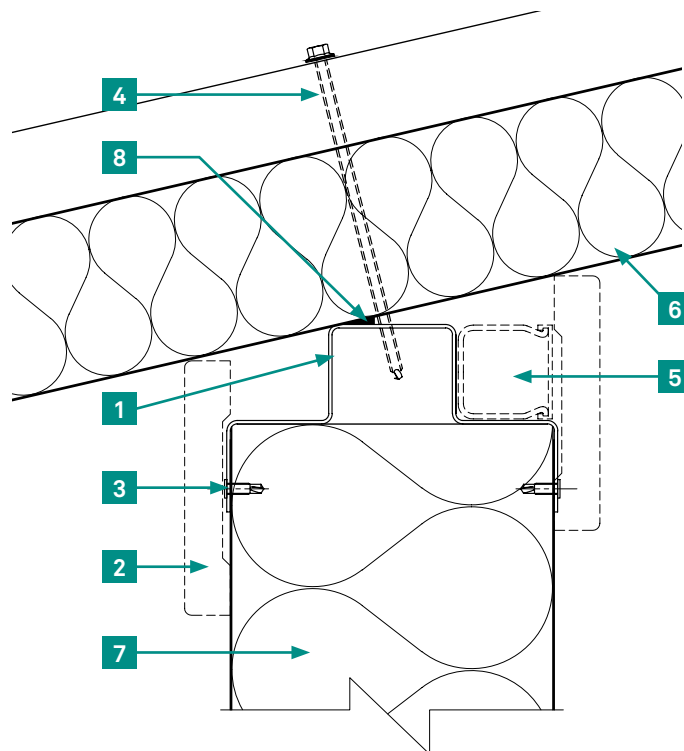
The top wall plates provide two shoulders 40x40mm wide to accommodate ducting and cabling around the internal/external top edge of the home. The shoulders are later concealed with cornice internally and trims externally.

##### Design Notes

Another method would be to install a removable cornice for easy access in the future.

#### Options for Electrical Services include:

- InsulWall® service ducts
- Above dropped ceilings or bulkheads
- Ducted skirting or cornice
- Under slab



- 1 - Stiffened Top Wall Plate
- 2 - Internal/External Cornice - typical
- 3 - Tek Screws at 150mm centres
- 4 - Roofing Screw with Washers
- 5 - Service ducting
- 6 - SolarSpan® & InsulRoof® Roof Panels
- 7 - Exterior 140mm InsulWall® Panels
- 8 - Polymeric Tape



#### Installation of electrical fittings

Mark the location of the penetration. Cut the skin and remove polystyrene foam. Drill a hole from the pre-routed service duct within the InsulWall® panel to the cut out and run the electrical services through. Install the electrical fitting.



##### Handy Tips

- Service boxes can be recessed into the InsulWall® panel as shown.



## 6.1.2 SolarSpan® & InsulRoof® Electrical Services

### SolarSpan® & InsulRoof® Rough-in-Lighting and Other Electrical services

SolarSpan® & InsulRoof® panels have a services duct (20mmx20mm) on the female (under lap) joining edge which accommodates a standard size conduit for electrical cables for ceiling lights and fans.

#### Step 1

Mark the entry location of the feed wires on the SolarSpan® & InsulRoof® panel ceiling.

#### Step 2

Mark the exit location of the feed wires for fan/light fittings on the SolarSpan® & InsulRoof® panel ceiling.

#### Step 3

Drill through the ceiling metal skin at the marked locations and remove the excess polystyrene.

#### Step 4

Drill and form a hole through the services duct to the exit and entry ceiling hole.

#### Step 5

Lift the SolarSpan® & InsulRoof® panel into position.

#### Step 6

Feed the conduit up from the wall panel into the entry hole on the SolarSpan® & InsulRoof® panel, along the services duct and out the exit hole.



#### Step 7

Complete the final screw off, fixing through the SolarSpan® & InsulRoof® panel ribs into the top wall plates or support beams. Installation of fixtures to SolarSpan® & InsulRoof® Panels (ceiling fans, smoke detectors, light fixtures, etc.) light fittings up to 10kg in total weight can be screwed to the SolarSpan® & InsulRoof® ceiling face with, 10g 16TPI screws. For heavier light fittings and fans (over 10kg total weight) refer to Bondor® Technical Services for project specific assistance.

### Installation of down lights

#### Step 1

Cut a hole in roof panel and remove the polystyrene foam.

#### Step 2

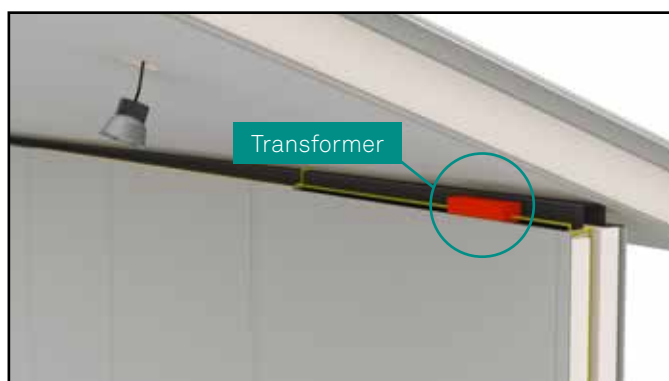
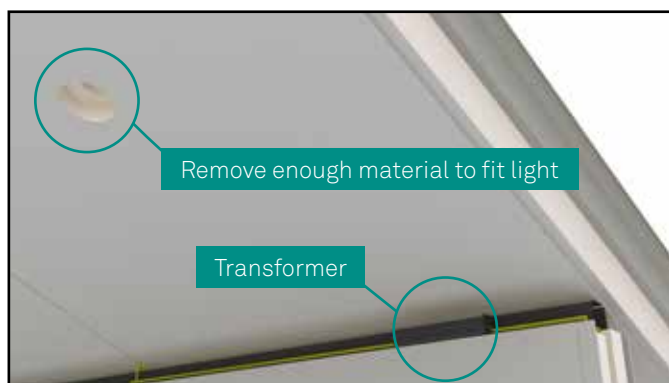
Install wiring and mount the transformer on the Stiffened Top Wall Plate.

#### Step 3

Connect wiring from transformer to down light. Wire to travel up channel in roof panel then drill horizontally through panel to reach light hole.

#### Handy Tips

- The transformer is shown attached to the Stiffened Top Wall Plate for cooling purposes, however it is possible to use smaller transformers that can conveniently fit inside the panel beside the down-light.
- The maximum allowable temperature of any electrical components installed within the panel is 80 degrees.



## 6.2 Plumbing

### Plumbing Services

Pressurised water services can be run along the top wall plate and down inside the panel service ducts or behind a false wall, battened out and fixed to the InsulWall® panel.

Waste water is run through the slab as standard with penetrations acceptable through the InsulWall® panel.

#### Typical InsulWall® Penetrations Include:

1. Taps/Hose cock
2. Bathroom Combinations/Fittings
3. Plumbing/Gas pipes

#### Options for Plumbing Services include:

- InsulWall® service ducts (60mm x 30mm every 1200mm)
- On walls battened out with furring channel / batten
- Above dropped ceilings or bulkheads
- Under slab

### 6.2.1 Plumbing within the panel

#### Step 1

Cut into the InsulWall® panel skin and remove a section of the panel core (normally a void max. 50mm deep is sufficient). Form a fixing back plate box from treated timber to act as solid surface for screwing down plumbing fittings and preventing movement of bathroom combinations.



#### Step 2

Prior to fixing a skin patch it is recommended that all voids be filled with a polyurethane foam filler. Once filled, use InsulWall® skin offcuts and fix using metal fixing screws Class 3 10-16x16 flat head.



### 6.2.2 Plumbing behind false wall

#### Step 1

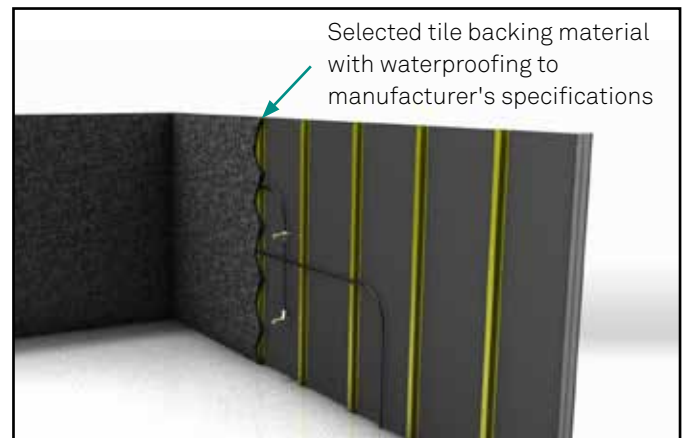
Fix plumbing to the InsulWall® panel skin

#### Step 2

Install battens/Furring channels to wall, cut to accommodate plumbing.

#### Step 3

Install wall sheeting according to manufacturer's recommendations.



## 7.0 Door & Window Frames

### Handy Tips

- Openings can be pre-cut on the ground prior to InsulWall® panel erection.

### Window and Door Frames

For ease of installation and a modern finish we recommend the InsulLiving® window/sliding door frame system which can incorporate a thermal break. This framing system will accommodate standard sliding windows, double hung windows, louvre windows, timber framed windows or sliding doors and can be rendered or painted (assembly is required).

### InsulLiving® Frame System Installation

The InsulLiving® window/sliding door frame is made up of the following components:-

- External Frame Section
- Internal Frame Section
- Frame Corner Inserts
- The fitting of the frame will also require the fitment of receiver channel internally around the opening (all 4 sides for windows and 3 sides for sliding doors)

### Step 1

Cut a 50mm slot into the polystyrene to accommodate the legs of the receiver channel and fit the receiver channel.

### Step 2

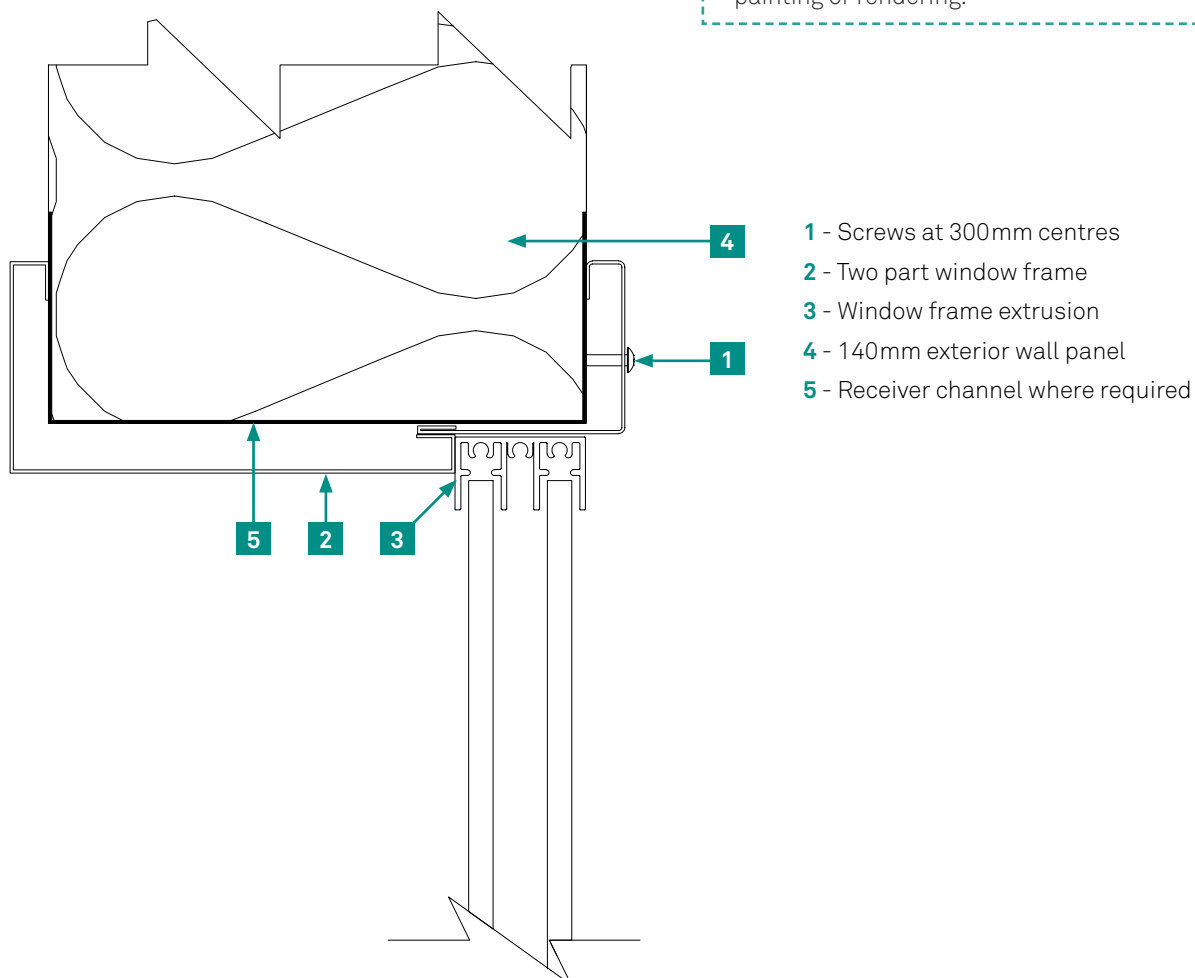
Measure and cut the external frame with mitred corners. Assemble the external frame using the frame corner inserts. Place the frame into the opening and fit the window into the frame. Check that the external frame is the correct size and square. Fix the frame through the recessed holes with Class 3 10-16x16 stitching screws, to the InsulWall® outer skin.

### Step 3

Measure and cut the internal frame with mitred corners, fit and screw through the recessed holes with Class 3 10-16x16 stitching screws, to the InsulWall® inner skin.

### Handy Tips

- The window can be easily removed for preparation of painting or rendering.



## Door Frames

One flexible door frame option is the preformed Ezyjamb® door frame system which comes with perforated sides for flush jointing or fixing an architrave.

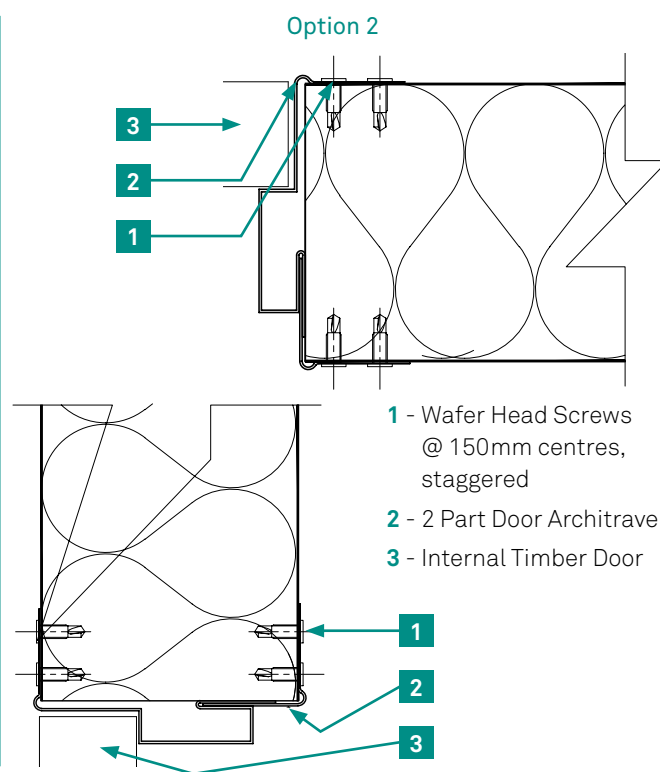
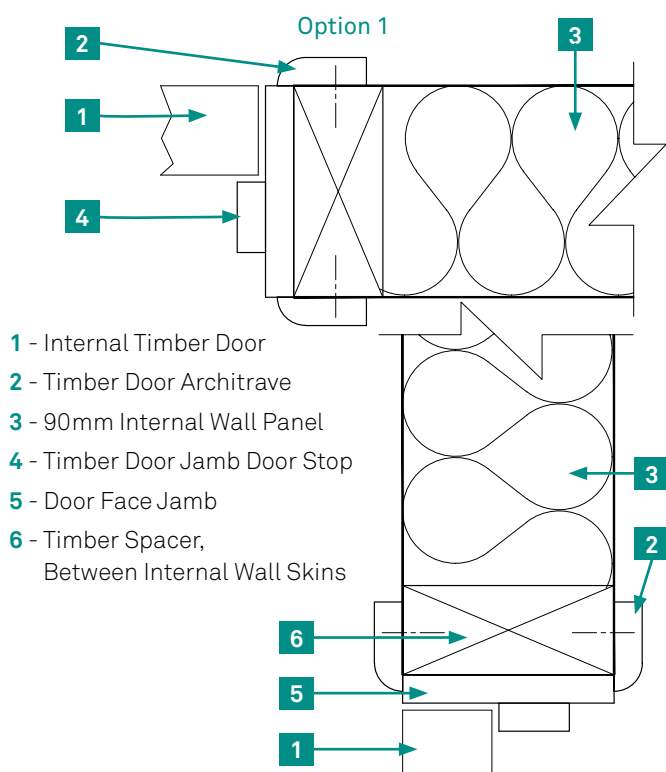
Alternatively, door jambs can be fixed to timber fixing blocks inserted around the perimeter of the opening at approximately 300mm centres.

Architraves can be fastened to the wall using a nail gun and then using the appropriate metal fixing screws i.e. Bremick 6-20x50 Countersunk Head Ext Point (Zinc Yellow).



### Handy Tips

- It is a good idea to put a bead of liquid nails to the back of the architrave before fixing for additional adhesion.



## 8.0 Finishes

A benefit of InsulWall® is the fact that the edges of the wall panels are recessed on both faces so that they can be taped and flush jointed in a similar fashion to plasterboard and fibre cement.

This allows the panel to be used as a flush internal and external lining in one operation saving significantly on additional cladding options. The InsulWall® metal skin has a finish that allows direct rendering externally and plastering and painting internally.

### Handy Tips

- The tried and tested products and methods are the Dulux products mentioned in the following pages.
- Refer to Bondor® in your state or territory for an introduction to the Dulux expert for added assistance.

## 8.1 Interior

### 8.1.1 Dulux Specification Sheet (Interior)

#### Handy Tips

- For best results, follow the Dulux DuSpec specification sheet below.
- InsulWall® panels are not as absorbent as plasterboard so may take longer to dry.

#### DuSpec Specification Sheet (Interior)

DULUX Wash & Wear 101 Advanced L/G for broad wall &  
DULUX Wash & Wear Kitchen & Bathroom L/G for Wet Areas to  
Bondor InsulLiving Panel



#### Substrate:

InsulWall® by Bondor® is a composite sandwich panel with factory laminated pre primer steel facing sheets. The panel system is designed for wall cladding, incorporating a tongue and groove, recessed edge jointing detail ready for flush jointing and finishing. Bondor® Texture Panel is supplied with a corrosion inhibiting surface treatment/coating ready for painting. The panel should be in accordance with the design engineer's specification and consider the clear span of the panel, applied loads, fire rating requirements, and deflection limits.

#### Substrate Preparation:

Building /Frame detail and sheet fixing must comply with relevant building codes and be in strict accordance with substrate manufactures recommendations. All preparation and painting must conform to AS2311: The Painting of Buildings. Dulux recommends suitable expansion / contraction relief joints at natural building weak points eg in line with openings (window / doors), at all horizontal multi-levels, and at all interfaces of different building construction materials. Sheet alignment is critical in all cladding systems and specific attention must be given to control of framing and/or sheeting alignment relative to the cladding system.

**All fixings must be non-corrosive, suitable for the exposure condition and be in accordance with substrate supplier recommendations.** Remove all surface contaminants such as oil, grease or dirt by washing with and alkaline detergent and rinse thoroughly with fresh potable water. Repeat until the surface is clean. Ensure the substrate is completely dry before applying any coatings system.

#### Coating System:

| Interior Bondor InsulLiving Panel System                                                                                                                                                                                                                                                                     |  | Data Sheet           | Wet Film Thickness (microns) | Dry Film Thickness (microns)  | Theoretical Spread Rate (m2 per L) | Recoat ** |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|----------------------|------------------------------|-------------------------------|------------------------------------|-----------|
| <b>RECESSED JOINTS</b><br>Premixed Multi Purpose Flushing Compound<br>Fill joint, embed 50mm mesh then flush joint, taking care not to fill past recess edges.<br>Sand when dry                                                                                                                              |  |                      |                              | Refer Manufacture Instruction |                                    |           |
| <b>PRIMER</b><br>DULUX Precoat All Metal Primer(Water Based)<br>Spray – Conventional or HVLP, brush nap roller                                                                                                                                                                                               |  | AUDD01891            | 68                           | 25                            | 14.8                               | 2 hours   |
| <b>Undercoat</b><br>Optional for best finish and max. protection<br>DULUX Professional Total Prep<br>Spray – Conventional or HVLP, brush nap roller                                                                                                                                                          |  | AUDD1169             | 71                           | 29                            | 14.1                               | 2 Hours   |
| <b>Dulux Wash &amp; Wear (1st coat)</b><br>Dulux Wash & Wear 101 Advanced Low Sheen<br>OR<br>Wash & Wear Kitchen & Bathroom Low Sheen (Wet Areas)<br>Spray – Conventional or HVLP, Airless, brush nap roller                                                                                                 |  | AUDA0432<br>AUDD1516 | 63<br>64                     | 24<br>24                      | 15.8<br>15.7                       | 2 hours   |
| <b>Dulux Wash &amp; Wear (2nd coat)</b><br>Dulux Wash & Wear 101 Advanced Low Sheen<br>OR<br>Wash & Wear Kitchen & Bathroom Low Sheen (Wet Areas)<br>Spray – Conventional or HVLP, Airless, brush nap roller<br>(Some colours may require more than the recommended number of coats to achieve full opacity) |  | AUDA0432<br>AUDD1516 | 63<br>64                     | 24<br>24                      | 15.8<br>15.7                       |           |
| *Practical Spreading Rate will vary from quoted Theoretical Spreading Rate due to factors such as method and condition of application and surface roughness.                                                                                                                                                 |  |                      |                              |                               |                                    |           |
| **. Recoat times are quoted for 25°C and 50% Relative Humidity, these may vary under different conditions.                                                                                                                                                                                                   |  |                      |                              |                               |                                    |           |

#### Important Notes:

Coatings should be applied in full accordance with relative product Technical and Applicational data sheets. This specification is provided as requested based on trials conducted by Bondor on the nominated system and confirmed by Bondor as suitable. Dulux accepts no liability for joint cracking or joint deformation, as control of structural movement is beyond the scope of a coating specification.

This specification assumes the zinc coated and specialised factory applied pre-treatment provides adequate corrosion protection. The specified coating / flushing system does not provided corrosion resistance, and attention must be given to ensuring the factory installed corrosion inhibiting system is not damaged through installation.

Do not apply paint if Relative Humidity is above 85% or temperature is within 3°C of Dew Point, or the surface temperature is greater than 50°C or below 10°C, or likely to fall below 10°C during the drying period.

Although the film is dry to touch in 30 minutes allow 7 days for film to fully cure before washing.

|            |             |            |                                              |             |                 |
|------------|-------------|------------|----------------------------------------------|-------------|-----------------|
| Project    |             | Duspec     | DULUX 101 Interior Bondor InsulLiving System |             |                 |
| Project ID | Principle   | Duspec no. |                                              | Page no.    | 1               |
| Issue      | Prepared By | Issue      | 5                                            | Prepared By | Shane Langkilde |
| Date       | Approved By | Date       | 23/04/2014                                   | Approved By |                 |

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This specification should be read in conjunction with the Product Datasheets specified within this document. Printed documents are current as at the document issue date. Dulux reserves the right to update or modify at any time it is the responsibility of those using this information to check that it is current prior to specifying or using any of these coating systems.

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### 8.1.2 Waterproofing & Tiling

Most waterproofing systems including polyurethane or acrylic are suitable for InsulWall® panels. Water proof all wet areas to be tiled.



Tiles can be applied to all wall surfaces as for conventional construction provided the walls have been water proofed and cured.



### 8.1.3 Internal Fit-out

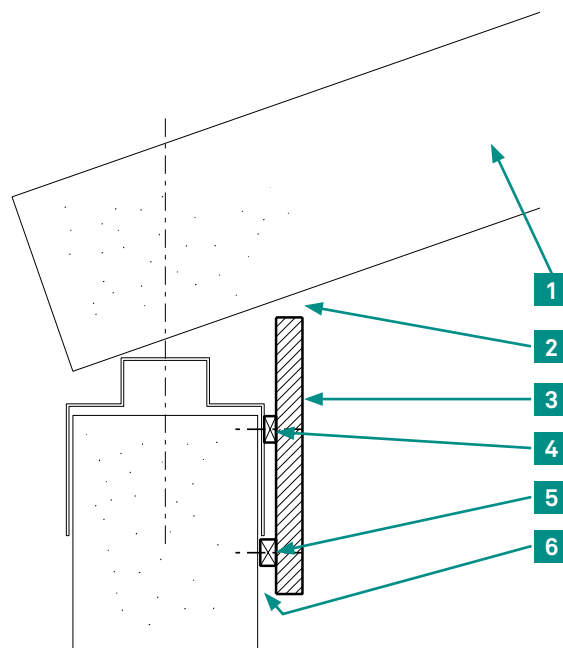
An internal fit out of the InsulLiving® home is comparable to conventional fit outs with a number of exceptions:

#### Cornices

SolarSpan® & InsulRoof® is a composite roofing material where thermal bowing contributes to movement of the ceiling lining. Therefore, square setting or plaster cornice fixed to both walls and ceiling is not recommended. Since the cornice must be fixed to the wall only, it is preferable to use a cornice with a shadow line effect. Consider using a cornice configuration with a removable capped screw to provide future access to electrical services that are run along the top wall plate.

#### See the example fitting method:

- 1 - Roof Panel
- 2 - 20mm Shadow Gap
- 3 - 20mm MDF Panel Angle Cut to Fit Ceiling Rake
- 4 - Screw Fix with 6mm MDF Batten
- 5 - Screw Fix with 9mm MDF Batten
- 6 - 10mm Shadow Gap



#### Skirtings

Skirtings are fixed as you would the architraves i.e. with nails, glue and screws. A small rebate should be formed at the back of the skirting to accommodate the thickness of the base channel i.e. 2-3mm.

#### Internal Fixtures and Fittings

With any fit out there will be a requirement to install fixtures such as cupboards and various types of rails and holders. Using 10g 16TPI x required length screws, fix through the back of the cupboards directly into the metal skin of the panels.

#### Handy Tips

- Refer to latest copy of InsulLiving® Technical Manual for fixing methods and weight capacities.

## 8.2 Exterior

### 8.2.1 Dulux Specification Sheet (Exterior)

#### Handy Tips

- For best results, follow the Dulux DuSpec specification sheet below.

#### DuSpec Specification Sheet (Exterior)

DULUX AcraTex 951 Coventry Coarse / 955 AcraShield:  
for Bondor Insulwall Panel.



#### Substrate:

InsulWall® by Bondor® is a composite sandwich panel with factory laminated pre primer steel facing sheets. The panel system is designed for wall cladding, incorporating a tongue and groove, recessed edge jointing detail ready for flush jointing and finishing. Bondor® Texture Panel is supplied with a corrosion inhibiting surface treatment/coating ready for painting. The panel should be in accordance with the design engineer's specification and consider the clear span of the panel, applied loads, fire rating requirements, and deflection limits.

#### Substrate Preparation:

Building detail and sheet fixing must comply with relevant building codes and be in strict accordance with substrate manufactures recommendations.

Dulux AcraTex recommends suitable expansion / contraction relief joints at natural building weak points eg in line with openings (window / doors), at all horizontal multi-levels, and at all interfaces of different building construction materials.

Sheet alignment is critical in all cladding systems and specific attention must be given to control of framing and/or sheeting alignment relative to the cladding system.

**All fixings must be non-corrosive, suitable for the exposure condition and be in accordance with substrate supplier recommendations.**

Remove all surface contaminants such as oil, grease or dirt by washing with an alkaline detergent and rinse thoroughly with fresh potable water. Repeat until the surface is clean. Ensure the substrate is completely dry before applying any coatings system.

This coating recommendation does not constitute Dulux endorsement of this/any walling or cladding system or the suitability of building envelope / building system to meet the specific requirements of a given project.

Users of this recommendation will satisfy themselves of the suitability of this substrate /coating guide / advice, relevant to their specific project long term requirements. In all cases Building System Design must conform to relevant Local / Building Codes or regulations and be in accordance with substrate supplier's recommendations.

Users must make their own determinations as to the suitability of this building system/ material relevant to their specific requirements.

#### Expansion Joints:

CJ's are best treated before the top coat is applied. The use of a PU - Poly Urethane 'paintable' Sealant incorporating backing rod in strict accordance with the manufacturer recommendation for should be used in all cases. Select a colour that is complimentary to the final Texture colour. Apply Sealant on completion of the panel installation to ensure adequate curing.

#### Priming & Jointing System:

| Dulux Exterior Coating System Insulwall -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Data Sheet                                               | Application Rate                                                         | Recoat **                                                                                                     |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|--------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|
| <b>PRIMER</b><br>DULUX MetalShield Etch Primer<br><i>Spray – Conventional or HVLP</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | LI009                                                    | 16                                                                       | 1 hour                                                                                                        |
| <b>Panel Joint Recess</b><br><b>DULUX Acratex – AcraPatch Course L/SHade 194-20806</b><br>Using a power mixer mix AcraPatch Course with 10% Portland Cement and apply to<br><b>Immediately install 50mm Acratex Reinforcing mesh into wet AcraPatch followed by further AcraPatch to fill recess.</b><br><b>Application of AcraPatch should be 'wet on wet' to insure maximum integrity of the joint.</b><br><b>In Hot and windy conditions, where the edge of the patching may be difficult to feather edge, a wet brush or damp sponge float can be used to aid in feathering this product.</b><br><b>Optional coating to further improve joint masking.</b><br><b>DULUX Acratex – AcraPatch Fine L/SHade 194-20806</b><br>Using a power mixer mix AcraPatch Fine with 10% Portland Cement and apply by trowel or spatula knife across joints to a smooth finish (sand as required). | AUDA2925<br><br><br><br><br><br><br><br><br><br>AUDA0440 | 1.0 m2 per Litre<br><br><br><br><br><br><br><br><br><br>0.4 m2 per Litre | 24 Hours<br><br><br><br><br><br><br><br><br><br>24 Hours<br><br>Protect from rain and frost in first 48 hours |

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The data provided within the DuSpec system is correct at the time of publication, however it is the responsibility of those using this information to check that it is current prior to specifying or using any of these coating systems.

This specification should be read in conjunction with the Product Datasheets specified within this document.

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# DuSpec Specification Sheet (Exterior)

DULUX AcraTex 951 Coventry Coarse / 955 AcraShield:  
for Bondor Insulwall Panel.

## Texture & Topcoat System:

| Dulux Exterior Coating System Insulwall -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Data Sheet | Application Rate        | Recoat **                                                         |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-------------------------|-------------------------------------------------------------------|
| <b>BASE COAT</b><br><b>DULUX Acratex – FastCoat L/Shade 194-85640</b><br>Ensure that all imperfections are filled, work away from the sun (in shaded areas). Apply with Hawk & Trowel evenly over surface to the thickness of the largest particles. Follow up with a light 'floating' process to level out the product using a polystyrene float or red plastic trowel.<br><br>For Fine textured finish and to overcome MINOR surface panel misalignment a second application of Fastcoat may be required<br><b>MAJOR panel misalignment refer Dulux Acratex Technical Department</b> | AUDA0480   | 0.75 m2 per Litre       | 24 Hours<br>Protect from rain and frost in first 24 hours         |
| <b>TEXTURE COAT</b><br><b>DULUX Acratex – Coventry Coarse L/Shade 194-85753</b><br><b>NB Coventry Coarse colour must have a LRV greater than 35%</b><br>Apply with Hawk & Trowel evenly over surface to the thickness of the largest particles. Follow up with a light 'floating' process to level out the product using red plastic trowel/float.<br><br>Ensure express joints are not filled with texture.                                                                                                                                                                           | AUDA1065   | 0.8 m2 per Litre        | Recoat after 16hrs<br>Protect from frost & rain in first 24 hours |
| <b>Top Coat AcraShield Matt HB L/Shade 194-X0101 (PTB)</b><br><b>NB AcraShield colour must have a LRV greater than 35%</b><br>Apply with a 12mm nap roller over the surface ensuring a wet edge is maintained over the application area.<br>Dilute the first coat with 10% water.                                                                                                                                                                                                                                                                                                      | AUDA0432   | 5 m2 per Litre per Coat | 4 Hours<br>Protect from rain and frost in first 16 hours          |
| <b>Top Coat AcraShield Matt HB L/Shade 194-X101 (PTB)</b><br><b>NB AcraShield colour must have a LRV greater than 35%</b><br>Apply with a 12mm nap roller over the surface ensuring a wet edge is maintained over the application area.<br><br>Ensure adequate batch tint lots to achieve coverage over single elevations to ensure colour consistency.<br>It is recommended to hold a volume of finish material for future maintenance touch-ups.                                                                                                                                     | AUDA0432   | 5 m2 per Litre per Coat | 4 Hours<br>Protect from rain and frost in first 16 hours          |

## Important Notes

Practical spreading rates will vary from quoted theoretical figures depending on substrate porosity, surface roughness, overspray losses, application methods and environmental conditions (e.g. wind).

All preparation and painting must conform to AS2311: The Painting of Buildings.

Do not apply paint if Relative Humidity is above 85% or temperature is within 3°C of Dew Point. Do not apply if the surface temperature is greater than 40°C or below 10°C, or likely to fall below 10°C during the application or drying period.

Dry times apply to a single coat at recommended spread rate and at 25°C and 50% Relative Humidity.

Allow longer times under cool, moist, or still conditions and or when applied at high film builds.

Protect from dew, rain and frost for 48 hours when apply at the recommended spread rate.

Avoid application in hot, windy conditions or on hot surfaces cool the surface by hosing with water and paint the cool damp surface.

When using Bright Reds, Oranges, Blues and Yellows or where very light colours are applied over highly contrasting colours an extra coat maybe required.

Application techniques should be adjusted to achieve the recommended DFT and finishing standard.

To avoid "Picture Framing" of texture topcoats "wet on wet"

cutting in & coating technique is recommended or apply multiple coats thinning the first coat.

At Commencement of coating system application to the substrate it shall be deemed that the Applicator has certified that the surface which it is to be applied to is fit to receive the specified coating(s) system.

When the Applicator is preparing the site sample for approval he should advise the Project Superintendent if the substrate condition is not of sufficient standard to produce the specified finish.

Avoid dark colours - these will give rise to much higher surface temperature that may cause addition thermal stress and cooling demand to the building envelope and/ or require extra engineering considerations (greater building costs).

Use colours with a LRV greater than 35% Consult Dulux® on the potential to use InfraCOOL Heat Reflective Coatings that will keep the surface cooler “like for like” colour.

The coastal area is considered a marine environment and as such salt potentially can shorten the life of the coating systems. Care needs to be taken to wash down all areas twice. Once to remove surface contaminants, and raise salts to the surface and then secondly to remove these salts. Due to the locality, Weather conditions and lag time between applications of the coating system it may require the need to wash again, between coats.

This specification is to be read in conjunction with DULUX® product data sheets.

A DULUX® warranty can be provided on request, when the full AcraTex system is applied by a DULUX® AcraTex® trained applicator, according to specification, & at the specified spreading rates, & to the surface preparation details described in the DULUX® AcraTex® Specification Manual.

The dynamics of the substrate is outside the control of Dulux® Australia and as such joint deformation or cracking is excluded from warranty terms. Refer warranty document for full terms and conditions.

Glancing light Joints and panel deformation may be clearly evident under glancing light, casting visible shadows of the minute and uneven projections of the joints. Glancing light is light that is nearly parallel to the surface of the wall and casts visible shadows and uneven projections of the joints. Just like rendered masonry/ Jointed system any uneven projections will be highlighted and as such are outside the control / scope of this specification.

When using this specification, the Applicator shall maintain records in accordance with AS 3894 Parts 10, 11 and 12 and others as required by the Project Manager. These records shall be made available for inspection at any time by the Project Manager or authorised representative and submitted to the Principal Contractor upon completion of work.

## 8.2.2 External Fixtures

External fixtures such as power meter boxes, hose reels and gas hot water units can be screw fixed to the external skin of the InsulWall® panel. Ensure that all fixings are sealed with a suitable silicone sealant.

### Handy Tips

- Refer to latest copy of InsulLiving® Technical Manual for fixing methods and weight capacities.

## 9.0 Maintenance

### Dents and Scratches

InsulWall's two steel skins provide more resilience against bumps than other products. For minor dents and scratches InsulWall® panel can be patched using automotive body filler, builders bog or similar. Apply with trowel or spatula and when dry, sand to a smooth finish. Apply skim coat and render externally or paint internally.

Before patching make sure all exposed metal is primed with Dulux Quilt Rust All Metal (water based) refer to Dulux DuSpec Exterior.

### Coastal Regions

Panels which are exposed to salt air i.e. coastal regions should be periodically cleaned and washed down to minimize the effect of corrosion forming. This would apply to exposed skins of the panel e.g. soffit overhangs which have not been treated or painted.

### Handy Tips

- Regular visual inspection (max 6 monthly) of all external surfaces would be advised in coastal regions.



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