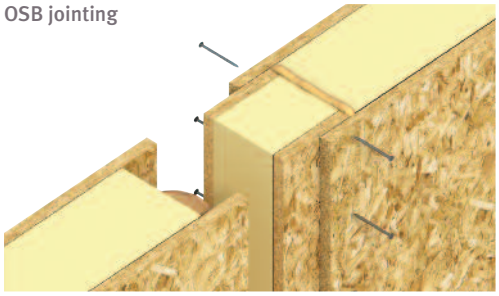
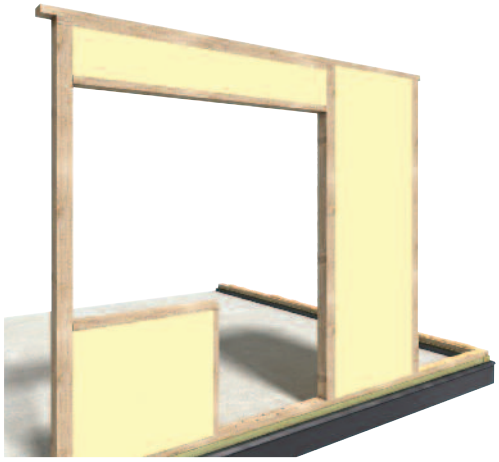
House extension installation guide

Guardian house extension at a glance

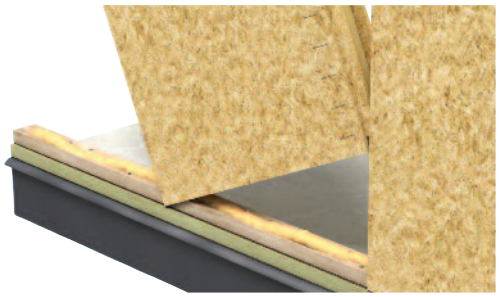
Guardian offer a unique opportunity to provide an affordable high-performance house extension in a complete package from a single source.

OSB jointing

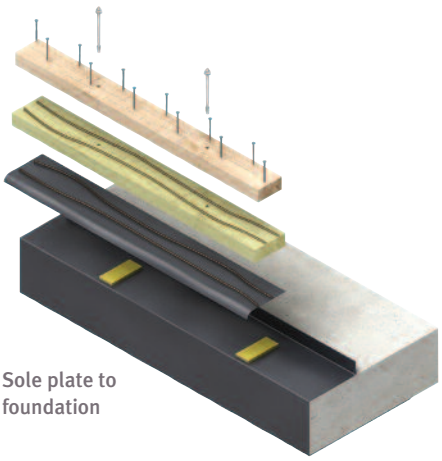




Window / door openings



Erection of first wall

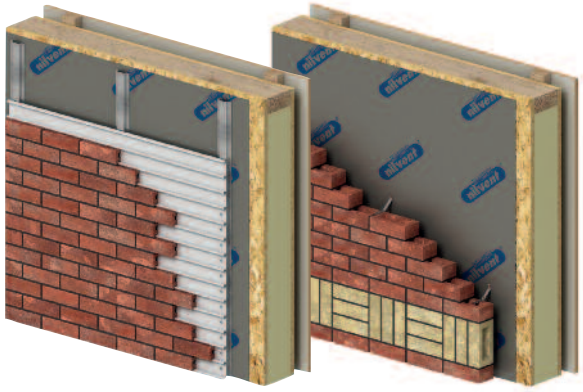


Sole plate to foundation

External finish options available to suit existing structure

Brick slip

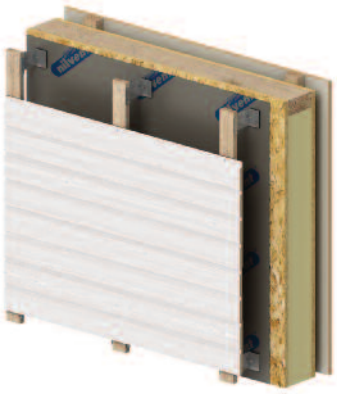
Brick



Stone

Render

Timber



Other finishes available on request.

Guardian

Stage 1 – Wall Installation

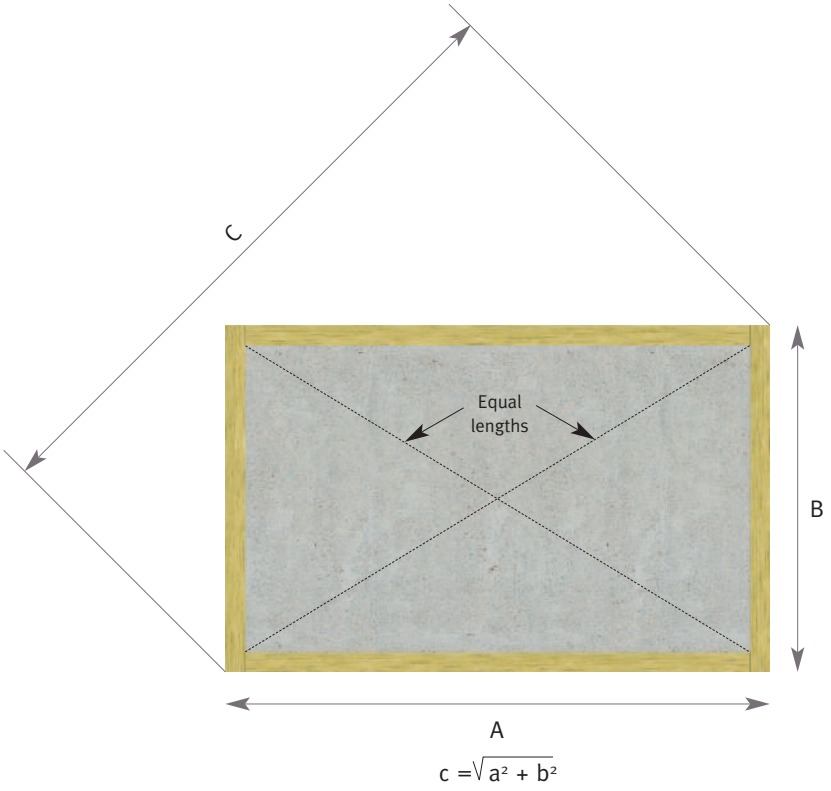
Foundation assessment

It is extremely important that you provide an accurate, level and square platform on which to erect the Guardian extension.

Ensure the soleplate of the building exactly matches the dimensions of the extension, and that all corners are square.

Foundation width and length should be within 5 mm of the dimensions called for in the foundation plans. Check the diagonal as shown in the diagram below. Pairs of diagonal measurements should be within 5 mm.

The top level of the slab shall also not vary from the design by more than ± 5 mm. Slight variations in foundation dimensions can be dealt with when setting the soleplate, but variations outside of these tolerances will make panel erection significantly more difficult. If the diagonals do not match exactly, some adjustment can be made when setting the soleplates. If the diagonal measurements are not given on the foundation or first floor plan, they can be calculated by using the formula $c = \sqrt{a^2 + b^2}$ as shown below.



Checking Foundation Square

The base or foundation should be swept and cleaned of all material and debris before starting erection of the extension.

Combination soleplate installation

Preparation of Combination Soleplate

The combination soleplate (see Figure 1) comprises a damp proof course (DPC) below a 40 mm x 140 mm treated timber soleplate below a 50 mm x 110 mm timber bottomplate. The complete unit is then fixed to the foundation or substructures.

Caution: Timber soleplates must be treated.

First, connect the soleplate to the bottomplate in accordance with the fixing method (figure 1), ensuring that two beads of silicone sealant are applied between the two elements prior to fixing.

Hint: Use a scrap of 15 mm wood as a gauge when you position the bottomplates.

Then, apply two beads of silicone sealant to the topside of the DPC to create a seal between it and the treated timber soleplate. The DPC should then be fixed to the underside of the treated timber soleplate, flush to the inside edge, using two rows of staples at 100 mm centres (rows should be staggered).

Positioning and Fixing Combination Soleplate

Accurately mark out all internal and external wall positions using a tape and chalk line. Using a Surveyors Level or laser, proceed to level the soleplate by taking levels at 1 m intervals along the lines of the walls in order to find the highest point. Using the level of the highest point as a datum, raise the treated timber soleplate at all other locations using shims to match this level. All points should be shimmed to within +/– 1 mm. Colour coded shimming strips are available in various sizes from 2 mm to 6 mm as detailed in the table below.

Shim thickness	Shim Colour
2 mm	Purple
3 mm	Green
4 mm	Yellow
5 mm	Blue
6 mm	Black

Position and fix the combination soleplate over the shims (DPC facing down) in accordance with the structural calculations and appropriate Guardian Building System standard details. Where posts or columns bear directly onto the slab these should be located using steel shims only (not plastic).

To seal against air infiltration under the soleplate, point the gap between the DPC and the base with a non-shrink cementitious mortar as shown below.

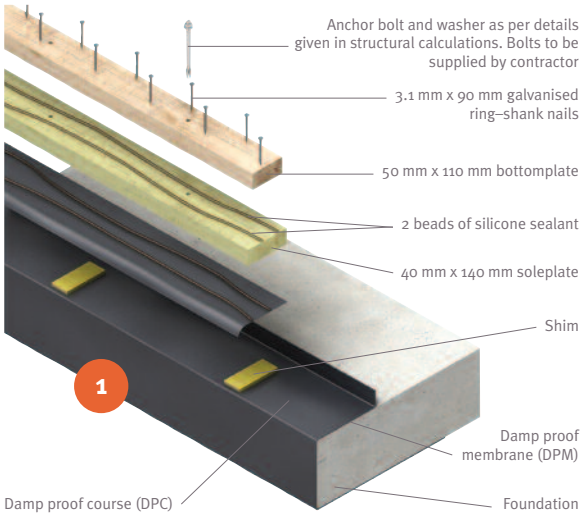


Figure 1: Preparation of Combination Soleplate

Wall assembly – panel by panel

General

It is assumed that the Guardian Building System registered contractor has made sufficient provision for all temporary works necessary to assemble the project safely and that they have prepared method statements to address difficult stages of work as appropriate. It is similarly assumed that scaffolding and safe working platforms will be constructed as the project proceeds to ensure a safe working environment at all times.

Handling Panels

Guardian Building System wall panels should preferably be lifted and manoeuvred in accordance with the contractors method statement, preferably using appropriate mechanical lifting equipment.

Sorting of Wall Components

The first wall should be started at the external corner furthest away from the main stack of Guardian Building System wall panels. The first wall panel to be erected should be the overlapping corner panel. Identify the required components for the first wall and place them near to the wall being erected.

Preparation of The First Panel

All routs should be brushed clean of any debris and checked for proper forming and depth.

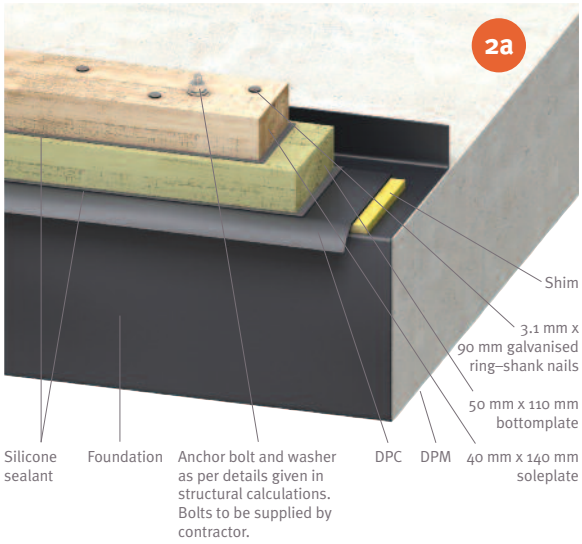


Figure 2: Installation of Combination Soleplate

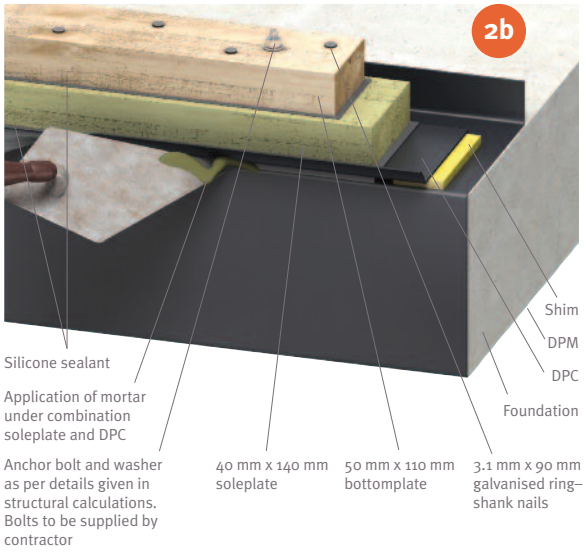


Figure 3: Application of Mortar Under Combination Soleplate

Erection of The First Wall Panel

Hint: Using site plans as a guide, mark out wall panel joints on the combination soleplate before erecting the first wall panel. If wall panels joints are not in line with the markings on the combination soleplate, corrective action should be taken immediately.

Apply a bead of expanding urethane sealant onto the bottomplate to ensure that an airtight joint is achieved. Manoeuvre the Guardian wall panel into position. Push it right down so that it is in full contact with the top face of the soleplate. The end timber within the wall panel must be perfectly flush with the outer edges of the corner.

HINT: Do not nail any Guardian Building System wall panels into the bottomplate until the roof is on the house, this will allow the walls to settle onto the soleplate giving the panel a more even load distribution.

Check that the wall panel is both level and vertical prior to installing a diagonal brace that will temporarily secure the wall panel in its correct position. This can be done using 50 mm x 100 mm timbers or proprietary wall braces.

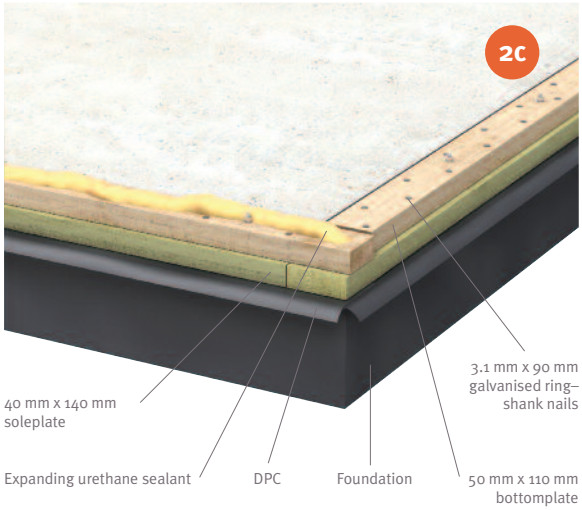


Figure 4: Combination Soleplates Ready to Receive Wall Panel

Existing wall to extension connectivity

Figure 5: Consideration on how level the wall is as levelling would be required and the measures to be taken to level the edge timber ready for the Guardian wall panel. Consideration on installing a soleplate timber up the wall to help in these very uneven situations. Existing wall should be pre-levelled out in an appropriate way using shims/levelling mortar/grout fit for purpose. Secure a vertical dpc (placed on the back of a vertical treated plate) to the existing wall. Fix Guardian side plate to wall using fixings (fixings would be dependant on substraight and would need to be confirmed with fixing manufacturer).

Figure 6: Install Guardian wall panel starting at the existing wall.

Figure 7: Silicone seal both sides of the Guardian wall panel to wall junction.

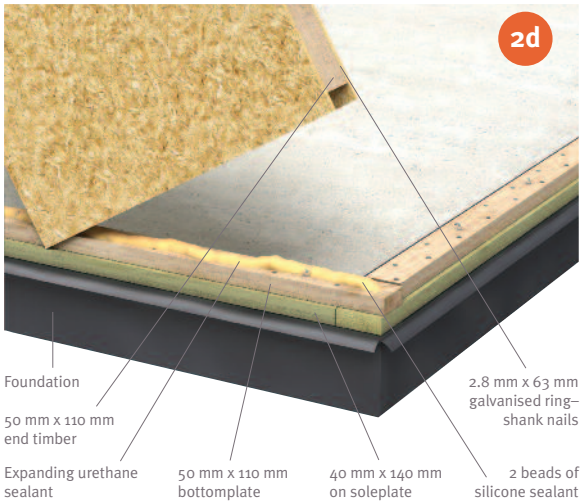


Figure 8: Erection of First Wall Panel

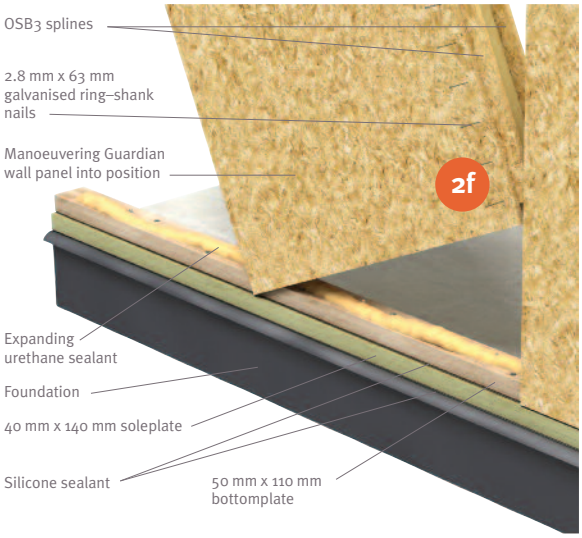


Figure 10: Wall Panel Joints > 300 mm from Joints in Bottomplates

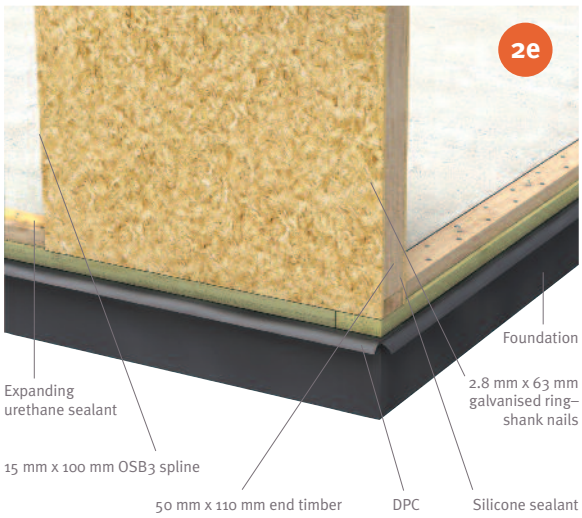


Figure 9: Fixing First Wall Panel

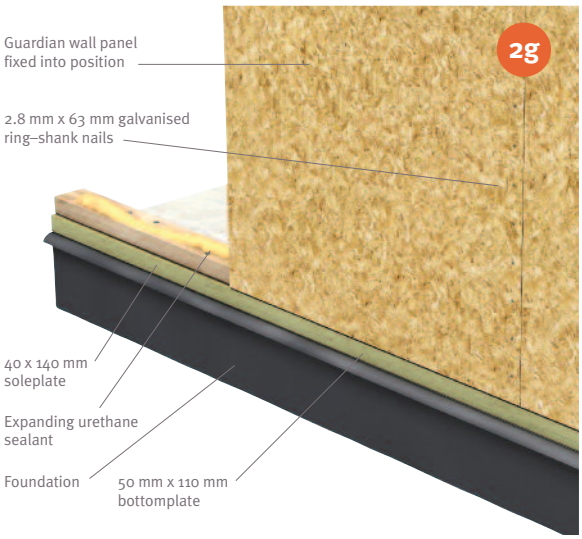


Figure 11: Wall Panel Joints > 300 mm from Joints in Bottomplates

Erecting Subsequent Wall Panels Along the First Wall

Prepare subsequent Guardian Building System wall panels by fixing OSB3 splines. Apply expanding urethane sealant onto the bottomplate and into the central vertical routed channel(s) of the previously erected panel to ensure an airtight seal is achieved.

Manoeuvre the wall panel into position so that the timber post or OSB3 spline is ready to engage the previously erected wall panel as illustrated in Figure 6 below. Firmly push the wall panel into place ensuring that all edges are tightly abutted. Where joints need tightening to ensure edges are tightly abutted use ratchet straps.

Caution: Ensure butt joints in the bottomplate are a minimum of 300 mm away from the Guardian Building System wall panel joint.

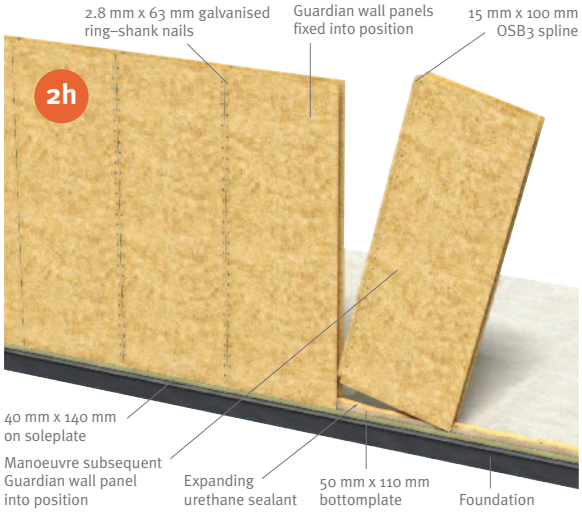


Figure 12: Erection of Subsequent Wall Panels

With the wall panel in position, fix the remaining fasteners along the joints.

The final wall panel within the wall should be fitted with an end timber, which should be fixed to allow correct corner assembly.

Again, the end timber within the wall panel must be perfectly flush with the outer edges of the corner.

HINT: A temporary raking wall brace should always be placed within 200 mm of junctions between interior wall and exterior walls to ensure that this load bearing connection can be properly formed.

Figures 13 and 14 below illustrate the two standard wall panel jointing methods.

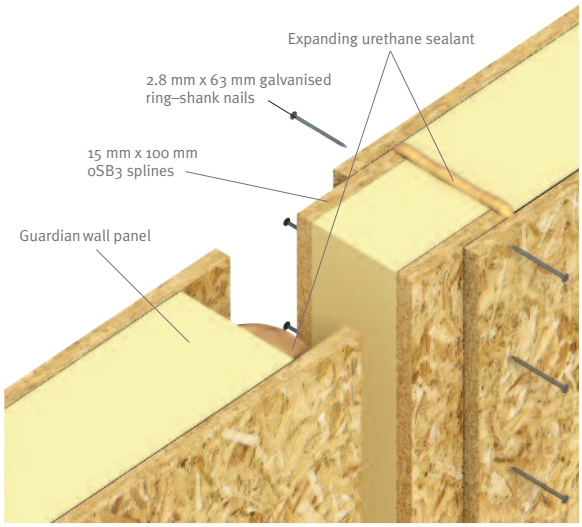


Figure 13: OSB3 Spline Joint

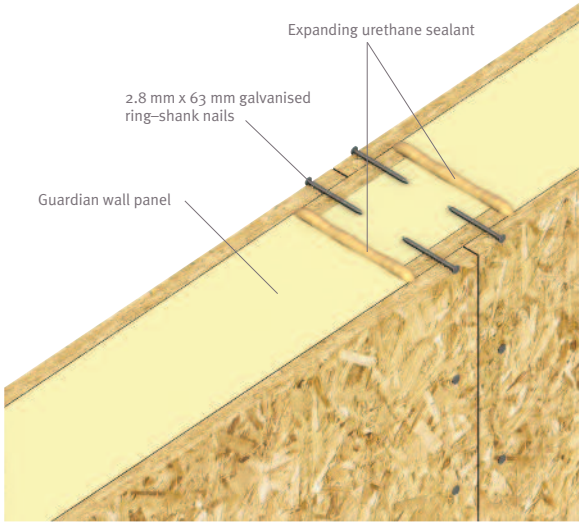


Figure 14: Fixed OSB3 Spline Joint

Erecting Subsequent Walls

The corner joint should first be sealed with two beads of silicone sealant and then fasteners should be fixed through the corners into the end timbers.

The rest of the walls should be erected in a similar manner. When all exterior and interior walls have been erected and headplates have been installed a horizontal line should be pulled between pairs of building corners to finally check that wall panels are correctly located. Additional racking braces should be used (or adjusted) to make any necessary wall panel realignment.

Where the Guardian Building System wall panels are used as internal walls, they need to be plumbed and levelled with the top of the external walls, braced as before and fixed.

As with external walls, use adjustable wall braces where necessary to ensure internal walls are in their correct position.

Hint: Ensure that sufficient wall braces are used to stabilise the wall construction during the erection of the final storey and that these remain in place until the roof has been completed.

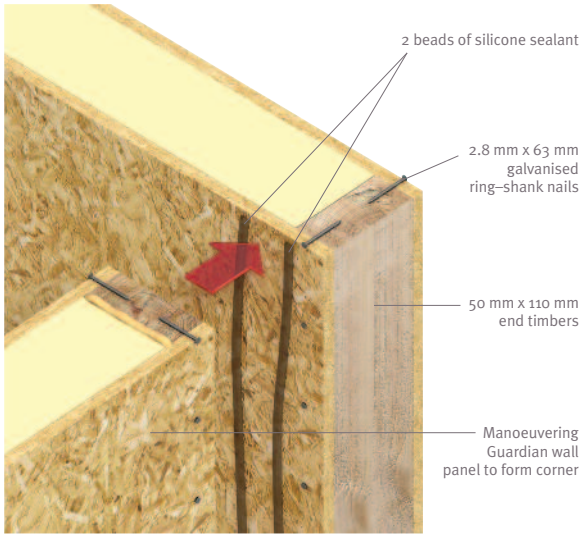


Figure 15: Creation of Corner Joint

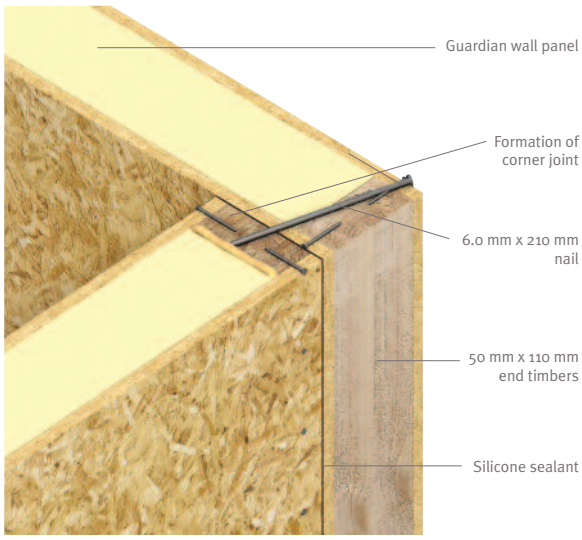


Figure 16: Fixing of Corner Joint

Standard Door and Window Openings

Guardian Building System wall panels will arrive (unless specified otherwise) from the factory pre-cut and routed for window and door openings. The routed grooves will (unless specified otherwise) be 50 mm deep so that the 50 mm x 110 mm edge timbers can be fully inset around the whole window or door perimeter as illustrated. These timbers need installing as soon as the wall panels have been erected to prevent excessive amounts of water standing in the rout.

Edge timbers should be installed as previously described, above both when the opening is enclosed within one Guardian Building System wall panel and also when it extends into any adjoining wall panels. With all openings for windows and doors, the edge timbers should be cut and installed into the routed channels to match the configuration illustrated. This helps distribute the load carried by the edge timber that forms the timber headplate.

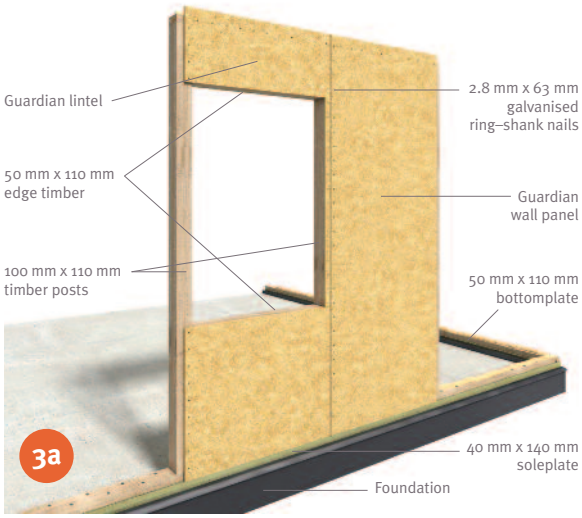


Figure 17: Opening for Window

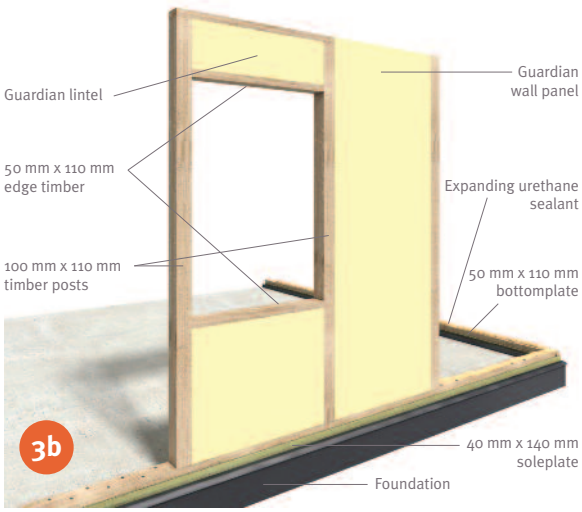


Figure 18: Opening for Window – Cross Section

Large Openings

Very wide windows and large doors often span more than a full Guardian Building System wall panel. In this case, the plans may call for a more substantial beam or lintel that is inset into the panels.

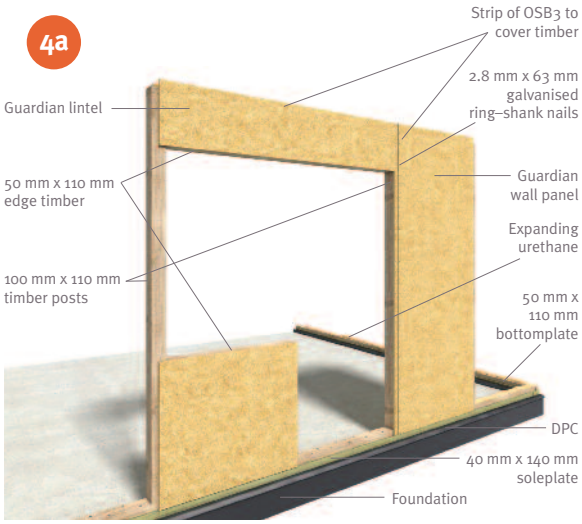


Figure 19: Beams or Lintels Above Window and Door Openings

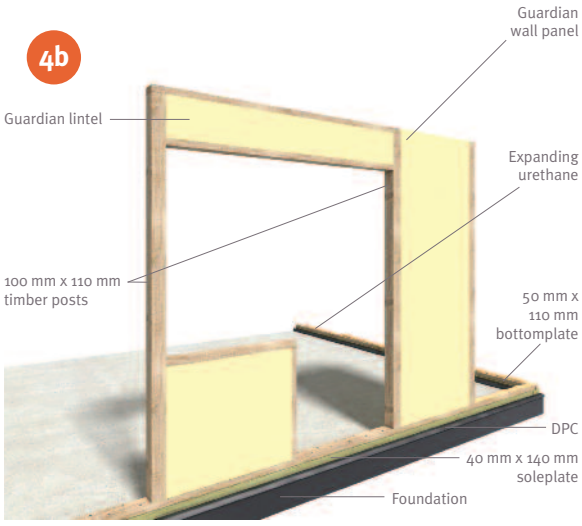


Figure 20: Beams Or Lintels Above Window and Door Openings – Cross Section

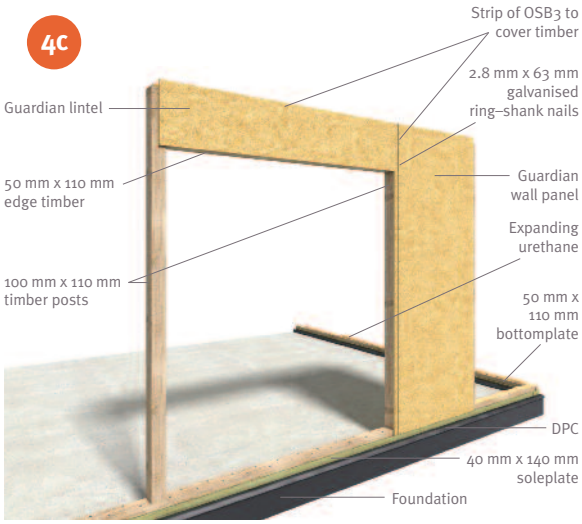


Figure 21: Beams or Lintels Above Window and Door Openings

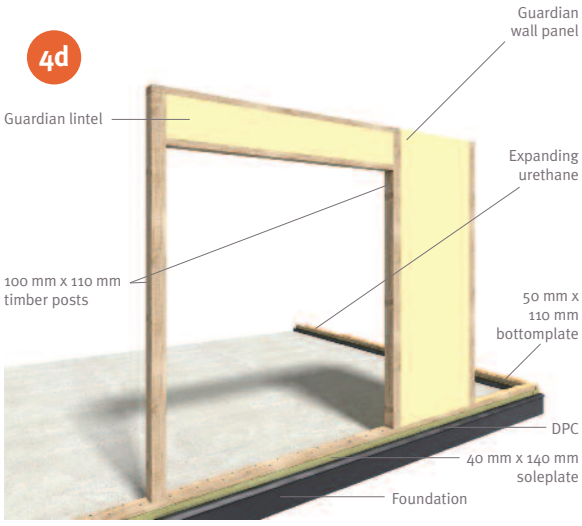


Figure 22: Beams or Lintels Above Window and Door Openings – Cross Section

Wall assembly – entire wall sections

Setting out Wall Panels Prior to Assembly

Organise the Guardian Building System wall panels into their designated positions on a level surface, (e.g. if the wall panel is resting on a combination soleplate it will not be level and therefore cannot be pulled together as an entire wall section) external face up, to match the detailed construction drawings provided with each project. At this stage leave a 25 mm gap between wall panels to aid assembly.

Hint: Prior to undertaking this method of Guardian Building System wall panel erection it is extremely important to plan the sequence of panel assembly so that site or building constraints can be accommodated.

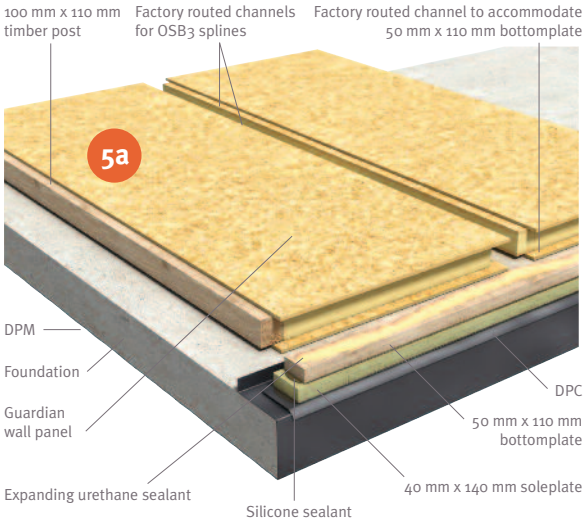


Figure 23: Ensure Wall Panels Are Laid Flat

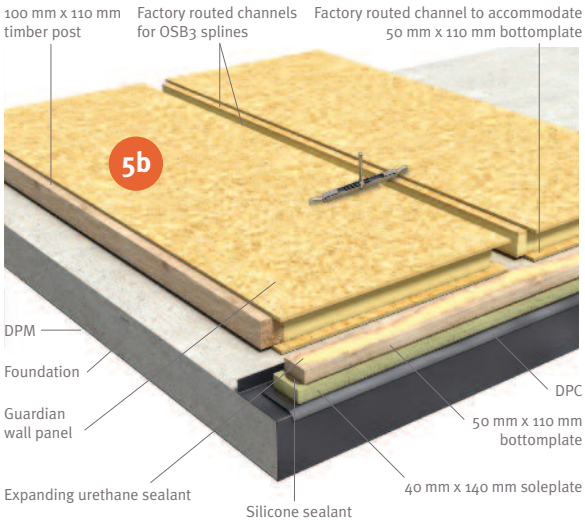


Figure 24: Install OSB3 Splines

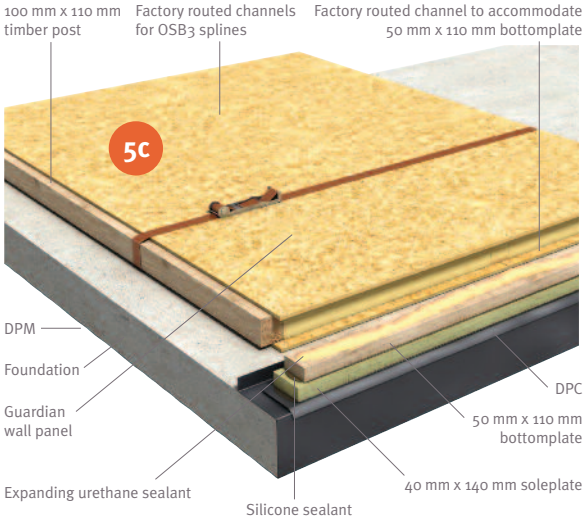


Figure 25: Bring Wall Panels Together Using Ratchet Straps

Joining Panels Using OSB3 Splines
Slide the OSB3 splines into the Guardian Building System wall panel joints as illustrated.

Pull the wall panels together using a ratchet strap having made sure the OSB3 splines are not intruding into the 50 mm x 110 mm routed channel at the top and bottom of the wall panels.

Before the insulated spline is fitted, expanding urethane sealant should be injected into each rebate to create an airtight seal.

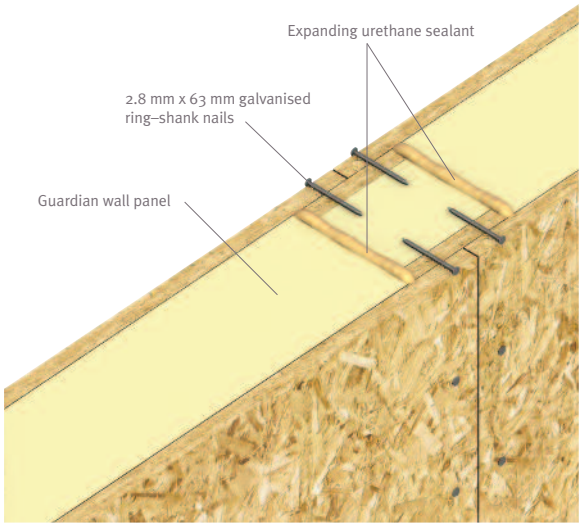


Figure 26: Fixed OSB3 Spline Joint

Closing Joints in Wall Sections
When using ratchet straps to close joints, it is imperative that the Guardian Building System wall panel edges are adequately reinforced or protected to prevent damage to the OSB3 facings, as illustrated in figure 25.

Caution: Do not attempt to lift large Guardian Building System wall sections manually – use correct lifting procedures.

Assembly, Nailing and Raising of Further Wall Sections
Further Guardian Building System wall sections should be constructed and erected in the same manner.

Hint: Ensure Guardian Building System wall sections are erected in the correct sequence so as to optimise the use of working space and resource.

Particular care should be exercised when assembling the wall sections that include either window or door openings. In certain situations some additional temporary bracing members may be necessary, nailed across breaks in Guardian Building System wall panel edges.

Hint: Ensure that sufficient wall braces are used to stabilise the wall construction during the erection of the final storey and that these remain in place until the roof has been completed.

Raising The Wall

Apply a bead of expanding urethane sealant onto the bottomplate. Tilt the Guardian Building System wall section using either a crane or another appropriate piece of mechanical lifting equipment and following the contractor's method statement for safe working. Attach temporary wall braces as required. To ensure the wall section is plumb and remains so, brace wall ends on the outside edge. Attaching the wall braces to the outside edge allows room on the floor surface for assembly of further wall sections.

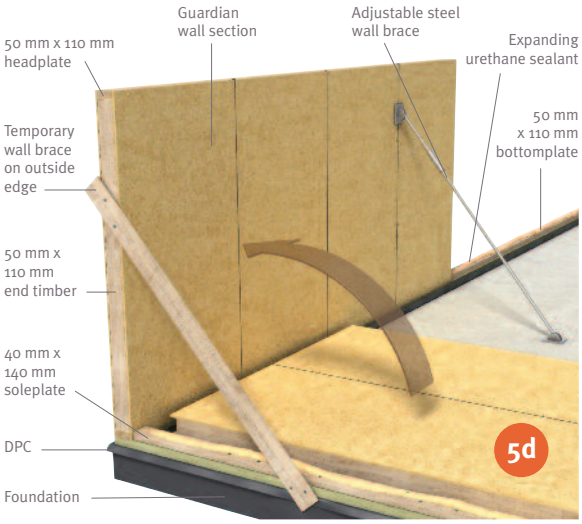


Figure 27: Bracing Wall Sections

Fixing Wall Panels Together At Corners

Fix through the corners into the end timbers through pre-drilled 4 mm dia. holes, illustrated below. It is extremely important to apply two continuous beads of silicone sealant along these types of joint.

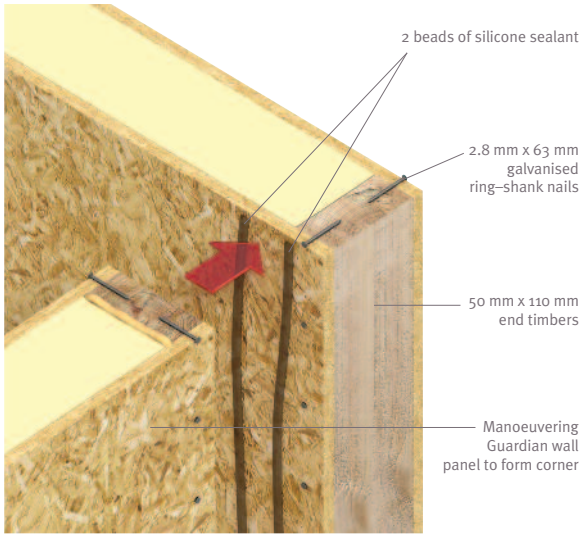


Figure 28: Formation of Corner Joint in Wall

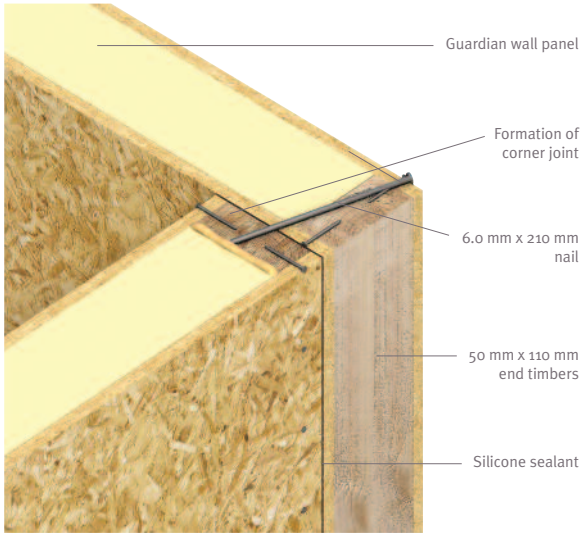


Figure 29: Fixing Wall Panels Together at Corners

Installing Headplates

Headplates tie the Guardian Building System wall panels together and provide a continuous solid surface to support the first floor construction. Headplate joints should be staggered so that they offset wall panel joints by a minimum of 300 mm. All OSB3 splines, timber posts and end timbers should not intrude into the routed channel that will accommodate the headplate. Expanding urethane sealant should be applied into the routed channel. The headplate should then be located within this channel and fixed.

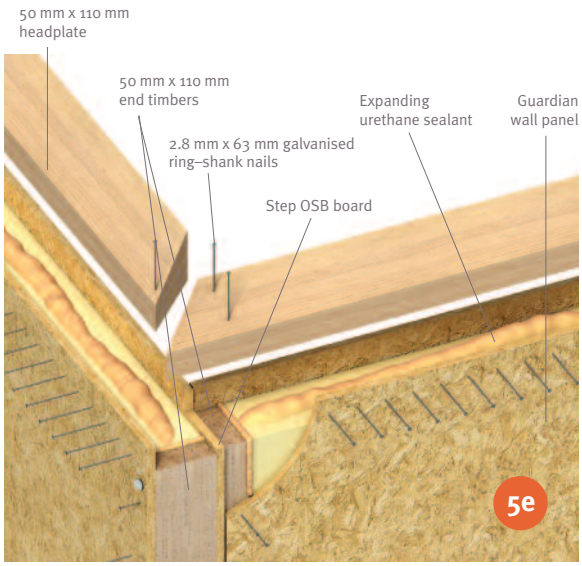


Figure 30: Install Mitred Headplates – cut angle to suit roof pitch

Hint: Cut-out section of OSB board to allow Headplate to fit flush.

Stage 2 – Roof Installation

The following guide has been created to assist in the fabrication and installation of the Guardian Roof. Please note that each roof is individual and will be fabricated to suit various shapes and sizes.

Your fabricator will be available to provide installation technical support. Your fabricator will include a roof layout plan and an installation guide with each roof.

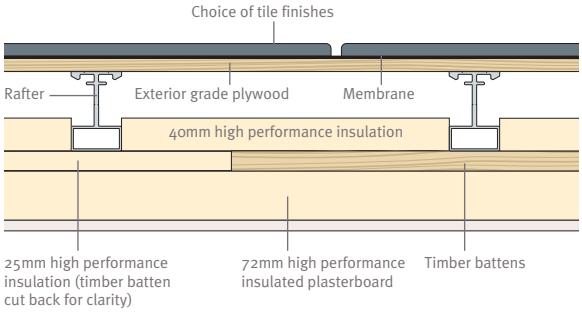
Roof Layout Plan

Please refer to the roof layout plan prior to commencing installation. It is very important that the roof fits the windows layouts and that all the windows are fully reinforced. All components are numbered to match the roof layout plan for ease of installation.

Tools required

- Cordless drill,
- Angle grinder,
- Silicone gun,
- Tape measure,
- Hand saw,
- 10mm spanner and 10mm nut spanner,
- 10mm ratchet,
- snips,
- staple gun,
- screwdriver,
- foam gun and expanding foam.

Guardian warm roof construction



Step 1:
Installation of roof rafter brackets

Stage 2 – Roof Installation

Step 2: Box gutter

Fix box gutter to wall and seal using suitable sealant. Place ringbeam on the side lip of the box gutter and fix in place by screwing up through the lip with a 25mm window screw.

It is recommended to run a strip of sealant along the box gutter channel prior to clipping on the ringbeam.

Please fit insulating foam to underside of box gutter.

Ensure not to puncture the box gutter itself.

For the best internal finish use insulated plasterboard under box gutter using timber battens.

Step 3: Ringbeam

60mm x 70mm square edged timber is supplied and fit to the underside of the ringbeam. The inside of the timber add on should be fit flush with the inside of the window frame. Bed timber add on onto window frame with silicone and fix from underneath.

Cleats to be inserted internally into the ringbeam and fixed using 25mm stainless steel window screws.

Ringbeam and packer should be installed flush with inside of window frame. Use 100mm stainless steel window screws at 600mm centres.

Step 4: Assemble rafters

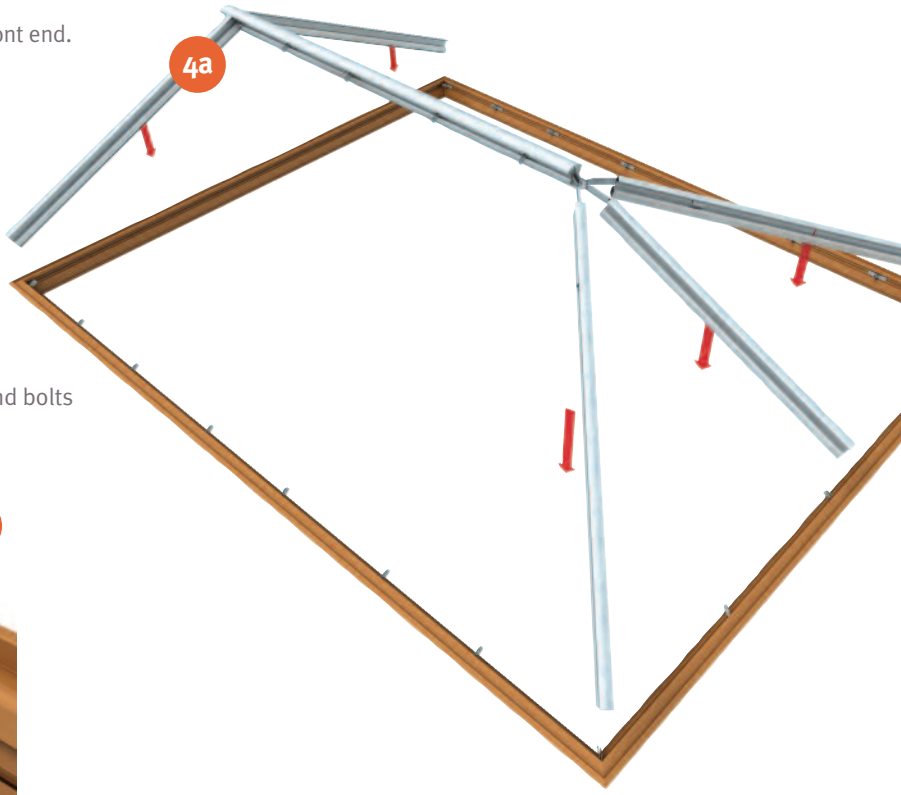
Gable rafters to be bolted to house wall and secured at 300mm centres using suitable fixings determined by the wall construction.

Ensure Stainless Steel Cleats provided are used when fixing to the house wall at the top and bottom of wall rafter.

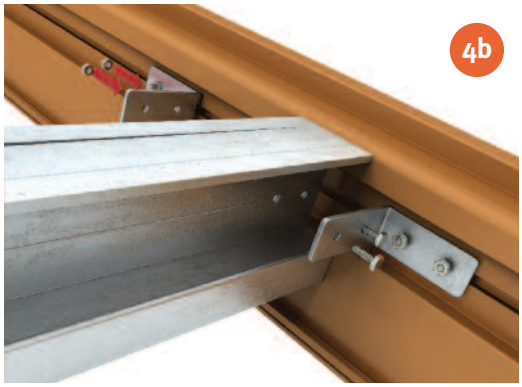
Stainless steel cleats must also be used at gable front end.

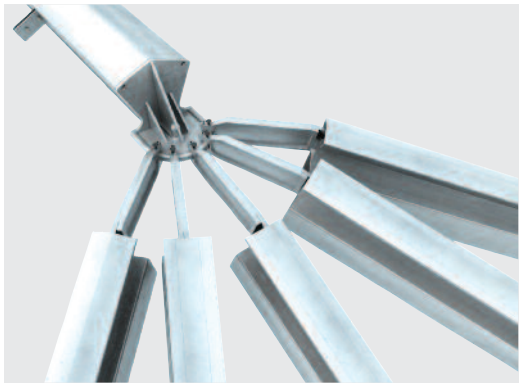
Edwardian stainless steel cleat

Victorian stainless steel cleat

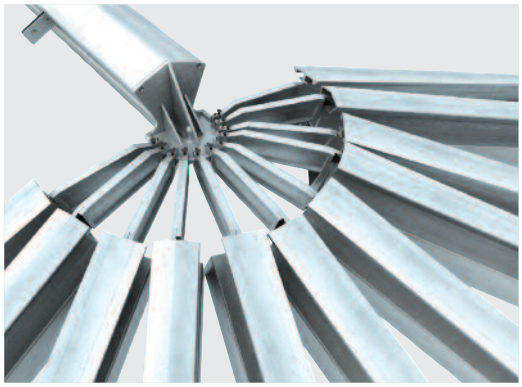


Fix rafter to ringbeam using pre-installed cleats and bolts provided (loosely tighten at this stage).



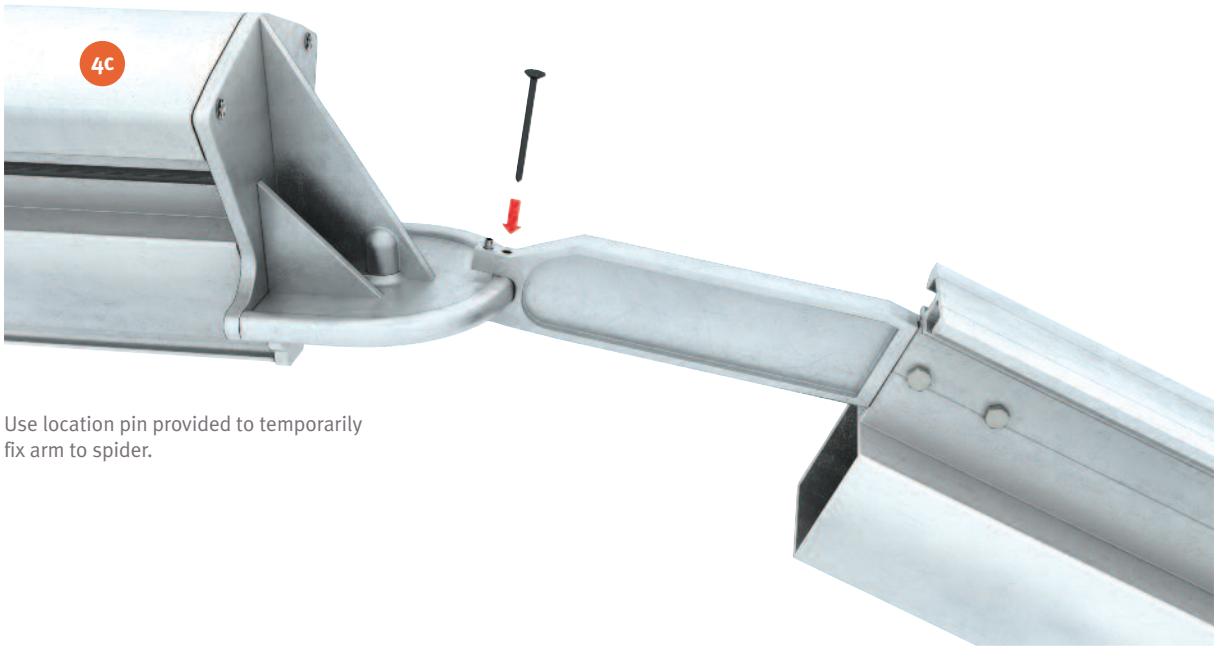


Edwardian conservatory



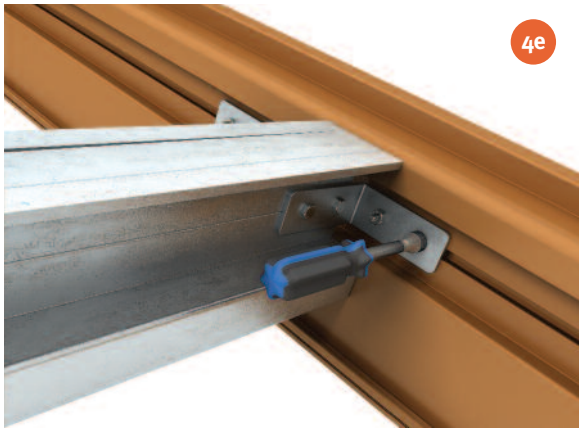
Victorian conservatory option

Step 4: Assemble rafters



Use location pin provided to temporarily fix arm to spider.

Temporary fix remaining rafters including any pre-engineered window framing (if required).

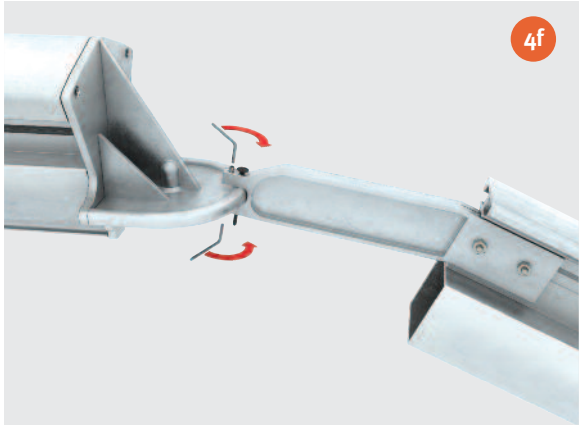


Ensure all roof sections are aligned to the pre-engineered positions and tighten into place.

For edwardian/victorian hip cleats tighten bolts on rafters first before tightening to ringbeam.

Edwardian aluminium cleat

Victorian aluminium cleat



Tighten pre-installed grub screws using allen key. Please ensure grub screws are not overtightened.

Stage 2 – Roof Installation

Step 5: Timber battens

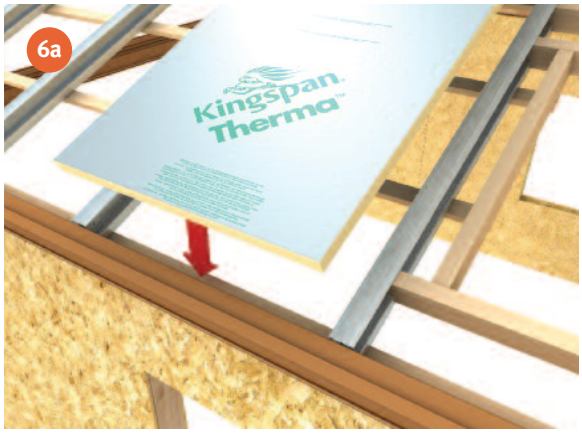
Fit 25mm timber battens at maximum 400mm centres to underneath of rafters.

Fixings are to be 5.5mm x 50mm light steel, 3mm-12mm wing tipped or a Timco 5.5mm x 50mm self drilling screw.

Batten out entire roof structure. Batten over window opening and cut back to suit.

Any exposed aluminium surfaces or spider arms visible on the inside need to be competely covered using expanding foam.

Step 6: Rafter insulation

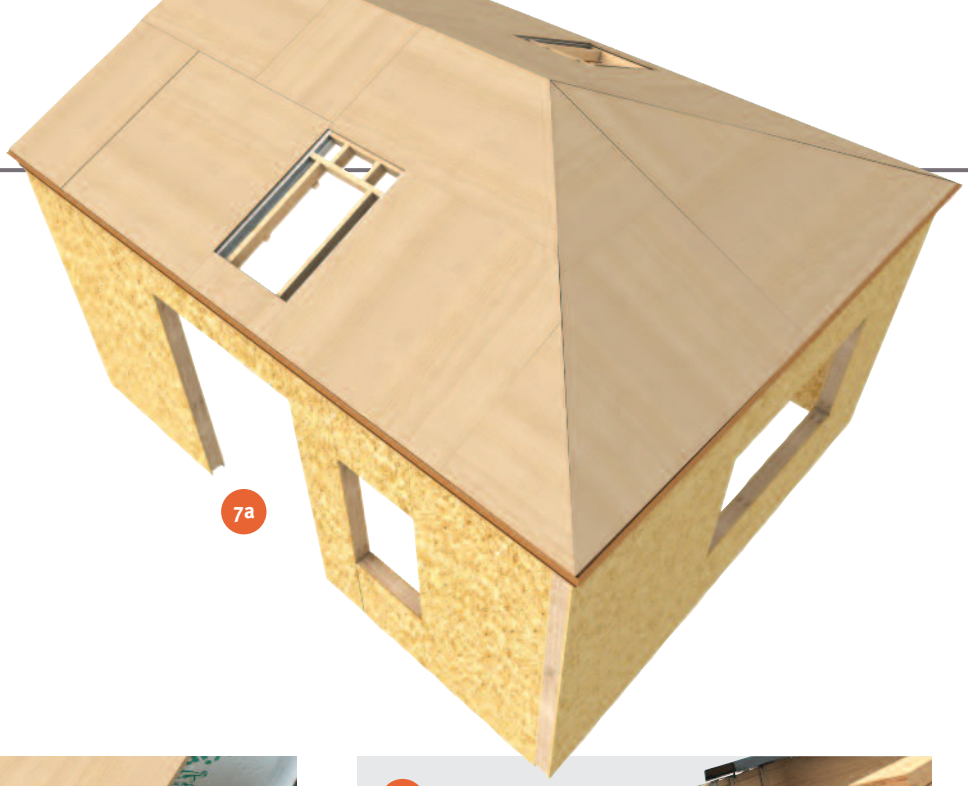


From outside insert **40mm** insulation board between rafters.

Seal all gaps with expanding foam.

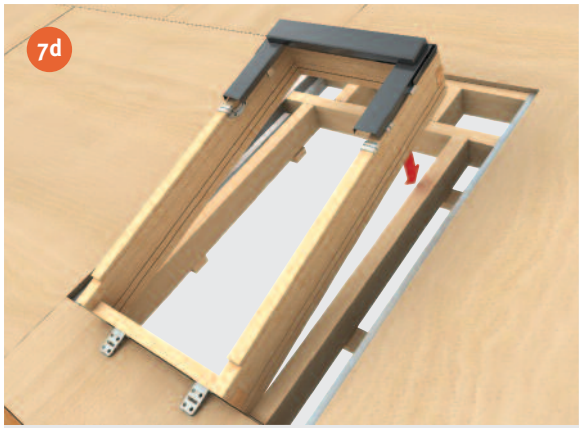
Step 7: Exterior plywood & window frame

Fix timber sheets to rafters.

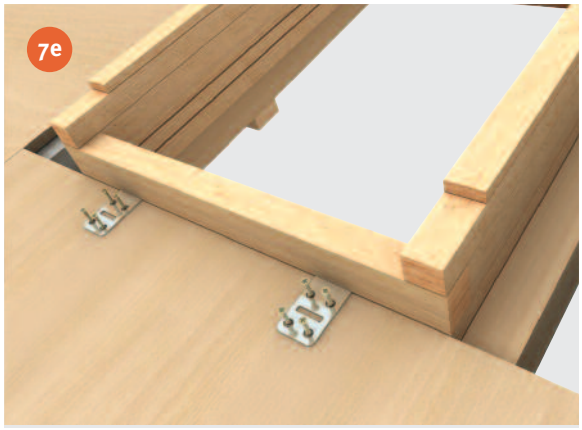


Timber out roof as per schedule. Ply sheets to be fixed at 200mm centres using 2.8mm x 38mm Timco self drilling screw.

Fix brackets to the V notch on roof window frame prior installation.



Install roof window frame into pre-formed opening within rafters.



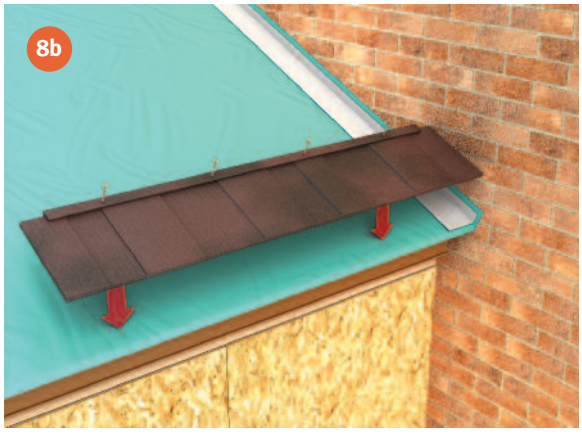
Fix frame to timber ply through brackets using screws supplied within roof window pack.

Step 8: Membrane & roof tile

Cover with vapour permeable underlay with a vapour resistance of less than 0.25MNs/gram as required by BS5250: 2002. Overlap all joints of underlay by 150mm and staple down to timber sheets. Over run ringbeams by 100mm and up outer wall by 50mm.

Take underlay up window frame and staple to topside.

Roofing membrane must be laid from the bottom up with the overlap always to the outside as you come down the roof. This also should be done at hip points.

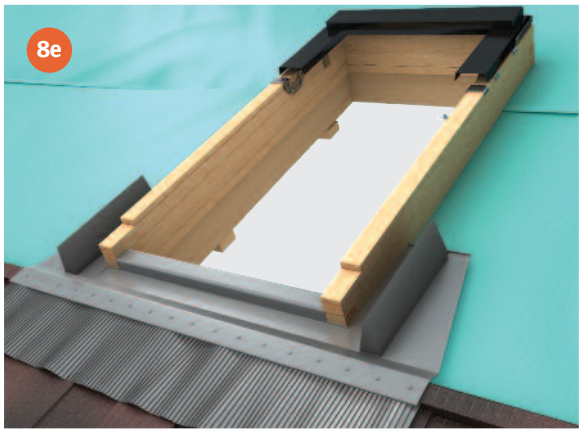


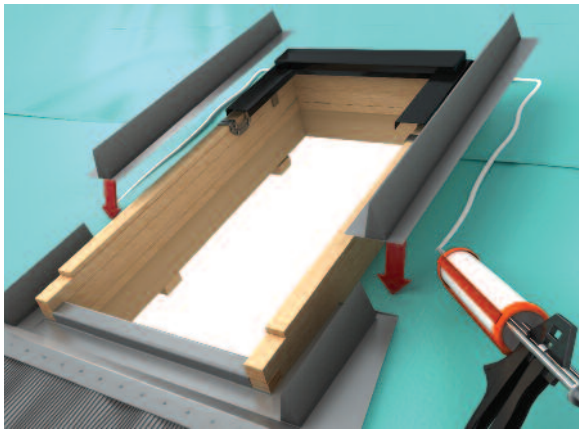
Fix watercourse to outer wall. Starting bottom right corner of the roof with a full roof tile, fix to lip of ringbeam and into the corner of the watercourse (allow 4 x 16mm screw fixings per tile).

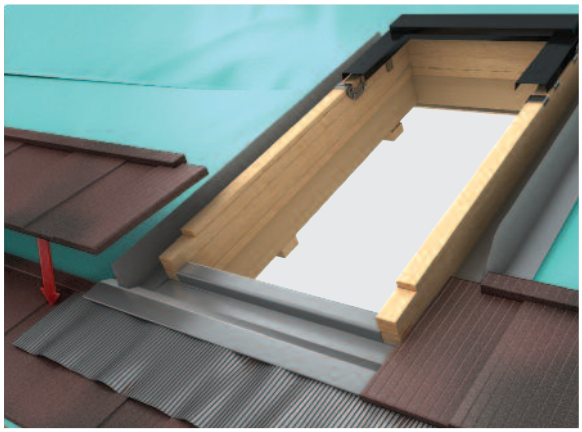
All tiling is from right to left. Complete one row at a time. For the second course always start with half a tile.

Dependant on height of roof window 1-3 tiles should be fitted below window before bottom flashing is installed.

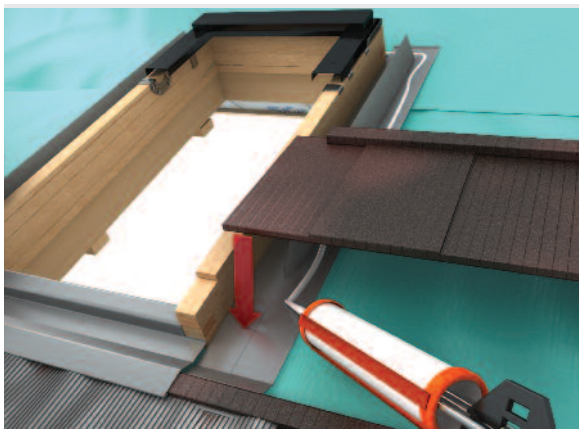
Roof window flashings should be sealed to the breather membrane. It is also advisable to run a line of sealant on top of the flashing and under the tiles on the sides and the top to prevent blowback.





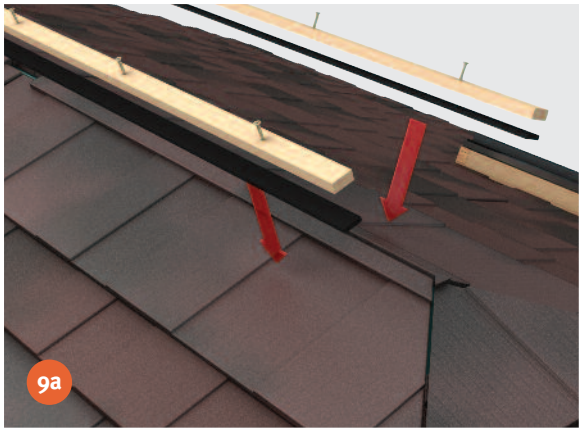


Contact roof manufacturer for correct installation of roof window and flashings.

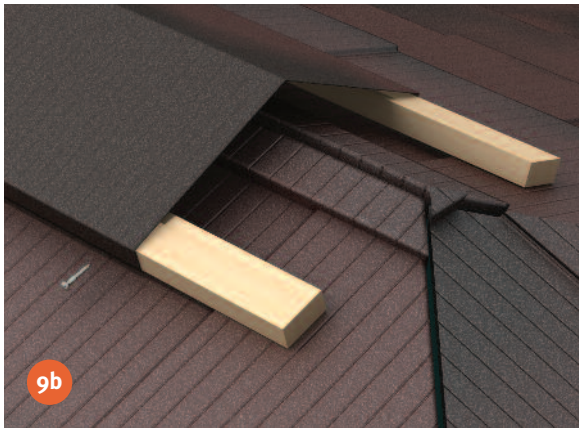


Roof window flashing to be installed to roof window pack instructions.

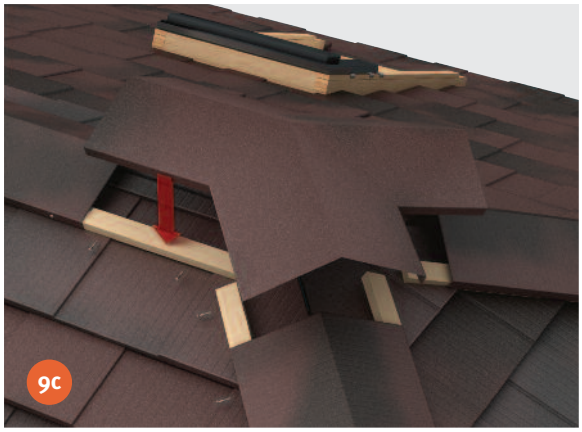
Step 9: Standard ridge & end cap



Apply foam tape to underneath the 25mm treated timber batten. Using the profile ridge and hip for position fit timber battens and screw into place.

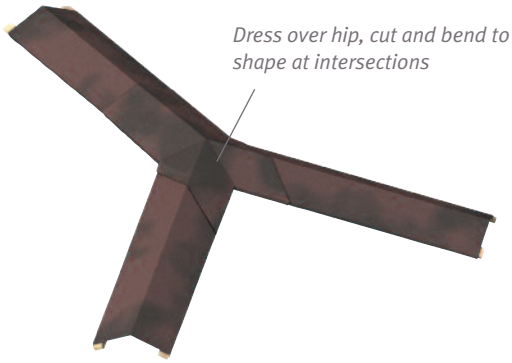


Position delta ridge over batten and fix side on. Use touch up kit provided to hide screw heads.



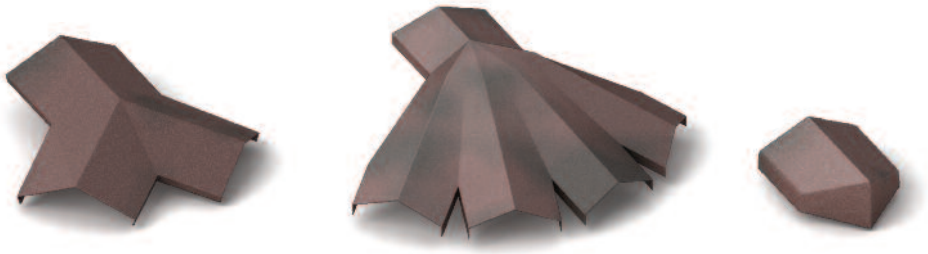
Follow instructions 8a and 8b for end capping. Fix rafter cap over delta ridge profile at verge.

Optional small ridge



In cases of stretched Victorians and off angles on ridges, a smaller ridge is available to allow for angle adjustment. Paint cut edges with touch-up kit.

Optional end capping

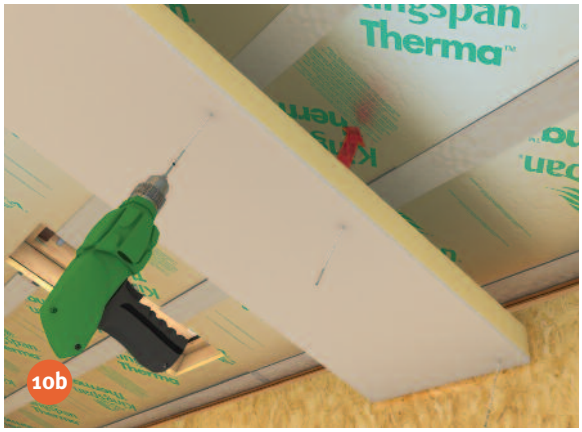


Step 10: Internal insulation

Install **25mm** foiled insulation between battens and apply expanding foam to the spider assembly.

75mm insulated foil tape should be run over every batten so no timber will be visible from the inside.

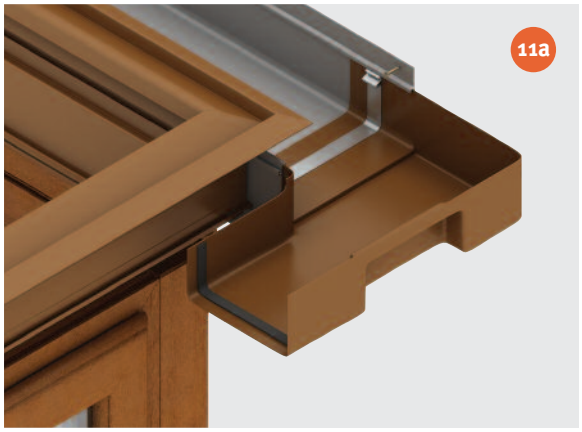
Please ensure electrical wiring is in place before 25mm PIR is positioned.



Tape all joints and seal against window frame, cut and mitre **72mm** insulated foil backed plasterboard, fix into position.

Fit colour matched cloaking trim to cover inside of timber add on prior to fitting plasterboard.

All insulation supplied must have a foiled back covering.



Step 11: Gutter adaptor

Fit box gutter adaptor into the box gutter and seal using suitable wet sealant. Seal between ringbeam/extension and window line with appropriate sealer. Also seal against house wall.

25mm PIR Insulation to be used under Box Gutter for insulating value and to avoid the risk of condensation.

Step 12: Gutter

Twist fit gutter brackets to ringbeam prior to installing gutter and downpipe.

Step 13: Valley gutter

Place valley tray on top of breather membrane within the valley itself.

Fix flaps either side directly into membrane and ply.

Tile into valley cutting at angle of roof.

Seal where necessary.

Optional mansard ceiling

Use appropriate low voltage down lighters with cowl.

Guardian Warm Roof suggests the use of Plug and Play down lighters used with a low voltage LED bulb.

Notes:

Guardian Roofs (Celuplast Ltd.)
FREE Phone: 0800 0665832 Email: info@guardianroof.co.uk

www.guardianroof.co.uk