



Installation Guide

This guide has been prepared by CSR Monier to assist the builder, the architect and the installer to specify, detail, prepare and install roof tiles.



CSR

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Terracotta and **concrete** roof tiles manufactured by CSR Monier satisfy the requirements of AS 2049: Roof tiles, as required by NZBC (New Zealand Building Code) Acceptable Solutions E2/AS1 and are suitable for roof cladding application.

This document has been prepared as a guide for the builder, architect and installer, however it is not intended to replace good trade practice and experience essential to obtaining a quality roof installation. The designer is responsible for ensuring that this guide is appropriate for use in installation that falls outside this guide.

This guide is supplementary to legislative requirements requirements, and was developed from industry experience, research and practical application, in context of the following relevant Building Codes and Standards:

- a) AS 2050 "Installation of Roof Tiles"
- b) AS/NZS 4200.2 "Installation of materials suitable for use as Pliable Building Membrane"
- c) NZS 4206 "Concrete Interlocking Roof Tiles"

Underlay creates a protective layer under tiles that helps keep out wind-driven rain, dust and embers for a more comfortable home. It acts as a drainage plane to channel any water that gets past the tiles to the gutter, and its reflective surface helps reduce summer heat gain inside the roof.

Fixing specifications for underlay must be installed in accordance with AS/NZS 4200.2. For all mandatory requirements, please consult a qualified project engineer.

REQUIREMENTS

There are many circumstances in which legislation mandates the use of underlay as a minimum requirement:

- Where local regulatory authorities suggest extreme weather conditions are probable, i.e. cliff tops, open exposed sites or bushfire prone areas
- Where design wind zone exceeds High Wind (speed of 44m/s) in NZ
- Immediately underneath and extending to the gutter around solar hot water collectors
- Where condensation may be an issue
- At the change of roof pitch joint from that joint to the eaves gutter
- Where rafter length exceeds 4.5m at minimum pitch
- Under raked ceiling or exposed rafters

CSR Monier recommends the use of underlay in all tiled roofs.

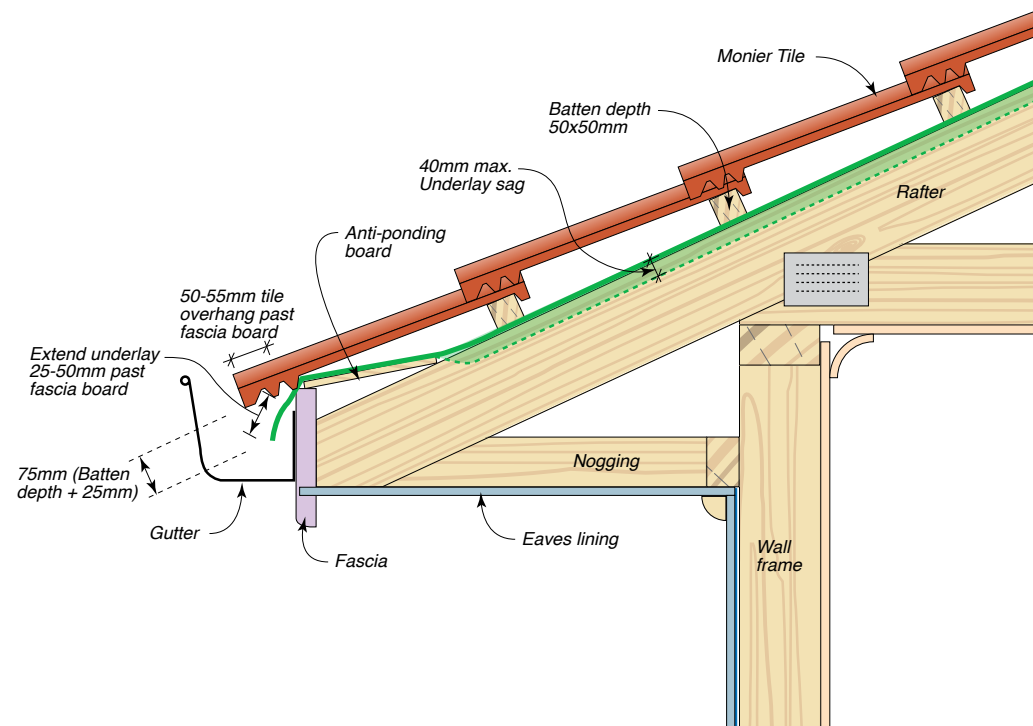
LAYING

Underlay should be laid horizontally, and over the rafter from the bottom up, so the upper layers overlay the lower layers.

OVER LAPPING UNDERLAY

Underlay should overlap not less than 150mm, ensuring the upper layer rests over the top of the lower layer of underlay. At the end of a roll of underlay, the layers of underlay should overlap by a minimum of one rafter spacing. Underlay should sag no more than 40mm between the rafters.

Underlay



+ DETAIL 1

OBSTACLES IN THE ROOF

- **Hot Flue:** The underlay should be cut back, allowing a clear space of 50mm.
- **Penetrations:** The underlay should be turned up and sealed to divert water from any projection in the roof. Where a fascia batten is used in place of a fascia board and there is no gutter, the underlay material should be neatly cut back to the outside edge of the fascia batten.

USE OF SECURITY PADS

To avoid constant flexing and to increase the life of the underlay material the use of security pads or anti-flap pads is recommended. Security pads should be installed in a staggered pattern under each second row of battens between each pair of rafters.

UNDERLAY AT EAVES

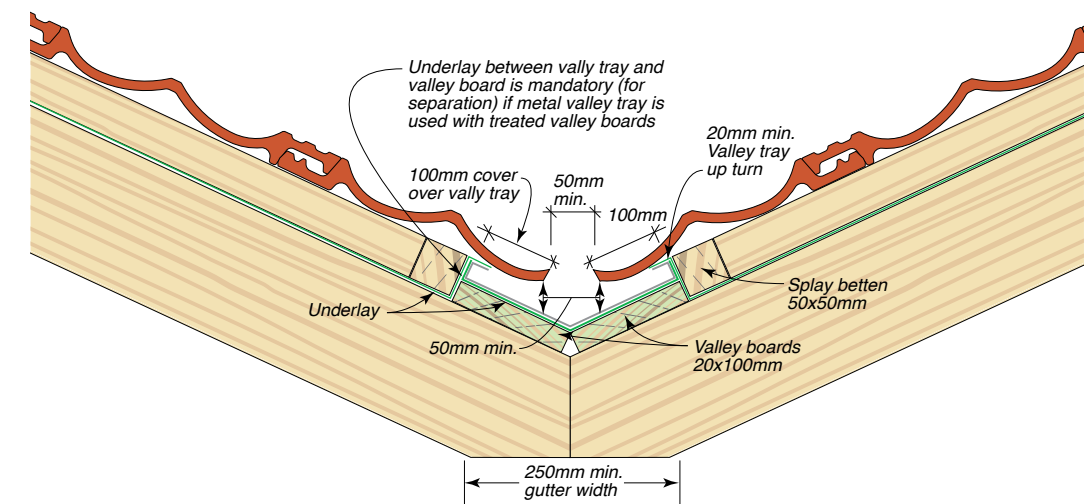
To allow effective run off into gutter, underlay should extend over the fascia board by a minimum of 25mm and a maximum of 50mm.

UNDERLAY SUPPORT

Subject to regional specifications, an approved anti-ponding board is recommended on roofs with a low pitch. Where rafter centres span up to 1200mm, underlay should be adequately supported unless using a heavy grade as per the AS/NZS 4200. Installation of underlay support, reinforcement, or safety mesh is usually performed by other trades as referred to in AS 2050 Appendix B.

UNDERLAY AT VALLEYS

Underlay is held in place by fixing a valley batten parallel to the valley gutter. The underlay should overlap the valley by no more than 25mm or be rolled over or cut at the valley batten. If underlay projects too far into valley the roof is likely to leak



+ DETAIL 2



Battens

The installation of battens to rafters must comply with NZS 4206.

SECURITY FIXING TO RAFTER

- Fixing for tiles to battens and for battens to steel frame should be non-ferrous stainless steel or steel with an appropriate corrosion-resistant coating
- Clout nails must comply with NZS 4206
- Self-drilling screws used to fix battens must comply with NZS 4206

JOINTS IN BATTENS

Batten joints should be staggered over the roof so that 2 consecutive battens are not jointed on the same rafter. All joints in battens must meet in the centre of trusses or rafters, and not be joined over girder trusses. Battens should be nailed to joint.

HIP AND VALLEY JOINTS

Where battens intersect with hip board and valleys, provide firm support.

STEEL BATTENS

Refer to the steel batten suppliers for the technical fixing specification. Consideration should be given to batten spacings as battens may be installed by trades other than the roof tiler.

Laying of Tiles

Tiles should be laid and secured in accordance with NZS 4206 and AS 2050.

LOADING

The entire roof must be battened and underlaid before tiles can be loaded onto the roof.

In buildings with exposed rafters, or a rafter length greater than 6m, tiles should be loaded onto the structure from each side to ensure their weight is evenly distributed.

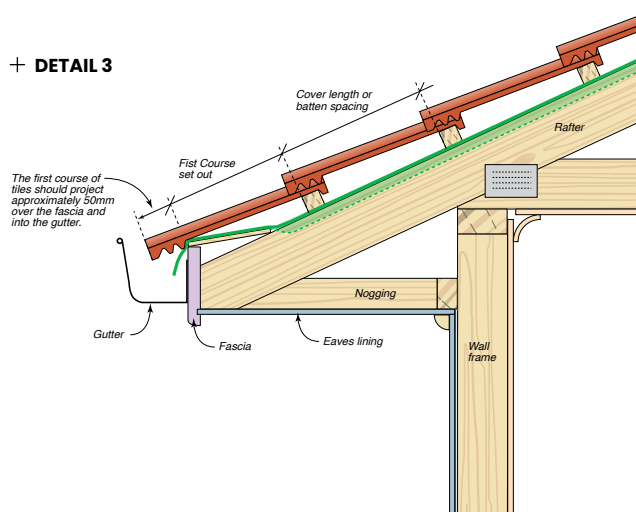
FIRST COURSE

The first course of tiles should project approximately 50mm over the fascia and into the gutter.

LAYING

All tile courses should be aligned horizontally, vertically and diagonally, to ensure a straight finish at the roof edge and to achieve the best look for the roof. Tiles should be always laid in straight lines. Top courses should be finished hard up against top ridge boards to enable full cover for ridge capping. No Soldier Courses. All short courses to be drilled and nailed with galvanised clouts OR galvanised tie wire. Short course clips may be used if there is no access to nail tiles.

+ DETAIL 3



Securing of Tiles

Suitable mechanical fixing method should be advised by project professionals suiting the site situation, in accordance with NZBC requirements and NZS 4206. Mechanical fixing can be achieved through either tile clip, nails or a combination of these. Please consult fastener or tile clip manufacturer for suitable fixing method, appropriate roof framing materials and wind loading conditions.

NZS 4206 specifies a minimum 2.5mm diameter nailing size, and Acceptable solutions E2/AS1 enforces a minimum length penetrating at least 35mm into timber battens.

For tiles at pitch greater than 35 degrees, project engineers must develop project specific design solutions.

TILE CLIPS

Please consult fastener or tile clip manufacturer for suitable fixing method and applicable wind classifications if mechanical fixing is required. All mechanical fixings through tile clips need to suffice NZBC requirements. Refer to tile clip manufacturer.

Accessories

ACCESSORY TILES

After the main roof tiles have been laid, the installation of accessory tiles can commence. All junctions of hip and ridges must be made weatherproof. Accessories available for installation are dependent on the profile, the pitch and the position of the join in the roof.

RIDGE AND HIP FINISHES

All ridge and hip tiles must be laid in a straight line, allowing for the natural contour of ridge tiles. The over-lapping of ridge tiles should be directed away from the prevailing winds.

Cut tiles should be supported by galvanised nails spiked to the hip board as per AS 2050 clause 2.4.2 and NZS 4206.

Ridge

Where mechanical fixing is not mandated by legislations, the ridge tiles are initially laid onto a bed of mortar and finished with flexible pointing material.

Hip

A hip begins with a hip starter or shell end, positioned on a bed of mortar at the lower end of the hip. The roof tiles at the join of a hip must be cut and laid with a maximum of 20mm between the planes.

A hip starter must be laid to project into the gutter, in line with the nose of the first course of tiles. Alternatively, a ridge tile can be shaped to replace a hip starter.

VALLEY TILE INSTALLATION

The valley width is dependent on regional weather conditions.

Under normal conditions, a gap of 75 to 100mm between tiles is acceptable. In high rainfall areas, valley tiles should be sealed with a bitumen

impregnated foam. The valley gap may be increased to 100mm. In high rainfall areas, valley design and downpipe position should be designed to suit the roof as per AS/NZS 3500.

FIRE WALLS/INTERNAL SEPARATING WALLS

Mineral fibre or other suitable fire-resistant material, such as fire rated mortar or bedding, should fill the cavity above the fire wall up to the underside of the tiles. Except for 75mm x 50mm roof batten or less, timber or other combustible building element, should not pass through the firewall.

Please refer to the firewall specification drawing on detail 7 below.

COUNTER BATTENING

Whenever a lining material is installed over rafters counter battens will need to be installed. This will then ensure underlay can be laid in accordance with the relevant Standard and also provide a base for the tiles battens to be fixed.

BARGE/GABLE

For gable roofs, it is good practice for roof tiles to finish with equal length of tile at both ends.

A gable end (verge) can be set according to local requirements and exposure conditions, and include:

Bed & Point Finish

Place a fibre cement bedding strip 100mm wide and 5mm thick over the barge board. The bedding strip should project a minimum of 19mm but a maximum of 25mm beyond the face of the barge board. It is recommended that the bedding strip is secured into place with a timber fillet.

Accessories

The degree of projection of the bedding strip should be left to the tiler's discretion to ensure finish off with a full tile at all left-hand gables (where practical). The underlap of the tile to all left-hand gables should be removed.

The barge board must be kept flush with the top of the batten. This allows the fibre cement strip to sit level with the top of the batten and barge board.

A bedding of cement mortar is placed onto the strip. Tiles with a clean edge are positioned along this bed and pointed with an appropriately coloured flexible pointing. Pointing should be finished with a slight incline toward the outer edge and devoid of trowel marks.

A+B Barge/Gable Finish

The top of the barge board should be flush with the top of the tilt batten.

Either standard or rounded barge tiles are laid over the gable end (with or without a bedding between the tiles and the barge tile). The lower end of the barge tiles are mechanically fixed (screwed or nailed) according to local specification into the barge board or brickwork.

Concealed/Secret Gutter Finish

The top of the barge must be 75mm above the top of the battens. A suitable metal soaker should be installed as illustrated.

BEDDING & POINTING

Cement mortar bonding shall not be used as the mechanical fixing method. It can be used in conjunction with some other form of mechanical fixing.

Bedding Mortar Mix

New Zealand Standard NZS 4206 requires cement mortar for bedding (1 :5) 1 cement, sand.

The use of other additives by volume such as "Lime, Fire clay" is permitted by NZS 4206, with specifications for the standard each must comply with, at the following ratios:

- Lime composition bedding mortar (1:1:6): 1 cement, 1 lime, 6 sand
- Fire clay when used, replaces an equal amount of sand therefore, if 1/2 a measure of fire clay is used the ratio would be (1:0.5:3.5): 1 cement, 0.5 fire clay, 3.5 sand. Fire clay is not a replacement for cement. The use of plasticisers and products that aerate mortar is not permitted as these products weaken the mortar

Fire clay is not a replacement for cement.

The use of plasticiser and products that aerate mortar is not permitted as these can reduce mortar strength and negatively affect the performance.

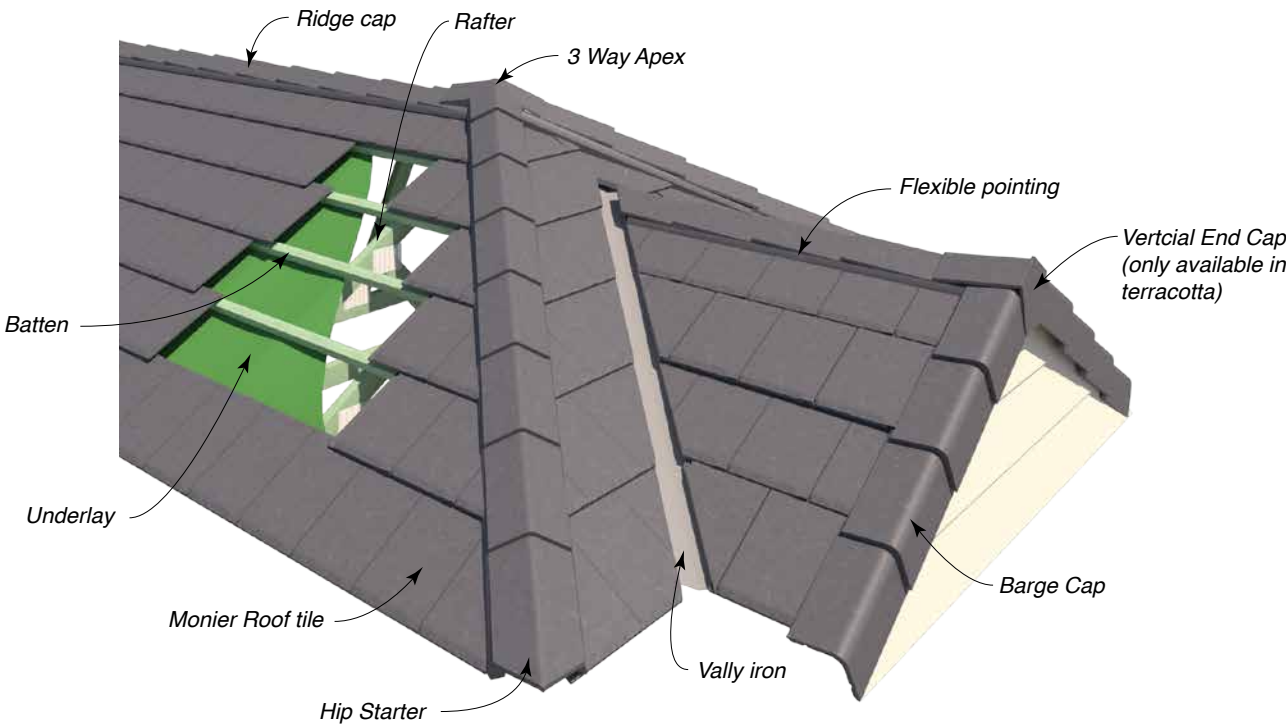
Bedding and pointing applications

The pointing should be neatly trowel led, with an even finish throughout. Collar/cuffs should be pointed (if Flexible pointing is the mechanical fixing, then it is mandatory to point collars/cuffs.) Follow manufacturers recommendations. The bedding should be trowel led through the whole joint with an even finish.

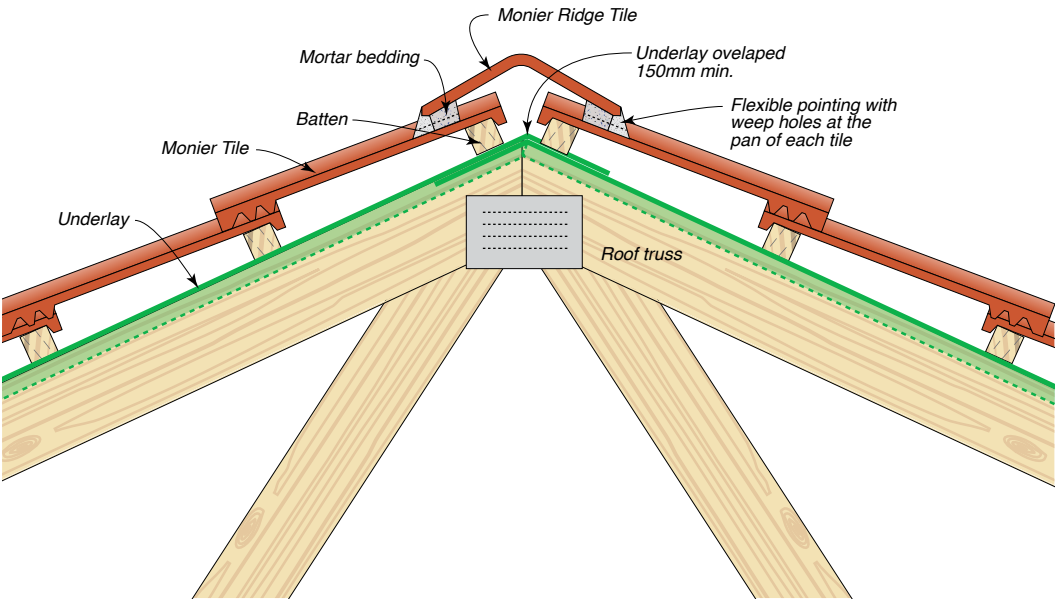
Check with the manufacturer for confirmation of status if flexible, premised pointing is to be used.

Roof Completion Details

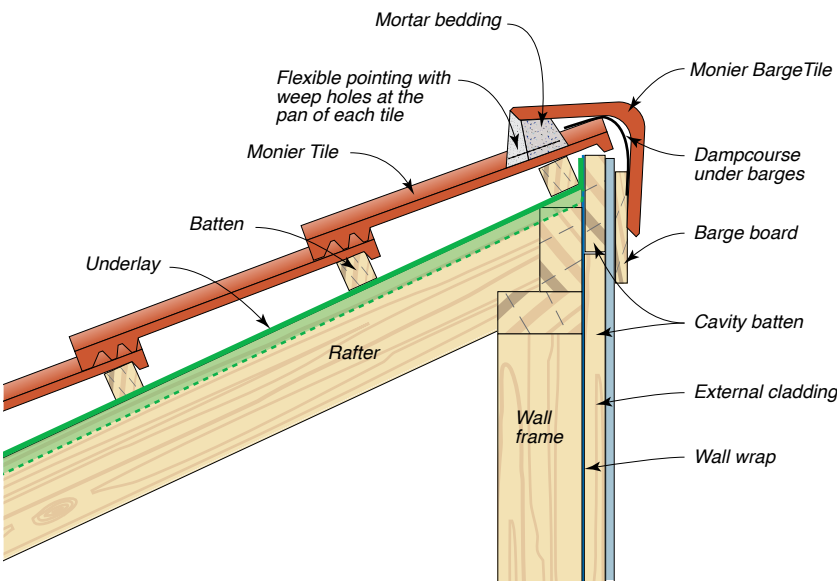
+ TILE ROOF OVERVIEW



+ DETAIL 4



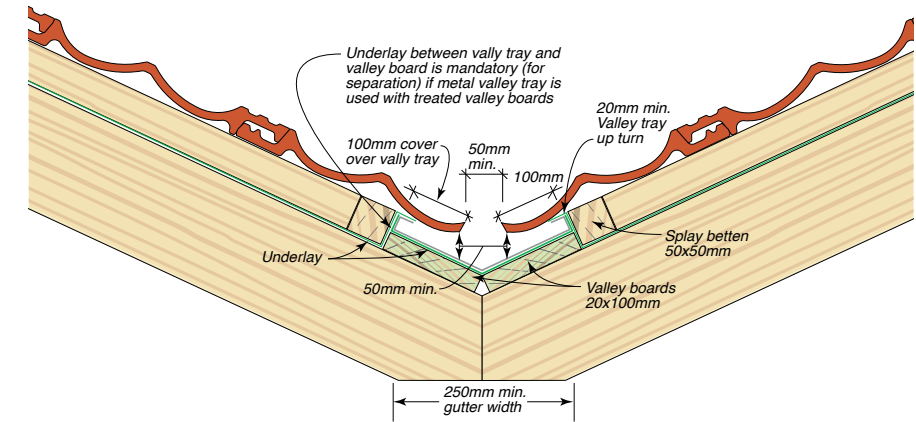
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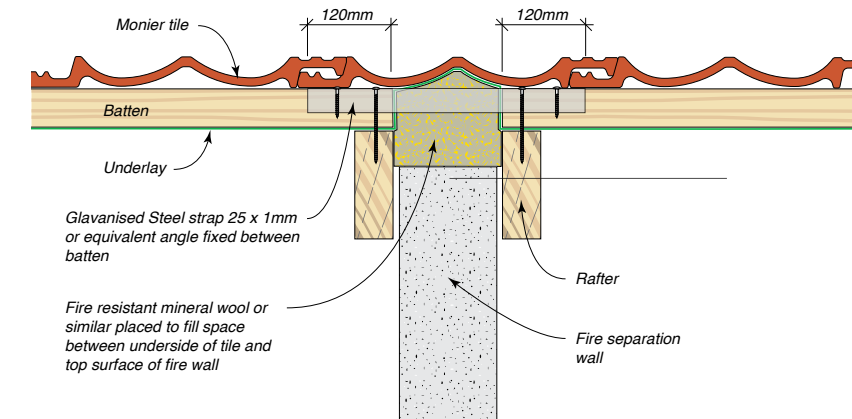
+ STANDARD CORNER DETAIL



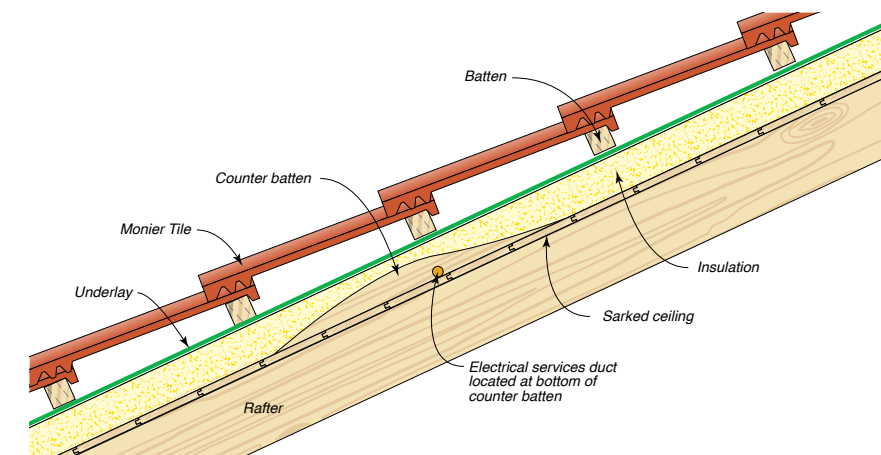
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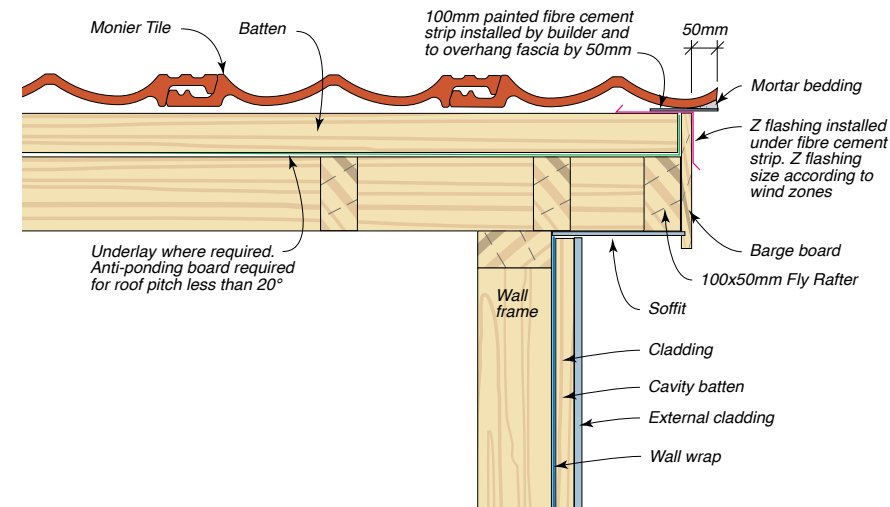
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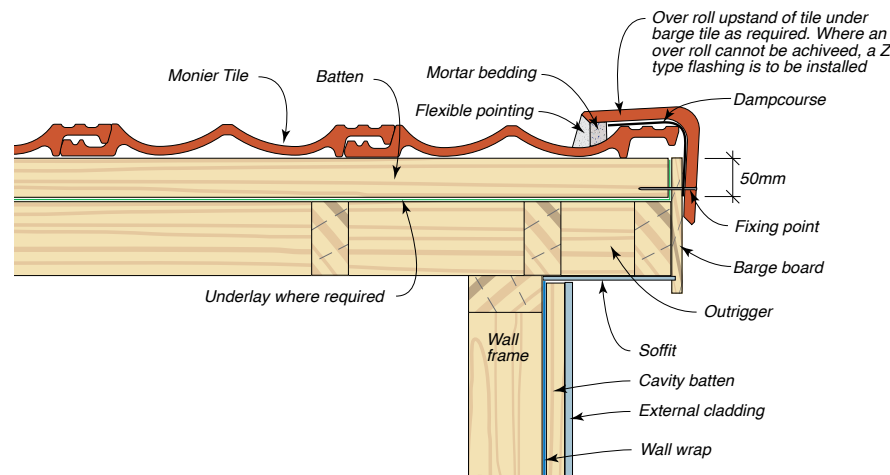
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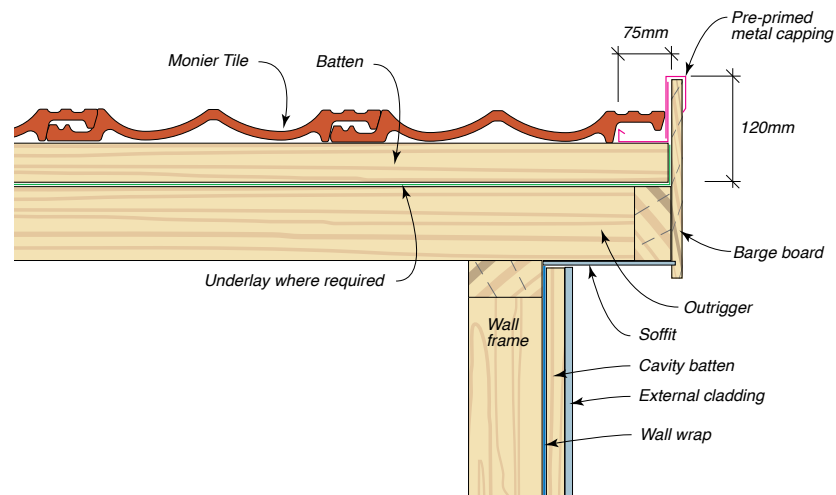
+ DETAIL 9



+ DETAIL 10



+ DETAIL 11



BUILDING A BETTER FUTURE

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