

FIBRE CEMENT SLATES

Fixing guide



MAY 2019



FIBRE CEMENT SLATES FIXING GUIDE

Eternit, a market leader in the design and manufacture of fibre cement roofing products, offers high quality, durable fibre cement slates in a variety of colours, sizes and textures.

This fixing guide gives comprehensive details on how to install Eternit fibre cement slate roofing products.

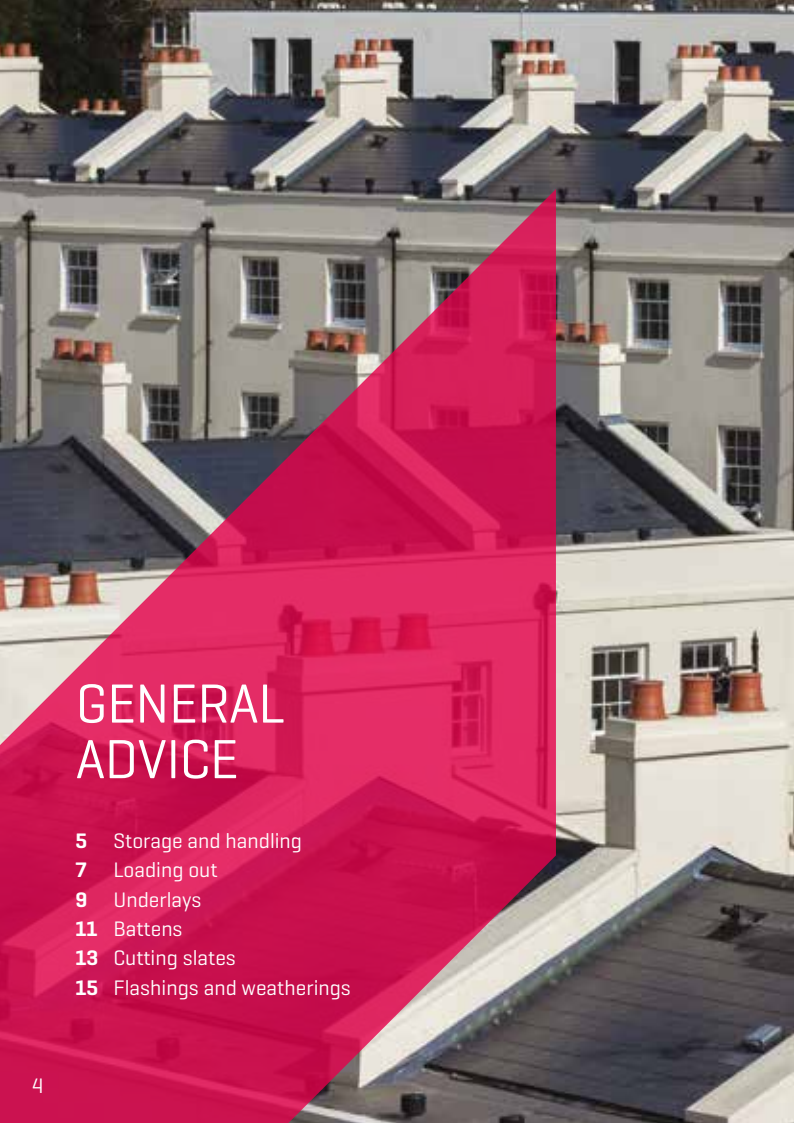
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GENERAL ADVICE

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STORAGE & HANDLING

Provision should be made for proper storage and handling of materials to avoid deterioration in quality and appearance, to avoid breakage or distortion, and to minimise wastage.

General

- 1 Should be stored in a safe location and should be kept protected from damage on site. Pallets should be stored on a smooth, level base capable of supporting their weight.
- 2 Store roof underlays upright, in accordance with manufacturers' guidelines.
- 3 Store battens and counterbattens on sufficient bearers to prevent sagging or twisting.
- 4 Protect battens and counterbattens from water saturation when stored in bales or bundles horizontally.
- 5 Store roof accessories in a safe, weatherproof store/location.

Pallets and crates should be transported using appropriate lifting machinery, i.e. fork lift or mechanical grab. Unload and handle slates and fittings with care to avoid damage, soiling and breakage. Avoid loading pallets onto scaffolding unless a safe access platform has been provided.

Most Eternit products are provided palletised, banded and shrink wrapped, and can be delivered direct to site by a fleet of modern transport with mechanical off-loading facilities.

The products are delivered as follows:

- Fibre cement slates – banded, packed on pallets under a cardboard hood and shrink wrapped

STORAGE & HANDLING

Health and Safety Guide 33 [HSG33]

The above guide 'Health and safety in roof work' sets out full working at height, handling, public protection, risk assessment and CDM guidance and recommendations and should be referred to before commencing work on any project.

Storage of fibre cement slates

Slates should not be allowed to become wet when in packs or banded together, as efflorescence and staining can occur.

Storage inside a building or similar shelter: the polythene hoods covering the slates should remain as a temporary protection to the slates, provided no water vapour can enter from below the packs.

Storage outside: remove the polythene hoods and stack the slates in bundles off the ground and cover with a good tarpaulin allowing clearance between the tarpaulin and the slates. This will allow free air movement and help prevent condensation forming within the pack [which could cause efflorescence].

If the slates are to be stored outside for a very short period of time, then the sides of the hood should be split open before covering with a tarpaulin to reduce the risk of condensation in the packs.

On larger contracts, it is better to avoid storing too many packs on site and to schedule deliveries of slates as they are required.

Do not stack slates more than 2 pallets high in stockyards or on site.

LOADING OUT

General

- 1 Before slating commences, check delivered products against initial order and report any discrepancies or defective materials to the site agent or manufacturer.
- 2 Pallet loads should be checked for batch codes to ensure consistency on large roof areas.
- 3 Special fittings should be checked against matching slates to ensure suitability before slating commences.

Loading the roof with slates

- Load slates and fittings out on roof safely, support by battens to avoid slippage and distribute evenly to prevent overloading of roof structure [Fig. 1, page 8].
- All slates should be mixed from different pallet loads whilst the roof is being loaded to enhance the appearance when laid.

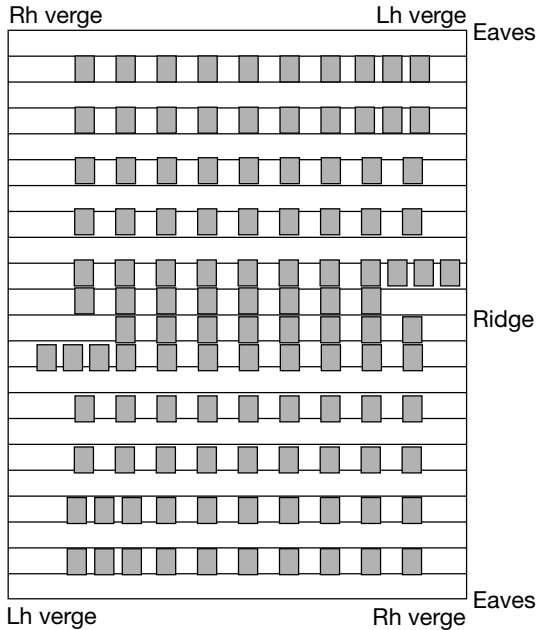


Fig. 1 - Loading roof evenly with slate stacks

General

Underlays for use beneath slates are either fully supported over boarding, sheathing or sarking, or unsupported draped over rafters/ counterbattens and should meet the following:

Fully supported underlays

- 1 HR* underlay to BS EN 13859-1 Class W1 water penetration classification with third party certification for the use intended.
- 2 LR† underlay to BS EN 13859-1 Class W1 water penetration classification with third party certification for the use intended.

Unsupported underlays

- 1 BS 8747 Class 1F Reinforced Bitumen or Class 5U polyester reinforced bitumen.
- 2 HR* underlay to BS EN 13859-1 Class W1 water penetration classification with third party certification for the use intended.
- 3 LR† underlay to BS EN 13859-1 Class W1 water penetration classification with third party certification for the use intended.

* HR (high water vapour resistance) underlay - > 0.25MN.s/g

† LR (low water vapour resistance) underlay - < 0.25MN.s/g

LR underlays are sometimes referred to as 'vapour permeable' or 'breather'.

General laying recommendations

- 1 Lay specified roofing underlay parallel to eaves or ridge with horizontal overlaps as specified in the table overleaf. Vertical side laps should be 150mm (min).
- 2 Minimise gap at laps resulting from different tautness between underlay courses. Drape in underlay between supports to be no less than 10mm and no greater than 15mm.

UNDERLAYS

- 3 A nominal 10mm drape should be provided between supports to allow a drainage path for moisture and to prevent excessive deflection under wind load.
- 4 Fix underlay with fixings specified, keeping number of perforations to a minimum.
- 5 Handle and fix underlay with care to ensure no tears or punctures. Repair any tears or punctures prior to slating.
- 6 Ensure that underlay does not obstruct flow of air through ventilators located at eaves, ridge or in the main roof.
- 7 Appropriately weather all holes formed in underlays for soil vent pipes etc.
- 8 Underlay laps should be covered by a batten and where necessary, the lap of the underlay adjusted to coincide with the nearest slating or tiling batten. Laps may also be sealed using proprietary means in accordance with manufacturers' instructions. Where a proprietary sealant is used, its durability should meet the same recommendations as the underlay. Refer to geographical wind zones for wind pressure resistance figures.
- 9 Contact should be avoided between the underlay and the underside of the slates to prevent the wind uplift load being transmitted to the slates.

Minimum horizontal lap for underlays

Rafter pitch	Not fully supported	Fully supported	Vertical laps
≥20°	150mm	100mm	150mm

BS 5250 and BS 5534 give advice on the installation of underlays and roof ventilation requirements.

BATTENS

Choosing battens

- 1 Roofing battens must meet the recommendations stated in BS 5534 in terms of their species, permissible characteristics and defects (knots, fissures and splits, wane, slope of grain, rate of growth, distortion, decay and insect attack, sap stain, resin pockets and moisture content), including minimum dimensions and grading requirements.
- 2 To help meet these minimum standards, roofing battens delivered to site should be graded with the following information in accordance with the standard:
 - a) Name of supplier (the company that graded the roofing battens NOT the company that cut them)
 - b) Origin
 - c) Graded in accordance with BS 5534
 - d) Basic size
 - e) Type of preservative (if applicable)
- 3 All roofing battens must conform to requirements set out in BS 5534 and must be checked prior to installation. Failure to do so, risks increasing unnecessary waste, invalidating warranties and introducing a health and safety hazard on site.

BATTENS

Choosing counterbattens

- 1 It is important to note that counter battens need not be marked or graded where they are fully supported by the rafters. In cases where they are used to restrain insulation boards and are subject to upward bending loads they should be graded.
- 2 If counter battens are used to provide a ventilation gap beneath the roof covering, there is a potential risk of high levels of moisture, and it may be advisable for them (and the roofing battens fixed above) to be preservative treated in order to provide the required durability.

Recommended batten sizes (BS 5534)

- 1 One of the biggest issues with roofing battens is under-sizing. To avoid this, there is now a clear tolerance limit for the minimum depth of a roofing batten, which is +3mm/-0mm. Also, roofing battens cannot be less than 25mm deep and where the span between supports exceeds 600mm, calculations must be completed to determine their correct dimensions for structural integrity.

Tile type	Basic minimum sizes			
	up to 450mm span		451 - 600mm span	
Rafters/supports	width	depth	width	depth
Fibre cement slates	38	25	50	25

All dimensions subject to re-sawing allowance: width + 3mm depth 0 or + 3mm based on measurement at a reference moisture content of 20%.

CUTTING SLATES

Fibre cement slates

All cutting and drilling of slates should be carried out in well ventilated areas to prevent the inhalation of dust, in accordance with Health and Safety recommendations.

- 1 Slates should be scored using a scribing tool and snapped over a straight edge (Fig. 2), or scribed and cut with a guillotine.
- 2 Slates can also be cut with a manual, hand-held slate cutter. This should always be used when cutting acute angles.
- 3 Do not use an angle grinder or slater's axe for cutting fibre cement slates.
- 4 Additional fixing holes should be drilled using a standard 4.0mm dia. drill bit. Fixing holes must not be punched.



Fig. 2 – Cutting fibre cement slate using a scriber

CUTTING SLATES

5 Wherever possible, avoid dust inhalation by using non-mechanical cutting equipment fitted with dust extraction or dust suppression.

6 Always wear appropriate personal protective equipment (goggles/protective clothing/ear defenders/and approved respirator] when mechanically drilling slates.

See HSE guidance on Respiratory Protective Equipment (RPE) at www.hse.gov.uk

7 After cutting or drilling slates, brush off all dust from the surface to avoid staining.

Product Data Sheets which comply with the Control of Substance Hazardous to Health (COSHH) regulations are available for all Eternit roofing products.

8 Avoid cutting slates that are laid in situ, particularly open valleys, as this may cause damage to the valley lining, and is also a health and safety hazard.

9 Consideration should be given to sealing any cut edges to prevent potential efflorescence staining.

FLASHINGS & WEATHERINGS

Introduction

Whilst lead sheet is the most common material for flashings and weatherings for slated roofs, pre-formed flashings and other lead replacement products are growing in popularity. These represent a much lower material cost and can be installed without the need for specialist tradesmen.

Lead is malleable and can be easily dressed to fit flat slates. BS EN 12588* gives the specification for lead for use in roof flashings and weatherings as summarised in the table.

Lead sheet for building purposes – BS EN 12588

Code No.	Colour code	Thickness [mm]	Weight [kg/m ²]	Max. length [mm]	Uses
3	Green	1.32	14.97	1.0	Soakers
4	Blue	1.80	20.41	1.5	Flashings Inclined valley Gutters Saddles
5	Red	2.24	25.40	1.5	Horizontal valley gutters

* BS EN 12588 – 'Lead and lead alloys. Rolled lead sheet for building purposes'. For further information and guidance on leadwork detailing, please see The Lead Sheet Association website: www.leadsheet.co.uk

FLASHINGS & WEATHERINGS

The following rules apply when using lead as a flashing and weathering:

- 1 Single pieces should be limited in size (the thinner the piece, the smaller the size) so that natural expansion and contraction is kept to a minimum and the risk of severe distortion (with associated risks of fatigue cracking) is avoided.
- 2 Fixings (while not restricting thermal movement) must be adequate to support the lead and (dependent on exposure) retain it in position.
- 3 Joints must allow for thermal movement, yet remain weathertight for the location in which they are used.

Flashings at the head of slated roofs should lap the top course of slates by a distance which will vary according to the pitch of the roof [see Fig. 3].

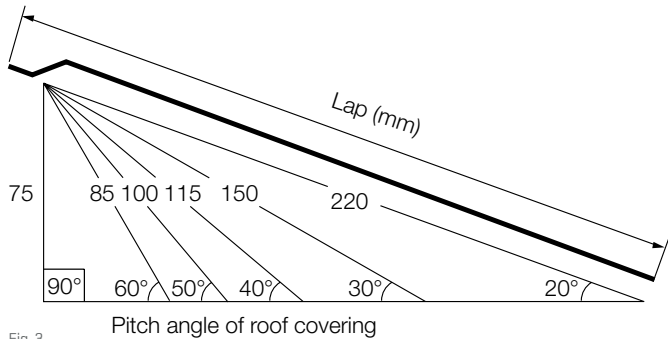


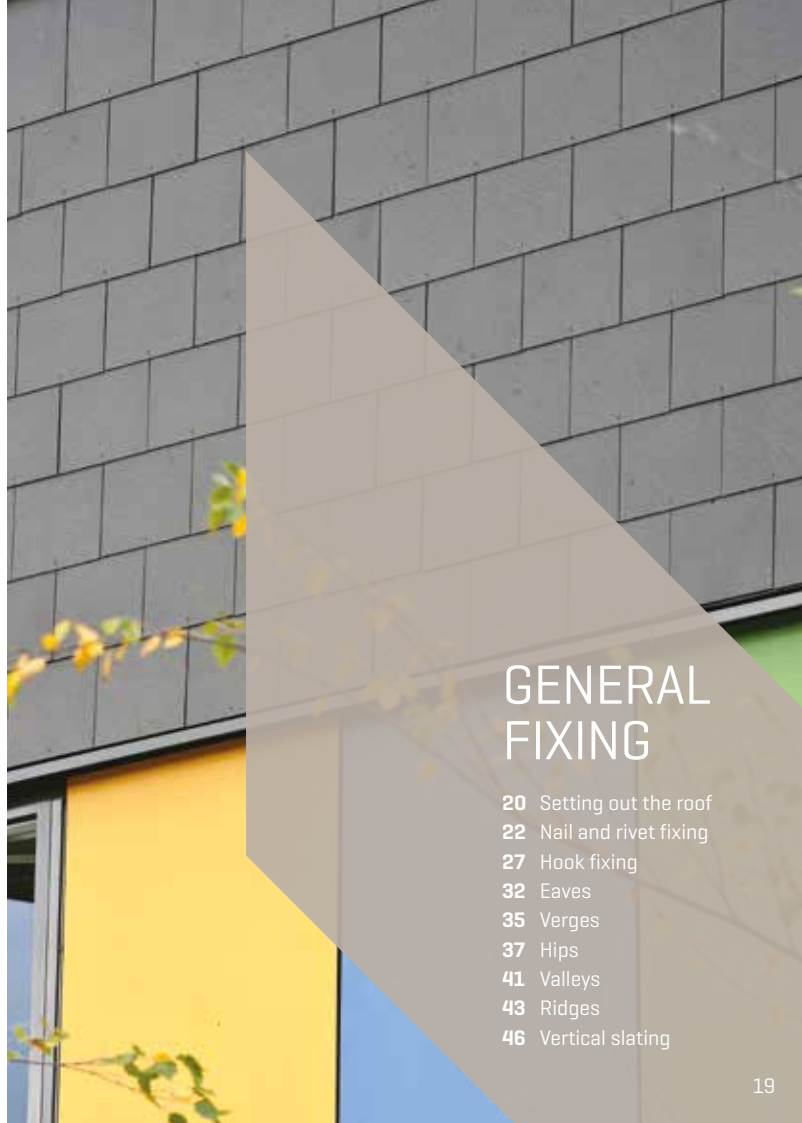
Fig. 3

FLASHINGS & WEATHERINGS

- 4 All lead flashings and soakers should be treated on both sides with patination oil to prevent water run-off and moisture-containing lead oxide from staining the roof covering.

Flashings and weatherings may also be formed from copper, aluminium or zinc as prescribed in BS 5534.

Proprietary materials formed using GRP, PVC or colour coated aluminium with a bituminous adhesive backing should be fixed in accordance with the manufacturer's recommendations.



GENERAL FIXING

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SETTING OUT THE ROOF

Setting out of battens

Roofs should be set out with battens, to the appropriate gauge. Select the appropriate gauge for the slate size by using the formula:

$$\text{gauge} = \frac{\text{length of slate} - \text{lap required}}{2}$$

Allow the eaves slates to overhang into the gutter by approximately 50mm. Verge overhang should be restricted to a maximum of 50mm.

Where less than $\frac{3}{4}$ of a standard slate is required, a cut double is used and drilled as required.

A vertical or raking batten is advisable at hips, valleys and intersections.

Counterbattens (Fig. 4)

Eternit fibre cement slates are classed as a 'close fitting' roof covering. When installed with vapour permeable underlays, counterbattens **MUST** be used to ensure 50mm continuous ventilation along with the correct eaves and ridge ventilation into the batten cavity.

SETTING OUT THE ROOF

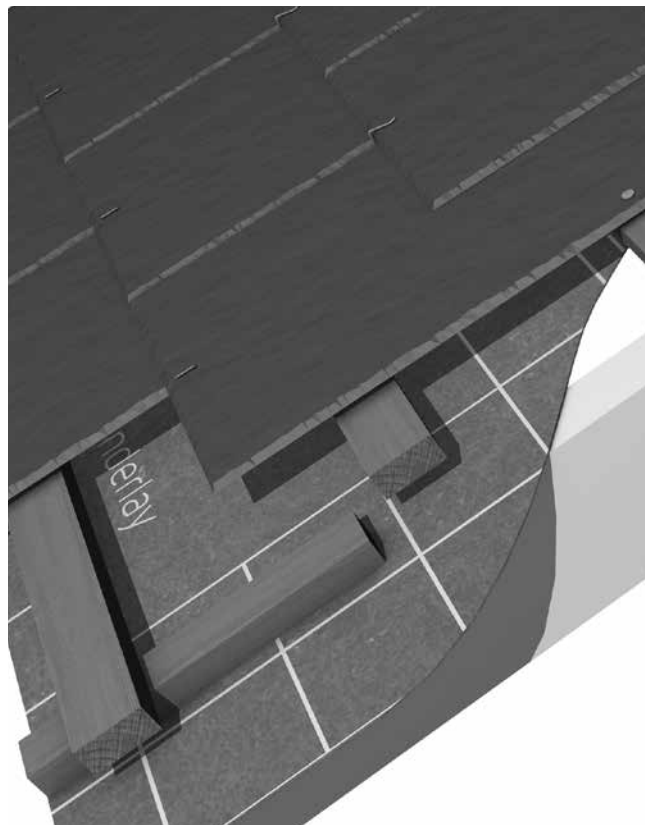


Fig. 4 - Counterbattens

NAIL AND RIVET FIXING

Slate fixing method

- 1 Set out roof with battens by calculating the gauge using the formula on page 20, remembering to allow eaves slates to overhang gutter by 50mm.
- 2 Set out both under-eaves battens to accommodate the under-eaves slate lengths, similar to those shown in the table on page 23, and Fig. 5 below, but following the correct laps and gauges.
- 3 Begin by cutting and head nailing the first under-eaves course along the eaves (Fig. 6). Drill two 4.0mm dia. holes for nails 20mm in from each edge and 15mm down from the head (when using 50 x 25mm battens). The top of the slate is placed at the centre of the batten and a 4-5mm gap should be left between each slate.

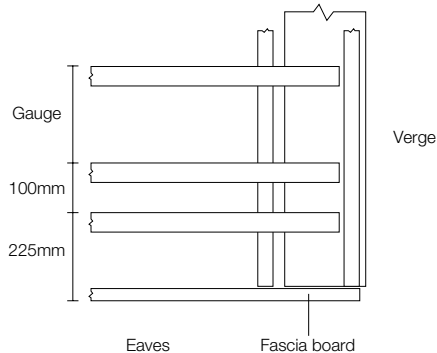


Fig. 5 - Batten configuration at eaves

NAIL AND RIVET FIXING

- 4 Cut and fix second under-eaves course to the lower batten with slate-and-a-half widths at the verge (Fig. 7). Prior to fixing slate-and-a-half slate, drill (4.0mm dia.) hole half a slate width in from verge and 25mm up, and insert a copper disc rivet for fixing first full slate course.

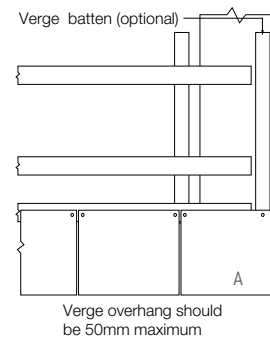


Fig. 6 - 1st under eaves course

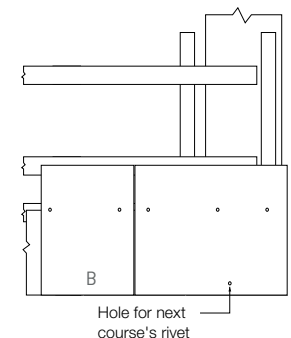


Fig. 7 - 2nd under eaves course

Under-eaves slate lengths

All sizes are in mm	Slate size	Typical laps	1st under-eaves slate length (A)	2nd under-eaves slate length (B)
Birkdale (20-90°) hook fixed	600 x 300	150	225	375
Birkdale (20-90°)	600 x 300	110	245	355
Thrutone (20-90°)	600 x 300	110	245	355
Rivendale (20-90°)	600 x 300	110	245	355
Garsdale (20-90°)	600 x 300	110	245	355
Birkdale, Thrutone, Rivendale, Garsdale (22.5 - 90°)	600 x 300	100	250	350

NAIL AND RIVET FIXING

- 5 Fix the first course of full size slates. At the verge, another 4.0mm dia. hole is required to allow for the copper disc rivet for the next course. This is drilled 50mm from the outside edge of the slate, and 25mm plus gauge from the bottom edge or tail (Fig. 8). The rivet must be inserted before the slate is nailed.
- 6 Each full size slate is now fixed with two nails firmly into the slate batten and a rivet placed between the edges of the two lower slates (Fig. 10 inset).

The shaft of the rivet projects through the hole in the tail of the appropriate slate in the next course and is bent down the roof slope to secure the tail of the slate.

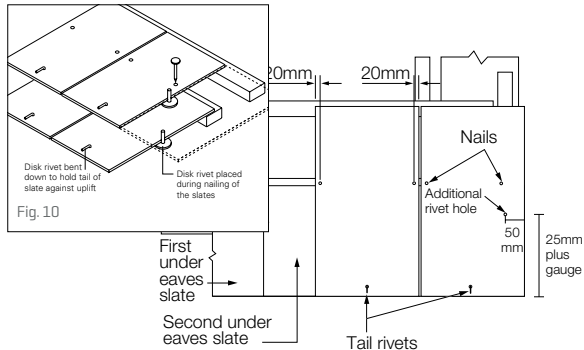


Fig. 8 - 1st course of standard slates

NAIL AND RIVET FIXING

- 7 At the verge, install the first full length slate-and-a-half slate, drilling 3 x 4.0mm dia nail holes on the batten line and two additional 4.0mm dia. holes for the copper disc rivets (Fig. 9).

For remaining courses where single and slate-and-a-half slates are used, a third 4.0mm dia. copper disc rivet hole is required to accommodate the rivet for the next single width verge slate (at point C, Fig. 9).

This is drilled half the single slate width from the side of the slate, and 25mm plus gauge from the bottom edge or tail.

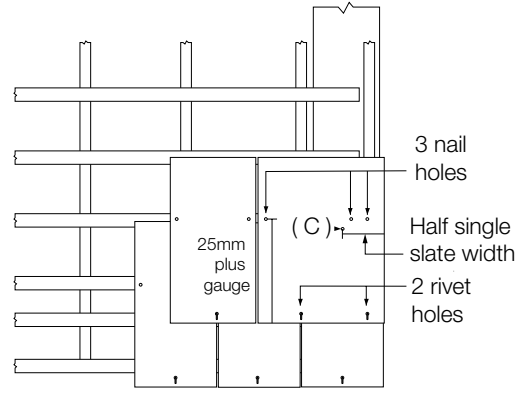


Fig. 9 - Using slate-and-a-half to break bond

NAIL AND RIVET FIXING

8 Continue across and up the roof with whole slates, trimming to verges, hips, valley and ridges as necessary [Fig. 11].

Cut double slates must be used at hips and valleys. The minimum width of cut slate should be 3/4 of a standard slate. If less, we advise using a cut double slate in place of the small cut piece and the adjacent full slate.

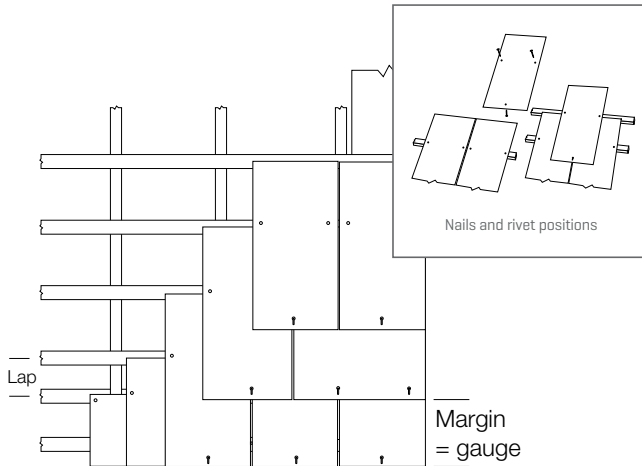


Fig. 11 - Continue laying broken bond

HOOK FIXING

For Birkdale slates at 20-90°*

1 Set out roof with battens gauged to suit a 225mm long first under-eaves course, a 375mm long second under-eaves course and general batten gauge of 225mm. Allow a 50mm eave overhang into gutter [Fig. 12].

* 225mm gauge with 50 x 25mm battens

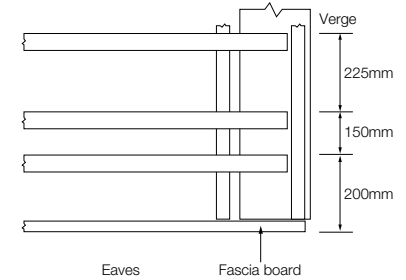


Fig. 12

2 Cut 225mm from the end of a full slate for the first under eaves course. Begin by cutting to size and drilling 2 no. 4mm dia. holes 20mm in from either edge and 15mm down from the top edge of the slate for head nailing the first under-eaves course along the eaves [Fig. 13].

The top of the slate is placed at the centre of the batten and a 4-5mm gap should be left between each slate.

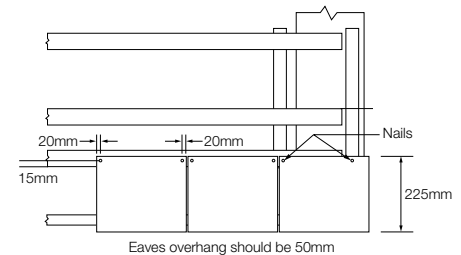


Fig. 13

HOOK FIXING

- The remaining cut piece of each slate can be used for the second eaves course. Cut to size and drill 2 no. 4mm holes 20mm in from either edge for shoulder nailing the second under-eaves course of full width slates to the bottom batten. The slate-and-a-half widths laid at the verge require 2 additional drilled holes, 1 on the batten line for centre nailing and 1 drilled half a slate width in from verge and 25mm up, to allow for a copper disc rivet to fix the first full slate course (Fig. 14).

Insert the disc rivet into this hole before fixing the slate-and-a-half. Keep a 4-5mm gap between adjacent slates.

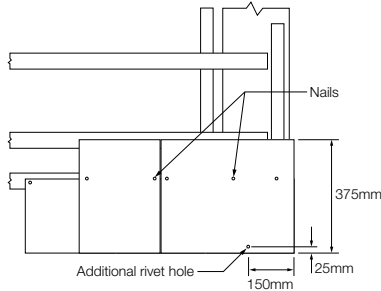


Fig. 14

- First course of full size slates (Fig. 15). All these slates need to be drilled with 3 no. 4mm dia. holes, 2 for shoulder nailing to the batten 20mm in from each edge 385mm from the bottom edge, and 1 drilled along the centre line of the slate and 25mm up from the bottom edge to accept a copper disc rivet, fitted in the course below.

At the verge, a fourth 4mm dia. hole is required to allow for the copper disc rivet for the next course. This is drilled 50mm from the outside edge of the slate and 25mm plus gauge [225mm] from the bottom edge. Keep a 4-5mm gap between adjacent slates.

HOOK FIXING

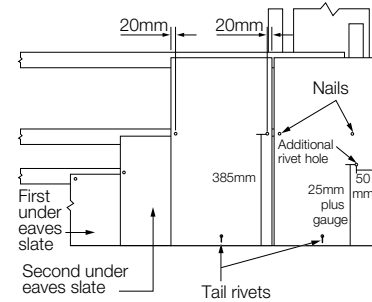


Fig. 15

- At the verge on the next course, install the first full length slate-and-a-half slate, by drilling 3 no. 4mm dia. nail holes on the batten line for shoulder nailing 385mm up from tail of slate and two additional 4mm dia. holes for the copper disc rivets to secure the tail of this slate and that of the slate above (Fig. 16).

A slate hook is placed between the two slates below to provide the second tail fixing for this slate-and-a-half.

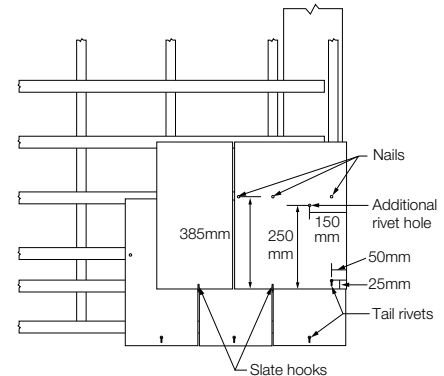


Fig. 16

HOOK FIXING

- Each full size slate on this course is now fixed with a 150mm long spiked hook driven into the batten between the edges of the two slates below (Fig. 17).
- The full size slate fitted at the verge on the course above requires 2 no. 4mm nail holes drilled on the batten line as well as 2 no. 4mm disc rivet holes to accommodate the tail rivet and for the slate-and-a-half in the course above (Fig. 18). For full drilling procedure, see No. 4, page 29.

Continue across and up the roof with hook fixed whole slates and nail and riveted perimeter slates, trimming to verges, hips, valley and ridge as necessary.

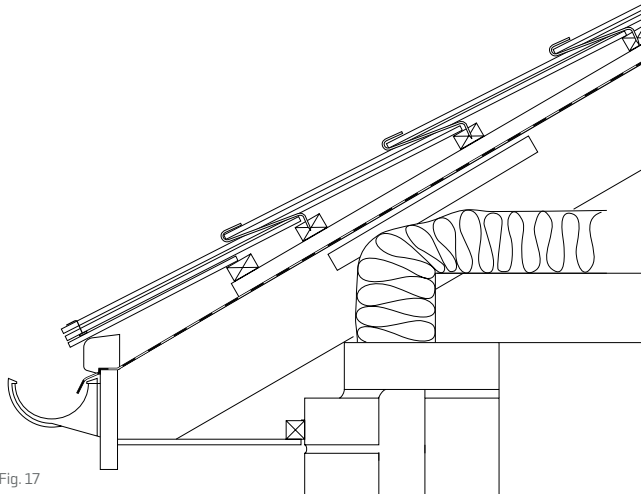


Fig. 17

HOOK FIXING

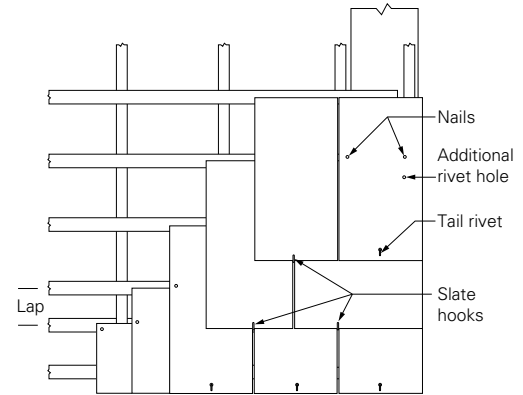


Fig. 18

Hook fixing at ridges

When using hook fixings at ridges, slates should be nailed and hooked. The ridge should be covered with an appropriate ridge capping.

Hook fixing at hips

When hook fixing at hips, the hips should be capped with an appropriate capping. Each hip slate should be nailed in addition to a rivet.

Hook fixing at valleys

When hook fixing at valleys, each valley slate should be nailed in addition to a rivet.

Both hips and valleys should be formed using cut double slates at the end of each course cut to suit.

EAVES

For fibre cement slates, it is essential for the function and long term performance of the roof that three courses of slates are laid at all eaves. Set out the under-eaves battens to accommodate the typical under-eaves slate lengths as shown in the table below.

Tilting fillet - eaves support tray

The dual purpose of the tilting fillet or eaves support tray is to ensure that the underlay is evenly dressed over the fascia to avoid trapping water and, in association with the fascia, commence the correct laying of the slates. To achieve these functions, the fascia/tilting fillet should be approximately 8-15mm above the top of the general batten level.

Note: At low pitches, the tilting fillet upslope length should ensure a minimum of 10° slope of the underlay.

Fixing

- 1 Install the underlay (and durable strip of Type 5U or UV resistant underlay) parallel to the eaves with the horizontal overlap appropriate to the rafter-pitch (see page 10).
- 2 Ensure that the underlay overhangs the fascia sufficiently to drain into the gutter and that dressing the underlay over the tilting fillet prevents any collection of water.*
- 3 Locate and secure the battens to the correct centres appropriate to the size of slate and rafter pitch.
- 4 Follow the slate fixing procedure described on pages 20-26, or 27-31 for hook fixing

Note: When using an LR underlay, a felt support tray should used with timber fillets at each rafter. If batten cavity is to be ventilated, fit felt support trays under OFV strips and lap underlay over a felt support tray by a minimum of 200mm.

EAVES

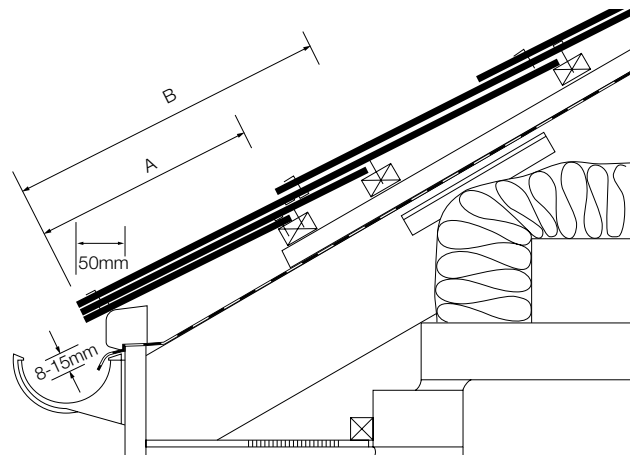


Fig. 19 - Detailing at eaves when installing breather membrane and counterbattens

Under-eaves slate lengths

All sizes are in mm	Slate size	Typical laps	1st under-eaves slate length [A]	2nd under-eaves slate length [B]
Birkdale (20-90°) hook fixed	600 x 300	150	225	375
Birkdale (20-90°)	600 x 300	110	245	355
Thrutone (20-90°)	600 x 300	110	245	355
Rivendale (20-90°)	600 x 300	110	245	355
Garsdale (20-90°)	600 x 300	110	245	355
Birkdale, Thrutone Rivendale, Garsdale (22.5°-90°)	600 x 300	100	250	350

EAVES

Eaves fascia heights without ventilation

The table below, calculated using a 19mm thick timber fascia board with slate projecting 50mm beyond the front plane of the fascia (Fig. 20).

Heights shown will be affected where rigid sarking and counterbattens (Scottish practice) are used or where there is variation in batten thickness, tile overhang, fascia thickness or pitch.

The eaves course of slates must be in the same plane as the remainder of roof.

Pitch	20°	30°	40°	50°	60°	70°
Fascia height (x) mm	24	22	22	22	-	-

* The nominal dimensions given are for guidance only and may need to be adjusted to suit site requirements by ensuring that the eaves course of slates is laid at the same pitch as the main body of the roof.

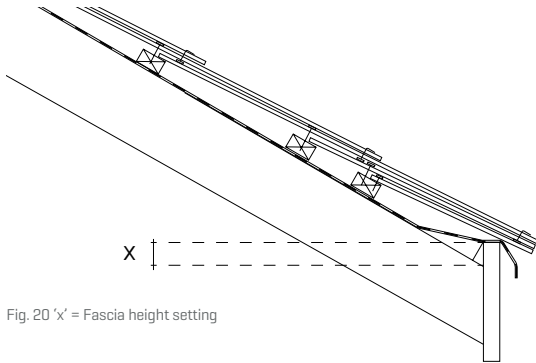


Fig. 20 'x' = Fascia height setting

VERGES

Eternit dry verge

- 1 Extend the roofing membrane to the edge of the roof area, either wall or bargeboard depending on design.
- 2 Extend the slate battens to the edge of the roof area as per the roofing membrane.
- 3 Fix the Eternit dry verge trim to the top of the slate batten such that the down stand is against the wall or bargeboard. Cut eaves end of the verge trim to suit the eaves detail and the ridge end of the trims to mitre together to suit the duo pitch or mono pitch roof detail.
- 4 Complete slating ensuring slates are fully inserted into the verge trim. Ensure slates are nailed and tail rivets inserted as per verge detail using alternate full slates and slate-and-a-half widths. In alternate courses and extra wide slates cut from blank double slates. Remember, smallest slate width is 3/4 of standard slate.



Fig. 21 - Eternit dry verge - shown with bargeboard

VERGES

Mortar bedded verge

- 1 Extend the underlay to edge of roof and trim to the edge of the bargeboard or wall. Nail fix or bed the undercloak, projecting not more than 50mm beyond the face of the bargeboard or wall. Nail the slating battens to finish 25-50 mm from the edge of the undercloak.
- 2 Finish the slating over the verge to the edge of undercloaking with alternate courses of full width and slate-and-a-half slates or extra wide slates [cut from doubles] on a 100mm wide bed of mortar.
- 3 Neatly point to form a weathered profile giving 5mm overhang of slates over the mortar. Make sure that the mortar is not displaced or cracked when nail-fixing the roof slates [Fig. 22].

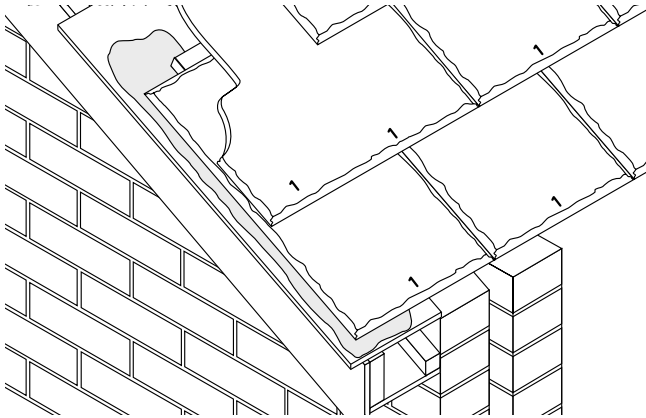


Fig. 22 - Bedded verge on bargeboard with fibre cement undercloak

HIPS

Hips with fibre cement duo pitch ridges

Eternit duo pitch ridges can be used to cap hips as well as roof apexes.

- 1 Dress the underlay along each slope and end at the hip rafter. Dress additional underlay along the hip rafter, overlapping 300mm minimum each side.
- 2 Fix a 150 x 25mm hip board on each side of the hip rafter. Cut and nail battens into side of hip board.
- 3 Mitred slates cut from double blanks should be fixed to the battens and hip boards. Each raking cut slate should be site drilled with 3 nail holes and 2 rivet holes, plus an additional rivet hole for the next course.

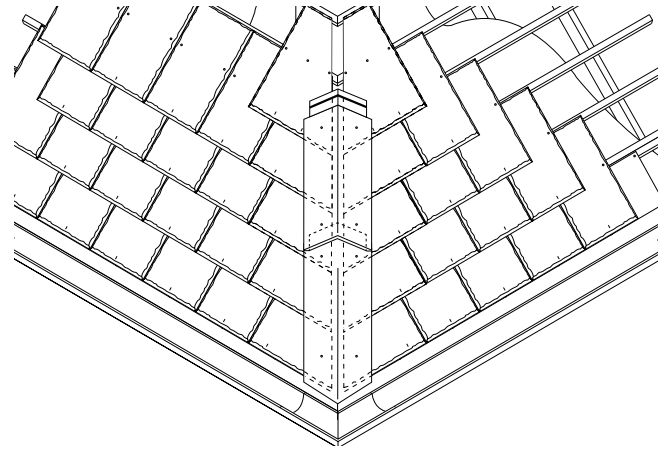


Fig. 23 - Fibre cement duo pitch ridge units used as hip capping

HIPS

- 4 Place duo pitch unit over hip, with internal socket pointing upwards and cut bottom edge to suit angle of the eaves. Drill 8mm holes [125mm from the effective ends of the capping, 50mm up from the edges] through the hip capping and the slates. Fix capping with 4 No. 60mm x 6.3mm self-sealing screws into hip boarding.
- 5 Fix subsequent units up the hip, sealing the joints with 6mm diameter butyl strip [Fig. 23].
- 6 At the intersection of the hips and ridge, all the duo pitch cappings should be mitre cut to form a neat detail with tight joints. The whole junction should be weathered with a Code 4 lead saddle fitted beneath the cappings. To avoid lead oxide staining, patination oil should be applied to all the lead surfaces before fixing.

Note: The use of additional extra wide slates may be necessary adjacent to the mitre-cut slates to reinstate the slate bond sequence across the roof.

Close mitred hips

Close mitred hip constructions should not be used for roof pitches below 30°.

If the site is in an exposed location, additional fixings are required.

- 1 Dress the underlay along each slope and cut at the hip rafter. Dress additional underlay along the hip rafter, overlapping 300mm minimum on each side.
- 2 Fix roofing battens to the hip rafter and align on each slope. Insert lead soakers in every course up the hip [Fig. 24].

Mitred slates cut from double blank units must be fixed with three copper nails and two copper disc rivets.

HIPS

The third nail must be fixed into either:

- A An additional batten parallel and central to the slating battens securely fixed to at least two rafters on either side of the hip.
- B A continuous board either side of the hip, again securely fixed, or
- C A continuous batten either side.

In areas of severe exposure, a supplementary fixing in addition to the above should be used in accordance with BS 5534.

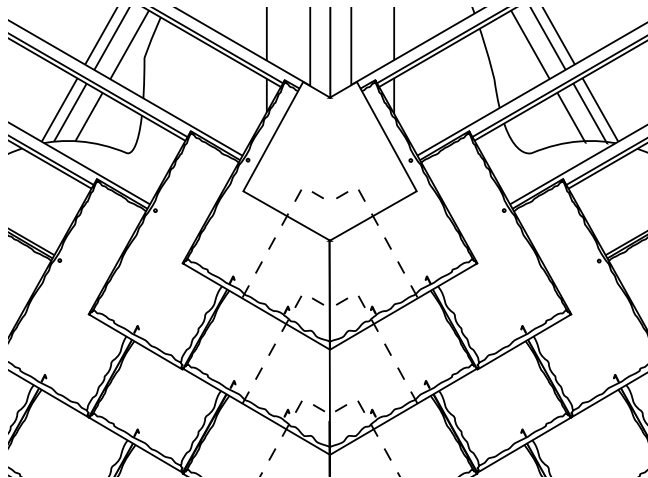


Fig. 24 - Close mitred hip with lead soakers

HIPS

Mortar bedded hips

- 1 Dress the underlay along each slope and cut at the hip rafter.
- 2 Install either an additional layer of underlay (not less than 600mm wide) centrally over hip line, or cut the underlay to the hip rafter and overlap the upper layer 150mm beyond the hip line.
- 3 Nail the slating battens to the hip rafter, or ensure that the ends are fixed to timber noggins.
- 4 Galvanised steel hip irons in accordance with BS 5534 are to be fixed to the hip rafter or hip batten with 2 No. 5mm diameter galvanised steel screws.
- 5 Form neat raking cut slates from double slates to fit closely at the junction, and fix each slate with 3 No. nails and 2 No. copper disc rivets avoiding small pieces of slate.

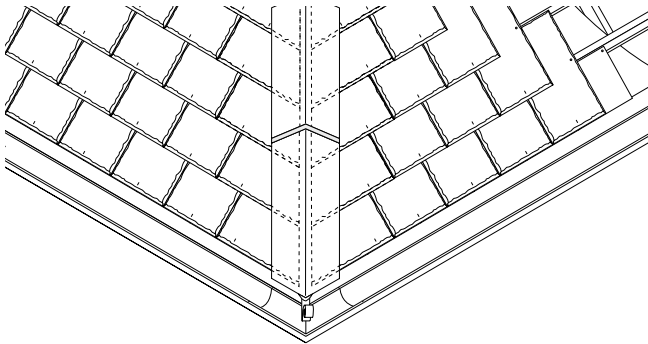


Fig. 25 - Mortar bedded hip with ridge/hip tile capping for concrete or clay

VALLEYS

Open metal valley

- 1 Fix support noggin to the inside of each rafter face at a level to receive individual valley boards between the rafters.
- 2 Nail valley boards to lay flush with the tops of the rafters, fix valley fillets ensuring sufficient valley width.
- 3 Drape the underlay and fix slating battens to bear 50mm on each valley board.
- 4 Lift the underlay and fix the lead gutter lining over the valley boards and dress on valley fillets. Form welted ends on the inside edges of the gutter lining, reposition the underlay over the welted edges of the valley and trim 40mm beyond the fillets.

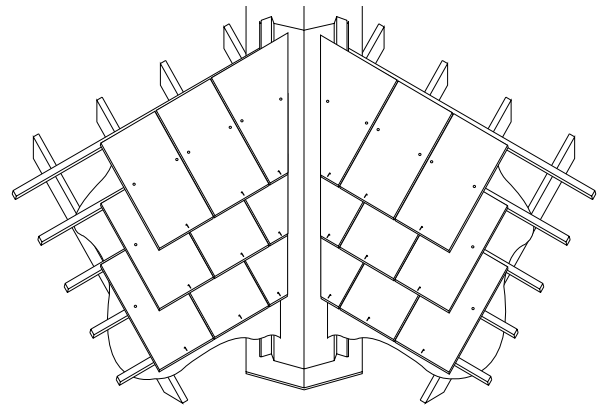


Fig. 26 - Open metal valley

VALLEYS

- 5 Vertical infill noggins or raking battens may be required between the slating battens to accommodate the third slate nail.

Note: If trussed rafters are used, the manufacturer may not permit the notching of rafters. This can be overcome by fixing timber noggins to the insides of the rafter faces at a level to receive individual lay boards between the rafters.

- 6 Centre-nail valley slates, positioning rivets before fixing down. Ensure a 50mm overhang from the valley fillet and provide the required clear gutter to maintain an uninterrupted flow of water from the roof [Fig. 26, page 41].

Note: Double width slates should be used in every course adjacent to the valley with additional nail fixings.

Minimum widths of valley gutter for different roof pitches and plan areas (lead or GRP open valleys)

Design rainfall rate	225mm/h		150mm/h		75mm/h	
Roof pitch (on plan)	<25m ² [mm]	25-100m ² [mm]	<25m ² [mm]	25-100m ² [mm]	<25m ² [mm]	25-100m ² [mm]
20° - 22.5°	125	200	125	150	100	125
22.5° - 29.5°	100	150	100	125	100	100
30° - 34.5°	100	125	100	100	100	100
> 35°	100	100	100	100	100	100

RIDGES

Fibre cement duo pitch ridge

Eternit duo pitch ridge units and stop ends are designed with a socket for a simple fix by drilling and screwing to an additional ridge fixing batten at the apex. Recommended screws are 60mm x 6.3mm self-sealing wood screws. An alkali-resisting, non-oil based 6mm diameter butyl strip should be used to seal across the socket, 50mm from the end.

- 1 Fix the underlay along the roof apex to overlap opposite roof slopes by 300mm.
- 2 Fix the top batten to suit the gauge of the slate.
- 3 Fix an additional ridge fixing batten downslope to enable the self-sealing screw to penetrate the ridge unit 50mm up from the bottom edge of the ridge unit.

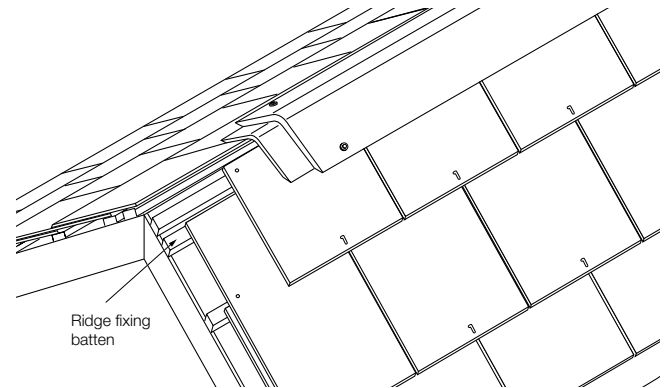


Fig. 27 – Ridge finished with duo pitch ridge units*

* The duo pitch right angle return units are fixed in the standard manner, drilled and screwed and bedded on butyl strip as described above.

NB: Please ensure ventilation is always maintained in line with BS 5250

RIDGES

- 4 Head nail the top slate course to the top batten. Locate the starter ridge stop end at one end, drill and screw the end of the ridge to the ridge fix battens. Drill 125mm from the effective ends 50mm up, i.e. ignore the socket.
- 5 Apply 6mm butyl diameter strip across the socket, 50mm from the end.
- 6 Locate successive ridge units along the roof apex, drill and screw to the ridge fixing battens, ensuring a level ridge with joints bedded on butyl strip [Fig. 27, page 43].
- 7 Shorten the ridge units and finish the stop end as necessary, which may include removal of the socket. Avoid ridge units less than 450mm length. If necessary, shorten one ridge so no ridge unit is less than 450mm long, Do not shorten the stop ends.

Notes: If a mortar bedded ridge unit is used, the surface of the slate should be primed with a suitable bonding agent, and the mortar should contain a non-shrink additive.

For fixing fibre cement ridges, a 12-sided [1/4"] Torx socket is required.

Mortar* bedded ridges

- 1 Lay the top course of the underlay from one side of the ridge over the apex to overlap the top course of the underlay on the other side by not less than 150mm.
- 2 Position two slating battens downslope from the ridge line. The last full length roof slate/short course is cut to headrest on the lower batten and centre nailed, as normal. The top course of slate is then formed to the required length and head nailed to the highest batten, 40mm from the side and 30mm from the top edge.

RIDGES

[To ensure that the top course of slates lays neatly, an additional timber strip can be placed on top of the batten to compensate for the thickness of the slate course below.]

Note: An adhesion additive should be added to the mortar when used with fibre cement slates

- 3 The ridge fittings should be edge bedded onto the top course of the slates with solid bedding at butt joints, supported by slate pieces [Fig. 28].
- 4 Install the stop end ridge tiles neatly to align with the ridge and verge edge, solidly bed in mortar and, where specified, secure the ridge mechanically at the stop end.
- 5 Make all joints with the adjacent ridge tile weathertight and solidly bed in mortar. A mechanical fix is required in each mortar joint.
- 6 Ensure all ridge units are mechanically fixed at both ends with mechanical fixings through the mortar joint, or with additional mechanical fixings through the ridge tile.

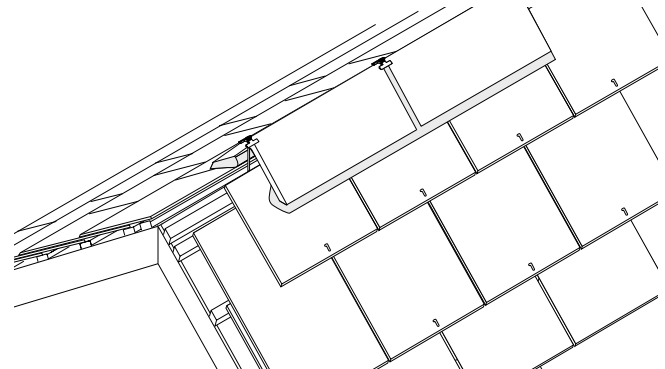


Fig. 28 – Ridge finished with mortar bedded angular ridge tile, mechanically fixed

VERTICAL SLATING

For small areas of wall slating (e.g. dormers). In general, vertical slating follows the same installation principles as roof slating [Fig. 29, page 47].

- 1 Finish the vertical slating at each end with alternate courses of full width and slate-and-a-half or extra wide slates.
- 2 All corners and angles should be weathered with Code 3 lead soakers interlaced with the slates or with feature lead roll details.
- 3 The soakers for vertical slating are 200mm width, with length equal to gauge + lap + 20mm.
- 4 Junction of vertical slating with roof verge. Install an additional slating batten parallel to and below the roof verge.
- 5 At the ends of the courses, mitre-cut the extra wide slates to the angle of the verge rake. Fix cut slates to the batten with the cut edge parallel to and below the verge [not illustrated].
- 6 Complete roof apex using either a fibre cement mono-ridge capping or concrete/clay mono-ridge tile [mechanically fixed as recommended].
- 7 If vertical slating is being installed as a ventilated rainscreen or requires a ventilated batten cavity, please contact Technical for details.

VERTICAL SLATING

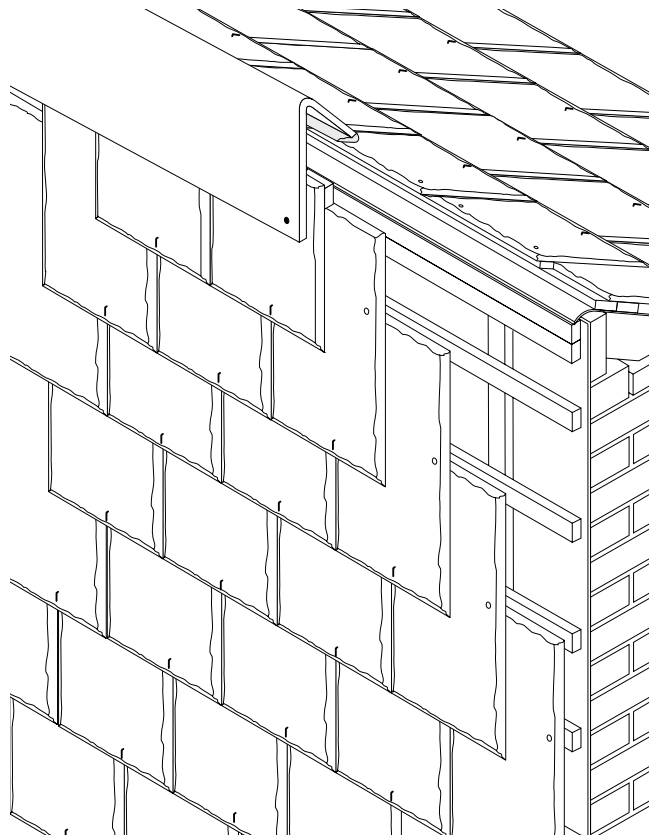


Fig. 29 - Vertical slating with fibre cement mono-pitch ridge capping



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