CEDRAL

The World of Roofs

STANDARD ROOFS

FIBRE CEMENT SLATE FIXING GUIDE

etex inspiring ways of living

INTRODUCTION

Roofs falling into this category have the following characteristics:

(a) Any roof slope equal to or greater than the minimum pitch for the size of slate preferred that has a rafter length (horizontal projection – ie, measured on plan, not along the slope, from ridge to eaves) not exceeding 6 metres.

How this manual is structured

For ease of use in the office and on site, this section of Cedral's slating manual is divided into a series of "mini-chapters" – one for each of the different principal parts of a roof, as follows:

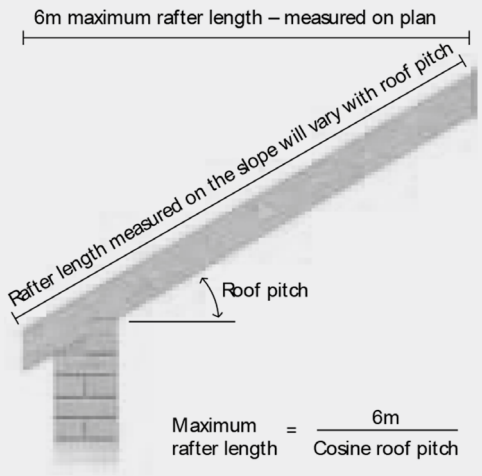
- The Eaves
- The Verge
- The Ridge
- The Hip
- The Valley
- Abutments
- Change of Pitch
- Roof Windows

The recommended use and detailing of both fibre cement slates and Classic natural slates is addressed within each mini-chapter. Discussion of each part of the roof opens with the relevant 'standard' or most commonly used fibre cement slate detail, and generally closes with a variation of that detail, in which Classic natural slates are used. In between, step-by-step guidance on important requirements and related considerations is provided and illustrated by thumbnail sketches, where appropriate.

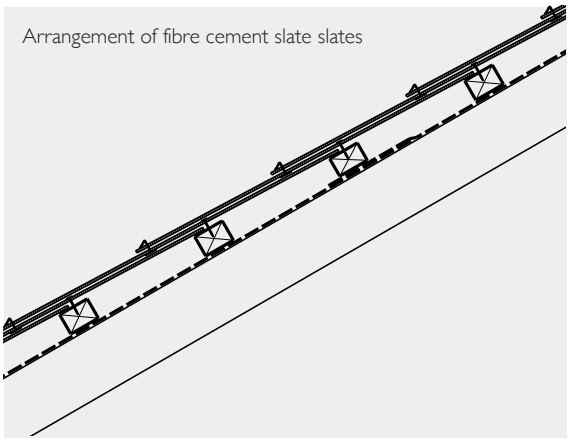
To improve overall legibility, the details – which are printed at scale 1:10 – are not annotated.

A selection of fully annotated, 1:5-scale, popular Cedral slating details is provided in the wallet at the back of this manual. These details, and many more, are also available for downloading from cedral.ie

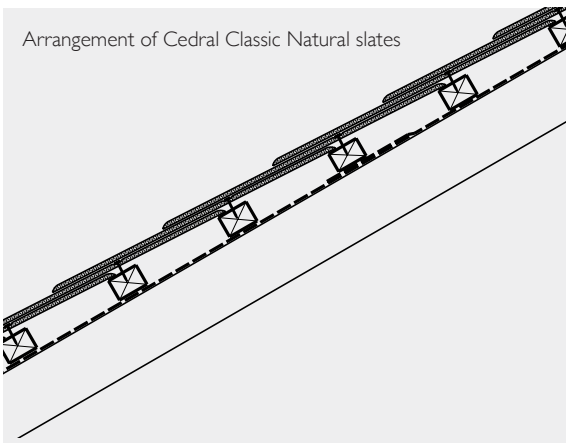
Standard roof



Arrangement of fibre cement slate slates



Arrangement of Cedral Classic Natural slates



EAVES

The eaves is the lower edge of the roof and handles the largest volume of water of any part of the roof. An eaves can be either overhanging, flush or concealed behind a parapet. An eaves may be straight (ie, level and horizontal) or raking (ie, an eaves that is either not level or, when viewed on plan, does not run at 90° to the rafters).

A sprocket or bellcast, as it is sometimes called, is not recommended for use with fibre cement slates but can be a feature when used in natural slating. Recommendations for minimum pitches apply when using a sprocket.

Structure

Eaves Support

A triangular tilting fillet should be used at the eaves to fully support the underlay and prevent moisture from ponding behind the fascia. A tilting fillet should fall outwards to the gutter by approx. 10°, and can be either of continuous timber, shaped to suit (not recommended where over-fascia ventilation is proposed) or of 6mm thick board material (such as exterior-grade plywood) or a proprietary plastic Cedral underlay support tray. A batten placed beneath the underlay is not suitable for providing the necessary eaves support.

Eaves Tilt

To ensure that finished slating fits correctly, the tails of undereaves and eaves slates should be raised slightly above the plane of the battens. Fibre cement slates should be tilted by between 8 mm and 15 mm above the plane of the battens. For natural slates, the tilt should be between 15mm and 25mm.

Underlay

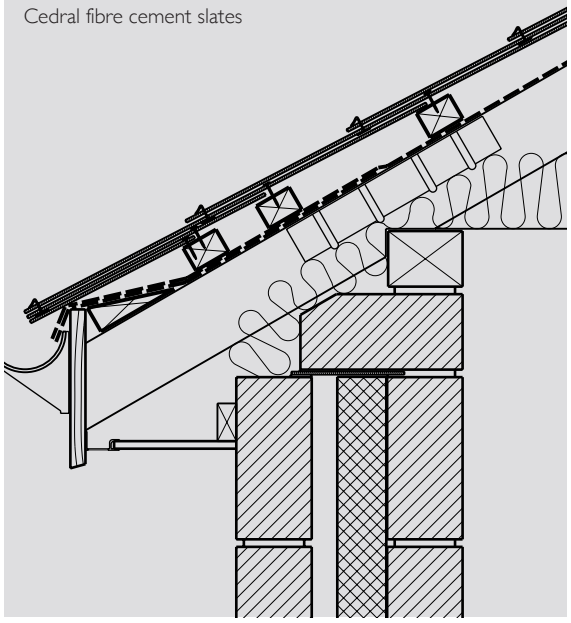
Drainage at Eaves

Roofing underlay must be supported at the eaves to prevent ponding and ensure that surface moisture discharges safely into a gutter. The importance of getting this detail right was highlighted as long ago as November 1982, in BRE Defect Action Sheet 9, published by the Building Research Establishment Housing Defects Prevention Unit.

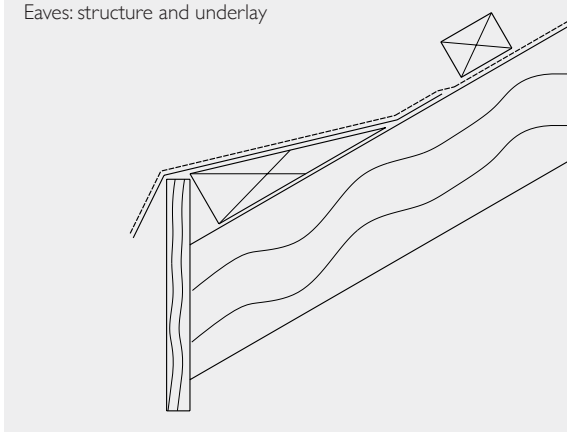
Eaves Reinforcement Strip

Where underlay is not resistant to UV degradation – for example, Type 1F felt to BS 747 or IS 36 – an "eaves reinforcement" strip of durable, UV-light-resistant material, such as Type 5U felt or a Cedral underlay support tray, should be installed between the eaves support and the underlay. It is important to ensure compatibility between the materials used in the reinforcement strip and the underlay.

Standard eaves with soffit ventilation – Cedral fibre cement slates



Eaves: structure and underlay



EAVES

Battens

The First Eaves Batten

For natural slating use either a pair of slating battens or an extra-wide batten as the first eaves batten. With all slates the positioning of the first batten depends on the length of slate and headlap specified.

Slates

Eaves Slate Courses

With fibre cement slates, two undereaves courses are used. The first undereaves course, which is equal in length to the gauge, is head-nailed and used both to support the lowest crampion and stiffen the eaves. The second undereaves course, which is equal in length to the gauge plus the headlap, is centre-nailed and laid in a broken bond over the first undereaves course. As the sum of the lengths of the undereaves courses is equivalent to the headlap plus twice the gauge, both undereaves slates can be cut from one full slate.

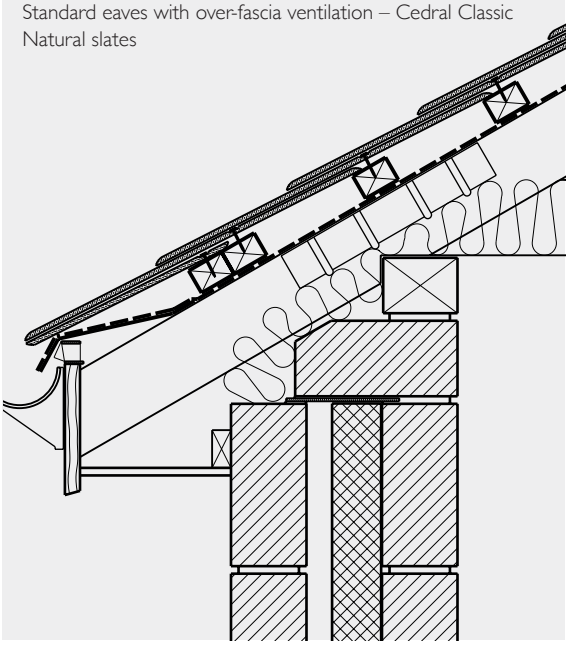
With Classic natural slates, a single undereaves course is used. Equal in length to the gauge plus the headlap, the undereaves slate is turned "upside down" – so that the riven, or dressed, edge of each slate tapers towards the other – before being head-nailed. This produces a strong, sharp line at the eaves.

Both the undereaves courses and the first full course of slating should overhang the gutter by about 50mm, measured horizontally from the face of the fascia.

Ventilation accessories

Ventilation can be incorporated into the eaves either by using soffit or over-fascia ventilators. Reference should be made to Cedral's Ventilation Solutions brochure.

Standard eaves with over-fascia ventilation – Cedral Classic Natural slates



Sizing undereaves slate courses

Size of slate	Lap	1st undereaves slate length	2nd undereaves slate length
600 x 300mm	110mm	245mm	355mm
600 x 300mm	100mm	250mm	350mm
600 x 300mm	90mm	255mm	345mm
500 x 250mm	100mm	200mm	300mm
500 x 250mm	90mm	205mm	295mm

VERGE

The verge is the edge of the roof plane that follows the line of the gable and connects the eaves with the ridge or a higher hip. The verge can be either straight (where it is at right angles to the line of the slate courses) or raked (where it is not). Verges may be finished flush with the gable wall or, more commonly, overhang it, to form a bargeboard and sloping soffit.

High winds can cause unusual, spiralling turbulence around verges and for this reason it is important to ensure that edge slates are adequately secured. Verge slating may be finished by using either an undercloaked, mortar-pointed system or Cedral's dry-fix trim system.

Cavity closer

A Cedral fibre-cement cavity-closer strip is a traditional means of closing off the top of cavity wall construction.

Underlay

Generally speaking, roofing underlay should be carried out over the outer edge of any verge. Underlay intended for use with dry verges should lap onto the outer leaf of the wall or, in the case of an overhanging verge, on to the flying rafter and extend approximately 20mm beyond the bargeboard. In the case of an overhanging verge to be undercloaked and pointed, the underlay should lap under the undercloak and extend approximately 20mm beyond the bargeboard or face of the wall.

Battens

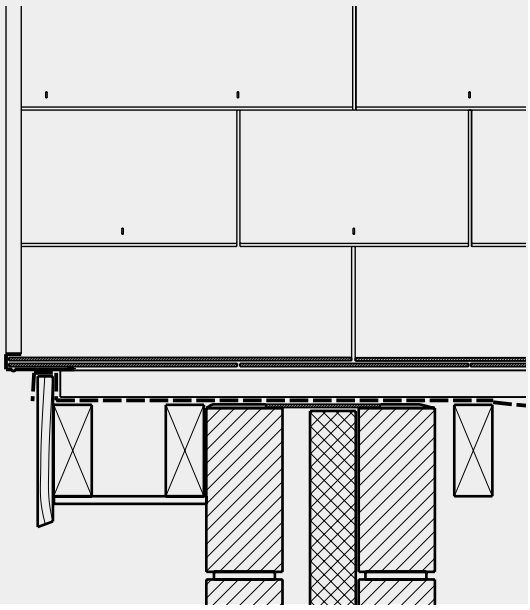
Battens should overlap the wall or undercloak by not less than 50mm. In the case of an overhanging verge the batten end should be supported on a flying rafter. The ends of all slating battens should be mechanically secured.

Slates

When using fibre cement slates, alternate courses should begin at the verges with either a cut double-width slate or a cut slate. Cut slates that would be less than 150mm wide should never be used. All slates wider than one-and-onethird times the specified slate-width should be fixed with three nails and two crampions – full holing and fixing details are provided in the Sitework section of this manual. Cut slates should be fixed with two nails and have their outside edge secured at the verge by a Cedral trim or be drilled and tied with copper wire to the slate below.

When using Classic natural slates, alternate courses should begin at the verges with a special slate-and-a-half slate. Slates wider than one-and-one-third times the specified slate should be centre-fixed with three nails. The appearance of a roof can be modified by chamfering or rounding the outer bottom corner of each verge slate.

Standard dry-fixed verge – Cedral fibre cement slates



VERGE

Dry-fixed verge: Cedral trims

During recent decades, the plain overhanging verge – a detail where the slates overhang the bargeboard or gable by between 30mm and 50mm – became one of the most common ways of forming verges in many parts of Ireland. The performance of this detail can be significantly enhanced by using one of Cedral's dry-fix verge trims.

Cedral's range of trims is intended for use with fibre cement slates only. There are three different trim designs – one for overhanging verges, one for flush verges, and another for use in refurbishment work or fitting after slating has been completed. Trims should be positioned to overhang the finished verge. They should be overlapped by 50mm at joints and fixed into each batten with a 20mm long clout nail. Once the trims are in position, slates can then be slid into the preformed channel and fixed. The result is a perfectly straight and secure verge.

Pointed verge

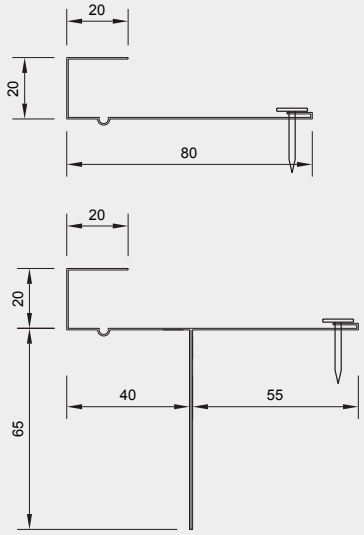
Undercloak

The verge overhang should be not less than 38mm and not greater than 50mm. The undercloaking slate should always be laid facedown, for the best appearance when seen from below. On flush verges, the undercloak should be bedded in mortar on the wall. On overhanging verges, the undercloak can be nailed.

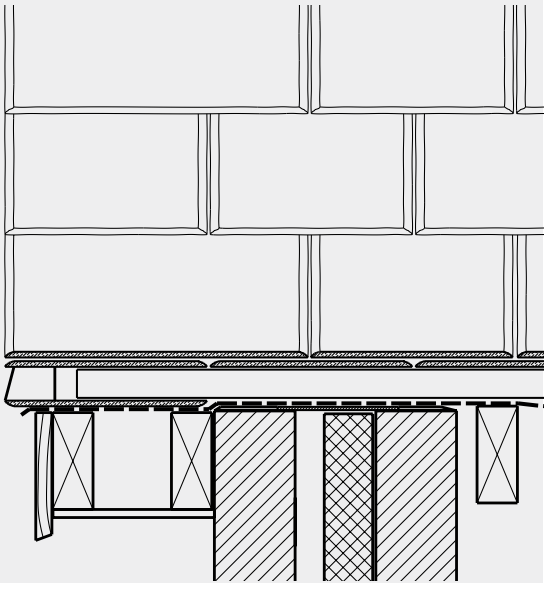
Bedding

Provide about 75mm mortar width, taking care to avoid direct contact with batten ends. Finish the edge neatly. Vibration from nailing slates can sometimes loosen the bedding. Where later pointing of the bedding is envisaged, the risk of cracking and separation can be avoided by applying the bedding so as to make allowance for a substantial later insertion of mortar for finishing and pointing. The mortar bed should be dampened prior to pointing.

Cedral verge trims



Standard undercloaked and pointed verge – Cedral Classic Natural slates



RIDGE

The ridge is the most exposed part of a roof. As well as having to be securely fixed, the ridge has a number of other functions. It should form a weatherproof seal at the apex, may have to incorporate roofspace ventilation components, and may also form one of the main decorative elements on a roof.

For roofs laid with fibre cement slates, ridge cappings of fibre cement, clay or concrete are available. Clay ridge cappings are suitable for natural slates.

At the ridge, the length of the top two courses of slates may require adjustment to ensure that the minimum headlap is maintained.

Underlay

For duo-pitch roofs not requiring ridge ventilation, the underlay on one slope of the roof should be carried up over the ridge, to overlap the underlay on the other slope by not less than 225mm. For mono-pitch roofs not requiring ridge ventilation, the underlay should be carried over the mono ridge, to extend vertically by not less than 100mm.

For ridges requiring ventilation, the underlay should be cut and turned up to form a continuous 5mm gap on either side of the ridge board. The turned-back felt should be secured in place by tacking to the back of the slating battens nearest the ridge.

Battens

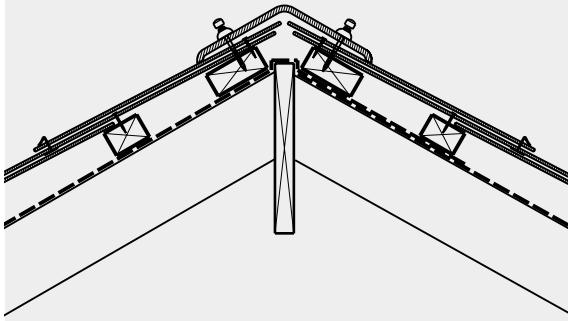
When slating up to the ridge, the headlap of the final few courses of slates can be increased – but never decreased – to achieve a neat and uniform finish to the roof slope. Batten positions may need to be adjusted to achieve this. Easy positioning and fixing of both slates and dry-fix ridge cappings can be facilitated by using either a pair of slating battens or an extra-wide batten along each side of the ridge.

Slates

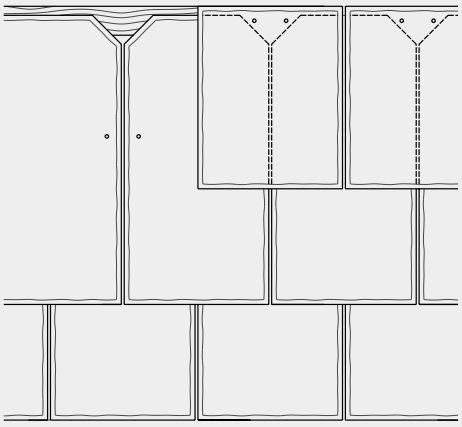
Slates should be laid up to the ridge so that a gap of about 10mm remains between the slated surfaces on opposing slopes of the roof. It is vital to the weatherproofing of the roof that the specified minimum headlap is provided in the vicinity of the ridge. It may not always be possible to achieve this using full-length slates laid to standard gauge. The top two courses on either side of the ridge should be set out with shortened slates, if necessary, to ensure that the minimum headlap of the ridge capping over the penultimate course of slates is achieved. In areas of very severe exposure, additional security can be provided by a continuous, UV light-resistant, flexible material – such as a strip of dpc – laid over the apex as a soaker between the last two courses of slates on each slope.

With Classic natural slates, the penultimate course at the ridge should be "shouldered", by chamfering the top corners of each slate. The final, "short" course of slates can then be head-nailed into the batten without first having to drill holes in the slates below. Where the heads of the slates in the penultimate course do not extend as far as the top of the last batten, a narrow packer may need to be fixed to the batten to prevent the tails of the top, short course of slates from "kicking".

Standard dry-fixed ridge – Cedral fibre cement slates



Ridge: shouldered Cedral Classic Natural slates



RIDGE

Ridge cappings

Fibre cement slate Dry-Fix System

Position and fix the top slating battens or additional battens so as to facilitate mechanical fixing of the ridge cappings. Lay the cappings with the internal spigot joints facing towards, or the external socket joints facing away from, the prevailing wind. Fix using 50mm-long no. 10 gauge brass or stainless steel screws with Sela M6 washers and caps. One fixing is recommended on each side of the capping, positioned 50mm from the edge of the wing and centred on the socket. Seal joints with a butyl sealant strip. End ridge units should always be full-length.

Another common way of securing fibre cement slate ridge cappings is to fix a long drive-screw through the apex or crown of the capping, into the ridge board. This alternative method of fixing is acceptable, provided two fixings per capping are used – positioned 100mm from each end – the cappings are predrilled with holes oversized by 2mm prior to fixing, and the drive-screws are not over-nailed, so as to fracture the capping.

Bedded Clay Ridge Cappings

As the firing process can induce some variation in the size and shape of clay ridge cappings, it is recommended that cappings should be laid out on a level surface and visually compared and matched prior to bedding.

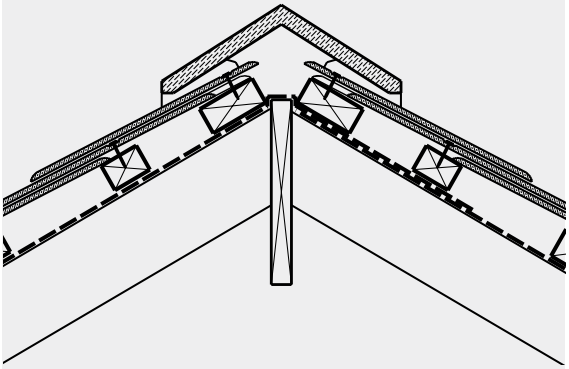
Neatly edge-bed all clay ridge cappings in mortar and solid-bed all joints using mortar and dentil or tile slips. Bedding and pointing should not be carried out during frost or rain or when such conditions are imminent. Ridge-end cappings should always be full-length. On severely exposed buildings, bedded cappings within 900mm of the end of a ridge should also be mechanically fixed. Cedral clay ridge tiles are provided with a fixing hole or concealed strap for fixing into the ridge board.

Lead Roll Ridges

This is a traditional way of forming a ridge. The roll should be cut from a section of timber measuring at least 50mm x 50mm. Larger sections can be used. The undercut or sloping sides of the roll are intended to resist wind lift. The roll should be set at least 5mm above the line of the slates, so that the lead can be dressed neatly under the bulge of the roll. The girth of lead should be sized taking into account the required or desired wing lengths and dimensions of the wooden roll core. The laps and clipping are dependent upon the exposure rating of the site.

Non-standard angle ridge cappings are also available, as specials. For duo-pitch roofs having different pitches on either slope, a standard plain-angle ridge capping may not suit; a halfround clay ridge may have to be used.

Standard bedded ridge – Cedral Classic Natural slates



Selecting the corrrect ridge capping

Roof pitch	Fibre cement ridge capping	Clay ridge capping
25°	135°	125°
30°	120°	115°
35°	105°	105°
40°	90°	90°
45°	90°	90°
60°	32.5°	special

HIP

The true angle of pitch of the hip is always less than that of the rafters. Because of this, the hip may be particularly susceptible to wind damage.

For roofs laid with fibre cement slates, hip cappings of fibre cement or clay are available. Clay ridge cappings are suitable for natural slates.

Depending on the exposure of the site and the pitch of the roof, the option of specifying a close-mitred hip may exist.

Underlay

The underlay on every roof slope adjoining a hip should overlap the line of the hip and be carried across the adjoining roof slope by not less than 150mm. Then an additional strip of underlay, not less than 600mm wide, should be rolled out along the line of the hip, from eaves to ridge.

Battens

An extra-wide hip- or raking-batten, the same height as the slating battens, should be fixed to either side of the hip, running from eaves to ridge. The purpose of such battens is to receive dry-fix hip-capping fixings and provide additonal support to the cut slates forming the edge of the roof plane. Slating battens, cut to the rake of the hip, can also be nailed into the hip batten, from their lower side (closest to the eaves).

Slates

Where a hip capping is to be used, rake-cut slates to the hip line, leaving a gap of about 10mm between the two planes of slating. Double-blank fibre cement slates and slate-and-a-half Classic natural slates should be used wherever the tapered head of a standard slate would be less than 50mm wide. Small, triangular-cut slates should never be used.

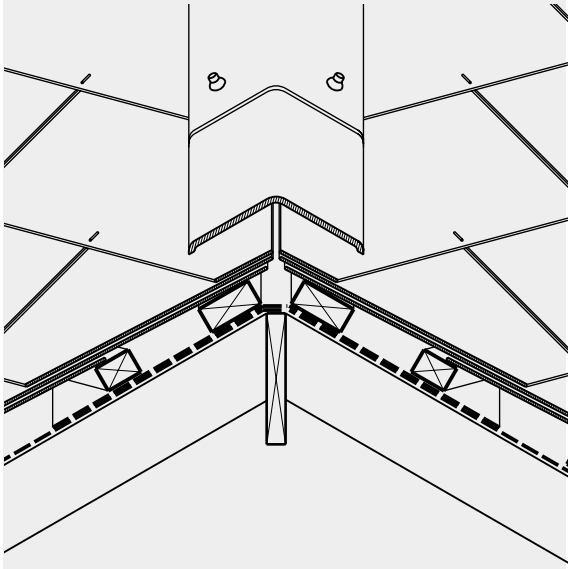
Cappings

Fibre cement slate Dry-Fix System

Lay the hip cappings with the internal spigot joints facing upslope or the external socket joints facing downslope. Fix the cappings to a true line to the raking battens, using 50mm long no. 10 gauge brass or stainless steel screws with Sela M6 washers and caps. One fixing is recommended on each side of the capping, positioned 50mm from the edge of the wing and centred on the socket. Seal joints with a butyl sealant strip. The alternative method of fixing cappings, described in "The Ridge", is also acceptable.

Cut the bottom hip capping from a full-length unit to align with the eaves. Where a hip meets a ridge, cappings should be cut to a close mitre. A concealed metal flashing saddle should underlap the junction and be trimmed once the cappings have been fixed in place. A bead of butyl rubber tape should be fitted in the mitre joints.

Standard dry-fixed hip – Cedral fibre cement slates



Selecting the corrrect hip capping

Roof pitch	Hip pitch	Fibre cement hip capping	Clay hip capping
25°	18.2°	145°	135°
30°	22.2°	135°	135°
35°	26.3°	135°	125°
40°	30.7°	120°	115°
45°	35.3°	120°	115°
60°	50.8°	90°	90°

Non-standard angle hip cappings are available, as specials.

HIP

Bedded Clay Hip Cappings

As the firing process can induce some variation in the size and shape of clay hip cappings, it is recommended that cappings should be laid out on a level surface and visually compared and matched prior to bedding.

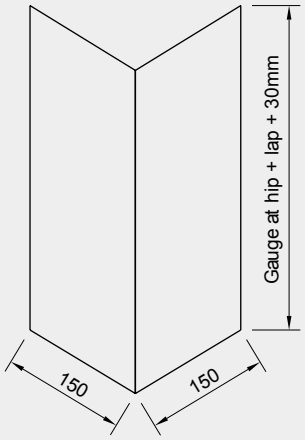
ICP 2 requires that a hip iron should be mechanically fixed to the eaves end of the hip rafter to support mortar-bedded hip cappings where the roof pitch (not the pitch of the hip) is greater than 35°. Cut the bottom hip capping from a full-length unit to align with the eaves. Neatly edge-bed all clay hip cappings in mortar and solid-bed all joints using mortar and dentil or tile slips. Bedding and pointing should not be carried out during frost or rain or when such conditions are imminent. On severely exposed buildings, bedded cappings within 900mm of the end of a hip should also be mechanically fixed.

Close-Mitred Hips

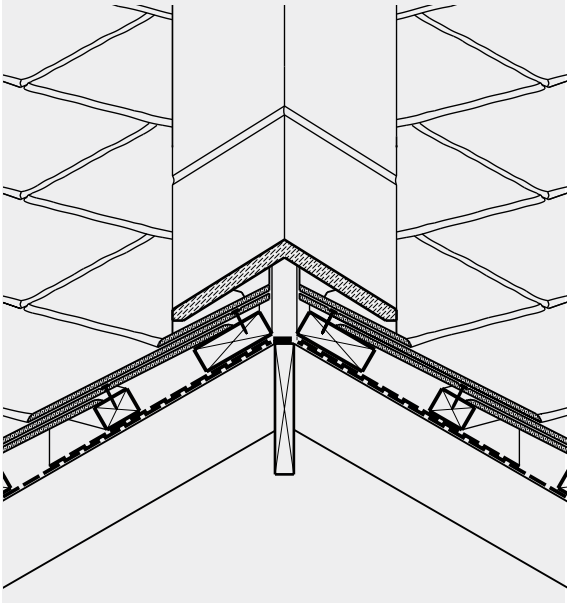
Close-mitred hips should be specified only where the roof pitch is 35° or more. Some sizes of Classic natural slates may not be suitable for forming close-mitred hips where the pitch is less than 45°, as the slate-and-a-half may not be wide enough. This is never the case with fibre cement slates, where double-width slates are readily available. Where close-mitred hips are specified in severely exposed locations or where the pitch is greater than 45°, external tail fittings, such as slate hooks or screws with washers and caps, may be necessary to resist high wind loads.

Rake-cut slates on opposing roof slopes to form a close mitre at the hip, ensuring that the tapered head of no slate is less than 50mm wide. Cut soakers should be laid with each course and extend approximately 150mm each side of the hip line. The length of each soaker should be not less than the sum of the raking gauge of the slating (measured along the hip line) plus the headlap plus 30mm.

Close-mitred hip soaker



Standard bedded hip – Cedral Classic Natural slates



VALLEY

Second only to the eaves, the valley is the edge of the roof that receives most water. Because of this, the following items should be carefully considered when designing and constructing a valley gutter:

- **The exposure of the site to wind-driven rain**
- **The size and pitch of the roof slopes draining into the valley gutter**
- **The length and overall capacity of valley gutter required**
- **The height of the valley lining boards relative to the slating battens**
- **The material from which the valley gutter is to be formed and how it is to be jointed**

Although valley gutters in slating can be designed as open valleys with sheet metal linings or as proprietary preformed valley gutters or as close-mitred valleys or – when using Classic natural slates – as laced or swept valleys, only open valley gutters with sheet metal linings are considered within this section of Cedral's slating manual. The other types of valley are discussed in later sections.

Roof pitch	True pitch of valley (between roofs of equal pitch meeting at a right angle)
25°	18.2°
30°	22.2°
35°	26.3°
40°	30.7°
45°	35.3°
60°	50.8°

Structure

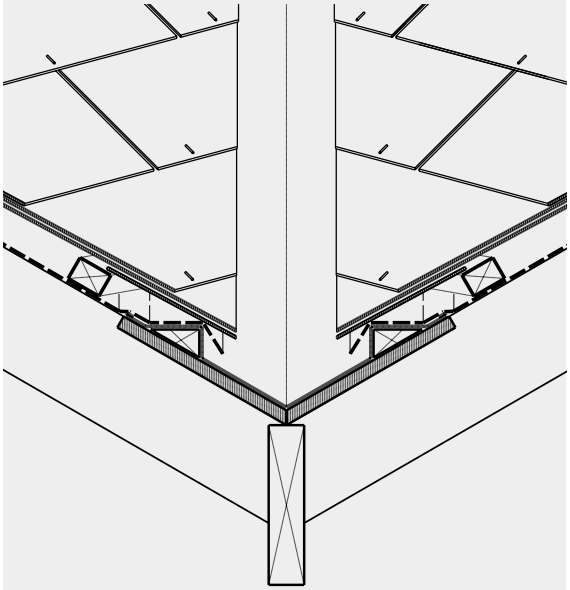
The true angle of pitch of the valley is always less than that of the adjoining roof slopes.

For pitched valley gutters on standard roofs, the minimum dimension required for the open width of the gutter is 125mm.

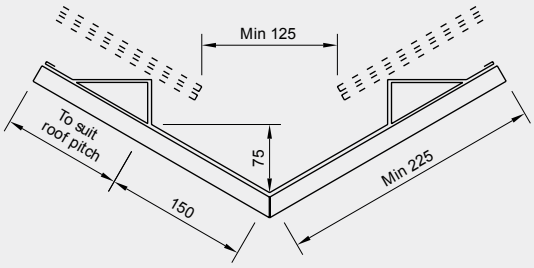
To achieve this minimum open width, the valley boards should extend not less than 225mm each side of the centre of the valley. The top of the triangular tilting fillet on each side of the gutter should be approximately level with the tops of the battens and positioned 150mm from the centre of the valley, measured along the slope.

The valley boards should be at least 19mm thick and recessed so that their tops are level with those of the rafters. On a cut-rafter roof this can be achieved by notching the tops of the rafters.

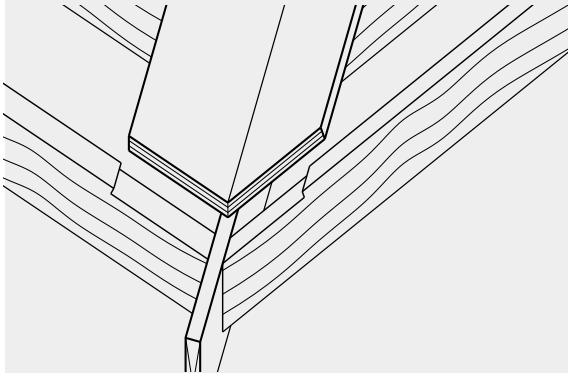
Standard open metal valley – Cedral fibre cement slates



Key dimensions



Cut roofs



VALLEY

On a prefabricated trussed-rafter roof, however, the rafter depth must not be reduced; instead, the valley boards should be cut into sections and laid flush between the tops of the rafters, supported on bearers fixed to the sides of the rafters. In addition, a 4-mm-thick flat sheet should be laid across the tops of the valley boards and rafters to provide a smooth surface to receive the metal lining.

ICP 2 states that where the length of a valley gutter, measured along the valley slope, does not exceed 6m the valley boards may be supported on the tops of the rafters.

Where two roof slopes having different pitches meet at a valley, care should be taken to detail the valley gutter substrate and lining so that water run-off from the steeper slope does not surcharge the gutter and spill onto the underlay of the lower slope.

The assumed design maximum rainfall rate is 225mm/h/m^2. Further guidance on rainfall and expected discharge is provided in BS 6367.

Where the length of a valley gutter, measured along the valley slope, exceeds 6m and the roof pitch is below 30°, consideration should be given to widening the valley gutter to avoid surcharging the lower end in storm conditions.

Underlay

Metal valley materials should not be laid directly onto an underlay where there is any risk of adhesion, eg, bituminous felts. Such adhesion can result in the premature failure of the valley material when it cools following hot weather. The underlay on a roof slope should be cut to overhang the tilting piece on that side of the valley board by 25mm and dressed into the valley gutter.

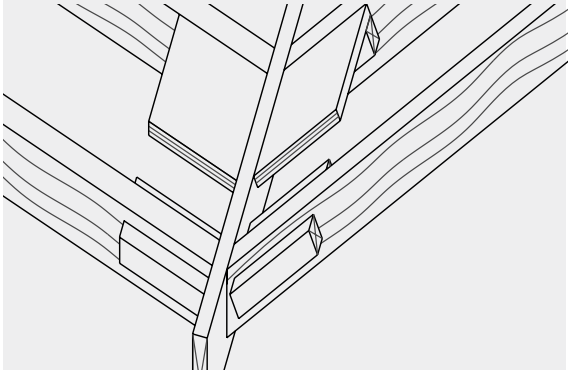
Battens

Battens ends should be fully supported.

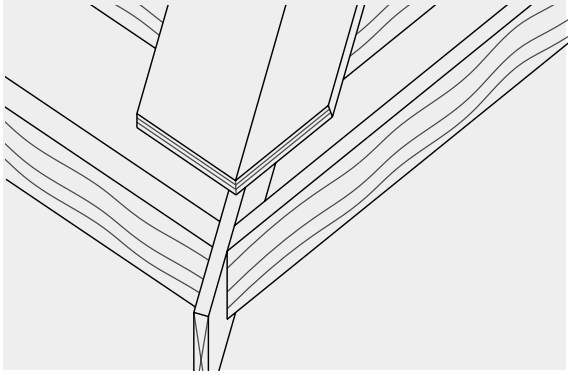
Slates

With fibre cement slates, double-blank slates should be used on every course to both sides of a valley. With Classic natural slates, slate-and-a-half slates should be similarly used. Slates should be laid into the valley and rake-cut to overhang the tilting fillet and provide the required open channel, while ensuring that the tail of no slate is less than 100mm wide. Slates should not be bedded in mortar.

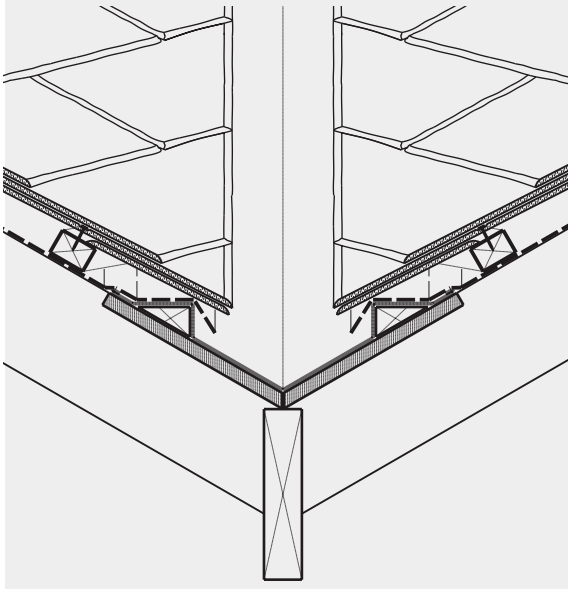
Trussed-rafter roofs



Small roofs



Standard open metal valley – Cedral Classic Natural slates



ABUTMENTS

Special details are required to prevent water ingress where a vertical element, such as a wall or a chimney or a dormer window, penetrates the plane of a roof slope. These intersections are normally weathered with a flexible metal flashing, such as lead.

Structure

A gap of about 50mm should be left between masonry walls and timber rafters at side abutments. The tilting fillet used at the back gutter should be designed similarly to a tilting fillet at an eaves.

Underlay

At top and side abutments, the underlay should be carried up the vertical plane of the abutment by about 100mm. Where possible, it should be secured and sealed to form a watertight junction and prevent sagging of the underlay over time.

At back gutters, the underlay should be supported, as at an eaves, and lapped over the material forming the back gutter by not less than 100mm. Ponding or water traps on the underlay should be prevented.

Battens

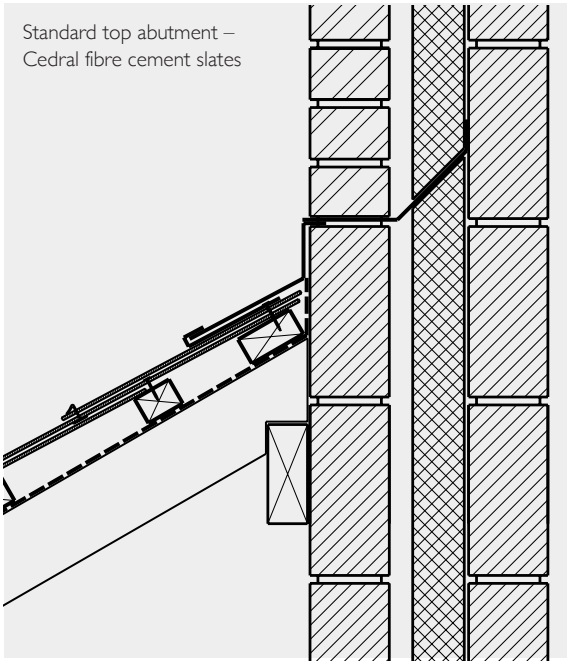
At top edges. the top batten should be positioned to allow an apron flashing to overlap the top course(s) of slates so as to maintain the required headlap. At side abutments, battens should be held back between 10mm and 25mm from the face of the abutment and be suitably supported.

Slates

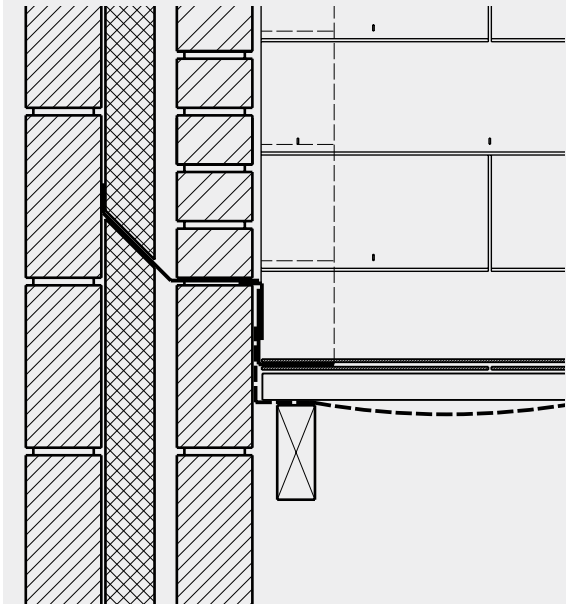
At side abutments, cut slates that would be less than 150mm wide should never be used. At top abutments, the slate headlap should be maintained by the flashing. Slates should be carried to within 10mm or 15mm of the wall, to ensure that the lead flashing does not eventually form a hollow where water could pond. When using natural slates, the penultimate slate course should be "shouldered" – by chamfering the top corners of each slate. The short, top course of slate may then be head-nailed into the batten without having to drill the slates below.

When forming a back gutter, fibre cement slates should be laid similarly to at an eaves, except that the length and number of undereaves courses will be determined by the slate coursing on the adjacent area of the roof. Where it is not possible to have two undereaves courses, the tails of fibre cement slates should be drilled and tied together with copper wire, or else hook-fixed.

Standard top abutment – Cedral fibre cement slates



Standard side abutment – Cedral fibre cement slates



ABUTMENTS

Weathering abutments

Top Abutment

Top abutments can be weathered by either a one-piece metal apron or a combined apron and-cover flashing. The apron should be clipped. The distance between restraining clips depends on the site exposure.

Side Abutment

Side abutments can normally be weathered by a combination of interleaved soakers and a cover flashing. A soaker should be laid in between each slate course and head-nailed to a batten. The length of the soaker should not be less than the sum of the gauge plus the headlap plus 25mm or 30mm. Where there is a risk of water penetration of the soakers, an alternative method of weathering is to construct either an open or hidden secret gutter.

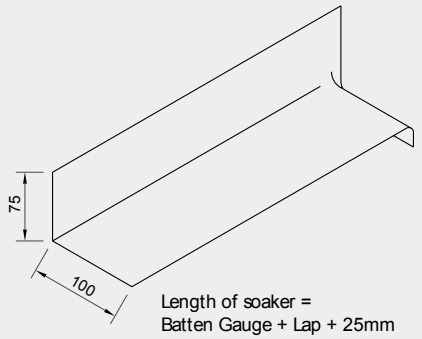
Back Abutment or Back Gutter

Back abutments should be constructed as open or tapering gutters. For normal situations, a back gutter can be weathered with lead sheet that should be either bossed or cut and leadwelded to the appropriate profile and protected at the wall by a cover flashing.

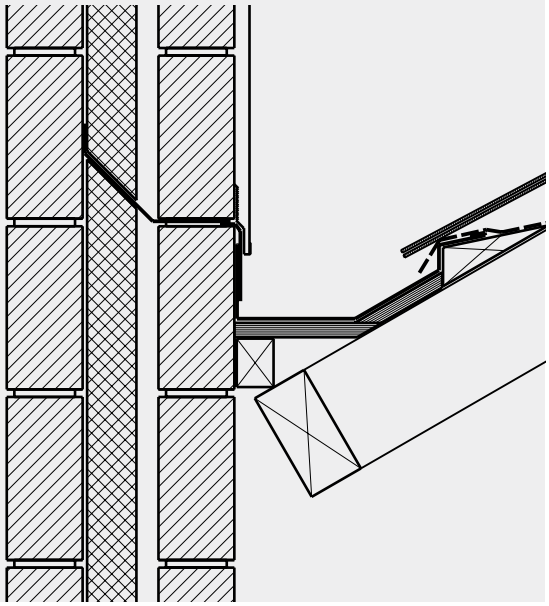
Advisory note

Any cover flashing, rendering or painting of areas projecting above a slated roof should be completed prior to slating, to ensure that no damage or staining is caused to the slates. The roofing underlay should be cleaned of any mortar droppings before slating begins.

Side abutment soaker



Standard back gutter – Cedral fibre cement slates



CHANGE OF PITCH

Special details are required to prevent water ingress where two slopes of different pitch meet between the eaves and the ridge, or top edge, of a slated roof. Different headlaps may be used on each slope.

Structure
The tilting fillet used for the mansard or sprocket detail should be designed similarly to a tilting fillet at an eaves.

Battens
The use of either a pair of slating battens or an extra-wide batten at the top of the lower slope can make the positioning and fixing of the slates and flashing clips easier.

Underlay
When constructing a "Mansard" or "Sprocket" change-of-pitch detail, carry the underlay on the lower slope up beyond the change-of-pitch junction and secure it beneath the tilting fillet. The underlay on the higher roof slope should be detailed to lap over the material forming the junction flashing by not less than 100mm. Ponding or water traps on the underlay should be prevented.

When constructing a junction between the top edge of a slated slope and a flat roof, turn the underlay over the head of the topmost batten and tack it in position.

Slates
The volume of rainwater run-off from the higher roof slope – which has an effect equivalent to increasing the rafter length of the lower slope – must be taken into account when specifying the slate headlap on the lower slope and sizing the apron flashing. This may be of vital importance when designing a "Sprocket" change-of-pitch.

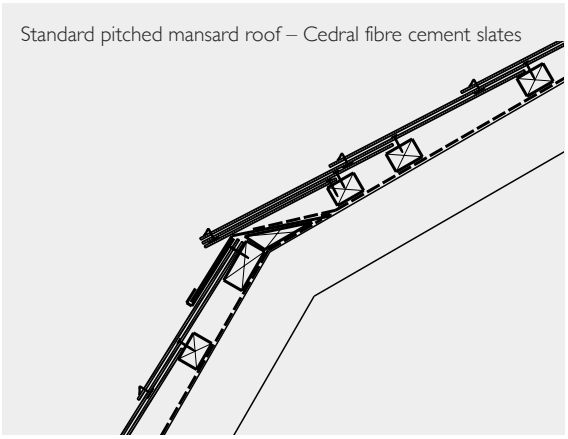
Where it is desirable to control the rainwater run-off from the upper slope of a steeply sloping mansard roof, particular attention should be paid to the sizing and positioning of gutters.

Slates on the lower slope should be laid up as close as possible to the change of pitch position. It is vital to the weatherproofing of the junction that the specified slate headlap is maintained between the slates and the flashing. When using natural slates, the penultimate slate course should be "shouldered" – by chamfering the top corners of each slate. The short, top course of slate may then be headnailed into the batten without having to drill the slates below. The bottom edge of slating on the higher slope should be designed similarly to an eaves.

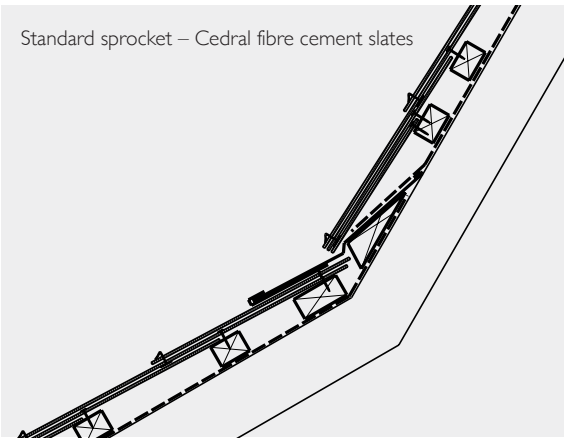
Advisory note
Should the edge of an apron flashing be cut to form a decorative pattern, the overall girth of the flashing may need to be increased in order to maintain the minimum headlap with the slates.

Special provision for access may be needed, as roof ladders cannot be secured at the change of pitch junction.

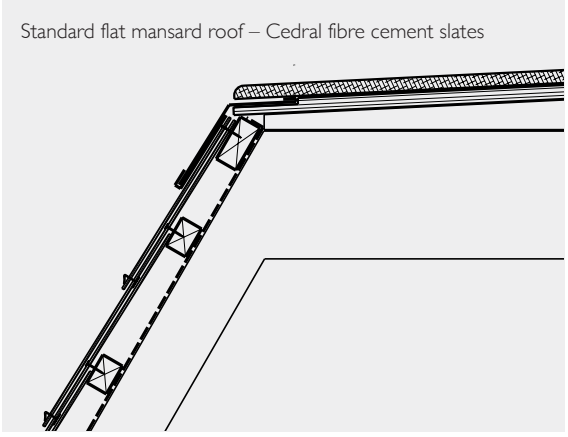
Standard pitched mansard roof – Cedral fibre cement slates



Standard sprocket – Cedral fibre cement slates



Standard flat mansard roof – Cedral fibre cement slates

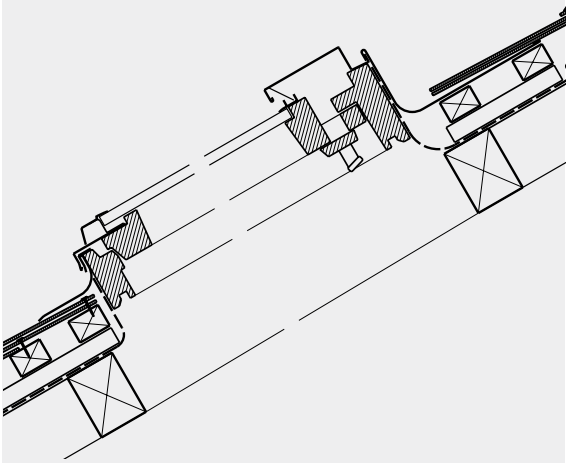


ROOF WINDOWS

Several proprietary types of roof window are available and most incorporate the flashings required to maintain the watershedding function of the roof covering. These windows should be fitted in accordance with the manufacturer's recommendations, including those relating to the treatment of the underlay around the roof window. Guidance should be sought from roof-window manufacturers when groups of roof windows are installed in close proximity.

Depending on their overall width, non-proprietary roof windows should be detailed similarly to a chimney, as already described in Abutments. When designing wide, continuous runs of roof windows, particular care should be taken to ensure that rainwater on the slates and moisture on the underlay above the window head can drain safely away. The means of controlling harmful condensation in such situations should also be considered.

Roof window – Cedral fibre cement slates



Structure
Additional rafters, trimmers or supports may be required around roof-window openings.

Underlay
In order to maintain the weatherproofing function of the roof as a whole, it is strongly recommended that the roofing underlay around a roof window is carried up the sides of the window and taped to form a wind- and watertight seal. When installing a roof window, a hole the same size as the window should never be cut in the underlay. Some manufacturers recommend that a proprietary drainage channel should be fitted up-slope from a roof window; or that an additional strip of underlay, 300mm wider than the opening in the slates, should be secured to the window frame, carried up the slope, below the battens, and lapped beneath the next row of underlay.

Battens
Additional short lengths of battens may be required at top and bottom edges of a roof window. The cut battens to either side of a roof window should be fully supported.

Slates
At sides of roof lights, half-width slates that would be less than 150mm wide should never be used. At top abutments, the slate headlap should be maintained by the flashing. Slates should be carried to within 10mm or 15mm of the roof window.

Advisory note
In "warm" roofs, where counterbattens are not used, any dead-end rafter spaces should be ventilated.

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