cardinalslates

REPRODUCTION COTSWOLD ROOF SLATES

Issued: 16 September 2024

Installation guidance

Battening

The batten schedule should always be checked against the actual roof length before starting battening, to make certain that it is appropriate for that roof. It is very important to adhere to the coursing specified. Failure to follow the schedule will result in the wrong quantities of tiles. If it is necessary to make any changes to the batten schedules provided, we should be notified immediately to enable us to adjust the quantities before delivery (assuming it is not too late!). It is best to make any minor adjustments in the F, G or H courses.

The batten schedule provided will give the correct head lap for each length of tile. All gauge measurements are taken from the top of the battens. A cumulative total is provided for checking progress up the roof. It is a good idea to check the cumulative length two or three times on the average roof.

The battens for J and K courses are very close together so it is important to nail the battens on edge to allow the nib to be inserted. Due to the narrower profile it is essential to take extra care when nailing these courses so as not to split the batten.

Laying the tiles

Cardinal tiles can be cut in the same way as other concrete tiles, except that manual tile cutters are not suitable due to the irregular texture of the back of the tiles.

Side lap

The minimum side lap will vary according to the length of the tile. In the main body of the roof there should be a minimum side lap of 50mm. For the S to C courses, aim for 75mm, and for verge courses aim for 50-75mm side lap to get the bond started.

Using narrow and medium width tiles

It is important that the medium and smaller width tiles are worked into the main body of the roof. There will be a lot more of these smaller tiles supplied than is the case with most other manufacturers of imitation stone tiles. Wide tiles should mainly be used for cutting valleys, hips, verges etc, with narrower width ones used to establish a regular bond in the main body of the roof.

Mixing colours

There should be a mix of darker and lighter colour shades provided, which need to be distributed to avoid banding.

An excess of tiles will be provided – these remain the property of Cardinal Slates if not used on the site they were delivered to, and should be left in the crates to be returned. The delivery note will indicate the excess amount delivered.

Fixing the tiles

Eave, undereave, valley, hip, abutment, and verge tiles should be nailed, as well as every fifth course in the main body of the roof. The nails should be clout headed nails to BS1202 (aluminium or copper), long enough to be driven 15-20mm into the batten while allowing for a small amount of movement by the tile. Generally, a 40mm nail will be suitable but a longer one may be required for lower courses with thicker tiles. The tiles have integral nibs which are used to simply hang the other courses over the batten.

Steeper or exposed roof pitches

Where the roof pitch is over 50 degrees every third course should be nailed, and where it is over 60 degrees or vertical every course should be nailed. If the roof is in a very exposed area or subject to unusual stresses then please consult us.

Eaves

The length of S and Q tiles can vary slightly and the eaves tilt can also change. It is best to use an undereave and eave tile on site to determine exactly where to place the eave and undereave batten.

Verges

Cardinal Slates can be laid with or without an under cloak at the verges. If one is used, the tiles should be turned over so that the more textured side is visible from the ground. They should always be bedded in with mortar as they are laid.

Dressing the shoulders off the verge tiles will prevent the nibs showing and give a more traditional finish.

A usual oversail is 50mm.

Hips

Hips using hip tiles: fix 6mm galvanised hip irons at the base of each hip using 12 gauge galvanised screws or nails. The tiles should be cut to fit closely together, and the hip ridge should follow a straight line up the roof edge and be bedded in as the tiles are laid. The end of the bottom hip tile should be trimmed to align it with the eaves tiles, and filled with mortar.

Exposed hip: mitre tiles closely together and use code 4 lead soakers above each course extending 100mm each side of the hip to create a weathertight junction. The line of the mitre should follow a straight path up the hip. Once this is created, a mortar cap or roll can be applied to cover the mitred hip if a different traditional appearance is desired.

Valleys

Close mitred valley: use an additional underlay strip 1m wide, underneath the main underlay, and use code 4 lead soakers above each course. The tiles should be cut cleanly so the mitre is in a straight line and the soakers will be correctly supported. At a lower roof pitch or with long roof lengths (more than 4m) close mitred valleys may not be able to cope with very intense rainfall.

Open valley: the gutter should be lined with code 5 lead dressed over triangular timber fillets, and supported using valley boards (minimum 19mm thick). The tiles should be mitred as appropriate and then bedded in mortar.

Valleys should be laid dry. A comb filler should be used where there are substantial gaps between the tiles and the rafter, in order to prevent animal access.

Swept valley: we do not recommend using Cardinal tiles to form swept valleys because they are not suited to this use. Where they must be used (e.g. requirement from conservation officer) they demand a high level of skill and attention to detailing by the roofer.

Flat vent tiles

The flat vent tiles are suitable for use in B, C or D courses. They will need holes drilled in them in the appropriate place for nailing on to the batten, and a 100mm pipe adapter fitted (this is provided with the vent). The tile itself is 390mm wide by 400mm tall. They are not suitable for boiler flues.

The net free area for these vents is 10 000mm^2 and spacing centres to achieve a set ventilation are 2m for 50 000 mm^2/m and 1m for 100 000 mm^2/m.

They can be used for roof space ventilation to comply with Building Regulations Approved Document C2, BS 5250, and BS 5534; for soil vent pipes to comply with Building Regulations Approved Document H; and for mechanical ventilation to comply with Building Regulations Approved Document F.

The vent used is a Glidevale IN-LINE vent – see https://glidevaleprotect.com/product/universal-in-line-slate-and-tile-ventilators/.

For adding ventilation near the top of the roof we recommend using a plain tile vent.

Bat access tiles

The bat access tiles are suitable for use in F, G or H courses, right at the top of the roof. They will need holes drilled in them in the appropriate place for nailing on to the batten. The tile itself is 320mm wide by 270mm tall.

They have an approximately 20mm x 100mm slot cut in the front of them, with a lead sheet fitted into it and extending up the sides. The lead sheet extends behind the tile so it can be bent upwards gently to make sure it is weatherproof on shallow pitched roofs. If this is done, it is important to check that the gap between the lead and the back of the tile is at least 20mm throughout.

Vent viewed from the front

Vent viewed from behind

Roof design guidance

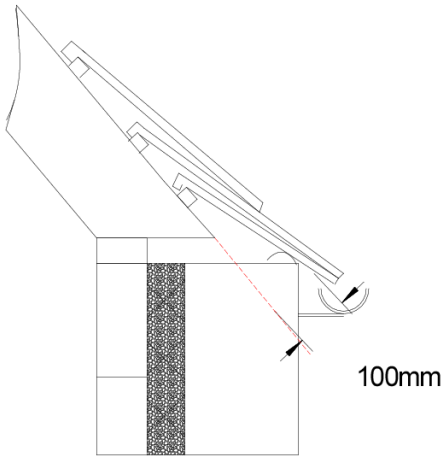
Specification statement

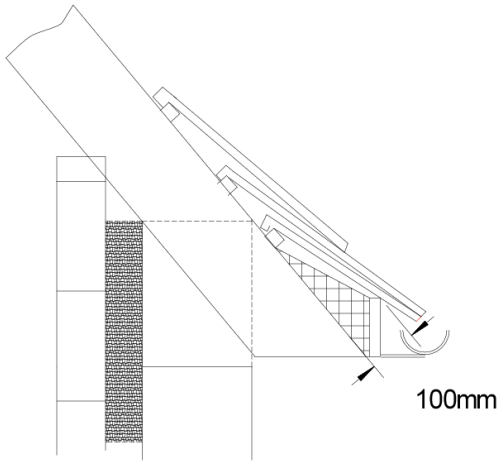
"Roof laid with Cardinal Slates reproduction stone tiles in diminishing courses to manufacturer's specification"

Roof pitch and construction

Cardinals are suitable for vertical fixing down to a minimum roof pitch of 35 degrees in sheltered areas, 40 degrees in exposed areas. The normal headlap is sufficient for normal exposure, but please consult us if the roof is going to be very exposed or subjected to unusual stresses.

It is important to get at least a 100mm tilt at the eaves, as shown below. If the oversail is more than 75mm, let us know so that we can supply the correct undereave and starting tile.





When laid, the weight of the tiles is approximately 90kg per m^2.

Rafter/truss centres at 600mm: use 25 x 50mm batten
Rafter/truss centres at 400mm: use 25 x 38mm batten

In all cases, use 25 x 38mm batten for H courses, and on edge for J and K courses. This allows sufficient space for the nib and slightly raises the J and K tiles to prevent rocking.

The rule of thumb is to allow 9m of batten per m^2 of roof.

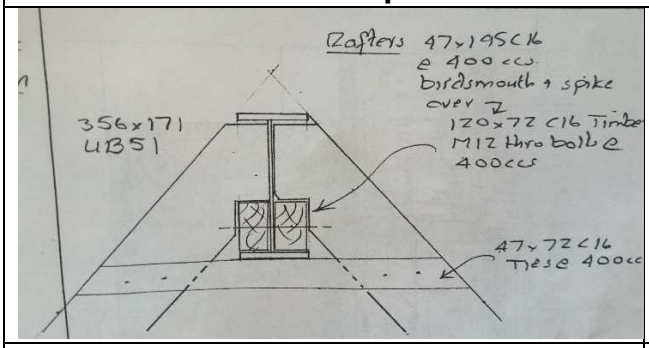
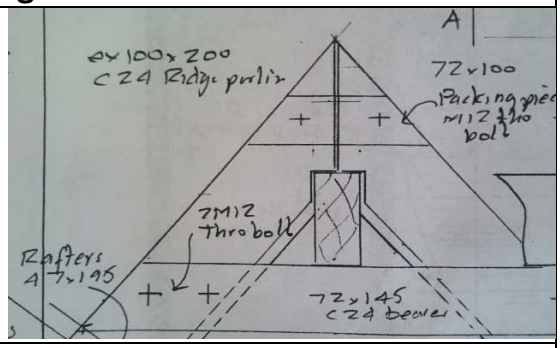
Batten should conform to the standard in the most recent version of BS5534.

Changes in roof pitch on long roofs can be continuous, but are often best dealt with by separating the roof into two sections and using code 5 lead flashing at the join.

The total thickness of the roof covering from the rafters to the outside of the tiles is around 80mm so flashings for rooflights and other openings will need to reflect this, for example Velux EDJ/EKJ (recessed installation), Velux EDW/EBW/EKW (standard installation), Fakro EHN-A or Keylite DTRF will work.

Roof pitch and construction (continued)

It is important that the tops of the rafters are sufficiently close together at the roof apex for the top batten (usually for a K course) to be placed at the highest point of the roof. This is sometimes a problem where there is a wide ridge board / beam or the counterbattening stops short of the apex. If this is not done, the ridge unit may not provide enough cover to the top course of tiles.

Examples of different ridge constructions	
	
Unsuitable – note large flat area over beam which will need to be dealt with	Suitable – battening can continue right up to the apex

BS-5534:2014 compliance

Additional requirements for compliance with BS-5534

Although the fixing and design instructions in the rest of this document have been found to be reliable over the last twenty-five years in the areas where Cardinal Slates are usually supplied, for full compliance with BS5534 the following additional requirements will need to be satisfied.

Two mechanical fixings on perimeter tiles, top and bottom two courses

If a perimeter tile has only one nail hole then it also needs to be fixed with a suitable MS polymer adhesive, e.g. Evo-Stik Wet Grab as well as a nail. This would mean at verges, abutments, valleys and hips, as well as the undereaves, eaves, J and K courses (these being the usual final courses). This is more likely to apply on hips than valleys or verges since a medium or wide tile is usually used to start the course off.

Mechanical fixing of ridge and hip units

Proprietary dry ridge fixing kits are suitable for use with Cardinal ridge or hip units. Generally speaking it should be possible to just use a clamping plate and stainless steel screw between the units, then mortar around them as usual. BS5534 also makes specific requirements for roof mortar.

Severe or very severe exposure, or on a building more than 12m high

Where the roof will be subject to severe exposure, additional calculations may be required to check that the installation will conform to BS5534. It is possible to increase the headlap or sidelap in these circumstances, however there may be an additional cost involved due to the extra tiles needed.

Very long oversail on undereaves

If the oversail will be more than 75mm then additional calculations will be required to check conformity with BS5534.

Ridge ventilation

Where ridge ventilation is required, a dry ridge system can be used which complies with the BS requirements. Alternatively it is possible to use plain tile vents in H courses (generally 150 – 200mm down from the ridge).

Product data

Tile dimensions

Tile type	Tile length (mm from tip to bottom of nib)	Range of widths (mm)
S	500	240 to 570
Q	425	190 to 540
A	400	125 to 470
B	380	150 to 350
C	350	110 to 340
D	320	145 to 350
E	290	105 to 355
F	275	120 to 355
G	250	130 to 340
H	220	100 to 310
J	210	90 to 245
K	185	100 to 230

90 Ridge

This is the standard ridge, suitable for roofs pitched 42.5 degrees and over. Lengths: 0.4m, 0.54m, 0.65m units supplied. Their weight is approximately 18.1kg per m. The internal angle is 90 degrees and it gives 180mm coverage each side of the ridge.

105 Ridge

This is supplied for roofs pitched between 35 and 42.5 degrees. Lengths: 0.4m, 0.54m, 0.65m units supplied. Their weight is approximately 20.6kg per m. The internal angle is 105 degrees and it gives 180mm coverage each side of the ridge.

Wide hip

This can be used as ridge on roofs with very shallow pitches, as well as on main roof hips. Lengths: 0.4m, 0.54m, 0.65m units supplied. Their weight is approximately 17.1kg per m. The internal angle is 120 degrees and it gives 125mm coverage each side of the hip.

Narrow (dormer) hip

Lengths: 0.4m, 0.54m, 0.65m units supplied. Their weight is approximately 15kg per m. The internal angle is 120 degrees and it gives 80mm coverage each side of the hip.

Note on measurements

All measurements in this section are nominal.

LENGTH	S	Q	A	B	C	D	E	F	G	H	J	K	
NOMINAL WIDTH IN MM	570	540	460	470	350	340	350	355	340	310	245	230	
	450	460	380	380	325	320	290	340	310	255	200	230	
	320	345	370	340	300	290	240	260	260	215	200	210	
	280	325	365	255	260	260	240	230	225	210	175	210	
	260	250	340	225	250	225	220	220	200	210	165	200	
	240	235	310	220	240	225	200	220	190	185	165	190	
	240	215	240	220	220	215	190	205	185	170	150	180	
	240	190	230	200	200	200	190	200	170	160	150	180	
	200		230	190	200	180	150	200	150	150	145	170	
	190		210	190	150	160	145	180	150	140	145	155	
			210	170		110		180	145	140	110	150	
			200	125				175	130	130	100	140	
			200					165		110		120	
			175					160		100		100	
			150					160					
								120					
								105					
								105					**TOTAL**

MOULDS	10	8	15	12	10	11	10	18	12	14	12	14	**146**

Where a width appears more than once, this shows the presence of multiple moulds for the same width tile.