Construction Notes - No 10 Dry fix ridge

CONCRETE TILE MANUFACTURERS ASSOCIATION

In a series of articles on interlocking concrete roof tiles, experts from the **Concrete Tile Manufacturers Association** have pooled their knowledge. This Construction Note discusses dry fix ridges.

Duo Pitch Ridge

A duo ridge occurs where two roof slopes meet at their upper edges. This is generally the highest part of the roof, and should be horizontal or parallel with the eaves. If the ridge is not horizontal it is technically a hip. Where the top of one roof slope meets a vertical wall it forms either a Mono ridge or a top edge abutment, both of which are dealt with in separate articles.

A duo pitch ridge can be formed with or without high level ventilation to comply with BS5250 and Building Regulation Approved Document F2. The requirement for ventilation will depend upon the location of the insulation and the span and pitch of the roof structure, and will be dealt with in a later article.

A duo pitch ridge can also be formed with or without mortar bedding to comply with BS 5534 and BS 8000 part 6. Where mortar bedding is not used a proprietary system will be required to prevent wind driven rain and large insects from gaining access to the roof. In all instances some, if not all, of the ridge assembly will need to be mechanically fixed to the roof structure to ensure that the ridge is not displaced during hurricane force winds, which can occur anywhere in the UK, at least once in any fifty year period.

Ridge Tiles

The junction of the tiles between the two roof slopes needs to be covered with a purpose made ridge tile **(A)** which is approx. 250mm wide, enough to bridge the gap between the tiles and lap onto the top tiles on each slope by a minimum of 75mm. The amount will vary with rafter pitch and the proximity of the top tile to the apex of the roof. The length of the ridge tile is normally 450mm. The shape of the ridge may be half round or angled, and may have some form of finial or ornamentation.

The Roof structure

The roof structure, which will normally be timber pre-formed trussed rafters **(B)**, should meet at an apex. Ideally the pitch on either side should be the same. If the pitches are not the same the whole ridge will sit over towards the steeper slope. With a cut timber roof **(C)** there will be a ridge board at the apex, which runs at right angles to the rafters, and simplifies the joint between the rafters.

Underlay/Battens/Tiles

The underlay **(D)** should be laid to finish on the first slope, level with the apex of the roof. On the second slope the underlay should extend beyond the apex and lap onto the underlay of the first slope by a minimum of 150mm. With a ventilated dry fix ridge the underlay should finish short of the apex to allow a minimum 5mm continuous air gap.

Where a ridge batten **(E)** is used it should be installed along the apex of the roof, nominally 38mm wide and to a height to allow 35mm of screw/nail **(F)** penetration from the ridge tile fixing. The height the ridge batten will need to finish above the apex of the roof will depend upon the pitch of the roof and the profile/thickness of the roof tile being used. The ridge batten should be securely fixed to the roof structure with straps **(G)** or screws to each rafter, to ensure that the wind suction loads on the ridge are transferred back into the roof structure.

The top batten **(H)** should be positioned to allow the top course of tiles **(I)** to finish as close to the ridge batten as possible. With some designs of tile a special top tile is needed to provide a flat surface for the dry fix ridge system to sit on. Cutting tiles in their length to fit the top course of tiles should be avoided were ever possible.

Tile Fixings

British Standard 5534: The code of practice for Slating and Tiling requires all perimeter tiles to be mechanically fixed. Whilst the ridge tiles are not glued to the top tiles with mortar, the top tiles will still need to be mechanically fixed to comply with BS 5534. Therefore the top course of tiles should be head nailed or tail clipped; whichever is appropriate, having undertaken the wind uplift/fixing calculations within BS 5534.

Ridge Tile Fixings

Unlike mortar bedding, dry fix ridge systems can allow for the small amount of movement and flexing that can occur with timber and steel roof structures, caused by changes in the level of humidity, temperature, and loads experienced during the lifetime of the roof.

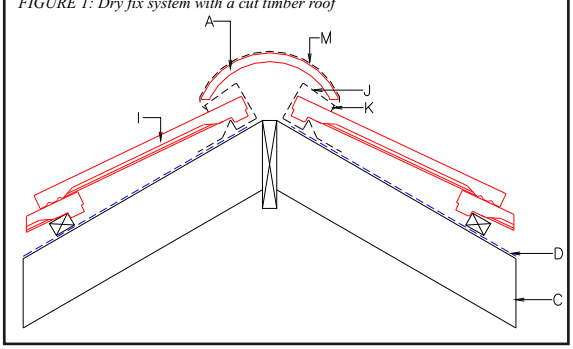
With dry fix ridge systems all ridge tiles need to be mechanically fixed. The mechanical fixing of the ridge tile may be one of the following: -

1. One screw/nail fixing through the centre of the ridge tiles.
2. One screw/nail through each end of the ridge tile.
3. One screw/nail through a plate at the cross bed joint.
4. A strap/ridge to ridge seal clipped to a support tray.

For options 1 to 3 there will need to be a ridge board/batten of adequate width and height to allow the fixing screw/nail to penetrate the ridge board/batten by a minimum of 35mm. The ridge batten height for any given rafter pitch and tile profile should be provided by the manufacturer of the system as the profile filler units or membrane will vary from system to system. Where a ridge batten is being used with timber trussed rafters the batten will need to be securely screwed or strapped to each rafter and extend at least 80mm beyond the end ridge fixing screws/nails position.

For option 4 a specially shaped ridge support tray **(J)** is positioned in place of the top tile batten and is nailed directly to the rafters. The support trays need to be accurately positioned to ensure that the strap/ridge to ridge seal fits correctly.

FIGURE 1: Dry fix system with a cut timber roof



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Fillers and Seals

The use of dry fix systems for securing the ridge tiles onto the ridge batten, to weather the ridge junction; is now quite common as it allows work to commence, and be completed, in all weather conditions.

The Dry fix ridge systems require fillers **(K)** between the ridge tiles and the top tiles. The types available fall into two broad classifications: -

1 Rigid fillers.
2 Membrane fillers.

Rigid fillers are plastic units, mostly supplied by the manufacturers of roof tiles, shaped to fit only their profiled tiles. For flat tiles the rigid fillers are more universal. The rigid fillers rely upon the ridge tile or ridge tile support tray to hold them in place.

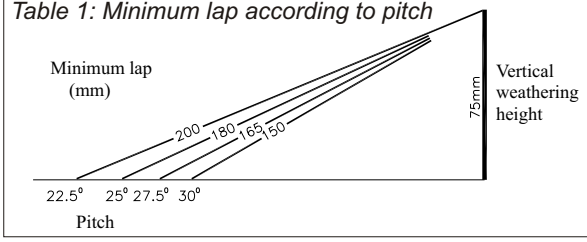
Membrane fillers are flexible strips, which are slightly wider than the ridge tile. Each one lies along the ridgeline and laps onto the head of both roof slopes. The membrane is designed to follow, and often stick to, the contour of a profiled tile to achieve a weather-tight joint.

The joint between the but joints of the ridge tiles need to be protected using ridge to ridge seals **(M)**, to prevent rainwater from draining down into the gap between the heads of the top tiles. The seals are either designed to seal over the joint or lay between and underneath to form a pair of hidden gutter channels. With rigid ridge to ridge seals they are designed to fit specific ridge shapes and manufacturers.

Junctions and Ends

Where a dry fix ridge meets another feature such as a hip, valley, top edge abutment or side abutment, a code 4 lead saddle needs to be installed when using rigid filler units. It should be positioned either under the profile filler units, or over the ridge tile, depending upon the direction of the water run off. The positioning of the saddle under the profile filler units is visually more acceptable. Where membrane filler Units are being used, most membrane will act as a saddle provided it is lapped correctly. Those that are not suitable should use a lead saddle.

Table 1: Minimum lap according to pitch



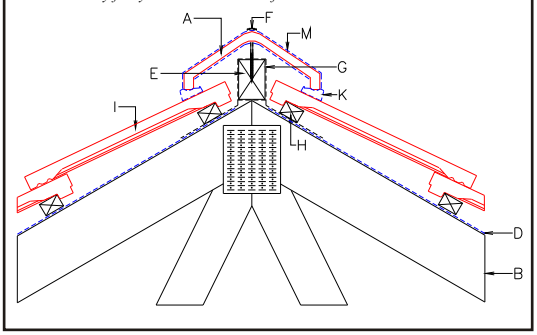
Where the lead saddle is positioned under the profile filler units, the size of the saddle will depend upon the lap of the lead onto the head of the tiles on each slope (see table 1). For a rafter pitch of 17.5 degrees, the lead saddle headlap length is likely to be 350mm for each of the top tiles, plus the distance between the top tiles, which comes to approx. 800 mm. The width of the saddle will depend upon the proximity of the adjacent roof slope and its relative rafter pitch. The minimum size of lead saddle, 450 x 450mm, should therefore not be used on rafter pitches below 35 degrees. The practice of trimming the lead saddle back to the line of the mortar bed is technically incorrect, as it will reduce the effective headlap to approx. 75mm.

Where the lead saddle is positioned over the ridge tile, the lead needs to be dressed neatly over the ridge tile and onto the surface of the top tiles by 50mm. Depending upon the size of the ridge tile the lead sheet width is likely to be between 450mm and 550mm, regardless of the rafter pitch.

Depending upon the complexity of the junction, it may be appropriate to cut and lead weld in gussets to the saddle, rather than boss the lead sheet into shape. Some junctions may be difficult or impossible to form using dry fix ridge systems, therefore the system manufacturer should be consulted if you are Concerned. At the head of an open valley a block may be required to support the lead saddle between the roof tiles on each side of the valley, to prevent rain and insects entering the roof under the profile filler units.

At a gable end, block end ridge tiles or ridge end caps will be required to close off the end of the ridge and provide an end fixing for the gable end ridge.

FIGURE 2: Dry fix system with trussed rafters



SUMMARY

- Dry fix ridge systems will provide a more secure ridge fixing than mortar bedded ridge tiles.
- Dry fix ridge systems with rigid profile filler units can be installed in almost any weather conditions to allow roofing work to be completed on program.
- The ridge is the highest and most exposed part of any roof and is much more vulnerable to wind damage and rain penetration. Until the last ridge tile is bedded the roof is not weather tight.
- Where the ridge changes direction, or meets another feature of the roof, such as a hip, mono ridge or valley, a lead saddle should be installed at the junction.

CTMA members are:

Cemex
Forticrete
Lafarge
Marley Eternit
Sandtoft