Update: Slates & tiles

Slating & Tiling TIPS 21

Counter batten size

With more and more buildings being designed with rooms in the roof, the more we are seeing rigid insulation being placed above the rafters, just below the battens. By placing insulation boards above the rafters , to reduce the cold bridging effect of the rafters, the greater the need for counter battens.

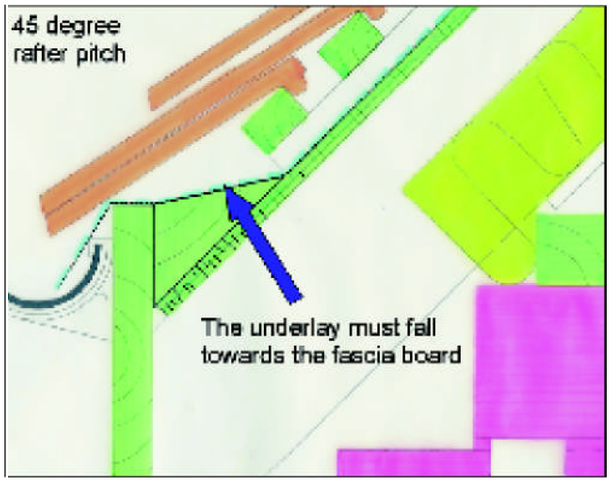
Whenever a rigid board, or sarking, is placed between the rafters and the battens of a slated or tiled roof, it is essential to lift the battens clear of the rigid board to allow any water on the underlay to escape. Regardless of the type of underlay, water in the form of condensation, melted snow or rain entering the roof before the last ridge tile has been installed will try and run down the underlay. Unless it can run under the battens it will dam up against the first batten it meets and run sideways until it can find a way through the underlay (usually down a batten nail hole). Provided the battens are clear of the underlay by more than 6mm, water will take the easiest route and drain off into the gutter at the eaves. To achieve a consistent gap between the battens and the underlay, timber counter battens should be fixed through the rigid board and into the rafter below.

But that's not the only reason why counter battens are needed. With rigid insulation boards it would be expensive, especially with plain tiles, to fix each batten with helical nail fixings, through the insulation into each rafter. It is much more economical to use fewer helical fixings to secure the counter battens through the insulation into the rafters below, and use cheaper nails to fix the battens into the counter battens.

The thickness of the counter batten can vary depending upon the rigid board material. All batten nails need to penetrate a structural material by a minimum of 38mm. Where insulation board is used that has no structural fixing quality, the counter batten needs to be the full 38mm deep to provide the full nail penetration depth. With rigid boards such as plywood and oriented strand board the thickness of the board can be used as part of the nail penetration depth provided the board is adequately secured to the rafters first. This can either be achieved by using a nail long enough to pass through the counter batten, rigid structural board and into the rafters by 38mm. With this method the counter batten contributes to the batten nail penetration depth. Alternatively the board is nailed directly to the rafters before the battens are nailed through the counter batten into the rigid board and rafter. With this arrangement the counter batten only qualifies as a spacer and can not count as a part of the batten nail penetration depth.

Weight of tiles on steep roof slopes with counter batten used with insulation board, can cause the helical fixing nails to bend, as the section of the nail passing through the insulation is unsupported. In this situation the ends of each counter batten should be fixed to horizontal restraining battens equal to the depth of the insulation board. Provided each end of the counter batten is fixed in this manner they will not rack and will allow the helical counter batten fixing to transmit safely the tension and compression loads.

The fixing of counter battens through any form of board is not easy. With the roof boarded out it is difficult to see the rafter that you are fixing into. Accurate marking of the boards as they are installed, or setting chalk lines from top to bottom, is essential to maintain the line of each rafter. If



~ If plain tiles are being used on a roof incorporating sarking board and the underlay is below the counter battens the minimum rafter pitch is 45°. Below 45° the underlay will back fall.

the underlay is laid before the counter battens the rafter lines need to be transferred to the surface of the underlay. The thicker the insulation board and the thicker the counter batten, the greater the risk that the helical nail fixing will miss the centre line of the rafter below. A fixing that misses the rafter or splits the edge fibres of the rafter will not be transferring any load back into the roof structure.

At the apex of a ridge the counter battens should finish with a vertical mitre cut. This ensures that the top tiling/slating batten on each side will not finish on a joint and is as far away from the end of the counter batten as possible.

Provided underlay is installed over the counter battens, the counter battens can be finished behind the fascia board. But where the underlay is laid under the counter batten the bottom of the counter batten should finish close to the bottom edge of the first tile/slate batten to allow the underlay to pass out over the fascia board without having to rise. A rise in the underlay at this point will allow water on the underlay to be trapped and pond, where it could drain through an end lap in the underlay.

Counter battens installed with rigid insulation material should be a minimum of 38 by 38mm fixed through the insulation into the structure below with helical fixings. The length of the fixings should equal the thickness of the insulation plus 80mm and the ends of the counter batten should be fixed to a restraining batten.

Counter battens installed with rigid structural boards do not need helical fixings and do not require a thick counter batten. However the length of the counter batten fixing nail should be equal to the thickness of the counter batten plus 40mm provided the rigid structural board is adequately fixed to the rafters.

Where the counter batten is used as a spacer the length of the batten nail should be equal to the thickness of the slate/tile batten plus counter batten + 40mm.

The wider the rafters, the thinner the combined thickness of the insulation and counter batten the better the chances of the helical fixing nail entering the middle third of the rafter and achieving an adequate pull out resistance.

As with any system of components, the more layers the more options are available and the more things that can go wrong.

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