

Slating & Tiling

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Lead slates

The term lead slate refers to a vertical pipe flashing formed in lead sheet; but whilst they are used with slates they can also be used with tiles, provided you know how to install them.

Lead slates have been a traditional pipe flashing for centuries. Today they are rarely manufactured on site, but bought as pre-formed units, or as a metal sheet with a flexible rubber cone, through which the vertical pipe can pass. With so many years of experience there should be no problems associated with their specification and installation, but unfortunately this is not the case as I shall explain.

Head lap

Most lead slates are supplied as a standard item, they have a pre determined pitch and pipe size and come with a 450 x 450mm base sheet. This is where the problems start, as at a rafter pitch of 35° with a plain tile or natural slate roof covering, the lead slate can be laid within the array of slates and tiles and lap over the lower tiles and be fully supported by 150mm, under the adjacent slates and tiles by 150mm, and up under the slates and tiles above by 150mm. Provided the slates or tiles are cut tightly around the pipe, that is no greater than 150mm in diameter, it will work within the pitch and lap requirements recommended by the Lead Sheet Association (LSA). But as soon as the rafter pitch is reduced below 35° for natural slates, greater lap lengths are needed and therefore the size of the base sheet should be increased. At 22.5° rafter pitch the side laps should be a minimum of 200mm and the head laps above and below should be 190mm, which would require a 510 x 510mm base sheet when used with a standard 110mm soil pipe.

With interlocking tiles that can go down, in some instances to 12.5°, the situation gets more extreme. Whilst the side lap recommendation remains at

200mm, the head laps increase to as much as 390mm requiring a base sheet of 900+ mm x 510mm.

True pitch

The situation is further complicated by the fact that whilst the rafter pitch may be 22.5° depending upon the size and thickness of the slate or tile, so the true pitch of the surface of the slate or tile will be less than the rafter pitch by between 3 and 10°. For a flat interlocking tile like a Marley Modern the true pitch is approx 5° less than the rafter pitch making a 22.5° rafter pitch into a 17.5° true pitch requiring a base sheet that is 620mm long by 510mm wide.

Tile module

With interlocking tiles it is often impossible to cut a neat hole at an angle through the centre of a tile and therefore it is often easier to leave out a complete tile and use the flashing to fill the gap. As a standard interlocking tile has a horizontal coverage of 300mm, and a gauge at 22.5° of 340mm, to lap under and over the adjacent tiles by the distances recommended by the LSA, the base sheet would need to be 770 mm x 700mm. It is the lap of the base sheet under or over the adjacent slates or tiles that is of importance, not the notional width of the flashing, assuming that the slates or tile will be cut tight to the pipe. In addition an extra 20 to 40mm should be allowed for on all four edges for a welt, and for the distance from the head of the lower tile to the nail holes (as the head lap should be measured from the nail holes not the head of the tile), making the base sheet for a Marley Modern tile laid on a rafter pitch of 22.5°, with a 110mm soil pipe, at least 820mm x 750mm in size.

Support

Lead is unique in being unable to support its own weight. This means that it is incapable of spanning across open space and keeping its shape over a long period of time. This means it must always be supported. With

a double lap slate or tile this is little or no problem. But for interlocking tiles, from the head of the lower tile to the pipe, and from the pipe to the head of the sheet there needs to be a timber support board at the correct level. Without a support board the lead sinks down pulling the lead around it in further, reducing the side and head laps. Eventually a trough forms at the base of the pipe flashing and this fills up with debris and water and eventually cracks and leaks. The size and shape of the support board will vary with each tile profile and whilst it should be installed, in normal practice it rarely is.

Collar

Where the pipe flashing passes around the pipe the top edge needs to be sealed to prevent water running down the pipe, and down between the pipe and the flashing. With lead it is possible to dress the top edge tightly around the pipe, but it is still essential that the top of the pipe flashing is either protected by a collar, or sealed off with suitable lead compatible mastic and a stainless steel Jubilee-type clip.

Other considerations

When lead slates are installed with fibre cement slates it can be impossible to install a copper disc rivet fixing to the slates in the course directly above, without puncturing the lead sheet. Without the copper disc rivet, fixing the slates will be vulnerable to wind damage. In a similar vein the clipping of interlocking tiles to the right and above the lead slate can be compromised as the clip needs to locate into the side interlock above the base sheet



The base sheet on this lead saddle was only 400 x 400 giving approx 100mm of side lap. Notice the pipe has sunk into the roof creating a rat hole under the tiles above. At least the top edge of the lead pipe is protected by a plastic collar.

and fix to the tile, or batten, below the base sheet.

Conclusion

There are many situations where the only solution to weathering a penetration through a pitched roof is the installation of a lead slate, but there again there are alternatives for some situations which overcome some, or all, of the problems mentioned above. These are called ventilation tiles. In many instances lead slates are leaking not because they are badly made, but because they were never large enough in the first instance, or have not been installed correctly.

Tips

- Calculate the size of the base sheet. 450 x 450mm is only suitable for steep rafter pitches. The lower the rafter pitch the bigger the base sheet should be regardless of the metal used.
- Always ensure that the lead flashing is fully supported.
- The top edge of the pipe flashing should be sealed, or covered with a collar to stop water running down between the pipe and the flashing.

Compiled by Chris Thomas FIoR
The Tiled Roofing Consultancy
2 Ridlands Grove, Limpsfield Chart, Oxted,
Surrey, RH8 0ST
tel: 01883 724 774

email:
chris.thomas@thetiledroofingconsultancy.com
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