

Where does the water go...?

The Tiled Roofing Consultancy discusses where the water goes once vapour passes through a roof membrane...

Over the last fifteen years, we have seen vapour permeable underlays dominate the roof underlay market in the UK. This development has been driven by the need to reduce the risk of condensation forming in the roof space. But once vapor passes through the membrane, where does it go?

Background

A good roof with VP underlay installed should have a vapour check layer installed below the insulation layer to prevent as much water vapour getting into the insulation and roof construction as possible. But where no vapour check layer has been installed, or where the membrane has been incorrectly installed, water vapour will eventually penetrate the roof construction.

On a frosty night, the amount of water vapour in the warm air inside a heated building is relatively high. Hot air will rise to the top floor and attempt to rise into the roof construction. If it finds a little path, the moist air will eventually get into the cold air space above the insulation layer. Cold air cannot absorb as much moisture as warm air, so it will try and lose the excess moisture onto a cold surface, which is normally the underside of the

slate (or tile) roof covering, or in some instances the underlay.

Water is trapped between slates

The part of the slate that is at risk of condensation forming is the underside of the upper zone of the slate. When the volume of water on the underside of the slate is sufficient, it will run down the underside and into the thin spaces between overlapping slate surfaces. By capillarity, water will be drawn into these spaces and spread across 60% of the slates' surfaces.

This is similar to rainwater being sucked up from the slates' external edges, but in smaller quantities and from the top edge. So even if it is not raining, water can collect between the slates. If the temperature is sufficiently cold, the condensation can freeze on the underside of the slate and remain frozen until the temperature rises above freezing, which could be a matter of hours or even days.

What trapped water does

Thermal stresses are generated when the sun heats the top surface of a slate that is being cooled by trapped water on its underside. This causes material fatigue. With freezing temperatures, water that has absorbed into the slate's surface freezes, expands and more

aggressively undermines the stone.

A controlled separation

By providing a ventilation path, vapour can be guided through the roof construction quickly before it has time to condense and freeze. Small gaps between slate (or tile) surfaces can perform this function. A certain amount of this occurs on rough slates, but the effect is limited. The effect can be enhanced by introducing a controlled, slim gap between slates.

By introducing slight gaps between slate surfaces, condensation that does form is not held between the slates, but runs straight through. The less water that is held between the slates, the quicker the slates dry out, the less thermal stress is imparted, and the less damage from freezing can occur.

Comparisons on old slates, between exposed surfaces that dry quickly and remain sound and covered surfaces that remain wet and age early, make clear the benefit of evacuating water and speeding drying.

By reducing condensation, and its aging effects, gapping slates increases the return on one's roofing investment, conserves a limited natural resource and reduces carbon emissions.

Slate spacers

Slate spacers are available to impart a small, controlled gap. They look like a small wire coat hanger and are easily slotted between each pair of slates (no fasteners required). Spacers rest between the slate courses to maintain a 1.2mm gap, a gap that has been shown to allow slates to dry eight times quicker than slates that touch. Slate spacers are universal as they work with any size and thickness of slate and work equally well with slates that are hook fixed, head or centre nailed.

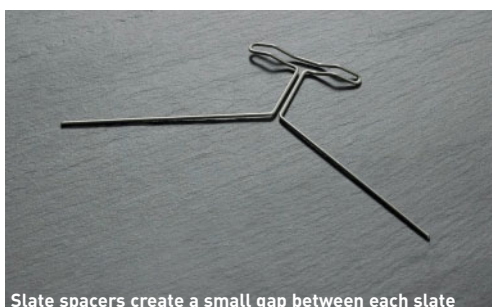
Slate spacers have other benefits apart from reducing condensation on the underside of slates and lengthening slate life: less rain water is drawn up between the slates; and, by reducing point loads from proud nail heads, spacers can reduce breakage.

All of this can be achieved just by introducing a small gap between the slates.

For more information about The Tiled Roofing Consultancy use our online enquiry service www.abc-d.co.uk/info quoting number 365

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Slate spacers create a small gap between each slate



Frost can cause moisture to form on the underside of slates



Heat from the sun can cause moisture build up