

# WHY VENTILATION IN COLD ROOFS IS SO IMPORTANT PARTICULARLY BARN CONVERSIONS

By Ken Hamilton of Surevent

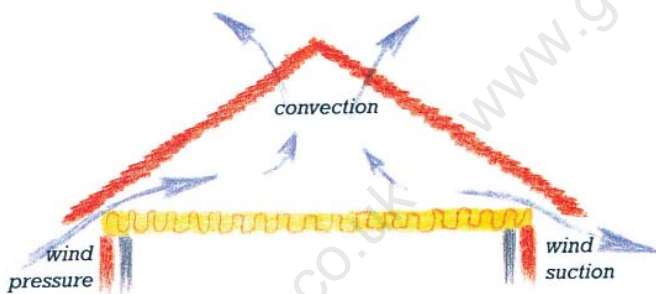
New products almost always challenge existing ones. But sometimes existing products and methods are cheaper, safer and more reliable, so why change?

Until recently, roof ventilation practice was clear. The introduction of a new product, vapour permeable underlays [VPUs] has resulted in a perception that roof ventilation is no longer needed. This has led to a dangerous confusion among those responsible for building and designing roofs, which, unless redressed, will lead to future problems of condensation.

## Background

Since the 1960s, successive changes in building regulations and in particular the recent changes to Part L are making buildings more energy efficient and have greatly increased roof insulation requirements. At the same time, houses have been made more airtight through increased draught-proofing and double-glazing, while higher living standards have seen an increase in the number of bathrooms, washing machines and tumble dryers all creating warm, moist air within the building, which must find an escape route.

For the last 20 years or so, the tried and tested solution to this problem has been to ventilate the roof space using high and low level ventilation systems. These create a combination of convection,



A ventilated cold roof

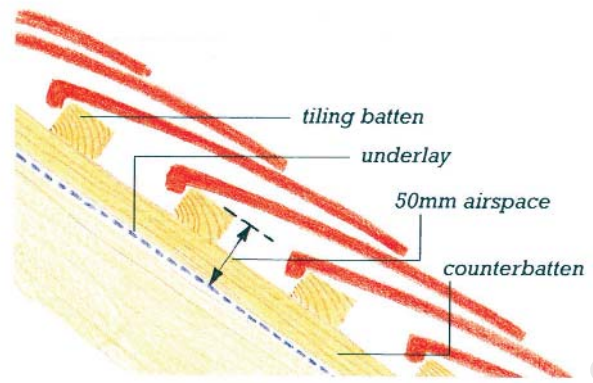
wind pressure and wind suction to disperse water vapour before it has a chance to condense and cause damage. The recently revised BS 5250 on Condensation has reinforced this advice.

## Better information

Vapour permeable underlays have been offered as a new solution instead of standard 1F felt, but this is not as straightforward as it seems. Several sections of the roofing industry have got together to form SureVent, an organisation, campaigning to promote best practice in cold pitched roofs so that harmful condensation damage is prevented. It is the view of both SureVent and the Building Research Establishment that the performance of VPUs without additional ventilation systems has not been conclusively proven in practice. When in doubt, ventilate!

VPUs can be used in certain circumstances, but our members, which include several companies that market such products, are

## Countryside Building 4



Batten space ventilation

concerned that incorrect specification and installation will lead to avoidable problems. VPUs play a useful role in modern roofing, being lighter, cleaner and easier to handle than bitumen felt. However to completely prevent harmful condensation in cold pitched roofs batten cavity ventilation must be installed when the ventilation of the loft-space is not positively ventilated.

## Dangers of not ventilating

Even with low risk conditions (eg a house with couple with no children and a large part of the day with no water vapour production), there is a risk of harmful condensation above the VPU, which would eventually cause rot and failure of the tiling battens. It is in any case not possible to guarantee such an occupancy over the life of most dwellings.

In the high risk conditions (eg a family with children) there is a risk of harmful condensation both above and below the VPU. This would result in serious damage to the roof structure and the insulation.

How can it be guaranteed that a roof does not deteriorate? Air permeability of roof coverings reduces with age. Ventilation above the VPU is necessary because it is not possible to accurately predict the level of air leakage through slating and tiling systems over the life of a roof as the joints become fouled by debris and moss.



How much ventilation will these tiles provide?

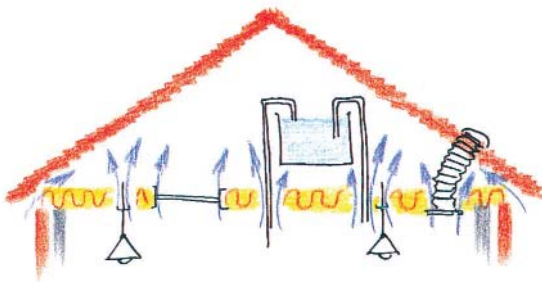
## What is best practice?

SureVent therefore recommends loft space ventilation as the simplest and most reliable option for all cold pitched roofs, even where vapour permeable underlays are used.

## Take a close look at the VPU suppliers' claims

Many suppliers of VPUs will refer to third party certificates such as Agrimont Certificates to support their claim that ventilation is not required. Close reading of these Certificates shows that for the construction to be covered by the certificate there must be an airtight ceiling. We agree that in a new building, if an airtight sealing is achieved, moisture from the inside of the building is unlikely to reach the roof space and so condensation should not be a problem, but we do not believe that it is practical to construct an air tight ceiling for the life of the building. How is this barrier to be constructed to ensure that it completely air tight at all junctions? Such as:

- Seals onto brick or blockwork
- Around pipes
- Around electrical wiring

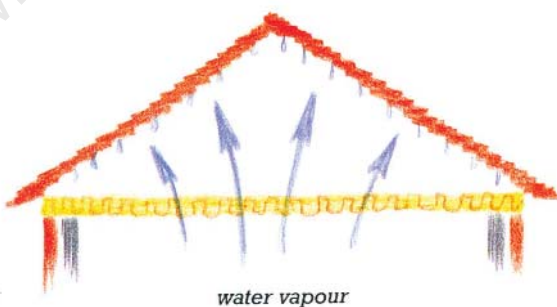


How can all these junctions at ceiling level be constructed to remain air tight for the life of the building?

- Around fixings
- In corners
- Around a hot metal gas flue
- Around the loft hatch.

Even if, in a new construction, an airtight seal is achieved around all of the above junctions, how is it possible to ensure that it remains for the life of the building? We therefore strongly recommend that:

- If a VPU is used without loft space ventilation then a condensation risk analysis should be carried out
- If a risk exists then the loft space should be ventilated.
- In any case the batten cavity should always be positively ventilated when not ventilating the loft space



The risk of condensation if the roof is not ventilated and there is not an airtight seal at ceiling.

## Health and safety

Manufacturers and third part certificates also recommend that for cold sealed pitched roofs the underlay is laid from eaves to eaves over the ridge. This greatly increases the risk of the roofer falling through the construction, because as the roofers lay the felt they are being asked to work above it, when it can not be classed as a safe work surface, it is therefore a requirement that some form of fall arrest equipment such as nets or harnesses are used, edge protection on its own will not be acceptable. This is a risk that the designer must take account of under his responsibilities in the CDM regulations to ensure that the design is as safe as possible to construct (reference volume 3 Issue 2. 'Some Health and Safety aspects in Design Procurement'). It should be remembered that when the underlay is fixed in the traditional way from verge to verge, the roofer is able to fix the battens as he moves up the roof to ensure that he has an acceptable and safer surface to work on.

## Cost considerations

SureVent has obtained costs from a number of leading roofing contractors for materials and labour for the underlay and associated work on a simple cold pitched roof. These calculations show that an unventilated cold roof with VPU and sealed laps as required by the Third Party Certificates, but without batten space ventilators, is over three times the cost of a conventional positively ventilated roof with non-permeable underlay.

## Building conversions

Ventilation is particularly important when considering the conversion of old barns and out houses. Using traditional constructions these buildings will have been very vapour permeable and have stood the test of time by surviving, often without damp proof courses or double skin walls, by allowing moisture vapour to move through the structure. If when we convert these buildings to other use we attempt to seal moisture out this will also have the effect of sealing moisture in and can cause major problems of condensation and even structural damage as there is nowhere for all the moisture in the structure to go. It is much better to provide plenty of ventilation and allow the moist air from the living or working areas to pass through the ceilings or the insulation and into the roof space where it can be vented away by the correct inclusion of ventilation preferably at eaves and ridge.

So why pay the extra money and possible cause an increased risk of injury to the roofers and still have a risk of condensation causing damage in the roof space, far better to lay the felt in the traditional way and ventilate, which will ensure that you reduce the risk of harmful condensation and help to ensure that the roof is safer to construct.

For more information on roof space ventilation visit our web site at [www.surevent.co.uk](http://www.surevent.co.uk)

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