

Ventilation requirements for cold and warm pitched roofs with LR underlay and air impermeable roof coverings

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Question

What are the ventilation requirements for cold and warm pitched roofs with LR underlays and air impermeable roof coverings?

Considerations

- Performance standard 7.2.15 Ventilation, vapour control and insulation states 'roofs shall have adequate precautions against condensation',
- In roofs with LR membranes moisture can move by both diffusion and convection from the loft into the batten space,
- Air impermeable roof coverings such as self-supporting metals sheets with standing seams can restrict the transfer of vapour from the batten space to atmosphere due to their high resistance to water vapour and airtightness,
- There is a risk of interstitial condensation and moisture accumulation on the underside of air impermeable roof coverings,
- Excessive and prolonged interstitial condensation within a roof structure can cause hygroscopic materials such as timber to absorb sufficient moisture to encourage mould growth and decay if above 20% moisture content (decay threshold). It can also cause damage to coverings, insulation, metal fixings, linings and supporting construction.

Answer

BS 5250 *Management of moisture in buildings - code of practice* provides guidance on application of design principles for roofs and should be used by designers to control condensation risks to within safe limits.

Section 12.4.3.2 of BS 5250 describes a method for determining the air permeability of roof coverings. The outer weatherproof covering is deemed to allow sufficient air movement and be air permeable if the airflow at a differential of 10 Pa is greater than $17.4 \text{ m}^3/\text{h Ar}$, where Ar is the area of the outer weatherproof covering under test in m^2 (as defined in BS 5534:2014+A2:2018).

If the airflow is not greater than $17.4 \text{ m}^3/\text{h Ar}$, then the outer weatherproof covering is deemed air impermeable.

Confirmation should be sought from manufacturers on the air permeability of their coverings.

Where air impermeable coverings are used on a cold pitched roof with an LR underlay the following should be provided in accordance with BS 5250:

- Ventilation openings to the roof void in accordance with sections 12.5, 12.6 and 12.7; and
- Subject to manufacturers recommendations, ventilation openings to the batten space above the underlay, created with minimum 25mm deep counter battens, having a minimum free area of not less than $25000\text{mm}^2/\text{m}$ at eaves level and $5000\text{mm}^2/\text{m}$ at ridge level.

Where air impermeable coverings are used on a warm pitched roof with an LR underlay the following should be provided in accordance with BS 5250:

- Air and vapour control layer at ceiling level and
- Subject to manufacturers recommendations, ventilation openings to the batten space above the underlay, created with minimum 25mm deep counter battens, having a minimum free area of not less than $25000\text{mm}^2/\text{m}$ at eaves level and $5000\text{mm}^2/\text{m}$ at ridge level.