



# Building Control

## Technical Guidance Leaflet No. 13

### *LOW WATER VAPOUR RESISTANCE UNDERLAYS IN 'COLD' PITCHED ROOF SYSTEMS FOR DWELLINGS*

This leaflet is one of a series produced by the Hertfordshire Building Control Technical Forum

#### **Commentary**

A relatively recent introduction to the technology of pitched roof construction has been the development of LR or vapour permeable underlays for use in place of the traditional BS747 type IF bituminous felts. A type LR underlay is defined as an underlay with a vapour resistance of 0.25MNs/g or less.

These high performance materials can provide a barrier against wind-driven rain and snow whilst allowing water vapour in the loft space to pass through to the air space beneath the external tiled finish where it can disperse to atmosphere.

As with all building components, Building Regulations require that such materials be fit for their purpose. In order to assess their suitability it is usual to ensure that the manufacturer has obtained proper accreditation from an appropriate independent body such as the British Board of Agreement (BBA) or BRE Certification.

#### **Roof Ventilation**

The traditional method of preventing damage to roofs from interstitial condensation is to provide cross ventilation to the void between the insulation material and the underlay. Regulation C.2 and its associated approved document looks for accordance with BS 5250:2002 which allows for reduced levels of ventilation where LR underlays are used. The section below outlines these requirements.

Whilst not according with the above documents, some products are certified by UKAS accredited bodies such as BRE and the BBA to be suitable for totally unvented systems. This is only on condition that the installation methods and limitations of use in the certificates are met. It is important to check that the relevant certification is still valid when specifying these materials.

#### **Regulation C.2 and BS 5250 Route to Compliance**

Roofs with well-sealed ceilings are permitted to have eaves ventilation that is the equivalent of a continuous 3mm opening. The alternative is to provide high level (e.g. ridge) ventilation equivalent to a continuous 5mm gap. For a normal ceiling arrangement the eaves dimension increases to 7mm. In all cases the BS advises that additional 5mm high level ventilation be provided for new dwellings built using techniques that entrain large quantities of construction water i.e. masonry, wet plaster and cement floor screeds.

#### Well-sealed ceilings

To be considered as well sealed a ceiling must meet the following criteria: -

- a) There must be no unsealed holes or gaps in or between abutting elements such as walls and ceilings. This is particularly important where dry lining boards abut the ceiling.
- b) Roof hatches should not be located over kitchens, bathrooms or similar spaces where large amounts of moisture are produced.
- c) Loft hatches must be made sufficiently convection tight by using compressible draft seals. To compress the seal, hatches less than 5.5kg in weight should be clamped. Proprietary sealed sets should generally be used for drop-down type hatches.
- d) The head of cavity in a wall or partition should be sealed to prevent the transfer of warm moist air into the roof void.

- e) Recessed light fittings such as downlighters should be integrally sealed against air leakage. Alternatively they should be enclosed within a sealed box within the roof void. Depending on their sealing performance (usually quoted by manufacturers) they should be limited in number so that total air leakage does not exceed  $.06\text{m}^3/\text{hr}/\text{m}^2$  of ceiling. HTF produce a further guidance note specifically dealing with the use of downlighters.
- f) An effective vapour control layer should be incorporated to the 'warm' side of the insulation. Foil backed plasterboard or 500 gauge polyethylene sheet would suit this purpose.

The following conditions are also applicable when considering a reduced level of roof ventilation: -

- i) In addition to the need for a well –sealed ceiling, reduced ventilation will only be appropriate if the dwelling areas below the roof space are provided with the appropriate purge, background and mechanical ventilation as advised by Building Regulations Approved Document F1. This may not be so in the case of a new roof or loft conversion to an existing building.
- ii) Roofs to extensions that interconnect with existing roofs cannot be considered to have well sealed ceilings unless the existing ceilings can also be shown to meet the above criteria.
- iii) Water storage vessels in the loft area should be fitted with a tight fitting cover and all pipework lagged.
- iv) Roof finishes that are tight fitting and inadequately 'air open' may not allow the moisture passing through a LR underlay to dissipate to outside air. In such cases ventilation provision is required between the underlay and the finish. Such finishes include double lap fibre cement slates, profiled metal sheet, bituminous felt or plastics sheeting. Traditional tiling in concrete, clay and slate would not normally require such ventilation.

### **Alternative Route to Compliance**

As mentioned above, UKAS accredited certification gives a designer an alternative and enables the specification of an unvented LR underlay roof system. Not all vapour permeable underlays are suitable for such use and the BBA website at [www.bbacerts.co.uk](http://www.bbacerts.co.uk) is a useful source of information on those that have been tested and certified for unvented systems.

Certification is only valid if the materials are used in strict accordance with the conditions of installation and use stated on the respective certificates. The principles of achieving a well sealed ceiling and the other factors listed above are equally appropriate to these systems.

Other conditions that are typically found on certificates are; -

- i) Counter battens should be used where the underlay is laid directly over the insulation material and is fully supported by it. This allows the drainage of any moisture penetrating the tile finish and prevents the build up of dust or debris behind the tile battens.
- ii) Tiling battens should have a minimum depth of 25mm in order to form an adequate space for the dispersion of water vapour.
- iii) Certificates recommend the installation of a u.v. durable eaves carrier discharging into the gutter. This is because most materials are not resistant to u.v. degradation in the long term. They may also serve the function of a support fillet to prevent ponding of water behind the fascia board.
- iv) Unventilated loft spaces are acceptable with planked type timber sarking (100mm wide with 2mm gaps) but permeable underlays are not approved for unvented roofs incorporating OSB or plywood panels typically 1220 x 2440mm in size.

### **Further Information**

You are welcome to contact your local authority Building Control section for further advice on the use of Type LR roofing underlays.