



Residential Property  
Surveyors Association

## **Guidance for members**

The inspection and reporting of sprayed foam applied within the pitched roofs of residential property

Investigation and conclusions

December 2021 v1.0

## Introduction

There has been significant discussion over the use of sprayed polyurethane (PU) foams in domestic property. This has led to confusion amongst Surveyors and Valuers about how to report on the condition of a roof with sprayed foam applied, and with some lenders refusing to offer loans on affected properties. The result is that consumers may, unwittingly, put themselves in a position of detriment, sometimes making their home effectively unsaleable.

Negative press coverage is counterbalanced by advertising which makes extravagant claims, and sales practices are known to have targeted vulnerable individuals, especially the elderly. And the increasing need to make our homes more energy-efficient is a key driver in encouraging homeowners to explore opportunities to insulate their properties more thoroughly.

In September 2021 the Property Care Association and the Residential Property Surveyors Association convened a forum of industry stakeholders to consider the use and implications of sprayed foam products within existing pitched roofs of domestic property. The objective of the forum was to:-

- a. collate existing knowledge and identify gaps in understanding
- b. review, research and summarise findings
- c. publish guidance for Association members

The aim of the RPSA was to help Surveyors identify those circumstances where the presence of sprayed foam could be deemed to be “safe” i.e. where the risk of harm to the structural timbers of a pitched roof could be assessed as being minimal or absent.

It was assumed that, where installations had been carried out professionally, in accordance with the standards determined for the specific products being used, and with diligent procedures for pre-installation assessment of roof condition and hygrothermal conditions, the risk of potential defects would be reduced to acceptable levels.

In this way it was hoped that at least some installations could be deemed as sufficiently “safe”, without undue risk of harm to the roof structure, so that a Surveyor could offer their client confidence in making an investment in a property without risk of a future lender or buyer being deterred from investing in it, or of incurring unexpected costs for remediation.

While surveyors can carry out a visual inspection of those parts of the structural roof timbers not covered by spray foam, the presence of spray foam, inevitably, conceals some parts of the timbers. Specifically, the areas at highest risk of timber decay due to increased moisture levels are those uppermost faces of the rafters, those in close proximity to the roof covering, and timbers around valleys and roof junctions.

However, before conducting an inspection it is important that the Surveyor understands the types of sprayed foam that might be present, and how they differ in their properties.

## The Products

### **Closed Cell Polyurethane Sprayed Foam**

Applied directly to the underside of tiles and slates or to underfelts within pitched domestic roofs.  
Can be used to stabilise failing roof coverings e.g. nail fatigue  
Minimal value for improving the thermal performance of the building (not the primary function).  
Usually applied as a relatively thin layer of approx.. 20-40mm  
Has some vapour permeability but vapour transfer through the material is typically quite low  
Very strong adhesive properties, bonds strongly to substrate

Relatively dimensionally strong and resists compression  
The product is essentially waterproof resisting the passage of free water.

When used to stabilise failing roof coverings it should be applied to a “dry” (leak-free) and defect free roof.

The use of adhesive PU foams may work to delay the inevitable renewal of roof coverings.  
May render roof coverings (slate, tile and stone) unrecyclable/unreusable.  
Foam removed from roof coverings presents a waste disposal / recycling problem at the point when roof renewal is inevitably needed.

The presence of sprayed foam means that simple visual inspections to establish the condition of roof timbers is impossible.

Investigations performed to establish the condition of roof timbers will be difficult and limited.  
Where evidence of roof leaks, timber decay or insect infestations are identified, the full extent of the problem and the extent of any repairs, treatment and drying can only be undertaken if the foam is removed.

Where timber decay or insect attack is discovered, or is suspected, in a roof that has been coated in closed cell foam that has been applied directly to the roof coverings, it is likely that this will result in the full strip and recover of the roof as the foam will be extremely difficult to remove from localised areas.

The need to remove well bonded high-density foam from tiles, slate and stone will probably prevent their reuse.

### **Open Cell Sprayed Polyurethane Foam Insulation**

Used to improve the thermal performance of the building  
Applied to a thickness of 100-150mm  
Relatively soft – easy to squish – can push a probe into it easily  
Varying degree of vapour permeability  
May be applied to roofs with vapour permeable and non-permeable underfelts  
Some risk of vapour transfer  
Hygrothermal modelling is needed to confirm that condensation risk is managed  
Can be made wet but will not significantly restrict the passage of free water.  
The product is usually adequately vapour permeable and will allow vapour transfer.  
Open cell foam is not recommended for applications directly to the underside of tiles, slates or other domestic roof coverings.  
These foams should only ever be applied to the underside of felts.

*Note - Problems could occur if open cell foams are applied to underlays that are not vapour permeable. The inappropriate use of reinforced highly vapour resistant plastic underlays was relatively common where roofs were being replaced during the 1960s to 1990s*

Open celled PU foams are relatively dimensionally weak and although they bond to substrates effectively and hold their shape permanently, they have little or no value as an adhesive or bonding agent. Hence they are not commonly, or correctly, used for stabilising failing roof coverings.

Vapour conductivity of ceiling, occupation level and the ventilation regime in the occupied parts of the house affect condensation risk.

A vapour control layer (VCL) may sometimes be needed (recommended after a hygrothermal evaluation) on the warm side of open cell spray foam insulation. This is required if there is a risk of interstitial condensation.

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## Approvals/Certification

Many spray foam products are awarded certification by organisations such as the British Board of Agrement (BBA), LABC, Kiwa, and Huntsman

Products are described under their brand names such as Duratherm, Icynene, Isothane, and WBF.

The certification documents describe, for example, how the products should be used within Building Regulations, their technical specifications, pre-installation design considerations, thermal performance, installation procedures, and how testing was conducted.

## The nature of pitched roofs and insulation

Most houses built with a pitched roof have a “cold roof”. This usually includes insulation within the roof space (the “loft”) immediately above upstairs ceilings. Heat, and moisture-laden air, is therefore contained within the dwelling area, the loft space being colder.

To prevent the build-up of moisture due to any warm moist air escaping from the dwelling space condensing on cold surfaces within the roof space, ventilation is provided to remove excess moisture. This may take the form of gaps or vents at the edges of the roof, or vents in the gable walls or roof covering.

Closed cell sprayed foams are usually no more than 20-40mm thick and provide little or no insulation properties. So, when applied within a cold roof, the roof remains cold.

Open cell sprayed foams are applied more thickly, typically 100-150mm. and, therefore have a significant insulation property. While this may be beneficial in heat retention, it has the effect of turning the original cold roof into a warm roof. Heat from the dwelling area now becomes retained in the roof space, but this brings with it moisture from the normal everyday activities of those living within the property.

Unless any insulation which was originally laid above the ceilings is removed, then the roof space will be in a “halfway house”, being neither cold roof nor warm roof. This complicates any estimation of the performance of the roof, significantly increasing the risk of unintended moisture related defects. Alternatively, a VCL (Vapour Control Layer) can be included at upper floor ceiling level to reduce moisture levels within the roof space, though doing so will require additional ventilation and moisture management within the dwelling area of the property.

And the ventilation, so necessary in the original cold roof scenario now needs sealing up to prevent all the heat from the house being immediately wasted to the outside.

The installation of open cell spray foam therefore requires a comprehensive review of the hygrothermal (movement of heat and moisture through a building) performance of the property to assess the nature of any additional works that may be required.

It is usually essential\* that open cell spray foam is only installed where a vapour permeable underlay is present beneath the external roof covering. Such underlays were only introduced in the late 1990's and so many homes with roofs laid prior to that time will not have a vapour permeable underlay.

\*There are some spray foam materials that are deemed suitable for use where non-permeable membranes are present. However it is difficult to understand how these can be used safely unless, perhaps a vapour control layer is installed at ceiling/joist level

The most critical areas within a roof, where any type of spray foam has been installed, are the uppermost side of the rafters, and the underside of valleys and roof junctions. It is here, if anywhere, that moisture will condense and collect which can lead to the development of defects such as rot and infestations by wood boring insects (commonly known as woodworm). However, the presence of spray foam prevents any inspection of these vulnerable areas.

## The inspection

Unless the following detailed information is available to the surveyor at the point of inspection, it is unlikely that any property professional could be expected to comment on the condition of concealed roof timbers or speculate on medium or long term risk posed by water ingress or condensate.

Pre-installation condition of:	Roof coverings Flashings Parapets and valleys Leadwork, flashings and flashing
Type of PU foam	Open or closed cell Vapour permeability of the foam used

Primary function of installation	Insulation Extend the life of failing roof coverings
Timber condition	Moisture content before application Timber condition before application
Nature of the roof void	Warm Void Cold Void – Is there provision for adequate ventilation
Hygrothermal Evaluation	Results from the hygrothermal evaluation
Atmospheric moisture control	Adequate ventilation in the occupied space Vapour tightness of the ceiling Ventilation of the roof void (cold roofs only)
Underlay Characteristics	Accurate description and understanding of the vapour permeability characteristics of the underlay. (Bituminous felt, VCL, breather membrane, etc)
Product specifications	
Relevant agreement certificates	

If any of the items on the list above is unknown and unavailable, then even a surveyor who has the capacity to understand the significance of such information is unable to evaluate the appropriateness of the PU present. The evaluation of moisture risk associated with water ingress or condensate will also be difficult or impossible to assess. In most situations the professional surveyor will be unable and ill advised to comment on the condition of the timber roof structure.

It may be possible through research or detailed investigation by a trained and competent specialist to discover the information that is needed to understand risk and condition. However such investigations may require the removal of section of foam or roof coverings. Such investigations could cause damage to insulation or the roof coverings that will need to be properly repaired.

## Conclusion

It is unlikely that an RPSA member surveyor undertaking an inspection for condition or valuation will be able to provide any advice relating to the condition or life expectancy of the roof structure where the installation of PU foam is not supported by detailed technical information.

Where closed cell PU foam has been applied directly to the underside of primary roofing materials the member will have no alternative but to recommend that the roof should be scheduled for early renewal with a provision for extensive replacement of the roofs structure as well as the roof covering.

Where there is any uncertainty about the composition of the foam present (open or closed cell) or the presence of a vapour permeable membrane beneath open cell foam, the surveyor will in all likelihood wish to recommend a cautious approach and recommend provision for early renewal of the roof and the removal of the PU insulation.

Estimates suggest that there are around 250,000 homes with a space spray foam installation. Although detailed information should be sought through enquiries of the seller, or their agent, by the surveyor, past experience would indicate that this is rarely, if ever, available.

**Consequently**, as it is not possible, where any type of PU spray foam is present, to conduct a comprehensive and conclusive visual inspection, it is recommended that all RPSA member surveyors adopt a default position of applying a **condition rating 3**, referencing the need for further investigations.

The instructing client should be made aware that such investigations will require examination of all of the information noted above which, in the majority of circumstances is unlikely to be available. Where comprehensive and detailed information is available, confirmatory tests, which may include invasive investigation could result in irreparable damage to the installation.

Where comprehensive and detailed information is not available, the instructing client should be advised that the property will require early removal of the spray foam, which may require removal of the complete roof covering, at considerable cost.

In all cases where spray foam insulation is present, the instructing client should be clearly made aware that future inspections and/or valuations may specify the removal of the foam which could include complete replacement of the roof covering and structural elements.

It is accepted that this guidance may result in house purchases being delayed, renegotiated or abandoned, is likely to cause distress to both buyers and sellers, and financial detriment to homeowners. The RPSA will continue to work with stakeholders and Government to explore new information that may allow us to alter or refine this guidance for the benefit of members and their clients.