

Icynene Inc

6747 Campobello Road
Mississauga
Ontario L5N 2L7
Canada

Tel: 00 1 905 363 4040 Fax: 00 1 905 363 0102
e-mail: info@icynene.com
website: www.icynene.com



Agrément Certificate
08/4598
Product Sheet 1

ICYNENE INSULATION

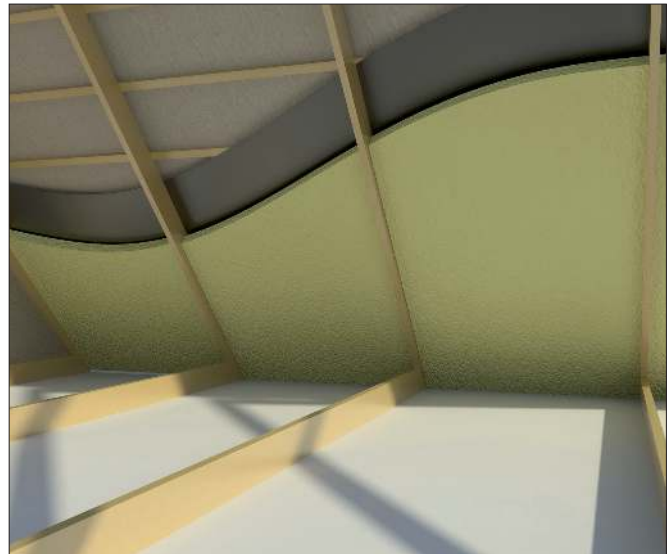
H₂FOAMLITE

This Agrément Certificate Product Sheet⁽¹⁾ relates to H₂FoamLite, also sold as LD-C-50, a spray-applied in-situ thermal insulation for pitched roofs with a roof tile underlay, the underside of flat roofs and lofts of new and existing dwellings or similar buildings.

(1) Hereinafter referred to as 'Certificate'.

CERTIFICATION INCLUDES:

- factors relating to compliance with Building Regulations where applicable
- factors relating to additional non-regulatory information where applicable
- independently verified technical specification
- assessment criteria and technical investigations
- design considerations
- installation guidance
- regular surveillance of production
- formal three-yearly review.



KEY FACTORS ASSESSED

Thermal performance — the product has a declared thermal conductivity (λ_D)* of 0.039 W·m⁻¹·K⁻¹ (see section 6).

Condensation risk — the product has a water vapour resistance factor (μ)* of 3.3. The risk of interstitial condensation will depend on the roof construction and should, therefore, be assessed for each project (see section 7).

Durability — the product will have a life equivalent to that of the structure in which it is incorporated. See section 12.

The BBA has awarded this Certificate to the company named above for the product described herein. This product has been assessed by the BBA as being fit for its intended use provided it is installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

A handwritten signature in black ink, appearing to read 'John Albon'.

A handwritten signature in black ink, appearing to read 'Claire Curtis-Thomas'.

Date of Third issue: 18 November 2015

John Albon — Head of Approvals

Claire Curtis-Thomas

Originally certificated on 14 November 2008

Construction Products

Chief Executive

The BBA is a UKAS accredited certification body — Number 113. The schedule of the current scope of accreditation for product certification is available in pdf format via the UKAS link on the BBA website at www.bbacerts.co.uk

Readers are advised to check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA direct.

British Board of Agrément
Bucknalls Lane
Watford
Herts WD25 9BA

tel: 01923 665300
fax: 01923 665301
clientservices@bba.star.co.uk
www.bbacerts.co.uk

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Regulations

In the opinion of the BBA, H₂FoamLite, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements of the following Building Regulations (the presence of a UK map indicates that the subject is related to the Building Regulations in the region or regions of the UK depicted):



The Building Regulations 2010 (England and Wales) (as amended)

Requirement:	C2(c)	Resistance to moisture
Comment:		The product can contribute to satisfying this Requirement. See sections 7.1 and 7.2 of this Certificate.
Requirement:	L1(a)(i)	Conservation of fuel and power
Comment:		The product can contribute to satisfying this Requirement. See section 6 of this Certificate.
Regulation:	7	Materials and workmanship
Comment:		The product is acceptable. See section 12 and the <i>Installation</i> part of this Certificate.
Regulation:	26	CO ₂ emission rates for new buildings
Regulation:	26A	Fabric energy efficiency rates for new dwellings (applicable to England only)
Regulation:	26A	Primary energy consumption rates for new buildings (applicable to Wales only)
Regulation:	26B	Fabric performance values for new dwellings (applicable to Wales only)
Comment:		The product can contribute to satisfying these Regulations; however, compensating fabric/services measures may be required. See section 6 of this Certificate.



The Building (Scotland) Regulations 2004 (as amended)

Regulation:	8(1)	Durability, workmanship and fitness of materials
Comment:		The product is acceptable. See section 12 and the <i>Installation</i> part of this Certificate.
Regulation:	9	Building standards applicable to construction
Standard:	3.15	Condensation
Comment:		The product can contribute to satisfying this Standard, with reference to clauses 3.15.1 ⁽¹⁾⁽²⁾ , 3.15.3 ⁽¹⁾⁽²⁾ , 3.15.4 ⁽¹⁾⁽²⁾ , 3.15.5 ⁽¹⁾⁽²⁾ and 3.15.7 ⁽¹⁾⁽²⁾ . See sections 7.1, 7.2 and 7.8 of this Certificate.
Standard:	6.1(b)	Carbon dioxide emissions
Standard:	6.2	Building insulation envelope
Comment:		The product can contribute to satisfying these Standards, with reference to clauses, or parts of, 6.1.1 ⁽¹⁾ , 6.1.6 ⁽¹⁾ , 6.2.1 ⁽¹⁾⁽²⁾ , 6.2.3 ⁽¹⁾ , 6.2.4 ⁽¹⁾⁽²⁾ , 6.2.5 ⁽²⁾ , 6.2.6 ⁽¹⁾⁽²⁾ , 6.2.7 ⁽¹⁾ , 6.2.8 ⁽²⁾ , 6.2.9 ⁽¹⁾⁽²⁾ , 6.2.10 ⁽¹⁾ , 6.2.11 ⁽¹⁾⁽²⁾ , 6.2.12 ⁽²⁾ and 6.2.13 ⁽¹⁾⁽²⁾ . See section 6 of this Certificate.
Standard:	7.1(a)(b)	Statement of sustainability
Comment:		The product can contribute to satisfying the relevant requirements of Regulation 9, Standards 1 to 6, and therefore will contribute to a construction meeting at least a bronze level of sustainability as defined in this Standard. See section 6 of this Certificate.
Regulation:	12	Building standards applicable to conversions
Comment:		All comments given for this product under Regulation 9, Standards 1 to 6, also apply to this Regulation, with reference to clause 0.12.1 ⁽¹⁾⁽²⁾ and Schedule 6 ⁽¹⁾⁽²⁾ . (1) Technical Handbook (Domestic). (2) Technical Handbook (Non-Domestic).



The Building Regulations (Northern Ireland) 2012 (as amended)

Regulation:	23	Fitness of materials and workmanship
Comment:		The product is acceptable. See section 12 and the <i>Installation</i> part of this Certificate.
Regulation:	29	Condensation
Comment:		The product can contribute to satisfying this Regulation. See sections 7.1 and 7.2 of this Certificate.
Regulation:	39(a)(i)	Conservation measures
Regulation:	40(2)	Target carbon dioxide emission rate
Comment:		The product can contribute to satisfying these Regulations. See section 6 of this Certificate.

Construction (Design and Management) Regulations 2015

Construction (Design and Management) Regulations (Northern Ireland) 2007

Information in this Certificate may assist the client, Principal Designer/CDM co-ordinator, designer and contractors to address their obligations under these Regulations.

See sections: 3 *Delivery and site handling* and 14 *Precautions* of this Certificate.

Additional Information

NHBC Standards 2014

NHBC accepts the use of H₂FoamLite if installed, used and maintained in accordance with this Certificate, in relation to *NHBC Standards*, Chapter 7.1 *Flat roofs and balconies* and 7.2 *Pitched roofs*.

CE marking

The Certificate holder has taken the responsibility of CE marking the product based on European Technical Approval ETA-08/0018. An asterisk (*) appearing in this Certificate indicates that data shown are given in the manufacturer's Declaration of Performance.

Technical Specification

1 Description

1.1 H₂FoamLite is a spray-applied open cell, water blown, low density polyurethane foam insulation suitable for pitched roofs with a roof tile underlay and the underside of flat timber roofs and lofts.

1.2 The product is prepared from two liquid components, isocyanate (BaseSeal) and resin (H₂FoamLite), and is yellowish in colour.

1.3 The product is applied with a fixed ratio (1:1) volumetric displacement pump in layers, until the final design thickness (not exceeding 300 mm) is achieved.

1.4 Ancillary items used with this product, but outside the scope of this Certificate, include:

- non-breathable and breathable roof underlays
- vapour control layer (VCL)
- gypsum plaster board
- timber battens
- spray equipment.

2 Manufacture

2.1 All production is controlled by batch production sheets with assigned numbers. Batches are blended according to the production sheets.

2.2 As part of the assessment and ongoing surveillance of product quality, the BBA has:

- agreed with the manufacturer the quality control procedures and product testing to be undertaken
- assessed and agreed the quality control operated over batches of incoming materials
- monitored the production process and verified that it is in accordance with the documented process
- evaluated the process for management of nonconformities
- checked that equipment has been properly tested and calibrated
- undertaken to carry out the above measures on a regular basis through a surveillance process, to verify that the specifications and quality control operated by the manufacturer are being maintained.

2.3 The management system of Icynene has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2008 by The Registrar Company (TRC) (Certificate TRC 00714).

3 Delivery and site handling

3.1 The isocyanate and resin components are delivered to site in drums (up to 250 kg capacity) bearing the product name, batch number and BBA Certificate number.

3.2 Drums should be stored in a well-ventilated area, between 15°C and 32°C, and away from possible ignition sources. The drums must be protected from frost.

3.3 The isocyanate and resin components are classified under the *Classification, Labelling and Packaging of Substances and Mixtures (CLP Regulation) 2009*, and the packaging bears the appropriate hazard warning label(s).

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on H₂FoamLite.

Design Considerations

4 Use

4.1 H₂FoamLite is satisfactory for use in reducing the thermal transmittance (U value) of roofs and lofts of dwellings or buildings of a similar occupancy.

4.2 The product can be installed:

- between, or between and under, timber rafters in a habitable warm pitched roof (room in the roof). Insulation at rafter level only, with or without counter battens

- between, or between and under, timber rafters in a non-habitable warm pitched roof (loft space). Insulation at rafter level only, with or without counter battens
- between, or between and over, timber ceiling joists in a ventilated non-habitable cold pitched roof (loft space). Insulation at ceiling level only
- between timber joists to the underside of a roof deck in flat timber roofs.
- between, or between and under, timber rafters, where the purlin and ridge may be steel (including open web types) (see section 4.9).

4.3 The product must be covered by a plasterboard lining except when used in a non-habitable loft space (see the *Installation* section in this Certificate); this use is restricted under the national Building Regulations (also see section 8.2).

4.4 Constructions must be designed in accordance with the relevant recommendations of:

- BS 5250 : 2011
- BS 5534 : 2014
- BS 8103-3 : 2009
- BS EN 351-1 : 2007
- BS EN 1995-1-1 : 2004 and its UK National Annex.

4.5 Before application of the product, it is essential that construction elements are designed and constructed to incorporate normal precautions against moisture ingress.

4.6 Existing constructions must be in a good state of repair with no evidence of rain penetration or damp. Defects must be made good prior to installation.

4.7 Installation must not be carried out until the moisture content of any roof timber framing is less than 20%.

4.8 The product must not come into direct contact with flue pipes, chimneys or other heat-producing appliances (see section 9).

4.9 The product must not come into contact with zinc or zinc-plated elements as, under certain environmental conditions, the foam will accelerate the corrosion of such elements. (Zinc or zinc-plated elements are used as fixings for timber, and extensively in prefabricated roof truss constructions.) In all situations where foam could come into contact with zinc, the zinc must be separated from the foam by covering the zinc plate with a suitable protective coating. The Certificate holder can advise on an appropriate coating for a particular application. The performance of such a coating is outside the scope of this Certificate.

4.10 The product forms a strong bond with clean, dry substrates. This should be taken into account when specifying the product or anticipating future alterations.

4.11 To satisfy the requirements of NHBC, a VCL of a type specified in their Standards must be applied behind the plasterboard lining in roof applications, and the product must only be applied to a roof construction incorporating a breathable roof tile underlay.

Pitched roofs — tiled or slated to BS 5534 : 2014

4.12 Pitched roofs are defined for the purpose of this Certificate as those roofs having a pitch in excess of 15°.

4.13 The product can be spray-applied directly to the underside of reinforced bitumen membranes, breathable roof tile underlays, or timber sarking boards between the rafters.

4.14 Care must be taken to ensure the integrity of the roof tile underlay drape when spraying the products (refer to the *Icynene Installer Training Manual* issued to installers). See section 15.9 of this Certificate.

5 Practicability of installation

The product should only be installed by installers who have been trained and approved by the Certificate holder (see section 13).

6 Thermal performance



6.1 Calculations of the thermal transmittance (U value) of a roof should be carried out in accordance with BS EN ISO 6946 : 2007 and BRE Report BR 443 : 2006, using the declared thermal conductivity (λ_D)* of 0.039 W·m⁻¹·K⁻¹.

6.2 The U value of a completed roof will depend on the insulation thickness, the roof structure and its internal finish. Example constructions are given in Tables 1 to 3. For improved energy or carbon savings, designers should consider appropriate fabric and/or services measures.

Table 1 U Values – cold flat roofs

Design U values (W·m ⁻² ·K ⁻¹)	H ₂ FoamLite thickness ⁽¹⁾⁽²⁾ (mm)
0.13	— ⁽³⁾
0.16	— ⁽³⁾
0.18	— ⁽³⁾
0.20	— ⁽³⁾
0.25	170 ⁽⁴⁾

- (1) Roof construction inclusive of bitumen, 18 mm plywood deck ($\lambda = 0.24 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$), variable thickness of timber joists bridging at 400 mm centres (12.5%) variable thickness of insulation (remaining thickness is air cavity), 12.5 mm plasterboard ($\lambda = 0.25 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$).
- (2) It is assumed there is no air gap correction ($\Delta U_g = 0.00$).
- (3) For improved thermal/carbon emission performance, additional batten/insulation thicknesses may be considered.
- (4) U value achieved using 200 mm joists.

Table 2 U Values – cold pitched roofs (lofts) – insulation at horizontal ceiling level

Design U values (W·m ⁻² ·K ⁻¹)	H ₂ FoamLite thickness (mm) ⁽¹⁾
0.13	150 between joists + 155 over
0.15	150 between joists + 120 over
0.16	150 between joists + 105 over
0.18	150 between joists + 80 over
0.20	150 between joists + 60 over
0.25	150 between joists + 25 over


- (1) Ceiling construction — 12.5 mm plasterboard ($\lambda = 0.25 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$). Between and over 50 mm by 150 mm ceiling joists at 400 mm centres (12.5%).

Table 3 U Values — warm pitched roofs

Design U values (W·m ⁻² ·K ⁻¹)	H ₂ FoamLite thickness (mm) ⁽¹⁾
0.13	— ⁽²⁾
0.15	— ⁽²⁾
0.16	— ⁽²⁾
0.18	150 between rafters + 85 below
0.20	150 between rafters + 60 below
0.25	150 between rafters + 20 below


- (1) Pitched roof construction — tiles on 25 mm timber tile battens, on low resistance (LR) breathable tile underlay, on 47 mm by 150 mm timber rafters $\lambda = 0.13 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$ at 600 mm centres (7.8%), with additional timber battens, VCL and 12.5 mm plasterboard $\lambda = 0.25 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$.
- (2) For improved thermal/carbon emission performance, additional batten/insulation thicknesses may be considered.

Junctions

 6.3 Care must be taken in the overall design and construction of junctions with other elements and openings to minimise thermal bridges and air infiltration. Detailed guidance can be found in the documents supporting the national Building Regulations.

7 Condensation risk

Interstitial condensation

 7.1 Pitched roofs should be designed and constructed in accordance with the relevant parts of BS 5250 : 2011 and Annex D including having a well-sealed ceiling for the roof application, using a water vapour resistance factor (μ)* of 3.3.

7.2 Care should be taken to provide adequate ventilation, particularly in rooms expected to experience high humidities, and to ensure the integrity of VCL’s (where installed) and linings against vapour ingress.

7.3 It is essential that the roof design, construction and maintenance not only limit opportunities for vapour migration by diffusion but also by convection through gaps, cracks and laps in air and/or VCL’s and through penetrations.

Warm pitched roof (habitable room in the roof, or non-habitable loft space) with low resistance (LR) breathable underlay — insulation at rafter level only

7.4 The insulation is sprayed between, or between and under, the timber rafters only (no insulation between horizontal ceiling joists), applied to the underside of the breathable underlay.

Warm pitched roof (habitable room in the roof, or non-habitable loft space) with high resistance (HR) non-breathable underlay (insulation at rafter level only) and cold flat roofs

7.5 The insulation is sprayed between, or between and under, timber rafters only (no insulation between horizontal ceiling joists), applied to the underside of non-breathable underlay or sarking board. In flat roofs the product is applied between, or between and under, timber joists. In both applications, a VCL is applied to the underside of the insulation (warm side), and the ceiling must be well-sealed.

7.6 Dynamic simulations to BS EN 15026 : 2007 indicate that variable⁽¹⁾ VCL's (sd between 0.2 and 25 m) may be acceptable in pitched roofs (humidity class 3) and flat roofs (humidity class 4) with a continuous, airtight and sealed internal finish. In the case of a non-habitable loft space, it is essential that the ceiling is airtight and of low vapour resistance. The simulations included meteorological data, solar irradiation (direct and indirect) and hygro-thermal properties, for all the materials. The suitability of other constructions/parameters may be assessed by using an appropriate dynamic modelling package (see section 17.2).

(1) A variable VCL alters its vapour resistance according to the direction of heat flow and the relative humidity between both sides of the membrane. In summer the membrane's vapour resistance decreases, allowing moisture to pass through, back into the room below the membrane. In winter, the membrane's vapour resistance increases, which minimises vapour transfer into the roof space.

Cold pitched roof (non-habitable loft space) — insulation at horizontal ceiling level only

7.7 Pitched roofs should be designed and constructed in accordance with the relevant parts of BS 5250 : 2011, Annexes D and H, including a well-sealed ceiling, using a μ value of 3.3 for the product.



7.8 It is important to seal existing service penetrations in the ceiling and to provide draught proofing to any loft hatches to reduce inflow of warm air and moisture. Any new loft insulation should be kept sufficiently clear of the eaves so that any adventitious ventilation is not reduced. Further guidance may be obtained from BRE Report BR 262 : 2002.

7.9 Insulation material placed at ceiling level will considerably reduce the temperature of an unheated roof structure and, if moist air passes into the roof space, condensation on cold surfaces is likely to be enhanced. Roof structures incorporating the insulation at ceiling level must have provision for adequate permanent ventilation of the space above the insulation, to minimise the formation of condensation in the roof space.

7.10 Permanent ventilation of the roof structure should be provided by continuous openings or regularly spaced vents of equivalent area, situated along two opposite sides of the roof at eaves level, and at a high level when required. The size and position of ventilation openings for pitched roofs should be in accordance with Clause H.4.4 of BS 5250 : 2011 (see Table 4 of this Certificate). Further information and guidance is given in BRE Report BR 262 : 2002. Alternatively, the recommendations of a BBA Certificate for a breathable (low resistance LR) underlay may be followed.

Table 4 Minimum low level loft space ventilation openings

Pitch	Underlay	Ceilings	Vents with area equivalent to (mm)
>15° and <75°	HR ₍₁₎	any	10 × longest horizontal dimension of roof
15° to <75°	LR	normal	7 × longest horizontal dimension of roof
15° to <75°	LR	well-sealed	3 × longest horizontal dimension of roof ⁽²⁾

(1) An additional high-level vent, 5 mm by longest horizontal dimension of roof, should be provided where:

- the pitch exceeds 35°; or
- the span exceeds 10 m; or
- the roof is a lean-to or monopitch.

(2) Alternatively, a high level vent, 5 mm by longest horizontal dimension of roof, should be provided.

7.11 Ventilation openings should be arranged to prevent the ingress of rain, snow, birds and small mammals and the risk of subsequent blockage by other building operations.

Surface condensation



7.12 Roofs and loft spaces will limit the risk of surface condensation adequately where the thermal transmittance (U value) does not exceed $0.35 \text{ W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}$ at any point and the junctions with other elements are designed in accordance with the guidance referred to in section 6.3 of this Certificate.



7.13 For buildings in Scotland, constructions will be acceptable where the thermal transmittance (U) value of the roof does not exceed $1.2 \text{ W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}$ at any point, and when designed and constructed in accordance with the relevant parts of BS 5250 : 2011, Annexes D and H. Further guidance may be obtained from BRE Report BR 262 : 2002 and section 6.3 of this Certificate.

8 Behaviour in relation to fire

8.1 The product is classified as Class F* to BS EN 13501-1 : 2007. The product is not classified as 'non-combustible' and must be protected from naked flames and other ignition sources during and after installation.

8.2 Once installed, except for the non-habitable loft application (which is restricted under the national building regulations), the product must be contained by a suitable lining board, eg plasterboard, with joints fully sealed and supported by rafters, noggins or battens. Therefore, it will not contribute to the development stages of a fire.

8.3 Elements must incorporate cavity barriers at edges, around openings and at junctions with fire-resisting elements, and the maximum dimensions of any cavity in any direction must meet the requirements of the national Building Regulations. The design and installation of cavity barriers must take into account any anticipated differential movement.

9 Proximity of flues and appliances

9.1 When installing the product in close proximity to certain flue pipes, chimneys and/or heat-producing appliances, the relevant provisions of the national Building Regulations are applicable:

England and Wales — Approved Document J

Scotland — Mandatory Standard 3.19⁽¹⁾⁽²⁾

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

Northern Ireland — Technical Booklet L.

9.2 The product must not be installed within 50 mm of heat-emitting devices, where the temperature is in excess of 93°C.

10 Materials in contact — wiring installations

10.1 The product is compatible with PVC materials in contact.

10.2 De-rating of electric cables should be considered in areas where the product restricts the flow of air. The use of suitable conduit or trunking is recommended.

10.3 Where recessed lighting is used, provision should be made to prevent the fitting overheating, or ventilated fittings must be used.

11 Maintenance

The product, once installed, does not require any regular maintenance and has suitable durability (see section 12), provided the waterproof layers are maintained in a weather-tight condition.

12 Durability



The product will have a life equivalent to that of the structure in which it is incorporated.

Installation

13 Approved installers

The Certificate holder operates an Approved Installer Scheme for this product, under which the installers are approved, registered and regularly reviewed by the Certificate holder to demonstrate that they are competent to carry out installation of the product in accordance with their instructions and this Certificate. Details of Approved Installers are available from the Certificate holder.

14 Precautions

14.1 To comply with the requirements of Section 4 of the *Health and Safety at Work Act 1974*, it is essential that there is an exchange of information between the client and the installer before spray operations commence on any site. Existing health hazards, and those brought into the premises by the installer, should be discussed and measures agreed to deal with them effectively.

14.2 The process for the installation of the product may produce a build-up of harmful vapours. Installers must wear full personal protection equipment (PPE) when working with the product, including full-face fresh-air-supplied respirators, protective clothing and chemical-resistant gloves. Other trades and personnel must be kept at least four metres away from the applicator while spraying is taking place. The requirements of the *Isocynene Installer Training Manual* and the product safety data sheets issued to Installers, must be followed at all times.

14.3 Vapours given off by certain components are generally heavier than air and will tend to move to lower parts of the building. These parts should be suitably ventilated.

14.4 If vapour levels need to be measured, methods should be those recommended by the Health and Safety Executive. Certain applications, eg confined roofs, require the use of extractor fans as recommended by the Certificate holder.

14.5 Care should be taken to minimise the degree of overspray generated whilst spraying. This is in the form of a fine mist of particles that can travel considerable distances and will adhere strongly to surfaces they land on.

14.6 To prevent the product from entering an occupied space, the loft hatch/cover must be kept covered during the spraying process. Protective covers must be placed over water tanks to prevent contamination and blockage during application, and should not be removed until sufficient time has elapsed for potentially harmful vapours to be ventilated from the roof space.

14.7 Overspray is of prime concern when installing any spray-applied insulation system. To minimise the hazards of overspray, the following points should be observed:

- the applicator must wear appropriate protective gear, including a full-face NIOSH-approved fresh air respirator, protective overalls, gloves and boots
- other than the applicator, everyone must be kept away from the application area. No unprotected individuals should be in the structure where the application is being conducted
- the spray gun should never be left unattended
- the spray gun should only be pointed at the surface or, when not in use, at the floor
- the product should not be installed if wind is a concern, use tarpaulins or other measures to block it
- cleaning the spray gun requires use of a solvent to breakdown and/or remove the reacted components. To prevent exposure to the components and the solvent, proper protection should be worn.

15 Procedure

General

15.1 Building elements to be insulated must be assessed for suitability and any necessary repairs carried out. Elements must be weathertight before application of the product. The positioning and access to services should also be considered.

15.2 Access boards and lighting should be positioned in the roof void.

15.3 The product should be stored, handled and applied in accordance with the Certificate holder's instructions and this Certificate.

15.4 The product should be spray-applied to clean and dry substrates and built up in layers, until the final design thickness (not exceeding 300 mm) is achieved.

15.5 The product contains no organic blowing agents. The resin component contains water which vaporises due to the exothermic reaction to create the cell structure. The resulting solid foam is fully-reacted (cured) in seconds.

15.6 Once cured, if required the product is trimmed flat using a saw and covered with lining board.

15.7 Where no provision is made for ventilation of the space, care should be taken to ensure that ingress of moisture vapour from the dwelling space below is restricted.

Pitched roof application — between rafters

15.8 The product is sprayed into the cavity formed by the rafters, or rafters and counter battens. When cured, the excess foam is trimmed flush with the rafters and the lining board installed, with a VCL with lapped and sealed joints if required (see Figure 1).



15.9 When spraying to breathable or non-breathable roof tile underlays without counter battens, the product must be applied in accordance with the Certificate holder's installation instructions, to ensure the integrity of the roof tile drape.

Pitched roof application — between and below rafters

15.10 The product is applied by spray to the depth of the rafters as in sections 15.8 or 15.9. Cross-battens are then mechanically fixed to the rafters. The battens must be of sufficient width and spacing (up to 600 mm) to provide adequate support to which the plasterboard can be mechanically fixed. When cured, if fully-filled, the excess foam is trimmed flush with the studs and the lining board installed with a VCL with lapped and sealed joints.

15.11 The product can be applied to roof tile underlays without counter battens (see section 15.9).

Loft application

15.12 All removable obstructions should first be cleared from the loft space and any holes in the ceiling, such as around pipes, sealed. Water tanks should be covered and any sources of moisture (eg vent pipes for central heating) arranged to avoid water vapour entering the loft space.

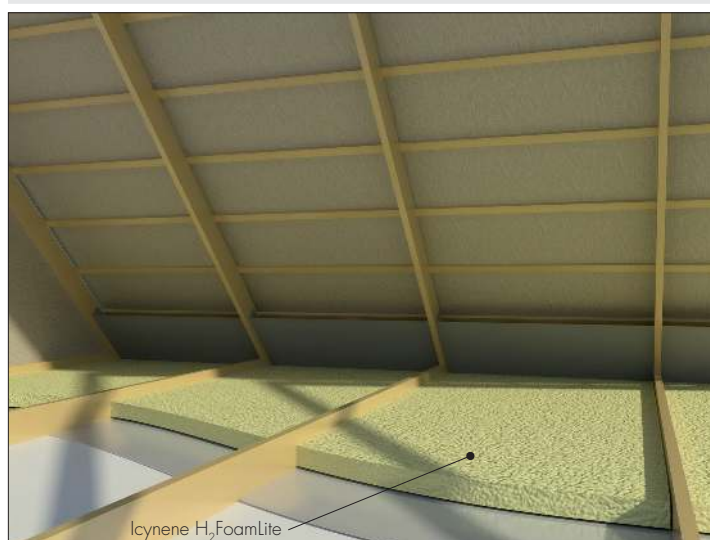
15.13 To reduce the risk of frost damage due to ceiling insulation, the pipes and tank in the loft space should be lagged before installing the product. The area directly below cold water tanks when resting at joist level must not be insulated to avoid the risk of the stored water freezing in cold weather.

15.14 During installation it is essential that all ventilation points, for example eaves gaps and air bricks at gable ends, are kept clear of insulant so that the airflow is maintained. Suitable proprietary eaves ventilators must be used (see also section 6.7).

15.15 In new and existing constructions the product should be installed from inside the roof space, after tiling or slating is completed.

15.16 The product is applied to plasterboard, between ceiling joists (see Figure 2). The product may also be applied over joists.

Figure 2 Loft application



Flat roofs

15.17 The product is sprayed into the cavity formed by the flat roof joists directly to the underside of the flat roof sarking board, softwood, OSB or plywood to the depth required.

15.18 Where a full fill is required, the excess foam when cured is trimmed flush with the joists, and the ceiling lining board installed with a VCL with lapped and sealed joints. In all flat roof constructions, a fully-sealed VCL with lapped and sealed joints is required.

Technical Investigations

16 Tests

Tests were carried out by the BBA on H₂FoamLite and the results assessed to determine:

- adhesion to substrates
- thermal conductivity
- density
- water vapour permeability.

17 Investigations

17.1 An assessment was made of independent data relating to:

- thermal conductivity
- reaction to fire and fire resistance
- water absorption
- release of dangerous substances
- tensile strength
- compressive strength
- dimensional stability.

17.2 A series of dynamic computer simulations to BS EN 15026 : 2007 were carried out on a range of roof constructions/parameters to assess the risk of interstitial condensation.

17.3 A visit was made to a site in progress to assess the methods of application and the material's behaviour in use.

17.4 The manufacturing process was examined, including the methods adopted for quality control, and details were obtained of the quality and composition of materials used.

Bibliography

BS 5250 : 2011 *Code of practice for control of condensation in buildings*

BS 5534 : 2014 *Slating and tiling for pitched roofs and vertical cladding — Code of practice*

BS 8103-3 : 2009 *Structural design of low-rise buildings — Code of practice for timber floors and roofs for housing*

BS EN 351-1 : 2007 *Durability of wood and wood-based products — Preservative-treated solid wood — Classification of preservative penetration and retention*

BS EN 1995-1-1 : 2004 *Eurocode 5 : Design of timber structures — General — Common rules and rules for buildings*

NA to BS EN 1995-1-1 : 2004 *UK National Annex to Eurocode 5 : Design of timber structures — General — Common rules and rules for buildings*

BS EN 13501-1 : 2007 *Fire classification of construction products and building elements — Classification using test data from reaction to fire tests*

BS EN 15026 : 2007 *Hygrothermal performance of building components and building elements — Assessment of moisture transfer by numerical simulation*

BS EN ISO 6946 : 2007 *Building components and building elements — Thermal resistance and thermal transmittance — Calculation method*

BS EN ISO 9001 : 2008 *Quality management systems — Requirements*

BRE Report (BR 262 : 2002) *Thermal insulation: avoiding risks*

BRE Report (BR 443 : 2006) *Conventions for U-value calculations*

ETA 08/0018 *Thermal and Acoustic Insulation for Building*

18 Conditions

18.1 This Certificate:

- relates only to the product/system that is named and described on the front page
- is issued only to the company, firm, organisation or person named on the front page — no other company, firm, organisation or person may hold or claim that this Certificate has been issued to them
- is valid only within the UK
- has to be read, considered and used as a whole document — it may be misleading and will be incomplete to be selective
- is copyright of the BBA
- is subject to English Law.

18.2 Publications, documents, specifications, legislation, regulations, standards and the like referenced in this Certificate are those that were current and/or deemed relevant by the BBA at the date of issue or reissue of this Certificate.

18.3 This Certificate will remain valid for an unlimited period provided that the product/system and its manufacture and/or fabrication, including all related and relevant parts and processes thereof:

- are maintained at or above the levels which have been assessed and found to be satisfactory by the BBA
- continue to be checked as and when deemed appropriate by the BBA under arrangements that it will determine
- are reviewed by the BBA as and when it considers appropriate.

18.4 The BBA has used due skill, care and diligence in preparing this Certificate, but no warranty is provided.

18.5 In issuing this Certificate, the BBA is not responsible and is excluded from any liability to any company, firm, organisation or person, for any matters arising directly or indirectly from:

- the presence or absence of any patent, intellectual property or similar rights subsisting in the product/system or any other product/system
- the right of the Certificate holder to manufacture, supply, install, maintain or market the product/system
- actual installations of the product/system, including their nature, design, methods, performance, workmanship and maintenance
- any works and constructions in which the product/system is installed, including their nature, design, methods, performance, workmanship and maintenance
- any loss or damage, including personal injury, howsoever caused by the product/system, including its manufacture, supply, installation, use, maintenance and removal
- any claims by the manufacturer relating to CE marking.

18.6 Any information relating to the manufacture, supply, installation, use, maintenance and removal of this product/system which is contained or referred to in this Certificate is the minimum required to be met when the product/system is manufactured, supplied, installed, used, maintained and removed. It does not purport in any way to restate the requirements of the Health and Safety at Work etc. Act 1974, or of any other statutory, common law or other duty which may exist at the date of issue or reissue of this Certificate; nor is conformity with such information to be taken as satisfying the requirements of the 1974 Act or of any statutory, common law or other duty of care.