Icynene Europe S.P.R.L.
30 Clos Chapelle aux Champs
B-1200 Brussels
Belgium

Tel: +32 2 880 62 33 Fax: +32 495 644 81
e-mail: info@icynene.eu
website: www.icynene.eu

Agrément Certificate
20/5846
Product Sheet 3

ICYNENE H_2 FOAM LITE E (LD-C-50 v8E) INSULATION

H_2 FOAM LITE E (LD-C-50 v8E) FOR SUSPENDED FLOORS

This Agrément Certificate Product Sheet(1) relates to H_2 Foam Lite E (LD-C-50 v8E) For Suspended Floors, a spray-applied in-situ thermal insulation for suspended timber ground floors of new or existing domestic 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 $W \cdot m^{-1} \cdot K^{-1}$ (see section 6).

Condensation risk — the product can contribute to limiting the risk of surface condensation. The risk of interstitial condensation will depend on the floor construction and should, therefore, be assessed for each project. A vapour control layer (VCL) should also be used (see section 7).

Behaviour in relation to fire — the product has a Class E reaction to fire to EN 13501-1 : 2007 (see section 8).

Durability — the product is durable, rot proof and sufficiently stable to remain effective as an insulation for the life of the building in which it is installed (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.

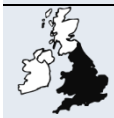
On behalf of the British Board of Agrément

Date of First issue: 16 February 2021

Hardy Giesler
Chief Executive Officer

Regulations

In the opinion of the BBA, H_2 Foam Lite E (LD-C-50 v8E) For Suspended Floors, 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 7.4 of this Certificate.
Requirement:	**L1(a)(i)**	**Conservation of fuel and power**
Comment:		The product can contribute to satisfying this Requirement. See sections 6.1 and 6.2 of this Certificate.
Regulation:	**7(1)**	**Materials and workmanship**
Comment:		The product is acceptable. See section 12 and the *Installation* 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 sections 6.1 and 6.2 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 *Installation* 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), 3.15.4(1), 3.15.5(1); however, compensating fabric/services measures may be required. See sections 7.1 and 7.5 of this Certificate.
Standard:	6.1(b)	Carbon dioxide emissions
Comment:		The product can contribute to satisfying this Standard, with reference to clauses, or parts of, 6.1.1(1), 6.1.3(1), 6.1.4(1) and 6.1.6(1). See sections 6.1 and 6.2 of this Certificate.
Standard:	6.2	Building insulation envelope
Comment:		The product can contribute to satisfying this Standard, with reference to clauses, or parts of, 6.2.1(1), 6.2.3(1), 6.2.4(1), 6.2.6(1), 6.2.7(1), 6.2.9(1), 6.2.10(1), 6.2.11(1) and 6.2.13(1). See sections 6.1 and 6.2 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 6.1 of this Certificate.

Regulation:	**12**	**Building standards applicable to conversions**
Comment:		Comments in relation to the product under Regulation 9, Standards 1 to 6, also apply to this Regulation, with reference to clause 0.12.1(1) and Schedule 6(1). (1) Technical Handbook (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 *Installation* part of this Certificate.
Regulation:	**29**	**Condensation**
Comment:		The product can contribute to satisfying this Regulation. See section 7.1 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 sections 6.1 and 6.2 of this Certificate.

Construction (Design and Management) Regulations 2015
Construction (Design and Management) Regulations (Northern Ireland) 2016

Information in this Certificate may assist the client, designer (including Principal Designer) and contractor (including Principal Contractor) to address their obligations under these Regulations.

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

Additional Information

NHBC Standards 2021

In the opinion of the BBA, H_2 Foam Lite E (LD-C-50 v8E) For Suspended Floors, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements in relation to *NHBC Standards*, Chapter 5.2 *Suspended ground floors*.

CE marking

The Certificate holder has taken the responsibility of CE marking the product in accordance with harmonised European Standard BS EN 14315-1 : 2013.

Technical Specification

1 Description

1.1 H_2 Foam Lite is an in-situ formed spray-applied, open-cell, water-blown, low-density semi-rigid polyurethane foam insulation.

1.2 The product is prepared from two liquid components, isocyanate and resin, and is yellow 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 200 mm) is achieved.

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

- vapour control layer (VCL)

- fire-resistant lining board
- timber joists
- spray equipment.

2 Manufacture

2.1 The two components of the product are manufactured in a conventional batch blending processes and mixed on site via a spray-gun.

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 : 2015 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 (of 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 and 32°C, and away from possible ignition sources. The drums must be protected from frost.

3.3 The Certificate holder has taken the responsibility of classifying and labelling the product under the *CLP Regulation (EC) No 1272/2008 on the classification, labelling and packaging of substances and mixtures.* Users must refer to the relevant Safety Data Sheets.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on H_2 Foam Lite E (LD-C-50 v8E) For Suspended Floors.

Design Considerations

4 Use

4.1 H_2 Foam Lite E (LD-C-50 v8E) For Suspended Floors is satisfactory for use in reducing the thermal transmittance (U value) of suspended timber ground floors of new or existing domestic buildings.

4.2 The product can be installed between timber joists in suspended timber ground floors provided no direct loading is applied to the insulation.

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

- BS 5250 : 2011
- BS EN 351-1 : 2007
- BS EN 1995-1-1 : 2004 and its UK National Annex.

4.4 A pre-installation survey must be carried out to ensure that the construction is suitable for the application of the product.

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

4.6 Installation must not be carried out until the moisture content of the timber floor construction is less than 20%.

4.7 The airspace void under the suspended ground floor must be a minimum of 200 mm deep and must be ventilated (see section 7.3). Care must be taken to ensure that ventilation grilles in the external walls are maintained clear of foam insulation and there is no obstruction to the underfloor ventilation.

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 floor should be carried out in accordance with BS EN ISO 6946 : 2017 and BRE Report BR 443 : 2006 using the declared thermal conductivity (λ_D) of 0.039 $W \cdot m^{-1} \cdot K^{-1}$.

6.2 The U value of a completed suspended timber ground floor will depend on the insulation thickness, the perimeter/area (p/a) ratio, the floor joist construction and the timber boarded finish. Example constructions are given in Table 1 for certain p/a ratios.

Table 1 U values — suspended timber ground floors[(1)(2)]

Design U value ($W \cdot m^{-2} \cdot K^{-1}$)	**H_2 Foam Lite E (LD-C-50 v8E) thickness (mm)**				
	P/A ratio (m/m^2)				
	0.2	0.4	0.6	0.8	1.0
0.13	—	—	—	—	—
0.15	200	—	—	—	—
0.20	115	155	175	180	185
0.22	95	135	150	160	165
0.25	70	110	125	135	140

(1) Floor construction — 22 mm thick chipboard floor finish (λ = 0.13 $W \cdot m^{-1} \cdot K^{-1}$), on timber floor joists (λ = 0.13 $W \cdot m^{-1} \cdot K^{-1}$) (11%).

(2) The depth of the joists = 100 to 200 mm depending on the depth of insulation between floor joists (11%) based on BR 443 (noggin every 3 metres at 38 mm wide).

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 Floors will limit the risk of interstitial condensation adequately when they are designed and constructed in accordance with the relevant parts of BS 5250 : 2011, Annexes D and F. Further guidance may be obtained from BRE Report BR 262 : 2002.

7.2 For the purposes of assessing the risk of interstitial condensation, a water vapour resistance factor (μ) of 3.3 should be taken for the product.

7.3 Voids below suspended timber ground floors must be ventilated. Ventilation may be achieved by installing vents not less than 1500 mm^2/m run of external wall or 500 mm^2/m^2 of floor area, whichever is the greater. 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

7.4 Floors will limit the risk of surface condensation adequately where the thermal transmittance (U value) of the floor does not exceed 0.7 $W \cdot m^{-2} \cdot K^{-1}$ 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.

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

8 Behaviour in relation to fire

The product is classified as Class E reaction to fire to EN 13501-1 : 2007(1).

(1) Centrum stavebního inženýrství a.s., report ref PK-18-060, issue number 1/2, 13 April 2018. Copies can be obtained from the Certificate holder.

9 Proximity of flues and appliances

Detailed guidance can be found in the documents supporting the national Building Regulations for the provisions that are applicable when the system is installed in close proximity to certain flue pipes and/or heat-producing appliances.

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.

11 Maintenance

The product, once installed, does not require any maintenance, and has suitable durability (see section 12), provided the floor structure is maintained in good condition, and the void below the floor is ventilated.

12 Durability

The product is durable, rot proof and sufficiently stable to remain effective as an insulation for the life of the building.

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. The requirements of the *Icynene Installer Training Manual* and the product safety data sheets issued to installers, must always be followed.

14.3 The building should be well ventilated during the spraying process as some vapours may sink to lower parts of the building.

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

14.5 Whilst spraying, care should be taken to minimise the degree of 'overspray', a fine mist of particles that can travel considerable distances and adhere strongly to surfaces it lands on.

14.6 To minimise the hazards of spraying, the following points should be observed:

- the installer must wear appropriate protective gear, including a full-face NIOSH-approved fresh air respirator, protective overalls, gloves, and boots
- other than the installer, individuals 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 – tarpaulins or other measures should be used to block it
- cleaning the spray gun requires use of a solvent to break down and/or remove the reacted components; therefore, 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 The product should be stored, handled and applied in accordance with the Certificate holder's instructions and this Certificate.

15.3 The product should be spray-applied to clean and dry substrates and built up in layers, up to a maximum thickness of 200 mm.

15.4 A barrier (such as thin plywood or a vapour permeable membrane) must be fixed to the underside of the joists to contain the foam. The product is then sprayed from above into the cavity formed by the barrier and the joists. When cured, the excess foam is trimmed flush with the joists and the flooring board installed.

15.5 If there is adequate access, the product may be applied by spraying from the underside of the floor against the floorboards. If required, when cured, the excess foam can be trimmed flush with the joists, with care, and a fire-resistant lining board installed.

15.6 Care must be taken to ensure that the 150 mm air gap below the suspended floor is maintained, the ventilation grilles in the external walls are clear of foam insulation and there is no obstruction to the underfloor ventilation.

Technical Investigations

16 Tests

Results of tests were assessed, to determine:

- adhesion to timber substrates after heat ageing and water immersion
- thermal conductivity
- density
- corrosion-developing capacity
- water absorption
- release of dangerous substances
- tensile strength
- compressive strength
- dimensional stability
- water vapour permeability.

17 Investigations

17.1 Existing data on durability and properties in relation to fire were evaluated.

17.2 The Certificate holder's training arrangements were evaluated.

17.3 An assessment of the practicability of installation was carried out.

17.4 A calculation was undertaken to confirm the declared thermal conductivity (λ_D).

17.5 A condensation risk analysis was carried out.

17.6 A series of U value calculations was carried out.

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

Bibliography

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

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

BS 5250 : 2011 + A1 : 2016 *Code of practice for control of condensation in buildings*

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 + A2 : 2014 *Eurocode 5 : Design of timber structures — General — Common rules and rules for buildings*
NA to BS EN 1995-1-1 : 2004 + A1 : 2008 UK National Annex to *Eurocode 5 : Design of timber structures — General — Common rules and rules for buildings*

BS EN 14315-1 : 2013 *Thermal insulating products for buildings — In-situ formed sprayed rigid polyurethane (PUR) and polyisocyanurate (PIR) foam products — Specification for the rigid foam spray system before installation*

BS EN ISO 6946 : 2017 *Building components and building elements — Thermal resistance and thermal transmittance — Calculation method*

BS EN ISO 9001 : 2015 *Quality management systems — Requirements*

EN 13501-1 : 2007 + A1 : 2013 *Fire classification of construction products and building elements — Classification using test data from reaction to fire tests*

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.

British Board of Agrément
Bucknalls Lane
Watford
Herts WD25 9BA

tel: 01923 665300
clientservices@bbacerts.co.uk
www.bbacerts.co.uk