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BBA APPROVAL INSPECTION TESTING CERTIFICATION
TECHNICAL APPROVALS FOR CONSTRUCTION

Agrément Certificate
14/5166
Product Sheet 2

DEMILEC SPRAY APPLIED OPEN CELL INSULATION

SEALECTION AGRIBALANCE INSULATION FOR SUSPENDED TIMBER GROUND FLOORS

This Agrément Certificate Product Sheet(1) relates to Sealection Agribalance Insulation for Suspended Timber Ground Floors, for use as a spray-applied in-situ thermal insulation for suspended timber ground floors over a sub-floor void, in new and existing dwellings or similar buildings. It can be installed between suspended timber ground floor joists where loading is not applied to the product.

(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 thermal conductivity (λ_D)* value of 0.039 $W \cdot m^{-1} \cdot K^{-1}$ (see section 6).

Condensation risk — the product has a water vapour resistance factor (μ) of 6. The risk of interstitial condensation will depend on the floor 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

Date of First issue: 21 October 2014

John Albon — Head of Approvals
Energy and Ventilation

Claire Curtis-Thomas
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.

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Regulations

In the opinion of the BBA, Sealection Agribalance Insulation for Suspended Timber Ground Floors, if installed and used 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 section 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 section 6 of this Certificate.
Regulation:	7	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 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 *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)(2)], 3.15.3[(1)(2)], 3.15.5[(1)(2)] and 3.15.7[(1)(2)]. See sections 7.1 and 7.5 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 made 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)(2)] and Schedule 6[(1)(2)].

(1) Technical Handbook (Domestic).
(2) Technical Handbook (Non-Domestic).

The Building Regulations (Northern Ireland) 2012

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 section 6 of this Certificate.

Construction (Design and Management) Regulations 2007

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

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

See sections: 3 *Delivery and site handling* (3.1 to 3.3) and 14 *Precautions* of this Certificate.

Additional Information

NHBC Standards 2014

NHBC accepts the use of Sealection Agribalance Insulation for Suspended Timber Ground Floors, when installed and used in accordance with this Certificate, 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. An asterisk (*) appearing in this Certificate indicates that data shown is given in the manufacturer's Declaration of Performance.

Technical Specification

1 Description

1.1 Sealection Agribalance Insulation for Suspended Timber Ground Floors is an open cell in-situ formed sprayed semi-rigid polyurethane (PUR) foam insulation, with a density typically between 9.6 $kg \cdot m^{-3}$ to 12.8 $kg \cdot m^{-3}$.

1.2 The product is available to a single specification, is yellowish in colour and is applied with a hand-held fixed ratio (1:1) volumetric displacement pump spray machine.

1.3 The product can be applied up to a maximum thickness of 300 mm.

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

- plywood soffit board or vapour permeable membrane (applicable if spraying floor from above).

2 Manufacture

2.1 The product comprises two liquid components, isocyanate and polyol resin, which are mixed together within the nozzle of the applicator gun, and spray applied using a water blown process. The product fully cures as a semi-rigid open cell polyurethane foam (PUR) insulation. Quality control checks are carried out on site to check density and appearance.

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.

3 Delivery and site handling

3.1 The two liquid components, isocyanate and polyol, are delivered to site in either 44 gallon drums or 230 gallon totes, bearing the product name, batch number and the BBA logo incorporating the number of this Certificate.

3.2 The components are combustible and must be protected from naked flames and other ignition sources during installation. Drums should be stored in a well-ventilated area, away from possible ignition sources. The drums must be protected from frost and conditioned at temperatures of between 15°C and 30°C prior to use.

3.3 The isocyanate and polyol are classified as 'harmful' and 'irritant' respectively under *The Chemicals (Hazard Information and Packaging for Supply) Regulations 2009* (CHIP4)/*Classification, Labelling and Packaging of Substances and Mixtures (CLP Regulation) 2009*, and the packaging bear the appropriate hazard warning labels. When cured, Sealection Agribalance Insulation for Suspended Timber Ground Floors does not constitute a hazard.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Sealection Agribalance Insulation for Suspended Timber Ground Floors.

Design Considerations

4 Use

4.1 Sealection Agribalance Insulation for Suspended Timber Ground Floors is satisfactory for use in reducing the thermal transmittance (U value) and contributing to the airtightness of suspended timber ground floors over a sub-floor void, in new and existing dwellings or similar 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 The product may be applied by spraying into the void between the floor joists either, from above the floor, utilising a plywood or a vapour permeable membrane fixed to the underside of the joists to contain the foam, or if there is adequate access, from the underside of the floor against the timber floor boards.

4.4 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.

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

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

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

4.8 The product must not come into direct contact with 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 fixing for timber. In all situations when foam could come in 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 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 The airspace void under the suspended ground floor must be a minimum of 150 mm deep and must be ventilated, see section 7.3. Care is to 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 also 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 : 2007, BS EN ISO 13370 : 2007 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 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

Perimeter/ area ratio	Sealection Agribalance Insulation thickness required (mm) between 38 mm x 150 mm joists at 400 mm centres[1]					Sealection Agribalance Insulation thickness required (mm) between 38 mm x 200 mm joists at 400 mm centres[1]				
	Design U value ($W \cdot m^{-2} \cdot K^{-1}$)					Design U value ($W \cdot m^{-2} \cdot K^{-1}$)				
	0.13	0.15	0.20	0.22	0.25	0.13	0.15	0.20	0.22	0.25
0.2	—[2]	—[2]	150	150	150	—[2]	200	200	200	200
0.4	—[2]	—[2]	—[2]	150	150	—[2]	—[2]	200	200	200
0.6	—[2]	—[2]	—[2]	—[2]	150	—[2]	—[2]	200	200	200
0.8	—[2]	—[2]	—[2]	—[2]	150	—[2]	—[2]	200	200	200
1.0	—[2]	—[2]	—[2]	—[2]	150	—[2]	—[2]	200	200	200

(1) Floor construction — 22 mm thick chipboard floor finish λ = 0.13 $W \cdot m^{-1} \cdot K^{-1}$, on timber floor joists at λ = 0.13 $W \cdot m^{-1} \cdot K^{-1}$ (11%, including a noggin every 3 metres).
(2) Improved thermal/carbon emission performance may be achieved for deeper floor joists.

Junctions

6.3 Care must be taken in the overall design and construction of junctions with other elements 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 6 should be taken for the product.

7.3 Voids below suspended timber ground floors should 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

8.1 The product is classified as Class F* reaction to fire Classification 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, the product will not add significantly to any existing fire hazard. The product will be contained within the floor by the overlay until the overlay itself is destroyed.

9 Proximity of flues and appliances

9.1 When installing the product in close proximity to certain 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.

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 durability of the product is satisfactory and 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 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 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 *Demilec Agribalance Product Application Guide* 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, ie confined spaces, 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 If applied to the underside of the floor, suitable protection measures should be taken to prevent the product from entering occupied spaces above the floor, during the spraying process, until sufficient time has elapsed for potentially harmful vapours to be ventilated from the underfloor space.

15 Procedure

General

15.1 Building elements to be insulated must be assessed for suitability and any necessary repairs carried out. The moisture content of the timber floor construction must be less than 20%. The positioning and access to services should also be considered.

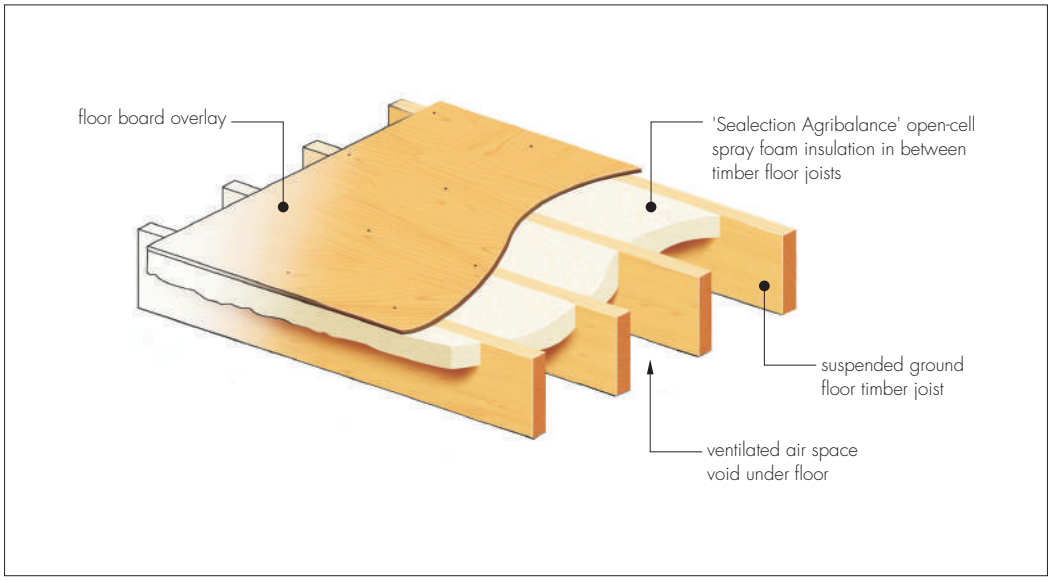
15.2 The product should be stored, handled and applied in accordance with the Certificate holder's instructions and this Certificate.

15.3 The product should be spray applied to clean and dry substrates and built up in layers of up a maximum thickness of 300 mm.

15.5 If applied from above the floor, the floor overlay boards are removed, and a barrier (such as thin plywood or a vapour permeable membrane) is fixed to the underside of the joists to contain the foam. The product is then sprayed into the cavity formed by the barrier and the joists. When cured, any excess foam is trimmed flush with the joists and the floor overlay boards are fitted. Alternatively if there is adequate access to the ventilated underfloor void, the product may be sprayed from beneath the floor into the cavity formed by the joists and the floor overlay boards, where the foam may be left untrimmed. See Figure 1.

15.6 Sub-floor voids below suspended timber ground floors should be ventilated. See section 7.3. Prior to the product installation, ventilation grilles in the external walls should be adequately protected against overspray of the product, to maintain an unobstructed airway for the underfloor ventilation (see Figure 1).

Figure 1 Suspended timber ground floor (ventilated sub-floor void under)



Technical Investigations

16 Tests

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

- adhesion to timber substrate after heat ageing and water immersion
- density
- water vapour resistivity
- dimensional stability
- thermal conductivity.

17 Investigations

17.1 An assessment was made of independent data relating to:

- thermal conductivity
- density
- fire properties
- dimensional stability.

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

17.5 The manufacturing process and quality control procedures were examined.

Bibliography

BS 5250 : 2011 *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 *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 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 : 2007 *Building components and building elements — Thermal resistance and thermal transmittance — Calculation method*

BS EN ISO 13370 : 2007 *Thermal Performance of Buildings — Heat Transfer via the Ground — Calculation Methods*

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

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

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.

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