

## SCOPE OF AGRÉMENT

This Agrément relates to Foamlok 501 (hereinafter the 'Product'), an in-situ formed, water-blown, spray-applied (hereinafter 'applied') thermal insulation layer which contributes to the thermal performance and airtightness of timber-frame flat warm roofs. The Product is for internal application to the underside of flat roof decks of existing or new domestic buildings.

## DESCRIPTION

The Product consists of two liquid components (hereinafter 'Product components') that are mixed under pressure and applied in-situ to form an open cell structure, soft polyurethane (PUR) seamless foam insulation layer, in accordance with BS EN 14315-2, that adheres to the treated surface. It is produced by an exothermic reaction between the isocyanate component and the resin (polyol blend) component. The Product is applied in layers until the final required design thickness (not exceeding 400 mm) is achieved. Once applied, the Product expands, solidifies and cures.

## ILLUSTRATION



## THIRD-PARTY ACCEPTANCE

None requested by the Agrément holder.

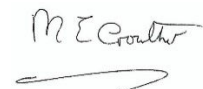
## STATEMENT

It is the opinion of Kiwa Ltd. that the Product is safe and fit for its intended use, provided it is specified, installed and used in accordance with this Agrément.

Chris Vurley, CEng  
Operations Manager, Building Products



Mark Crowther, M.A. (Oxon)  
Kiwa Ltd. Technical Director



## SUMMARY OF AGRÉMENT

This document provides independent information to specifiers, building control personnel, contractors, installers and other construction industry professionals considering the safety of and fitness for the intended use of the Product. This Agrément covers the following:

- Conditions of use;
- Production Control, Quality Management System and the Annual Verification Procedure;
- Product components and ancillary items, points of attention for the Specifier and examples of details;
- Installation;
- Independently assessed Product characteristics and other information;
- Compliance with national Building Regulations, other regulatory requirements and Third-Party Acceptance, as appropriate;
- Sources.

## MAJOR POINTS OF ASSESSMENT

**Moisture control** - the Product (see Section 2.2.9):

- has a low-volume closed cell percentage;
- can contribute to limiting the risk of interstitial and surface condensation;
- is not resistant to water penetration;
- has low water vapour transmission resistance.

**Fire performance** - the Product is classified as European class E, in accordance with BS EN 13501-1 (see Section 2.2.10).

**Thermal performance** - the Product improves the thermal insulation of flat roofs and can contribute to satisfying the requirements of the national Building Regulations (see Section 2.2.11).

**Durability** - the Product shall have a service life durability equivalent to that of the building into which it is incorporated (see Section 2.2.12).

**UKCA and CE marking** - the Agrément holder has responsibility for conformity marking, in accordance with all relevant British and European Product Standards (see Section 2.2.13).

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## 1 GENERAL CONSIDERATIONS

### 1.1 CONDITIONS OF USE

#### 1.1.1 Design considerations

See Section 2.2.

#### 1.1.2 Application

The assessment of the Product relates to its use in accordance with this Agrément and the Agrément holder's requirements.

#### 1.1.3 Assessment

Kiwa Ltd. has assessed the Product in combination with relevant test reports, technical literature, the Agrément holder's quality plan, DoPs and site visit, as appropriate.

#### 1.1.4 Installation supervision

The quality of installation and workmanship must be controlled by a competent person who must be an employee of an Approved Installer.

The Product shall be installed strictly in accordance with the instructions of the Agrément holder and the requirements of this Agrément.

#### 1.1.5 Geographical scope

The validity of this document is limited to England, Wales, Scotland, Northern Ireland and Ireland, with due regard to Chapter 3 of this Agrément (CDM, national Building Regulations and Third-Party Acceptance).

#### 1.1.6 Validity

The purpose of this BDA Agrément® is to provide for well-founded confidence to apply the Product within the scope described. The validity of this Agrément is three years after the issue date, and as published on [www.kiwa.co.uk/bda](http://www.kiwa.co.uk/bda).

### 1.2 PRODUCTION CONTROL AND QUALITY MANAGEMENT SYSTEM

Kiwa Ltd. has determined that the Agrément holder fulfils all their obligations in relation to this Agrément, in respect of the Product.

The initial audit demonstrated that the Agrément holder has a satisfactory Quality Management System (QMS) and is committed to continuously improving its quality plan. Document control and record-keeping procedures were deemed satisfactory. A detailed Production Quality Specification (PQS) has been compiled to ensure traceability and compliance under the terms of this Agrément.

### 1.3 ANNUAL VERIFICATION PROCEDURE - CONTINUOUS SURVEILLANCE

To demonstrate that the Product conforms with the requirements of the technical specification described in this Agrément, an Annual Verification Procedure has been agreed with the Agrément holder in respect of continuous surveillance and assessment, and auditing of the Agrément holder's QMS.

## 2 TECHNICAL ASSESSMENT

This Agrément does not constitute a design guide for the Product. It is intended as an assessment of safety and fitness for purpose only.

### 2.1 PRODUCT COMPONENTS AND ANCILLARY ITEMS

The following ancillary items detailed in this Section may be used in conjunction with the Product, but fall outside the scope of this Agrément:

- spray machinery, including plural component proportioner (double-acting positive displacement piston metering pumps) fitted with spray gun application equipment;
- vapour control layer (hereinafter 'VCL');
- plasterboard lining.

### 2.2 POINTS OF ATTENTION TO THE SPECIFIER

#### 2.2.1 Design responsibility

A Specifier may undertake a project-specific design, in which case it is recommended that the Specifier co-operates closely with the Agrément holder. The Specifier or installing contractor is responsible for the final as-built design.

#### 2.2.2 Applied building physics (heat, air, moisture)

A competent specialist shall check the hygrothermal behaviour of a project-specific design incorporating the Product, and if necessary, offer advice in respect of improvements to achieve the final specification. The specialist can be either a qualified employee of the Agrément holder or a suitably qualified consultant (in which case it is recommended that the consultant specialist co-operates closely with the Agrément holder).

#### 2.2.3 General design considerations

A suitable VCL incorporating lapped and sealed joints must be applied behind the lining board in flat roofs, unless an assessment to BS 5250 indicates that it is not necessary.

A cardboard rafter slide can be used to cover decking to create a ventilation gap, allowing any water vapour to disperse. The Product can then be applied over the rafter slide.

Ventilation openings shall be arranged to prevent the ingress of rain, snow, birds and small animals, and to reduce the risk of blockage by other building operations.

Care is needed for design detailing of joints at rooflight and flue pipe openings which shall be in accordance with BS 6093.

The Product shall not be applied over electrical cables, recessed lighting, existing vents or ventilation gaps. Consider re-routing, re-laying in conduit or trunking, or de-rating electrical cables. Replace existing recessed lighting with ventilated fittings that incorporate a protective fire hood.

The Product is an open cell foam which is inert once cured and is therefore chemically inactive. The Product will not react with metals typically used in construction elements.

The Product can insulate surfaces in restricted or curved areas which are typically hard to treat.

#### New-build design considerations

New flat roofs shall be designed and constructed in accordance with the national Building Regulations, for the site exposure and wind-driven rain index in accordance with BS 8104, to prevent moisture ingress and air infiltration.

#### Retrofit design considerations

Existing flat roofs shall be in a good state of repair with no signs of rain penetration or damp. Any necessary repairs shall be carried out prior to installation.

#### 2.2.4 Project-specific design considerations

The project-specific design shall take into account the service life durability required - see Section 2.2.12.

The project-specific design shall take into account the requirements of the national Building Regulations - see Section 3.2.

A pre-installation survey is required to allow determination of the project-specific design - see Section 2.4.

#### 2.2.5 Permitted applications

Only applications designed according to the specifications given in this Agrément are permitted. In each case, the Specifier and Installer shall co-operate closely with the Agrément holder.

#### 2.2.6 Installer competence level

The Product shall be installed strictly in accordance with the instructions of the Agrément holder and the requirements of this Agrément.

Installation shall be by employees trained and approved by the Agrément holder.

#### 2.2.7 Delivery, storage and site handling

The Product components are delivered to site in suitable packaging bearing the Product name, the Agrément holder's name and the BDA Agrément® logo incorporating the number of this Agrément.

Prior to installation, store the Product components in accordance with the Agrément holder's requirements. When required, particular care shall be taken to:

- avoid exposure to direct sunlight for extended periods of time;
- avoid exposure to high or low temperatures for extended periods of time;
- store in a well-ventilated covered area to protect components from rain, frost and humidity.
- store away from possible ignition sources.

The Product components, packaged in drums, are sensitive to humidity and shall be stored in sealed drums or hermetically sealed tanks to protect them from moisture. Drums shall be stored indoors at temperatures between 10 °C and 38 °C.

The isocyanate component is classified as 'harmful' under The Chemicals (Hazard Information and Packaging for Supply) Regulations 2009 (CHIP 4); drums containing Product components bear the appropriate hazard warning signs. Ventilate the treated area for 24 hours after application to prevent the inhalation of isocyanate vapour. When cured, the Product is non-hazardous.

### **2.2.8 Maintenance and repair**

Once installed, the Product does not require regular maintenance, provided the weathertightness of the flat roof is maintained. Damaged or poorly applied Product shall be removed from the affected area using a handsaw. New Product shall then be applied. For advice in respect of repair, consult the Agrément holder.

## **Performance factors in relation to the Major Points of Assessment**

### **2.2.9 Moisture control**

#### **Cell structure**

The Product has a very low-volume closed cell percentage (5.9 %), in accordance with BS EN ISO 4590.

#### **Water vapour transmission**

The Product has low water vapour transmission resistance. The water vapour permeability performance is in accordance with BS EN 12086, Method A, and is detailed in Section 2.5.1.

#### **Condensation risk**

Flat roofs incorporating the Product can adequately limit the risk of interstitial and surface condensation when designed in accordance with BS 5250 and BRE Report 262. Room spaces shall be ventilated in accordance with BS 5250. Care shall be taken to provide adequate trickle ventilation, particularly in rooms expected to experience high humidity, and to ensure the integrity of VCLs (where installed) and plasterboard lining against vapour ingress.

When required by the project-specific design, a Condensation Risk Analysis (CRA) or hygrothermal analysis shall be carried out by the Agrément holder, in accordance with BS EN ISO 13788 or BS EN 15026 respectively.

#### **Water permeability**

The open cell structure means the Product is not water resistant.

### **2.2.10 Fire performance**

The Product is classified as European Classification E (combustible), in accordance with BS EN 13501-1.

The fire classification of any flat roof containing the Product will depend upon the type of optional protective finish and the nature of the roof's waterproofing membrane. This will also determine the boundary limitations in accordance with the national Building Regulations.

The Product shall be:

- protected from naked flames and other ignition sources during and after application;
- applied at least 75 mm from recessed lighting, and not applied inside electric outlets or junction boxes.

Flat roofs shall incorporate cavity barriers at edges, around openings, rooflights and service penetrations, at junctions and in extensive cavities with fire-resisting elements, in accordance with the relevant provisions of the national Building Regulations.

The Product shall not be applied over junctions between roofs and compartment walls or external walls that are required to provide a minimum period of fire resistance. Care shall be taken to ensure continuity of fire resistance at junctions with fire-resisting elements, in accordance with the national Building Regulations.

The Product shall be covered by a plasterboard lining fixed to rafters or battens, with all joints taped/sealed to give a minimum 30-minute fire rating.

#### **Proximity of flues and appliances**

Non-combustible insulation shall separate or shield the installed Product from any heat-emitting fixed combustion appliances, fireplaces, chimneys or flue pipes passing through a flat roof, and from any potential source of ignition where the temperature is in excess of 82 °C, in accordance with the provisions of the national Building Regulations.

### **2.2.11 Thermal performance**

The Product's thermal resistance is relative to its installed thickness, in accordance with BS EN 12667.

For the purpose of thermal transmittance (hereinafter 'U-value') calculations, and to determine if the requirements of the national Building Regulations are met, the thermal resistance and U-value of flat roofs incorporating the Product shall be calculated according to BS EN ISO 10211 (taking into consideration BS EN ISO 6946, BS EN ISO 10456 and BRE Report 443), using the Product's declared thermal conductivity ( $\lambda_D$ ). Design and declared thermal values can be found in BS EN ISO 10456.

The Product can be used to upgrade a flat roof that has existing insulation between the rafters, to meet current U-value requirements.

Account shall be taken of the applicable Government Accredited Construction details for Part L, England and Wales, Accredited Construction Details, Scotland, and energy measures in PAS 2030 and PAS 2035.

The requirement for limiting heat loss through the building fabric, including the effect of thermal bridging, can be satisfied if the U-value of a flat roof incorporating an appropriate thickness of the Product does not exceed the maximum U-values given in the national Building Regulations.

The maximum thickness of the Product shall not exceed 400 mm. For improved thermal/carbon emissions performance, additional batten/insulation thicknesses may be required, which is outside the scope of this Agrément.

### Thermal bridging at junctions and around openings

The applied Product forms a seamless airtight insulating foam layer without joints or gaps, reducing thermal bridges.

Care shall be taken in the overall design and construction to minimise air infiltration and thermal bridging at junctions with external walls and openings.

Guidance on linear thermal transmittance, heat flows and surface temperature factors can be found in the documents supporting the national Building Regulations and BS EN ISO 10211, BRE Information Paper 1/06, BRE Report 262, BRE Report 497 and PAS 2030.

### 2.2.12 Durability

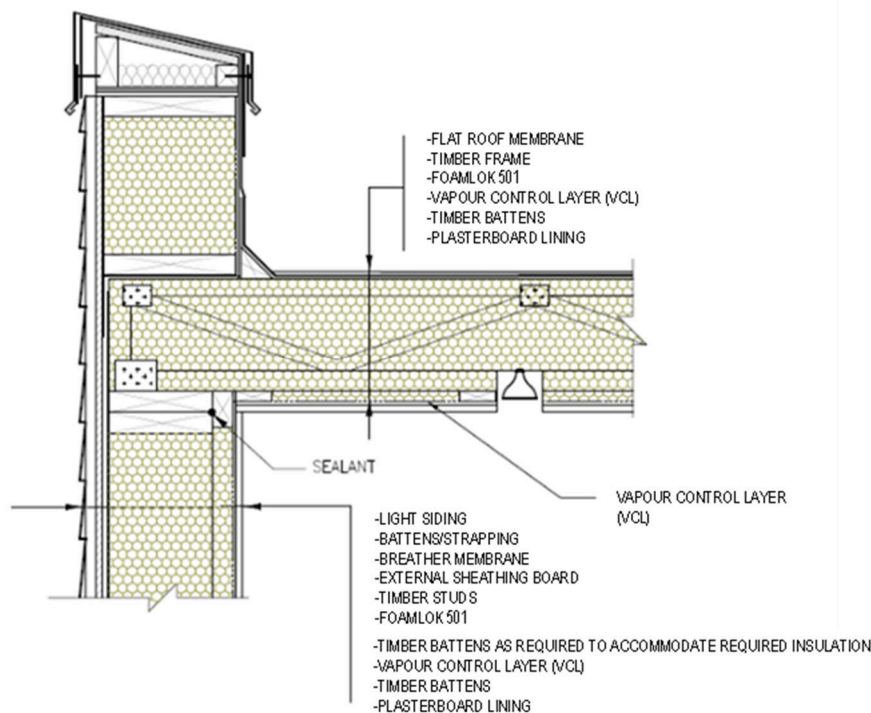
The Product shall have a service life durability equivalent to that of the building into which it is incorporated.

### 2.2.13 UKCA and CE marking

The European standard for the Product is BS EN 14315-1.

## 2.3 EXAMPLES OF TYPICAL DETAILS

Diagram 1 - Elevation detail of typical timber-frame flat roof



## 2.4 INSTALLATION

The Product shall be installed strictly in accordance with the instructions (hereinafter 'Installation Manual') of the Agrément holder, the requirements of this Agrément and the requirements of BS 8000-0.

### 2.4.1 Installer competence level

See Section 2.2.6.

### 2.4.2 Delivery, storage and site handling

See Section 2.2.7.

### 2.4.3 Project-specific installation considerations

The project-specific design shall be determined from a pre-installation survey.

The primary requirement of the pre-installation survey is to determine the following:

- the moisture content of the substrate surface is less than 19 % before application of the Product;
- the substrate and ambient temperatures are a minimum of -5 °C. An infrared or contact thermometer can be used to check substrate surface temperature;
- all roof elements are weathertight before the application of the Product;

- the external condition of the flat roof, gutters, chimney stacks, flashing, etc.;
- there is no existing rain ingress, dampness, staining or condensation on the internal face of a flat roof;
- the existing roof is structurally sound;
- the VCL requirement;
- the type, suitability and condition of roof timbers and any openings;
- flat roof space ventilation requirements;
- the location of expansion joints;
- areas not to be treated.

#### 2.4.4 Preparation

The following considerations apply before starting the work:

- application of the Product shall be carried out in accordance with BS 8000-0, BS EN 14315-1 and BS EN 14315-2;
- application of the Product may produce a build-up of harmful vapours. Installers shall wear personal protective equipment (PPE) when working with the Product, including nitrile gloves, disposable overalls and a full-face supplied-air respirator (SAR);
- some vapours given off by Product components are heavier than air and will naturally move to lower parts of the building compartment. These areas shall be suitably ventilated. Warning signs shall be posted to advise other trades and personnel to avoid entering the work area during and immediately after application. If vapour levels need to be measured, methods shall be in accordance with those recommended by the Health and Safety Executive. In certain conditions (e.g. application in a confined space), the use of extractor fans is recommended. The work area shall be properly ventilated;
- during application, contact with open flames and sources of ignition shall be prohibited;
- the spraying machine shall be specially designed to spray the Product via a spray gun. The Product is applied with volumetric displacement pumps with fixed mixing ratio A/B = 1/1 by volume. The ratio will be controlled prior to each application by measuring the flow rates of the two components before they pass through the spraying machine;
- the spraying machine shall have a temperature controller in its pre-heaters and hoses. The initial primary heater and hose-heat set-point temperature shall be between 43 °C and 54 °C;
- the initial processing set-point pressure of the spray machine shall be between 1100-1500 psi or 75-105 bar;
- the Product shall be protected if hot work is to take place nearby, e.g. by using heat blankets;
- application shall be avoided during excessively windy conditions;
- the maximum thickness of the Product shall not exceed 400 mm.

The following works shall be undertaken before the installation of the Product:

- substrate preparation and application parameters of the spraying equipment in accordance with Product application guide;
- any timber treatment;
- air vents closed or sleeved to prevent blockage by the Product;
- services, e.g. electrical cables, may need re-routing or trunking;
- any necessary repairs to flat roofs, such as replacing damp or broken/rotten timbers;
- any necessary repairs to damaged or dislodged gutters or flashing;
- any necessary welding of metal elements;
- flat roofs made weathertight;
- flues isolated by applying non-combustible thermal insulation material around them;
- to prevent the Product from entering an occupied space, the loft hatch/cover shall be kept closed or blocked during application;
- front faces of surfaces not to be treated covered, e.g. exposed joists etc.;
- services covered, e.g. water tanks and pipes etc.;
- access to services, task lighting, safety and breathing equipment, and ventilation facility (if required) in the compartment treated prior to application.

#### 2.4.5 Outline installation procedure

The detailed installation sequence can be found in full in the Agrément holder's Installation Manual.

The key sequence for installation is:

##### General

- set the appropriate temperature and pressure parameters to guarantee the mixing quality of the Product and select a suitable spraying nozzle;
- carry out quality control tests to check for a round spray pattern, no sticky patches, no light or dark patches/streaks, no voids, consistent colour, correct appearance, reaction profile (cream time, gel time, tack-free time and free-rise density), using test methods in accordance with BS EN 14315-1;
- check interlaminar adhesion on a two-layer spray sample;
- apply with the spray gun at a 90 ° angle to the substrate and hold the gun 25-35 cm away from the substrate;
- always spray perpendicular to the surface in a minimum 75 mm lift;
- apply the VCL if required;
- if subsequent passes are required, wait 2-5 minutes to allow any reaction heat to dissipate from the prior applications before attempting to apply additional layers of the Product.

##### Flat roof

- on flat roof structures, apply the Product directly to the underside of the roof deck between the flat roof joists and any firrings;
- depending on the thickness applied, a condensation risk analysis will determine if a VCL is required.

#### 2.4.6 Finishing

The following finishing is required on completion of the installation:

- the Product shall be cured and cold prior to undertaking any finishing work;
- any excess Product can be trimmed flat using a handsaw and covered with a plasterboard lining;
- the Product shall be covered with a suitable lining board, with all joints taped, sealed and supported by studwork, noggins or battens;
- follow the post-application best practices according to 'Guidance on best practices for installation of spray polyurethane foam'.

## 2.5 INDEPENDENTLY ASSESSED PRODUCT CHARACTERISTICS

### 2.5.1 Moisture control

Test		Standard	Result
Cell structure	Open and closed cell volume	BS EN ISO 4590 Method 2a	5.9 % closed cells
Water vapour transmission	Water vapour permeability ( $\delta$ )	BS EN 12086 Method A	0.099 mg/(mhPa)
	Water vapour diffusion factor ( $\mu$ )		7.26
	Water vapour diffusion equivalent air layer thickness ( $S_d$ )		0.11 m
Water absorption	Short-term water absorption	surface without skin	17.047 kg/m <sup>2</sup>
		surface with skin	15.328 kg/m <sup>2</sup>

### 2.5.2 Fire performance

Test	Standard	Result
Reaction to fire	BS EN 13501-1	E

### 2.5.3 Thermal performance

Test	Standard	Result
Declared aged thermal conductivity ( $\lambda_D$ )	BS EN 12667	0.039 W/mK

### 2.5.4 Other properties

Test	Standard	Result (mean)	
Dimensional stability under specified conditions (70 °C, 90 % RH)	BS EN 1604	$\Delta l$	-2.9 %
		$\Delta w$	-3.4 %
		$\Delta t$	-2.0 %
Adhesion strength perpendicular to faces	BS EN 1607	on oriented strand board (OSB)	17.6 kN/m <sup>2</sup>
		on fibre cement boards	17.4 kN/m <sup>2</sup>
Core free-rise density	BS EN 14315-1	10.44 kg/m <sup>3</sup>	

REACH Statement for the Product in respect of emission of dangerous substances in accordance with Regulation (EC) No 1907/2006 confirms that no hazardous materials are present.



#### 3.1 THE CONSTRUCTION (DESIGN AND MANAGEMENT) REGULATIONS 2015 AND THE CONSTRUCTION (DESIGN AND MANAGEMENT) REGULATIONS (NORTHERN IRELAND) 2016

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

#### 3.2 THE NATIONAL BUILDING REGULATIONS

In the opinion of Kiwa Ltd., the Product, if installed and used in accordance with Chapter 2 of this Agrément, can satisfy or contribute to satisfying the relevant requirements of the following national Building Regulations.

This Agrément shall not be construed to confer the compliance of any project-specific design with the national Building Regulations.

##### 3.2.1 England

###### The Building Regulations 2010 and Subsequent Amendments

- C2(c) Resistance to moisture - a flat roof incorporating the Product can adequately protect a building from interstitial and surface condensation
- L1(a)(i) Conservation of fuel and power - the Product can limit heat gains and losses through a flat roof
- Regulation 7(1) Materials and workmanship - the Product is manufactured from suitably safe and durable materials for its application and can be installed to give a satisfactory performance
- Regulation 23(1) Requirements relating to thermal elements - the Product can contribute to a flat roof complying with the requirements of L1(a)(i)
- Regulation 26 CO<sub>2</sub> emission rates for new buildings - the Product can contribute to a building not exceeding its target CO<sub>2</sub> emission rate
- Regulation 26A Fabric energy efficiency rates (new buildings) - the Product can contribute to satisfying this Regulation

##### 3.2.2 Wales

###### The Building Regulations 2010 and Subsequent Amendments

- C2(c) Resistance to moisture - a flat roof incorporating the Product can adequately protect a building from interstitial and surface condensation
- L1(a)(i) Conservation of fuel and power - the Product can limit heat gains and losses through a flat roof
- Regulation 7(1) Materials and workmanship - the Product is manufactured from suitably safe and durable materials for its application and can be installed to give a satisfactory performance
- Regulation 23(1) Requirements relating to thermal elements - the Product can contribute to a flat roof complying with the requirements of L1(a)(i)
- Regulation 26 CO<sub>2</sub> emission rates for new buildings - the Product can contribute to a building not exceeding its target CO<sub>2</sub> emission rate
- Regulation 26A Primary energy consumption rates for new buildings - the Product can contribute to satisfying this Regulation
- Regulation 26B Fabric performance values for new dwellings - the Product can contribute to satisfying this Regulation

##### 3.2.3 Scotland

###### The Building (Scotland) Regulations 2004 and Subsequent Amendments

###### 3.2.3.1 Regulation 8(1) Durability, workmanship and fitness of materials

- The Product is manufactured from acceptable materials and is adequately resistant to deterioration and wear under normal service conditions, provided it is installed in accordance with the requirements of this Agrément

###### 3.2.3.2 Regulation 9 Building standards - construction

- 3.15 Condensation - a flat roof incorporating the Product can protect a building from moisture caused by surface or interstitial condensation
- 6.1(b) Carbon dioxide emissions - the Product will contribute to energy conservation of a building
- 6.2 Building insulation envelope - the Product will contribute to the insulation envelope to resist thermal transfer
- 7.1(a)(b) Statement of sustainability - the Product can contribute to satisfying the relevant Requirements of Regulation 9, Sections 1 to 6, and therefore will contribute to a construction meeting a bronze level of sustainability, as defined in this Standard; in addition, the Product can contribute to a construction meeting a higher level of sustainability, as defined in this Standard

###### 3.2.3.3 Regulation 12 Building standards - conversions

- All comments given under Regulation 9 also apply to this Regulation, with reference to Schedule 6 of The Building (Scotland) Regulations 2004 and subsequent amendments, clause 0.12 of the Technical Handbook (Domestic)

##### 3.2.4 Northern Ireland

###### The Building Regulations (Northern Ireland) 2012 and Subsequent Amendments

- 23(a)(b) Fitness of materials and workmanship - the Product is suitable and can be adequately mixed, prepared and applied
- 29 Condensation - flat roofs incorporating the Product can adequately protect a building from moisture in the form of interstitial condensation
- 39(a)(i) Conservation measures - the Product will limit heat gains and losses through a flat roof
- 40(2) Target carbon dioxide emission rate - the Product will contribute to a building not exceeding its target CO<sub>2</sub> emission rate

##### 3.2.5 Ireland

###### Building Regulations 1997 and Subsequent Amendments

In order to demonstrate compliance with Irish Building Regulations, this BDA Agrément® certifies that the Product complies with the requirements of a recognised document and indicates it is suitable for its intended purpose and use.

- D1 Materials and workmanship - the Product is manufactured from suitably safe and durable materials for the application and can be installed to give a satisfactory performance
- F2 Condensation in roofs - flat roofs incorporating the Product can adequately protect a building from moisture in the form of interstitial condensation
- L1 Conservation of fuel and energy - the Product can enable a building to conserve energy and limit CO<sub>2</sub> emissions

### 3.3 THIRD-PARTY ACCEPTANCE

None requested by the Agrément holder.

## 4 SOURCES

- BS EN ISO 4590:2016 Rigid cellular plastics. Determination of the volume percentage of open cells and of closed cells
- BS EN ISO 6946:2017 Building components and building elements. Thermal resistance and thermal transmittance. Calculation methods
- BS EN ISO 10211:2017 Thermal bridges in building construction. Heat flows and surface temperatures. Detailed calculations
- BS EN ISO 10456:2007 Building materials and products. Hygrothermal properties. Tabulated design values and procedures for determining declared and design thermal values
- BS EN ISO 13788:2012 Hygrothermal performance of building components and building elements. Internal surface temperature to avoid critical surface humidity and interstitial condensation. Calculation methods
- BS EN 1604:2013 Thermal insulating products for building applications. Determination of dimensional stability under specified temperature and humidity conditions
- BS EN 1607:2013 Thermal insulating products for building applications. Determination of tensile strength perpendicular to faces
- BS EN 1609:2013 Thermal insulating products for building applications. Determination of short term water absorption by partial immersion
- BS EN 12086:2013 Thermal insulating products for building applications. Determination of water vapour transmission properties
- BS EN 12667:2001 Thermal performance of building materials and products. Determination of thermal resistance by means of guarded hot plate and heat flow meter methods. Products of high and medium thermal resistance
- BS EN 13501-1:2018 Fire classification of construction products and building elements. Classification using 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 14315-2:2013 Thermal insulating products for buildings. In-situ formed sprayed rigid polyurethane (PUR) and polyisocyanurate (PIR) foam products. Specification for the installed insulation products
- BS EN 15026:2007 Hygrothermal performance of building components and building elements. Assessment of moisture transfer by numerical simulation
- BS 5250:2021 Management of moisture in buildings. Code of practice
- BS 6093:2006+A1:2013 Design of joints and jointing in building construction. Guide
- BS 8000-0:2014 Workmanship on construction sites. Introduction and general principles
- BS 8104:1992 Code of practice for assessing exposure of walls to wind-driven rain
- American Chemistry Council Spray Foam Coalition:2012 Guidance on best practices for the installation of spray polyurethane foam
- BRE Information Paper 1/06:2006 Assessing the effects of thermal bridging at junctions and around openings
- BRE Report 262:2002 Thermal insulation: avoiding risks
- BRE Report 443:2006 Conventions for U-value calculations
- BRE Report 497:2016 Conventions for calculating linear thermal transmittance and temperature factors
- PAS 2030:2019 Specification for the installation of energy efficiency measures in existing dwellings and insulation in residential park homes
- PAS 2035:2019 Retrofitting dwellings for improved energy efficiency - Specification and guidance
- Regulation (EC) No 1907/2006: Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)
- The Chemicals (Hazard Information and Packaging for Supply) Regulations 2009

**Remark** - Apart from these sources, technical information and confidential reports have been assessed; any relevant documents are in the possession of Kiwa Ltd. and are kept in the Technical Assessment File of this Agrément. The Installation Manual for the Product may be subject to change, and the Agrément holder should be contacted for the clarification of revisions.

## 5 AMENDMENT HISTORY

Revision	Amendment description	Author	Approver	Date
-	First Issue	C Devine	C Vurley	March 2022

## 6 CONDITIONS OF USE

This Agrément may only be reproduced and distributed in its entirety.

Where a National Annex exists in respect of a BS EN (or other) standard, its use is deemed mandatory wherever the original standard is referenced.

Kiwa Ltd. has used due skill, care and attention in the preparation of this BDA Agrément®.

Whilst all due diligence has been used, no liability or warranty is extended by Kiwa Ltd.

The Agrément holder is responsible for advising Kiwa Ltd. immediately if there is a variation to the Product specification or constituent elements/components after initial publication of this BDA Agrément®.

For full terms and conditions, refer to Kiwa Ltd.