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BAW-21-194-S-A-UK
BDA Agrément®
LOGICFOAM
LF-105 CAVITY WALL
Injected Foam Insulation for Cavity Walls

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SCOPE

This Agrément relates to LOGICFOAM LF-105 CAVITY WALL Injected Foam Cavity Wall Insulation (CWI), hereinafter the "System", an in-situ HFO blown injected thermal insulation which contributes to the airtightness and watertightness of external masonry cavity walls (where masonry includes clay and calcium silicate bricks, concrete blocks, and natural and reconstituted stone blocks). The System is for injection into cavity walls up to and including 12 m in height, with cavity widths between 40 and 200 mm, in existing or new domestic and non-domestic buildings in the UK.

The System can also be used:

- in random stone properties where the cavities are even or uneven width, or narrow cavities not less than 25 mm width;
- in properties with missing or defective Damp Proof Courses (DPCs) or variable cavity widths;
- in walls above 12 m (and up to 18 m in height) where the building has been assessed as suitable by the Agrément holder.

DESCRIPTION

The System consists of two liquid components that are injected to form a closed cell structure, rigid polyurethane (PUR) seamless foam insulation to BS EN 14318-2 that adheres to the internal faces of the cavity. It is produced by an exothermic reaction between the isocyanate component (A) and the resin component (B). Once applied the System expands, solidifies and cures. The System is applied in layers, until the whole cavity wall is fully filled.

SYSTEM ILLUSTRATION

THIRD-PARTY ACCEPTANCE

NHBC - For detailed information see section 3.3 (Third-Party acceptance).

STATEMENT

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

Chris Vurley, CEng
Technical 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 fitness for the intended use of the System. This Agrément covers the following:

- Conditions of use;
- Initial Factory Production Control, Quality Management System and the Annual Verification procedure;
- Points of attention for the Specifier and examples of details;
- Installation;
- Independently assessed System characteristics and other information;
- Compliance with national Building Regulations, other regulatory requirements and Third-Party acceptance;
- Sources, including codes of practice, test and calculation reports.

MAJOR POINTS OF ASSESSMENT

Thermal performance - the System improves the thermal insulation of the cavity wall and has a declared aged thermal conductivity of 0.025 - 0.027 W/mK* depending on thickness (see sections 2.1.11 and 2.4.1).

Moisture control - (see section 2.1.12) the System:

- has a high volume closed cell percentage;
- has adequate water vapour transmission resistance;
- will contribute to limiting the risk of interstitial and surface condensation;
- has adequate resistance to water penetration;
- will resist the transfer of water across the cavity to the inner leaf;
- does not absorb water by capillary action and can be used in situations where it bridges the DPC of the inner and outer leaf.

Fire performance - where contained between the masonry leaves of the external wall the System will not contribute to the early development stages of a fire (see section 2.1.13).

Durability - the System will have a service life equivalent to that of the structure into which it is incorporated (see section 2.1.8).

CE marking - The Agrément holder has taken responsibility for CE marking of the product used in the System in accordance with all relevant harmonised European Product Standards. An asterisk (*) appearing in this Agrément indicates that data shown is given in the relevant product manufacturer's Declaration of Performance (DoP).

CONTENTS

CHAPTER 1 - GENERAL CONSIDERATIONS

1.1 - CONDITIONS OF USE

1.1.1 Design considerations
See section 2.1.

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

1.1.3 Assessment
Kiwa Ltd. has assessed the System in combination with its relevant DoPs, test reports, technical literature and factory and site visits. Also, the NHBC Standards have been taken into consideration. Factory Production Control has been assessed.

1.1.4 Installation supervision
The quality of installation and workmanship must be controlled by a competent person who shall be an employee of the installation company.

The System shall be installed strictly in accordance with this Agrément and the Agrément holder's requirements.

1.1.5 Geographical scope
The validity of this document is limited to England, Wales, Scotland and Northern 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 System 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. After this, the validity of the Agrément can be extended every three years after a positive review.

1.2 - INITIAL FACTORY PRODUCTION CONTROL (FPC)

- Kiwa Ltd. has determined that the Agrément holder has fulfilled all provisions of the specifications described in this Agrément in respect of the System.
- The initial FPC audit demonstrated that the Agrément holder has a satisfactory Quality Management System (QMS) and is committed to continuously improving their FPC operations.
- A detailed Production Quality Specification (PQS) has been compiled to ensure traceability and compliance under the terms of this Agrément.

1.3 - QUALITY MANAGEMENT SYSTEM (QMS)

- The Agrément holder:
    - has an effective and well maintained QMS in operation which covers the necessary clauses required for BDA Agrément®.
    - is committed to continually improving their FPC, QMS and associated procedures.
- Document control and production line procedures were deemed satisfactory, with sufficient evidence provided in support of BDA Agrément® requirements.

1.4 - ANNUAL VERIFICATION PROCEDURE - CONTINUOUS SURVEILLANCE

To demonstrate that the FPC is in conformity with the requirements of the technical specification described in this Agrément, the continuous surveillance, assessment and approval of the FPC will be done at a frequency of not less than once per year by Kiwa Ltd.

CHAPTER 2 - TECHNICAL ASSESSMENT

2.1 - POINTS OF ATTENTION TO THE SPECIFIER

2.1.1 Design responsibility
The Agrément holder reviews all designs submitted and offers design advice and guidance to ensure a compliant final project specific design.

2.1.2 Applied building physics (heat, air, moisture)
The physical behaviour of the cavity walls incorporating the System shall be verified as suitable by a competent specialist, who can be either a qualified employee of the Agrément holder or a qualified consultant. The Specialist will check the physical behaviour of the external cavity wall design and if necessary can offer advice in respect of improvements to achieve the final specification. It is recommended that the Specialist co-operates closely with the Agrément holder.

2.1.3 General design considerations
For retrofit applications, existing constructions must be in a good state of repair with no evidence of rain penetration, damp or frost damage. Any necessary repairs must be carried out prior to installation.

New external masonry cavity walls shall be constructed in accordance with the national Building Regulations. Where required, due consideration must be given to NHBC Standards. Installation of the System must not be undertaken until the cavity is weathertight, i.e. the roof is in place and the window and door openings are sealed.

To prevent water ingress, due consideration must be given to the design of joint detailing at window/door openings and flue pipe penetrations in accordance with BS 6093.

The minimum cavity width to be filled must not be less than 40 mm in masonry walls and not less than 25 mm in random stone properties.

The System may be used in walls above 12 m and up to 18 m in height where the Agrément holder has issued a suitable waiver.

In general, the System may be used in any exposure zone, with the following qualifications:
- the NHBC does not accept the use of full-fill insulation in very severe exposure zones with fair-faced masonry, for new buildings;
- the NHBC does not accept the use of full-fill insulation in Scotland, for new buildings.

In Scotland and Northern Ireland, in new buildings it is not permitted to fill cavities with pumped thermal insulation.

Account should be taken of Government Accredited Construction details for Part L, England and Wales - masonry cavity wall insulation detail illustrations; Accredited Construction details, Scotland; and PAS 2030.

Room space ventilation openings should be arranged to prevent the ingress of rain, snow, birds and small animals and the risk of blockage by other building operations.

Where indicated (by assessment to BS 5250) a suitable vapour control layer (VCL) incorporating lapped and sealed joints must be applied behind the dry lining in rooms.

Do not apply the System over electrical cables. Re-route or re-lay cables in suitable conduit or trunking or de-rate electrical cables.

The System is a closed cell foam which is inert once cured and is therefore chemically inactive by definition. The System will not react with metals typically used in construction elements.

Partial fill (residual cavities and omitted areas)
Wherever practicable and possible, all of the cavity space from ground level to the roof or gable copings should be filled, with the exception of:
- when a semi-detached or terraced property is to be insulated separately; in this case a column of the System is injected to create a party wall boundary formwork to prevent overspill into adjacent properties;
- when filling up to the underside of a horizontal boundary other than the roof, where the boundary is protected by a cavity tray or similar waterproof barrier;
- where the wall to be insulated is covered by a waterproof cladding, such as hung tiles, and this cladding either extends up to the roof or is protected at the top by other means (such as window sills);
- insulating areas of the wall where access for drilling may be limited by features such as carports and conservatories;
- NHBC does not accept fully filling of partially filled cavities against other existing insulants.

2.1.4 Project specific design considerations
Prior to the application of the System, an inspection must be carried out. Typical checks should include:
- the external condition of the cavity wall, flashings etc.;
- there is no existing rain ingress and there are no signs of dampness, staining or condensation on the internal face of the cavity wall;
- the type, suitability and condition of the cavity wall for filling in accordance with BS 8208-1;
- room space ventilation requirements;
- width of cavity and amount of debris in the cavity to ensure a clear void exists by using a tape measure and borescope.

2.1.5 Permitted applications
Only applications designed according to the specifications as given in this Agrément are allowed under this Agrément, in each case the Specifier will have to co-operate closely with the Agrément holder.

2.1.6 Installer competence level
The System shall be installed strictly in accordance with the instructions of the Agrément holder and the requirements of this Agrément.

Installation shall be by installers who have been trained and approved by the Agrément holder under the Quality Installer Scheme™ and subject to 1% inspections by Kiwa Ltd. under a Kiwa Installation Assessment & Surveillance Scheme.

2.1.7 Delivery, storage and site handling
The two components of the System are delivered to site in separate closed 205 litre type 1A1 drums. Both containers are labelled with component name and batch number and marked with the BDA Agrément® logo incorporating the number of this Agrément.

The optimum storage temperature is between 10 ºC and 25 ºC. The drums should not be exposed to direct sunlight, high temperatures or temperatures below 10 °C for long periods of time. Drums should be stored in a well-ventilated area protected from heat and frost and away from possible ignition sources.

Components A and B are sensitive to humidity, so they should be stored in sealed drums or hermetically sealed tanks and protected from humidity and rain.

The liquid isocyanate component is classified as 'harmful', under The Chemicals (Hazard Information and Packaging for Supply) Regulations 2009 (CHIP 4) and drums bear the appropriate hazard warning signs. When cured, the System is non-hazardous.

2.1.8 Durability
There is no mould growth risk and the System does not support vermin or insects.

The System is durable, rot-proof and considered to be adequately resistant to deterioration and wear by the normal service conditions, provided it is installed in accordance with the requirements of this Agrément.

The reaction to fire does not decrease with time in accordance with BS EN 14315-1.

The adhesion after ageing is considered sufficient to ensure the stability of the System.

The System is frost and heat-resistant from -50 °C to +70 °C.

The System will have a service life equivalent to that of the structure into which it is incorporated.

2.1.9 Maintenance and repair
The System once installed, does not require regular maintenance provided the weathertightness of the external cavity wall is maintained. For advice in respect of repair and maintenance concerns, consult the Agrément holder.

Performance factors in relation to the Major Points of Assessment

2.1.10 Adequacy of fill (using specified installation machinery and drilling pattern)
A cavity wall can be fully filled (with no gaps and a consistent density) with the System, including around details. Even the most difficult to fill area of a cavity wall (the area located over a conservatory) can be filled sufficiently with the System.

2.1.11 Thermal performance
Thermal conductivity
Due to the nature of the closed cell structure of the System, it offers good thermal resistance relative to its installed thickness.

For the purposes of U-value calculations and to determine if the requirements of national Building Regulations are met, the thermal resistance and U-value of external cavity walls incorporating the System should be calculated in accordance with BS EN ISO 10211 (taking into consideration BS EN ISO 6946, BS EN ISO 10456 and BRE Report 443), using the System's declared aged thermal conductivity (λ_D)*. Design and declared thermal values can be found in BS EN ISO 10456.

The System can be used to upgrade existing properties that already have partially fill rigid board insulation in place to meet current U-value requirements.

The injected System forms a solid and seamless air tight insulating foam fill without joints or gaps, reducing thermal bridges.

The requirement for limiting heat loss through the building fabric, including the effect of thermal bridging can be satisfied if the thermal transmittance (U-value) of the external cavity wall incorporating the System does not exceed the maximum and target U-values given in the national Building Regulations.

The System can insulate cavities which are typically hard to treat.

Thermal bridging at junctions and around openings
Care must be taken in the overall design and construction of junctions with other elements and openings to minimise thermal bridges and air infiltration. 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.

The installed System forms a solid and seamless air tight insulating foam fill without joints or gaps, reducing thermal bridges.

2.1.12 Moisture control
Cell structure
The System has a high volume closed cell percentage (92 %) in accordance with BS EN ISO 4590.

Water vapour transmission resistance
The System has a low level of water vapour transmission (high water vapour resistance) in accordance with BS EN 12086 Method A but does not favour the accumulation of water vapour between the System and cavity substrate faces.

Condensation risk
External cavity walls incorporating the System will adequately limit the risk of interstitial and surface condensation when designed in accordance with BS 5250, BRE Report 262, BRE Digest 369 or BS EN ISO 13788. Room spaces should be ventilated in accordance with BS 5250. Care should be taken to provide adequate ventilation, particularly in rooms expected to experience high humidity, and to ensure the integrity of VCL's (where installed) and dry linings against vapour ingress.

It is essential that cavity wall design, construction and maintenance limits opportunities for vapour migration through gaps, cracks and laps in VCL's and through penetrations. This is particularly important for cavity walls which include layers of high resistance to vapour diffusion on both sides of the insulation layer.

A VCL must be used where indicated by a dynamic simulation. A VCL (with sealed laps) is acceptable on the inner face of cavity walls with no penetrations.

A Condensation Risk Analysis can be carried out by the Agrément holder on a project specific basis, in accordance with BS 5250 and BS EN ISO 13788.

Water permeability
The closed cell structure means the System is water-resistant.

The System has adequate resistance to water absorption by immersion in accordance with BS EN 1609, Method B and BS EN 12087.

The System, when properly installed in accordance with this Agrément, will resist any rain penetration to the inner leaf.

Resistance to precipitation including wind-driven rain penetration
The System can be considered to offer a high resistance to wind-driven rain water infiltration.

Resistance to ground moisture
The closed cell structure means the System is water-resistant.

The System has very low short-term water absorption by partial immersion in accordance with BS EN 1609 and does not absorb water by capillary action.

When the System is used in situations where it bridges the DPC in cavity walls, it will resist the transfer of moisture to the inner leaf at DPC level, provided the wall is detailed in accordance with the requirements and provisions of the national Building Regulations.

The System is suitable for use in cavities where there are missing or defective DPCs.

2.1.13 Fire performance
The System must be protected from naked flames and other ignition sources during and after application.

In situations where there is a higher than average risk of fire, the System must be suitably separated from any potential source of ignition.

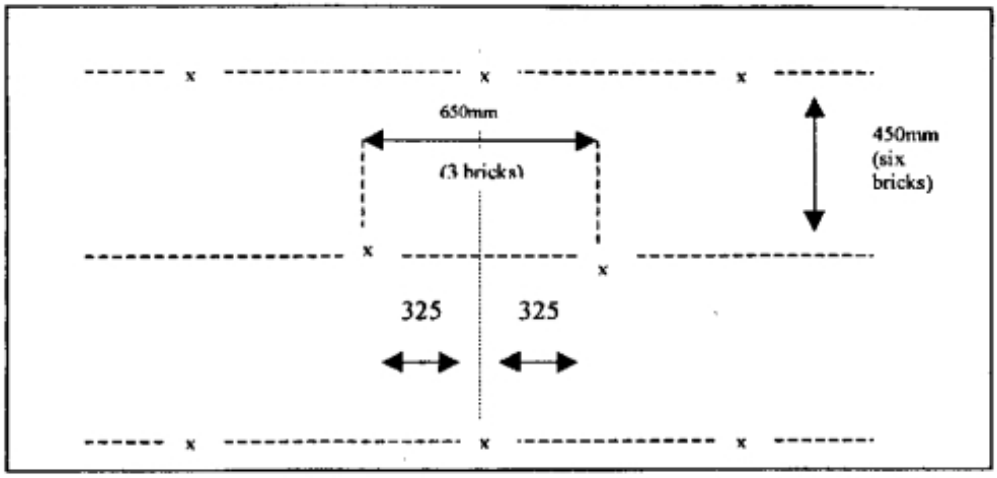
The System will not contribute to the early development stages of a fire.

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

External cavity walls must incorporate cavity barriers at edges, around openings, at junctions and in extensive cavities with fire-resisting elements in accordance with the relevant provisions of the national Building Regulations.

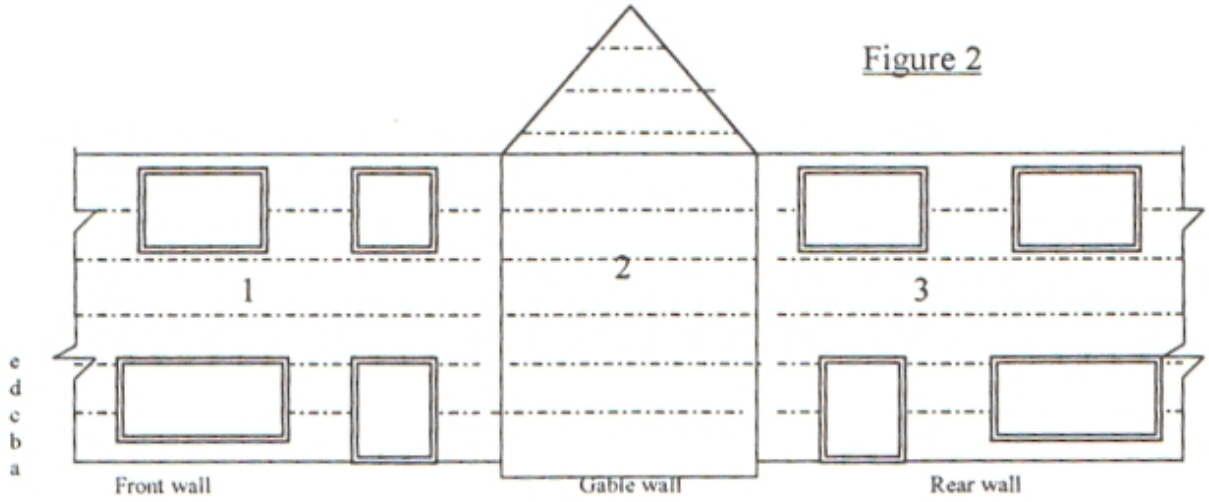
Proximity of flues and appliances
The System must be separated from heat-emitting flue pipes, fixed combustion appliances, incinerators, devices, fireplaces and chimneys and any potential source of ignition where the temperature is in excess of 70 °C, by non-combustible material in accordance with the provisions of the national Building Regulations.

Figure 1 - Staggered drilling pattern (representing maximum spacing)



All dimensions are in millimetres.

Figure 2 - Elevation for a typical semi-detached house showing a suitable injection sequence 1, 2 and 3



NOTE – Injection of foam is undertaken in horizontal bonds, e.g. a, b, c, d, e, as indicated, working from left to right at each level.

Figure 3 - Filled cavity

2.3 - INSTALLATION

2.3.1 Installer competence level
See section 2.1.6.

2.3.2 Delivery, storage and site handling
See section 2.1.7.

2.3.3 General
Installation of the System shall be carried out in accordance with BS 8000-0, BS EN 14318-1 and BS EN 14318-2.

Application of the System is to be left until the cavity is weathertight, i.e. that the external masonry wall and roof is in place and that all cavity openings, such as those around doors and windows, are sealed, to avoid water ingress on to the System.

During application, prohibit contact with open flames and the presence of ignition sources.

Do not weld or cut metal which is in contact with the System. If it is necessary to weld metal elements, this must be done before injecting the System.

Whenever practicable and possible, all of the cavity space from ground level to the roof or gable copings should be filled. Installation must be carried out to the highest point in each elevation, or to a level determined by any vertical cavity barrier between adjacent properties (whichever is the lower).

During injection, the ambient air temperature and substrate temperature must ideally be between 15 ºC and 25 °C and not be lower than 5 ºC. An infrared or contact thermometer can be used for checking substrate surface temperature.

On the surfaces of masonry or porous materials, the moisture content of the substrate should not exceed 5 %. Non-porous surfaces must be dry and free from condensation. The presence of surface humidity leads to the formation of a highly porous foam with low adhesion to the substrate.

The relative humidity of the air outside the building must be less than 85 % to minimise the risk of surface condensation.

When injecting, it is important to ensure that the compressed air used is completely dry.

The Product is spray applied using air operated, electrically heated, plural component proportioning machines (specially made for the purpose of dispensing 1:1 ratio formulations of polyurethane (PUR) foam and other fast setting materials). The output of the machines is a mixture of the A and B components 1:1 by volume or 100:104 by mass.

The machine must have a temperature controller in the preheaters and in the hoses. The working temperature must be set between 40 ºC and 50 ºC depending on the ambient temperature conditions.

The System is usually injected into the cavity externally. Injection can take place internally when the property is undergoing internal refurbishment.

Application of the System may produce a build-up of harmful vapours. Installers must wear personal protection equipment (PPE) when working with the System.

Some vapours given off by component chemicals are heavier than air and will tend to move to lower parts of the building compartment. These areas should be suitably ventilated. In certain conditions (e.g. application in a confined space) the use of extractor fans is recommended. Ensure proper ventilation in the work area.

The System must not make contact with heat-emitting flue pipes, appliances and chimneys etc. If hot work is to take place near the System, it must be cut back by 2 m and the void then filled with foam or mineral wool insulation.

2.3.4 Preparation
- Any necessary repairs, such as replacing damp or rotten door/window frames must be made prior to injection;
- repair any damaged or dislodged flashings;
- sleeve or otherwise modify essential vents to prevent blockage by the System;
- seal window and door openings;
- make external cavity walls weathertight before injection of the System;
- remove any debris or mortar droppings left in the cavity;
- services e.g. electrical cables may need re-routing or trunking;
- sealing defects in the openings in the inner or outer leaf of walls especially electricity and gas meter boxes using appropriate material.

2.3.5 Outline procedure
Drilling
Percussion drills with rotary cutting action must be used for drilling the injection holes.

The drilling pattern must be strictly in accordance with the Agrément holder's instructions.

It is essential that all drilling in each elevation and at least the first metre of adjacent elevations is completed before injection of that elevation is commenced.

Sight holes should be used to check the travel of the System, that the System has reached all areas and that the System has not spread into undesirable areas e.g. ventilation of the roof space, and to avoid over-pressurisation.

Pre-filling checks of foam quality
The pre-filling quality control (QC) checks must be strictly in accordance with the System specification.

Filling procedure

Filling should be undertaken according to the Agrément holder's instructions, using the correct injection gun nozzle for the area of application:

1. Injection begins at the end of an elevation or adjacent to a sealed stop-end within the cavity (e.g. a door frame or the column of foam at the party wall boundary), beginning at the lowest row of holes. The first hole should be approximately 0.2 m away from the sealed end.
2. The injection pattern should ensure that freshly injected foam is always keyed into an area of cured and cold foam, thus giving the strongest possible bond.
3. After each fill, an indicator stick is inserted into each hole to show that injection has taken place and to mark the presence of the foam.
4. At the top row of holes, the number of injection strokes is reduced, to avoid intrusion of foam against the roof structure. Smaller shots may be required around windows, door frames and ducts.
5. The System should be built up in layers, until the cavity is fully filled from ground level to the roof or gable copings.

2.3.6 Finishing

After injection of the System, the drill holes are fully filled with mortar of a similar type, colour, texture and weathertightness to that of the existing wall.

If the cavity is uncapped, any foam which has expanded over the top of the cavity into the loft space should be removed. Once cured and cold, the System can be trimmed flat at the top of the cavity using a hand-saw.

Any visible foam on the inside of the property should be removed from habitable areas and the hole through which it passed should be sealed.

2.3.7 Post-installation checks

Post-installation external and internal checks are carried out to ensure:

- that the installation has been completed and that no damage has occurred to the building;
- all areas have been insulated;
- all the injection holes have been sealed; check any internal injection holes are finished to the Agrément holder's specifications;
- all chimney flues, combustion air ducts, air vents and trunked air vents must be checked (e.g. smoke tests for combustion appliances) to verify that they are clear and not obstructed by the foam.

2.4 - INDEPENDENTLY ASSESSED SYSTEM CHARACTERISTICS

2.4.1 Adequacy of fill

Site visit to witness injection of foam	The System can be injected to fully fill the wall cavity space

2.4.2 Thermal performance

Declared aged thermal conductivity (λ_D) to BS EN 14318-2, Annex A, C, ISO 8301 and BS EN 12667	0.027 W/mK* for < 80 mm thickness 0.026 W/mK* for 80-120 mm thickness 0.025 W/mK* for > 120 mm thickness

2.4.3 Moisture control

Cell structure

Open and closed cell volume % to BS EN 14318-1, 2 and BS EN ISO 4590	Mean 92 % closed cell content, Class CCC4

Water vapour transmission

Water vapour diffusion resistance factor μ to BS EN 14318-1 and BS EN 12086, Method A	μ 54
Water vapour transmission rate	261.8 mg/(m^2h) for 70 mm thickness
Water vapour permeance	0.187 mg/m^2hPa for 70 mm thickness
Water vapour resistance	5.47 m^2hPa/mg for 70 mm thickness

Water absorption

Short-term water absorption by 24 hr partial immersion to BS EN 14318-1 and BS EN 1609, Method B	Mean 0.05 kg/m^2* for 70 mm and 130 mm thickness
Long term water absorption by total immersion to BS EN 12087, method 2, Method 2A	Mean 1.7 volume %

The REACH Statement for the System in respect of dangerous substances confirms no biocides are present.

2.5 - ANCILLARY ITEMS

Note:

Ancillary items detailed in this section may be used in conjunction with the System but fall outside the scope of this Agrément, include:

- injection machinery including plural component proportioners (double acting positive displacement piston metering pumps) fitted with suitable injection nozzles;
- VCL;
- conduit/trunking;
- mortar of similar colour.

CHAPTER 3 - CDM, NATIONAL BUILDING REGULATIONS AND THIRD-PARTY ACCEPTANCE

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 - NATIONAL BUILDING REGULATIONS

In the opinion of Kiwa Ltd., the System, 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.

3.2.1 - ENGLAND
REQUIREMENTS: THE BUILDING REGULATIONS 2010 AND SUBSEQUENT AMENDMENTS

- B3(1) Internal fire spread (structure) - the System does not prejudice the stability of walls.
- B3(4) Internal fire spread (structure) - a wall incorporating the System can inhibit the unseen spread of fire and smoke within concealed spaces.
- C2(a) Resistance to ground moisture - the System does not absorb water by capillary action and may therefore be used in situations where it bridges the damp proof course (DPC) of the inner and outer leaf.
- C2(b) Resistance to precipitation moisture - a wall incorporating the System can resist rain penetration to the inner leaf and satisfy this Requirement.
- C2(c) Resistance to condensation moisture - the System can contribute to satisfying this Requirement.
- J4 Protection of building - the System can be separated from combustion appliances, flue pipes, fireplaces and chimneys to prevent the building catching fire.
- L1(a)(i) Conservation of fuel and power - the System can contribute to limiting heat gains and losses through a wall.
- Regulation 7(1) - Materials and workmanship - the System 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 System can contribute to a wall complying with the requirements of L1(a)(i).
- Regulation 26 - CO_2 emission rates for new buildings - the System can contribute to satisfying this Requirement.
- Regulation 26A - Fabric energy efficiency rates - the System can contribute to satisfying this Requirement.

3.2.2 - WALES
REQUIREMENTS: THE BUILDING REGULATIONS 2010 AND SUBSEQUENT AMENDMENTS

- B3(1) Internal fire spread (structure) - the System does not prejudice the stability of walls.
- B3(4) Internal fire spread (structure) - a wall incorporating the System can inhibit the unseen spread of fire and smoke within concealed spaces.
- C2(a) Resistance to ground moisture - the System does not absorb water by capillary action and may therefore be used in situations where it bridges the damp proof course (DPC) of the inner and outer leaf.
- C2(b) Resistance to precipitation moisture - a wall incorporating the System can resist rain penetration to the inner leaf and satisfy this Requirement.
- C2(c) Resistance to condensation moisture - the System can contribute to satisfying this Requirement.
- J4 Protection of building - the System can be separated from combustion appliances, flue pipes, fireplaces and chimneys to prevent the building catching fire.
- L1(a)(i) Conservation of fuel and power - the System can contribute to limiting heat gains and losses through a wall.
- Regulation 7(1) - Materials and workmanship - the System 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 System can contribute to a wall complying with the requirements of L1(a)(i).
- Regulation 26 - CO_2 emission rates for new buildings - the System can contribute to satisfying this Requirement.
- Regulation 26A - Fabric energy efficiency rates - the System can contribute to satisfying this Requirement.
- Regulation 26B - Fabric performance values for new dwellings - the System can contribute to satisfying this Requirement.

3.2.3 - SCOTLAND
REQUIREMENTS: THE BUILDING (SCOTLAND) REGULATIONS 2004 AND SUBSEQUENT AMENDMENTS

3.2.3.1 Regulations 8 (1)(2) Fitness and durability of materials and workmanship

- The System is manufactured from acceptable materials and is considered to be 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

- 2.1 Compartmentation - a wall incorporating the System can inhibit the spread of fire and smoke.
- 2.3 Structural protection - the System does not prejudice the load-bearing capacity of walls.
- 2.4 Cavities - a wall incorporating the System can inhibit the unseen spread of fire and smoke within concealed spaces.
- 3.4 Moisture from the ground - the System can contribute to a construction satisfying this standard with reference to clause 3.4.1 of the Technical Handbooks; the System can be used in situations where it bridges the DPC of the inner and outer leaf.
- 3.10 Precipitation - the System can contribute to adequately protecting the building from precipitation penetrating to the inner face of the building.
- 3.15 Condensation - a wall incorporating the System can be designed and constructed to inhibit surface and interstitial condensation.
- 3.19 Combustion appliances - relationship to combustible materials - the System can be separated from fixed combustion appliances to prevent damage to the building.
- 6.1(b) Carbon dioxide emissions - the System can contribute to the building reducing carbon dioxide emissions.
- 6.2 Building insulation envelope - the System can contribute to the insulation envelope, which reduces heat loss.

- 7.1(a)(b) Statement of sustainability - the System can contribute to satisfying the relevant requirements of Regulation 9 and Standards 1 to 6 in relation to the Technical Handbook (Domestic). The System will therefore contribute to a construction meeting a bronze level of sustainability as defined in Standard 7.1. In addition, the System can contribute to a construction meeting a higher level of sustainability.

3.2.3.3 Regulation 12 Building Standards - Conversion

- 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) and clause 0.12 of the Technical handbook (Non-Domestic).

3.2.4 - NORTHERN IRELAND
REQUIREMENTS: THE BUILDING REGULATIONS (NORTHERN IRELAND) 2012 AND SUBSEQUENT AMENDMENTS

- 23(a)(i)(iii)(b) Fitness of materials and workmanship - the System is manufactured from materials which are considered to be suitably safe and acceptable for use as described in this Agrément.
- 28 Resistance to moisture and weather - the System can contribute to protecting the building from the passage of moisture from the weather.
- 29 Condensation - the System can contribute to limiting the risk of interstitial condensation.
- 35 Internal fire spread - Structure (1) - the System does not prejudice the stability of walls.
- 35 Internal fire spread - Structure (4) - a wall incorporating the System can inhibit the unseen spread of fire and smoke within concealed spaces.
- 39(a)(i) Conservation measures - the System can contribute to limiting heat gains and losses through a wall.
- 40(2) Target carbon dioxide emission rate - the System can contribute to a building not exceeding its target CO_2 emission rate.
- 43 Renovation of thermal elements - renovation work should be carried out to ensure the wall complies with requirement 39(a)(i).
- 73 Protection of people and buildings - the System can be separated from combustion appliances, flue pipes, fireplaces and chimneys to prevent damage to the building.

3.3 - THIRD-PARTY ACCEPTANCE

NHBC - In the opinion of Kiwa Ltd., the System, other than in very severe exposure locations with fair-faced masonry, if installed, used and maintained in accordance with this Agrément, can satisfy or contribute to satisfying the relevant requirements in relation to NHBC Standards, Chapter 6.1, External masonry walls.

CHAPTER 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 11925-2:2010 Reaction to fire tests. Ignitability of products subjected to direct impingement of flame. Single-flame source test
- 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 772-11:2011 Methods of test for masonry units. Determination of water absorption of aggregate concrete, autoclaved aerated concrete, manufactured stone and natural stone masonry units due to capillary action and the initial rate of water absorption of clay masonry units
- BS EN 845-1:2013+A1:2016 Specification for ancillary components for masonry. Wall ties, tension straps, hangers and brackets
- BS EN 1602:2013 Thermal insulating products for building applications. Determination of the apparent density
- 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 1996-1-1:2005+A1:2012 Eurocode 6. Design of masonry structures. General rules for reinforced and unreinforced masonry structures
- BS EN 12086:2013 Thermal insulating products for building applications. Determination of water vapour transmission properties
- BS EN 12087:2013 Thermal insulating products for building applications. Determination of long term water absorption by immersion
- 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 14318-1:2013 Thermal insulating products for buildings. In-situ formed dispensed rigid polyurethane (PUR) and polyisocyanurate (PIR) foam products. Specification for the rigid foam dispensed system before installation
- BS EN 14318-2:2013 Thermal insulating products for buildings. In-situ formed dispensed 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 5250:2011+A1:2016 Code of practice for control of condensation in buildings
- BS 5617:1985 Specification for urea-formaldehyde (UF) foam systems suitable for thermal insulation of cavity walls with masonry or concrete inner and outer leaves
- 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 8103-2:2013 Structural design of low-rise buildings. Code of practice for masonry walls for housing
- BS 8104:1992 Code of practice for assessing exposure of walls to wind-driven rain
- BS 8208-1:1985 Guide to assessment of suitability of external cavity walls for filling with thermal insulants. Existing traditional cavity construction
- ISO 8301:1991 Ed 1 Thermal insulation. Determination of steady-state thermal resistance and related properties. Heat flow meter apparatus
- 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
- BRE GG 33:2015 Building damp-free cavity walls
- BRE GBG 44-2:2000 Insulating masonry cavity walls: principal risks and guidance
- PAS 2030:2017 Specification for the installation of energy efficiency measures in existing buildings. Building Fabric Measures (BFM)
- SG19:2018 Thermal performance of in-situ PU polyurethane products used as thermal insulation for buildings with a new blowing agent
- Government Accredited Construction details for Part L, England and Wales - masonry cavity wall insulation detail illustrations
- Accredited Construction details, Scotland
- NHBC Standards 2019

Remark: apart from these sources confidential reports may also have been assessed; any relevant reports are in the possession of Kiwa Ltd. and kept in the Technical Assessment File of this Agrément; the Installation Guides are current at the time of publication and may be subject to change, the Agrément holder should be contacted for clarification of revision.

CHAPTER 5 - AMENDMENT HISTORY

Revision	Amendment Description	Amended By	Approved By	Date
-	First issue	C Devine	C Vurley	February 2021