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Kiwa Agrément

Permarock EPS EWI System - Direct Fix on Masonry

External Thermal Insulation Composite System (ETICS)

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Scope of Agrément

This Kiwa Agrément (hereinafter 'Agrément') relates to Permarock EPS EWI System - Direct Fix on Masonry (hereinafter the 'System'). The System is a mechanically and adhesively fixed, expanded polystyrene (hereinafter 'EPS') insulated, external thermal insulation composite system (ETICS) with brick slip, brick-effect render, dry dash, or silicone finishes. The System is for installation above damp-proof course (hereinafter 'DPC') level on masonry (where masonry includes clay and calcium silicate bricks, concrete blocks, and natural and reconstituted stone blocks) or concrete supporting walls, pre-cast or in-situ concrete (dense, lightweight or no-fines). The System is for existing and new residential and non-residential buildings.

Description

The System consists of EPS insulation boards which are mechanically and adhesively fixed to the masonry supporting wall or horizontal protected surfaces such as soffits. The System can be installed as follows:

- For low rise buildings (i.e. up to two storeys) with a service life of 50 years, the EPS insulation boards are mechanically and adhesively fixed to the supporting wall, a layer of basecoat with reinforcement mesh is then applied to the EPS insulation boards;
- For multistorey buildings (i.e. more than two storeys) with a service life of 50 years and all buildings with an extended service life of 60 years, the EPS insulation boards are mechanically and adhesively fixed to the supporting wall, a layer of basecoat and reinforcement mesh is then applied to the EPS insulation boards which are then mechanically fixed through the mesh to the supporting wall.

The System can incorporate either brick-effect render, brick slips, dash or silicone finishes:

- Primer is applied before the application of silicone and brick slip finishes;
- Brick slip adhesive is applied before the application of brick slips which are then finished with pointing mortar;
- The dash is finished with or without aggregate.

Illustration

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Third-party acceptance

See Section 3.3.

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.

Craig Devine Technical Compliance Manager, Building Products	**Alpheo Mlotha CEng FIMMM MBA** Business Unit Manager, Building Products

Summary of Agrément

This document provides independent information to specifiers, specialists, engineers, building control personnel, contractors, installers and other construction industry professionals who are considering the fitness for purpose of the System. This Agrément covers the following:

- Conditions of use;
- Production control, Quality Management System and the Annual Verification procedure;
- System components and ancillary items, 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, as appropriate;
- Sources.

Major Points of Assessment

Moisture control - see Section 2.2.7 - the System:

- Can contribute to limiting the risk of interstitial and surface condensation;
- Will provide a degree of protection against rainwater ingress.

Strength - see Section 2.2.8 - the System has adequate strength and is designed to adequately resist impact damage and wind loads normally encountered in the UK.

Fire performance - see Section 2.2.9 - the System is classified as European Classification:

- B-s1, d0, in accordance with BS EN 13501-1, when incorporating brick slip finish;
- B-s2, d0, in accordance with BS EN 13501-1, when incorporating silicone, brick effect render or dry dash finish.

Thermal performance - see Section 2.2.10 - the System improves the thermal performance of external walls and can contribute to satisfying the requirements of the national Building Regulations.

Durability - see Section 2.2.11 - the service life durability of the System will be dependent upon the environment (operating conditions) in which the System will be used.

1 General considerations

1.1 Conditions of use

1.1.1 Limitations

This Agrément has been prepared in accordance with the mandatory requirements defined in the relevant Kiwa Technical Requirement. Some information in this Agrément is provided for guidance or reference purposes only; this information falls outside the scope of the Technical Requirement.

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 relevant test reports, technical literature, the Agrément Holder's quality plan, audit and site visit, as appropriate. This assessment is contained in a Technical Assessment Report which includes the date of any inspection.

1.1.4 Installation supervision

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

The System 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 and Northern Ireland, with due regard to Section 3 of this Agrément.

1.1.6 Validity

The purpose of this Agrément is to provide well-founded confidence to apply the System within the scope described. The validity of this Agrément is as published on www.kiwa.com/gb/en-gb/about-kiwa/certificate-checker/

1.2 Production control and Quality Management System

Kiwa Ltd. has conducted an audit of the Agrément Holder and determined that they fulfil all their obligations in relation to this Agrément in respect of the System.

The initial audit demonstrated that the Agrément Holder has a satisfactory Quality Management System (hereinafter 'QMS') and is committed to continuously improving their 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 System 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 System. It is intended only as an assessment of fitness for purpose.

2.1 System components and ancillary items

2.1.1 Components included within the scope of this Agrément

The components listed in Table 1 below are integral to the use of the System.

Table 1 - Integral components

Component		Description	Dimensions
Adhesive	Permarock Adhesive	Cement-based, polymer-modified adhesive, conforming to BS EN 998-1	
	Permarock Lamella Adhesive / Permarock HP Adhesive	High polymer content, flexible, cement-based adhesive, conforming to BS EN 998-1	
EPS insulation	Permarock EPS-Premium	Grey, EPS70 grade insulation, with compressive strength of 70 kPa and a tensile strength of 110 kPa, in accordance with BS EN 13163, λ_D 0.030 W/m.K	1,200 mm by 600 mm, available in thicknesses from 20 to 300 mm
	mechanical fixings	KI-10 Hammerset insulation fixing with reinforced plastic pin. To be used as initial fixings where required	70 to 220 mm long by 10 mm shank diameter with a 60 mm plate diameter[^]
		R-KWL90-SW Retaining Plate[^^]	90 mm plate diameter
Basecoat	Permarock Bedding Mortar	Cement-based, polymer-modified basecoat, conforming to BS EN 998-1	
Reinforcement mesh	Permarock Reinforcing Mesh	Alkali-resistant coated, glass-fibre reinforcing mesh with a nominal weight of 165 g/m^2	50 m by 1 m, 4 mm by 4 mm grid size
Mechanical fixings	Fixings	J-SM35 stainless steel mechanical fixing - high-alloy, fully austenitic, super austenitic, stainless-steel grade 1.4016 BA	50 to 220 mm long with 35 mm square head size[^]
		J-SM70 stainless steel mechanical fixing - high-alloy, fully austenitic, super austenitic, stainless-steel grade 1.4016 BA	50 to 220 mm long with 70 mm head diameter[§]
Primer	Permarock K & R Primer	A pigmented synthetic resin dispersion with titanium dioxide, calcium carbonate, silicates, water, film-forming agent and additives, to be used with silicone textured render and brick slip finishes	
Silicone textured render	Permarock Silicone^{Ultra} K15 Finish	Hybrid binder render comprising silicone emulsion with organically cross-linked quartz silicate particles with 1.5 mm grain size	
Brick slip finish	Permarock Brick Slip Adhesive	Ready-mixed brick slip adhesive, available in various colours	
	Permarock Brick Slips	Synthetic resin brick slips based on inorganic fillers and aggregates with organic binder, available in various colours and surface textures	215 mm by 65 mm by 4 to 6 mm thick, including external corner (pistol) slips
	Permarock Brick Slip Pointing Mortar	Cement-free, dispersion based mortar with mineral filler, available in various colours	
Brick-effect render	Permarock Brick-Effect Render	Polymer-modified, self-coloured, cementitious render system	
Dash finish	Permarock Dashing Mortar	Polymer-modified, self-coloured, cement-based spar dash receiver, with or without aggregates	
	Permarock Dashing Stone	Decorative natural stones with various shapes and textures	3 to 8 mm

[^] length is dependent on the thickness of the insulation, alternative fixings may be used for thicker insulations. In all cases, alternative fixings can be used provided they can demonstrate that they have equivalent (or greater) pull-out strength, plate diameter, plate stiffness and load-resistance characteristics

[^^] usage of the R-KWL90-SW Retaining Plate is optional with the 60 mm plate diameter plastic fixing, to be used for higher design wind load values, as required. The usage of the R-KWL90-SW Retaining Plate has not been assessed

[§] length is dependent on the thickness of the insulation, alternative fixings may be used for thicker insulations. In all cases, alternative fixings can be used provided they can demonstrate that they have equivalent (or greater) pull-out strength, plate

diameter, plate stiffness and load-resistance characteristics. The design wind load values for the use of the J-SM70 fixing has not been assessed

2.1.2 Ancillary items falling outside the scope of this Agrément

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

- External supporting wall - masonry or concrete;
- Profiles - a range of standard profiles for end stop, corner reinforcement mesh and expansion joints, available in aluminium, stainless steel, PVC-U or organic polyester powder-coated galvanized steel, provided to the specifier's requirements;
- Under-and-over cills, cill extenders;
- Roof verge extenders;
- Expanding tape;
- Sealing tape;
- Silicone sealant;
- Roofline closure systems;
- Dubbing-out compound;
- Moss and mould remover/biocide;
- Fire barrier mechanical fixings - stainless steel.

2.2 Points of attention to the Specifier

2.2.1 Design

2.2.1.1 Design responsibility

A Specifier may undertake a project-specific design; it is recommended that the Specifier co-operates closely with the Agrément Holder. The Specifier or Installer is responsible for the final as-built design.

2.2.1.2 Basis of design

The characteristics detailed in the section titled 'Major Points of Assessment' shall be considered during the use of the System.

2.2.1.3 General design considerations

A project-specific design is required. This shall be developed in close co-operation with the Agrément holder.

This Agrément covers the use of the System in exposure zones 1, 2 and 3, in accordance with BS 8104 and PD 6697. This Agrément also covers the use of the System when installed onto cavity walls in exposure zone 4; however, for solid walls in exposure zone 4 areas, the Specifier, in close co-operation with the Agrément holder, shall determine the suitability of the System, taking into consideration the appropriate local wind-driven rain index using BS 8104 and permeability of the existing materials.

The System shall be installed above DPC level and a minimum of 150 mm above ground level.

New masonry supporting walls shall be designed in accordance with:

- BS EN 1992-1-1;
- BS EN 1996-1-1;
- BS EN 1996-2;
- BS 8000-3;
- PD 6697.

The ingress of water into the wall construction shall be avoided by carrying out detailing techniques specified in the Agrément to a high standard. The risk of water penetration will cause substantial damage to the wall construction incorporating the System and the thermal benefit of the insulation will be minimised.

Assessment of the structural performance of the System shall be carried out by the Agrément holder to confirm that the System can:

- Resist the design impact, wind, dead and imposed loads;
- Safely transfer loads to the building;
- Accommodate all anticipated thermal movements without damage.

Supporting walls incorporating the System shall be detailed to reduce the risk of damage due to movement in the supporting wall, taking into consideration differential movement in dissimilar materials.

Buildings incorporating the System shall be designed and constructed to prevent moisture penetration and air infiltration, in accordance with the relevant Codes and Standards.

Care is needed for design detailing of joints around openings, penetrations and movement joints, to minimise the risk of wind-driven rainwater and, where relevant, shall be in accordance with BS 6093 and Health Building Note 00-10 Part B: Walls and ceilings.

Where required, properly constructed structural movement joints (designed to cater for the calculated degree of movement to control expansion, contraction and cracking without reducing the stability and weathertightness of the wall) shall be carried through the System using movement beads of PVC, powder-coated galvanised steel, aluminium or stainless steel, subject to the project-specific design. Movement joints within the System shall be installed as follows:

- Structural expansion joints shall be provided at 7.5 m intervals when the length of a wall exceeds 12 m in accordance with PD 6697 and BS EN 1996-2 (subject to the project-specific design);
- Movement joints for the continuous render finish shall be provided at 10 m intervals;
- Movement and expansion joints of the System when designed in accordance with this Agrement meet the requirements of Health Building Note 00-10 Part B: Walls and ceilings.

For Systems designed for an extended service life of 60 years, the following components shall be made of stainless steel grade 1.4301 (minimum), in accordance with BS EN 10088-2, or of aluminium grade 1xxx, 5xxx and 6xxx series, in accordance with BS EN 573-3:

- Base profiles and render stop ends;
- Any other profile component that remains exposed after the finish coat is applied.

2.2.1.4 Project-specific design considerations

The project-specific design shall:

- Be determined by the Specifier.
- Consider the exposure zones where the System is installed.
- Take into account:
    - The requirements of the relevant national Building Regulations - see Section 3.2.
    - The service life required - see Section 2.2.11.

A pre-installation survey is required to allow determination of the project-specific design - see Section 2.4.1. A pre-installation survey is required to confirm that the design works can be carried out for new buildings - see Section 2.4.1.

The Agrément holder shall ensure that the following considerations are included in the development of a project-specific design:

- Thermal transmittance (hereinafter ‘U-value’) requirements;
- Thermal expansion effects of the supporting wall and the System;
- Likely local impact resistance;
- Pull-through of fixings;
- Pull-out of fixings;
- Effect of wind actions on the System;
- Accommodation of structural movement.

Masonry supporting walls shall be vapour permeable to ensure that moisture can escape from inside the building. In cases where the external envelopes are not vapour permeable, mechanical moisture management system shall be considered.

The local spell index method for assessing the exposure zones to wind-driven rain, on Systems installed on masonry supporting walls, shall be considered at the project-specific design phase, taking into consideration:

- Geographical location and orientation of the proposed wall;
- Terrain upwind;
- Obstructions;
- Characteristics of the proposed wall.

During the assessment and survey, fixing pull-out strength (kN) tests shall be conducted on the supporting wall surface in accordance with EOTA TR 051 and EAD 330196-01-0604. The results of the assessment and survey shall assist the Agrément

holder in determining the type, size and minimum number of fixings required per m^2. When using pull-out data for fixings, the material safety factor γ_m shall be considered.

2.2.2 Applied building physics (heat, air and moisture)

A Specialist shall check the hygrothermal behaviour of a project-specific design incorporating the System and, if necessary, offer advice on 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 Specialist co-operates closely with the Agrément Holder).

2.2.3 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.

2.2.4 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 an Approved Installer, trained and approved by the Agrément Holder.

2.2.5 Delivery, storage and site handling

The System components are delivered in suitable packaging bearing relevant identification information (such as the System name, production identification date or batch number, the Agrément Holder's name, etc.) and, where applicable, the Kiwa Agrément logo incorporating the number of this Agrément.

Prior to installation, the System components shall be stored in accordance with the Agrément Holder's requirements. Good housekeeping protocols shall be followed to avoid damage.

Where 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 System components in a well-ventilated covered area to protect them from rain, frost and humidity;
- Store System components away from sources of ignition.

For storage of liquid and powder components, minimum and maximum temperatures shall be observed, including limitations of the shelf life, in accordance with the manufacturer's recommendations.

2.2.6 Maintenance and repair

Once installed, the System requires regular maintenance.

The maintenance schedule for the installed System shall include regular visual inspection checks for:

- Signs of damaged areas and cracks in the render exceeding 0.2 mm;
- Signs of disbandment in brick slips; dislodged brick slips shall be re-fixed using brick slip adhesive;
- Signs of damage in brick slips; damaged brick slips shall be removed and replaced with new ones;
- Integrity of the sealant around openings and service entry points;
- Adequate performance of architectural details designed to shed water away;
- Leaks from external plumbing and fittings, guttering and drainpipes.

Maintenance shall include regular inspection and, if appropriate, replacement and resealing of joints at window and door frames and other penetrations through the System to prevent failure. Failed elements such as sealants, joint seals and corroded materials shall be replaced to ensure that water ingress does not occur.

Any damage to the render system shall be repaired immediately, in accordance with BS EN 13914-1 and the Agrément holder's Maintenance and Repair Manual.

The System finish may become discoloured by algae and lichens in damp areas. Cleaning with fresh warm water and light brushing or by overcoating will mitigate this. A mild detergent or traffic-film remover can be applied and washed off. Any surface algae can be cleaned off using an algicide.

The system shall be cleaned using soft washing techniques instead of high-pressure washing, which can damage the render. This involves applying the cleaning solution at low pressure and letting it sit for a few minutes to break down dirt, algae and

graffiti, meeting the requirement of School Output Specification - Technical Annex 2C: External Fabric and Health Building Note 00-10 Part B: Walls and ceilings.

For advice in respect of repair and maintenance, consult the Agrément Holder.

2.2.7 Moisture control

External walls incorporating the System can adequately limit the risk of surface and interstitial condensation when designed in accordance with BS 5250 and BRE Report 262.

A condensation risk analysis shall be completed at the project-specific design stage for all elements of the construction, including at junctions, openings and penetrations, to minimise the risk of surface and interstitial condensation. When correctly installed on an occupied building, no condensation will form on the internal wall.

Ensure adequate ventilation in the building to reduce the risk of interstitial and surface condensation. Mechanical ventilation with heat recovery (MVHR) should be considered.

Resistance to precipitation including wind-driven rain

The project-specific design shall include detailing around openings, penetrations and movement joints to minimise the risk of wind-driven rainwater ingress, in accordance with BS 6093.

The System will provide a degree of protection against rainwater ingress. However, care shall be taken to ensure that the supporting walls are adequately weathertight prior to installation of the System.

The guidance given in BRE Report 262 shall be followed in connection with the weathertightness of wall constructions. The Agrément holder shall select a construction which is appropriate to the local wind-driven rain index, in accordance with BS 8104, with due consideration to the design detailing, workmanship and materials to be used.

At the tops of walls, the System shall be protected by an adequate coping, overhang or other project-specific detail to shed water away from the walls and, where relevant, the detail shall be in accordance with the requirements of School Output Specification Technical Annex 2C: External Fabric or INCA's 'External wall insulation specification for weathering and thermal bridge control - Guide'.

The System has adequate resistance to artificial weathering and resistance to thermal shock, in accordance with EAD 040083-01-0404.

2.2.8 Strength

The supporting wall shall have sufficient strength to withstand all wind, dead and imposed loads applied to and from the System, including racking and any temporary loads that could be applied during installation. The strength of the supporting wall shall be verified by a qualified structural engineer. The project-specific design shall ensure that the System attachment to the supporting wall has adequate fixing pull out capacity for the calculated wind loads.

The System shall be designed to withstand wind action loads in accordance with BS EN 1991-1-4. Account shall be taken of the location, shape and size of the building. The average yearly wind action load data for the site location shall be collated and used to calculate the required design wind resistance (positive and negative). Special consideration shall be given to locations with high wind-load pressure coefficients, as extra fixings may be required.

The System can be designed to adequately resist wind-loads with suitable mechanical strength, in accordance with BS EN 16382. For the calculation of the wind-load resistance of the System, the design pull-through values given in Tables 2 and 3 shall be used.

Table 2 - Design wind load values - R-KI-10 mechanical fixing with 60 mm plate head through the EPS insulation only

Design wind load (kN/m²)	No. of fixings per EPS board	No. of fixings per m²	Design fixing pull-through resistance (kN)^
1.44	4	6	0.24
1.68	5	7	
2.16	6	9	
2.40	7	10	

^ derived from pull-through test through 90 mm thick EPS insulation. A partial factor of 3 has been applied

Table 3 - Design wind load values - J-SM35 stainless steel mechanical fixing with 35 mm square head diameter through reinforced basecoat and EPS insulation

Design wind load (kN/m²)	No. of fixings per EPS board	No. of fixings per m²	Design fixing pull-through resistance (kN)ˆ
4.14	4	6	0.69
4.83	5	7	
6.21	6	9	

ˆ derived from static foam block test through reinforced basecoat and 90 mm thick EPS insulation. A partial factor of 2.5 has been applied

The number of fixings referenced in Tables 2 and 3 can be reduced when using thicker EPS insulation boards. To ensure higher pull-through test values for calculation of the design pull-through resistance, the qualified structural engineer shall insure appropriate factors been applied.

The qualified structural engineer shall ensure that the maximum design wind load achieved by the System, as per Tables 2 and 3, shall be equal or less than the design pull-out resistance strength of the mechanical fixings from the supporting wall obtained from site tests. Contribution of the adhesive is not considered when calculating the wind-load resistance of the System.

For buildings with an extended service life of 60 years, the System shall always be fixed through the reinforcement mesh and EPS insulation to the supporting wall, due to high wind-load pressure coefficients.

Positive wind load is transferred to the supporting wall directly via bearing and compression of the EPS insulation and System finishes. Negative wind load is resisted by the bond between the EPS insulation and the System finish reinforced with reinforcement mesh. The EPS insulation is retained by reinforcement mesh and mechanical fixings, which are fixed through reinforcement mesh and insulation or though the insulation only to the supporting wall.

Impact resistance

When tested for hard-body impact resistance, in accordance with EAD 040083-00-0404, the System is categorised as:

- System incorporating one layer of reinforcement mesh:
  - Use Category I: for dry dash, brick effect render and brick slip finishes;
  - Use Category II: for silicone finish.
- System incorporating two layers of reinforcement mesh:
  - Use Category I: for silicone finish.

The Use Categories in accordance with EAD 040083-00-0404 are as detailed below:

- I - a zone readily accessible at ground level to the public and vulnerable to hard-body impacts but not subjected to abnormally rough use;
- II - a zone liable to impacts from thrown or kicked objects, but in public locations where the height of the System will limit the size of the impact; or at lower levels where access to the building is primarily to those with some incentive to exercise care;
- III - a zone not likely to be damaged by normal impacts caused by people or by thrown or kicked objects.

The System achieves Use Category I and satisfies the requirement of School Output Specification Technical Annex 2C: External Fabric and Health Building Note 00-10 Part B: Walls and ceilings.

2.2.9 Fire performance

The System is classified as European Classification:

- B-s1, d0, in accordance with BS EN 13501-1, when incorporating brick slip finish;
- B-s2, d0, in accordance with BS EN 13501-1, when incorporating silicone, brick-effect render or dash finish.

For all buildings in Wales and Northern Ireland, and non-residential buildings in England, the System shall not be used on buildings with a storey of 18 m or more above ground level; the System can be used without any boundary restrictions. Refer to the relevant national Building Regulations for types of buildings and any exclusions that may apply.

For residential buildings in England, the System shall not be used on buildings with a storey of 11 m or more above ground level; the System can be used without any boundary restrictions. Refer to the relevant national Building Regulations for types of buildings and any exclusions that may apply.

For all buildings in Scotland, the System is restricted to buildings with no floor more than 11 m above ground level and not less than 1 m from the boundary. In such cases, the System may be excluded from the unprotected area calculation regardless of openings. Refer to the national Building Regulations for types of buildings and any exclusions that may apply.

The fire resistance of walls is based on the occupancy, size and use of a building and shall be a minimum of 30 minutes. It is then specified in 30-minute intervals thereafter.

Walls shall be designed and constructed to adequately resist the passage and penetration of fire.

In addition to the other EPS insulation fasteners normally specified, when applied to buildings of more than two storeys, the System shall include a minimum of one stainless steel fixing per m^2 of EPS insulation or one stainless steel fixing per insulation board, whichever is the lesser, fixed through the reinforcement mesh and the EPS insulation, as per the guidance in BRE Report 135 and BRE Defect Action Sheets 131 and DAS132.

For detailed conditions of use regarding requirements for supporting wall fire performance and fire barriers, fire stopping of service penetrations and combustibility limitations for other materials and components used in the overall wall construction, designers shall refer to the relevant national Building Regulations.

The System as an external envelope meets the requirement of:

- School Output Specification Technical Annex 2C: External Fabric;
- Health Building Note 00-10 Part B: Walls and ceilings;
- Health Technical Memorandum 05-02: Firecode;
- Zurich Municipal's 'School and academy design'.

Proximity of flues and appliances

The installed System shall be adequately separated from any chimney, heat producing appliance or incinerator flue pipe passing through a wall. Recommended means of separation are detailed in the Approved Documents supporting the national Building Regulations. Reference shall also be made to the NIA's 'Specification for the installation of external wall insulation ensuring the safety and operation of fuel burning appliances'.

2.2.10 Thermal performance

The System can assist in reducing the U-value of external walls. It is essential that detailing is carried out to a high standard if the ingress of water into the EPS insulation is to be avoided, and the full thermal benefit is to be obtained from the installation of the System. Any moisture penetration will affect thermal conductivity. The System is designed to minimise moisture penetration to the EPS insulation layer.

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 wall incorporating the System does not exceed the maximum U-value requirement given in the national Building Regulations.

The U-value of a completed wall construction will depend on the EPS insulation thickness, fixing method, type of mechanical fixing and insulating value of the supporting wall and its internal finish. For further improvement of the thermal performance of the building, the designer should consider additional insulation thickness or service measures.

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 the walls incorporating the System 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 thermal conductivity (λ_D) of the insulation - see Section 2.5.4.

Thermal bridging at junctions and around openings

Care shall be taken in the overall design and construction of junctions with other elements and openings to minimise cold bridging and air infiltration. Due consideration shall be given to INCA's 'External wall insulation specification for weathering and thermal bridge control - Guide'.

Guidance on linear thermal transmittance, heat flows and surface temperatures can be found in the documents supporting the national Building Regulations and in BS EN ISO 10211, BRE Information Paper 1/06, BRE Report 262, BRE Report 497, PAS 2030 and PAS 2035.

2.2.11 Durability

The service life durability of the System will be dependent upon the environment (operating conditions) in which it will be used. The expected service life durability will be in excess of 50 years.

The service life durability can be extended to 60 years by fixing the System through the mesh and insulation, using appropriate fixings, profiles, etc. and by following a bespoke extended repair and maintenance protocol as detailed in the Agrément Holder's instructions. The maintenance regime is detailed in Section 2.2.6.

Once installed, the System is not susceptible to damage from environmental conditions normally encountered in the UK. Under normal service conditions, the actual service life of the System may be considerably longer without significant degradation affecting its performance. The stated service life is not a guarantee but an indication of the expected economically reasonable service life of the System.

For projects requiring compliance with the School Output Specification Technical Annex 2C: External Fabric, the System has been assessed as having a service life in excess of 50 years, extendable to 60 years where the specified fixing, inspection, repair and maintenance provisions are implemented.

2.3 Examples of typical details

Diagram 1 - Typical build up detail

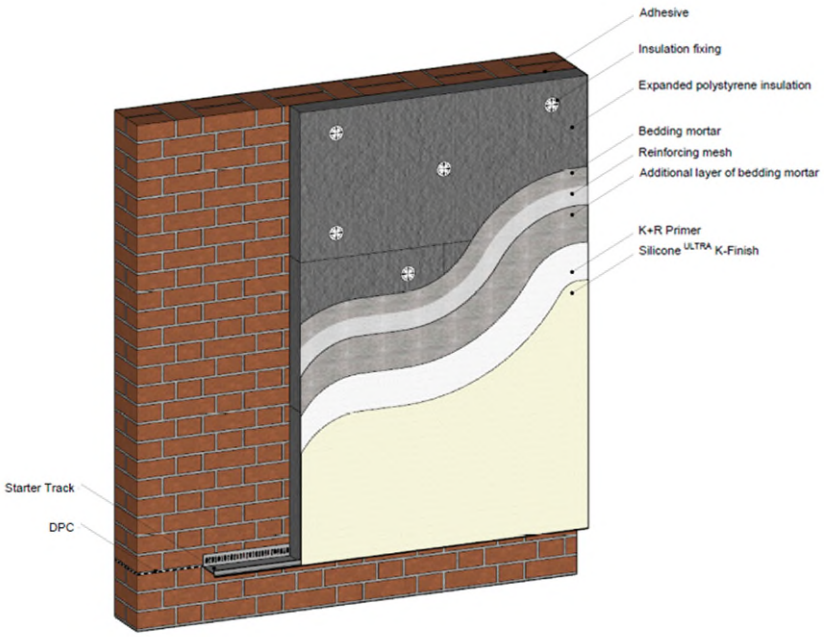


Diagram 2 - Typical application of the stainless steel fixings through the reinforced basecoat

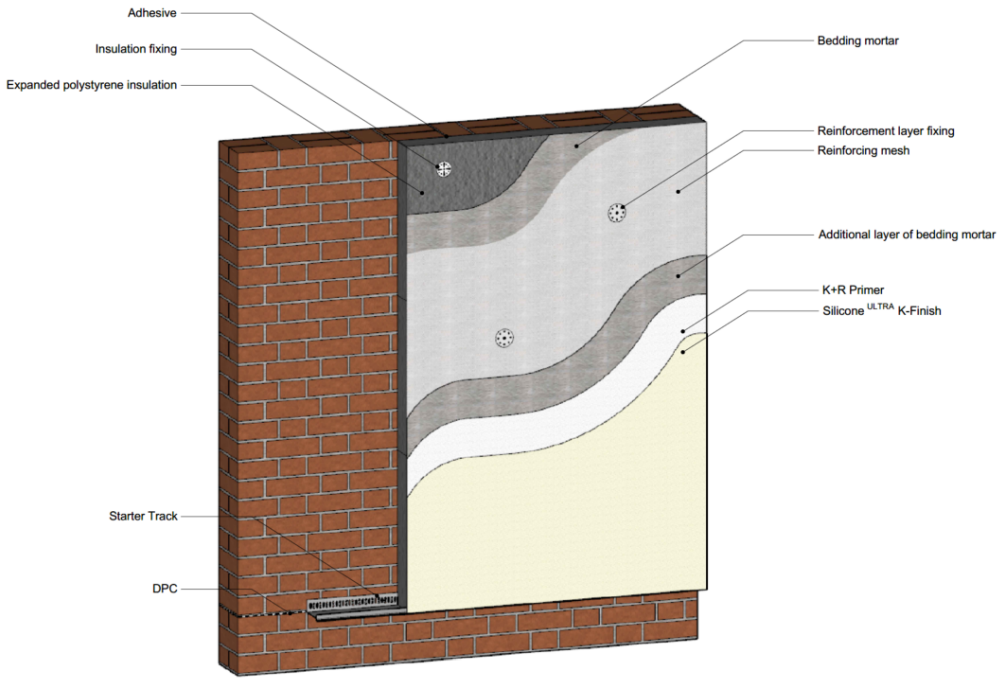


Diagram 3 - Typical standard base detail

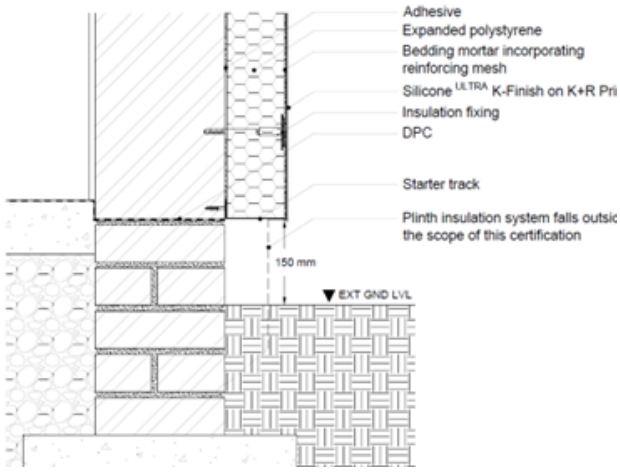


Diagram 4 - Typical overhanging eaves detail

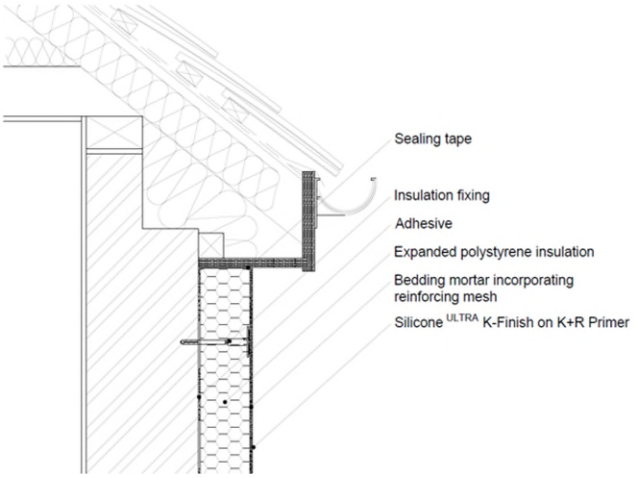
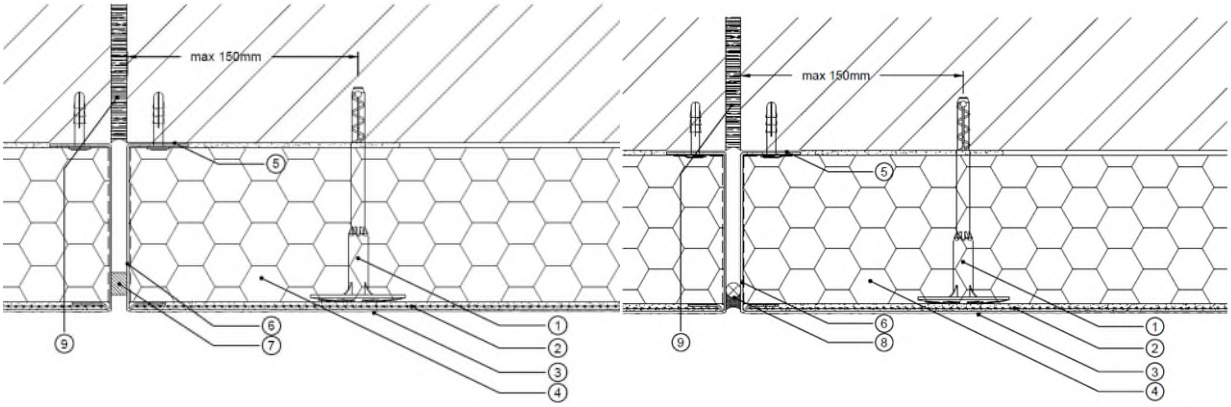


Diagram 5 - Typical vertical movement joint detail with joint tape or mastic seal



1. Mechanical fixings
2. Basecoat incorporating mesh
3. Permarock Decorative Finish
4. EPS insulation on adhesive
5. Continuous beads of Permarock silicone sealant to seal full system stop bead to wall face
6. Permarock Full System Stop Bead. Adjacent sections interconnected with Permarock Full System Joint Clips
7. Expansion joint tape
8. Proprietary backing rod and low modulus sealant
9. Construction movement joint

Diagram 6- Typical window head detail

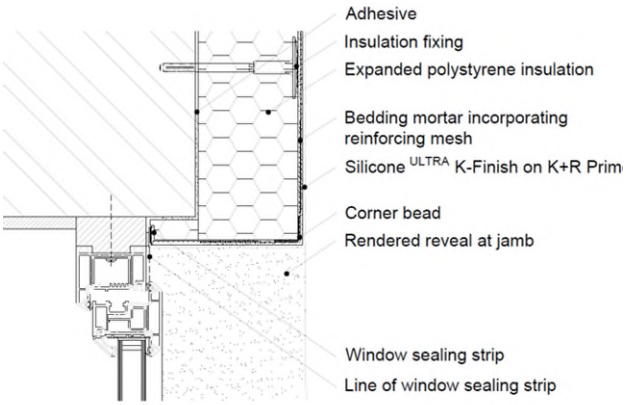


Diagram 7 - Typical cill detail

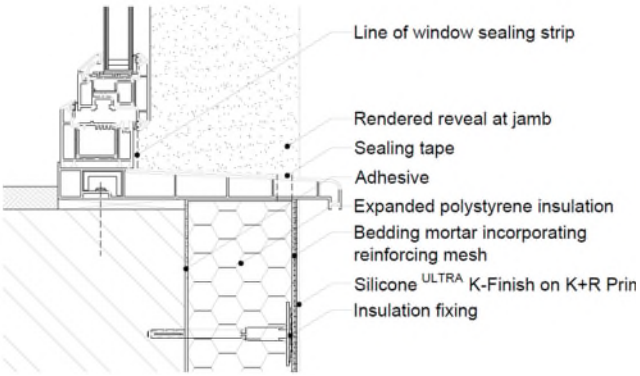


Diagram 8 - Typical window jamb detail

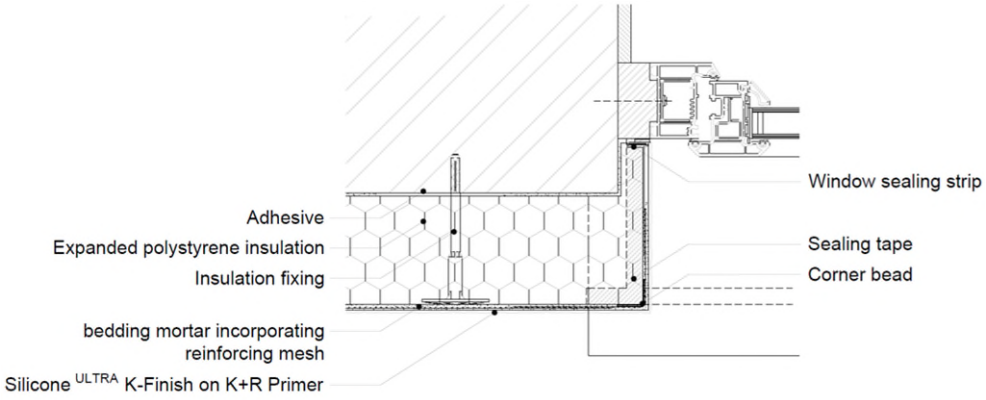
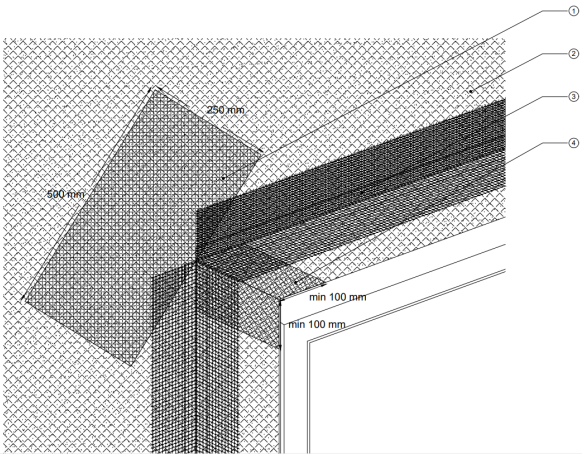
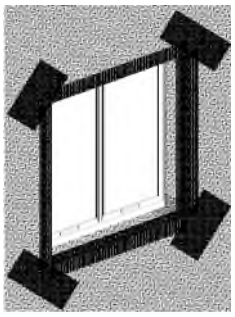


Diagram 9 - Typical opening stress patch detail





1. Reinforcement mesh stress patches (500 mm by 250 mm) at all corners of structural openings
2. Bedding mortar incorporating reinforcement mesh
3. Corner beads with reinforcement mesh
4. Reinforcement mesh at internal corner of reveal

2.4 Installation

The System 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. The Installation Manual may be subject to change; contact the Agrément Holder for the clarification of revisions.

2.4.1 Project-specific installation considerations

The project-specific design shall be determined from a pre-installation survey. The pre-installation survey shall confirm that the design works can be carried out for new buildings.

A specification shall be prepared for each elevation of the building indicating, where appropriate:

- DPC level, the position of base rail, water deflection beads/channels, expansion joints and weather seals;
- Detailing around windows, doors, etc.;
- Location of fire barriers installed in line with compartment walls and floors;
- Identification of:
    - Services and any fittings requiring removal or alteration to facilitate installation of the System;
    - Areas where silicone/flexible sealants shall be used.

This process includes fixing pull-out tests of the supporting wall according to the Construction Fixings Association Guidance Note 'Procedure for site testing construction fixings', to determine pull-out strength values. The characteristic resistance of fixings shall be subject to the partial factor, as advised by the System designer and the Agrément holder. The design pull-out resistance strengths of the supporting wall and EPS insulation anchor fixings shall be checked by a competent person and evidenced to be adequate before installation of the System.

Subsequent project-specific design considerations include confirmation that:

- There is no existing rising damp and there are no signs of damp on the inner face of the supporting wall, other than those caused solely by condensation;
- Existing walls are:
    - Structurally sound, in a good state of repair and show no evidence of rain or frost damage;

- Watertight, clean and meet the requirements of the relevant Standards and national Building Regulations for airtightness.

2.4.2 Preparation

The following works shall be undertaken before installing the System:

- The supporting wall shall be finished and free from protrusions and uneven jointing;
- Make any necessary repairs or modifications (e.g. removal of fittings which can be relocated after the System is installed);
- The roof shall be in place and window and door openings shall be sealed;
- Surfaces shall be clean, dry and free from dirt, grease, oils, solvents and loose particles;
- Flues, chimneys and combustion air ventilators shall be continuously sleeved through the wall. Reference shall be made to CIGA's 'Technician's guide to best practice: Flues, chimneys and combustion air ventilators';
- Supports for services/fittings, e.g. soil pipes, shall be fixed back to the supporting wall; no load is to be transferred to the System;
- External power cables concealed in trunking shall be well labelled with warning signs. Cables shall be adequately rated in accordance with BS 7671;
- Where required, extend beyond the surface and securely refix external soil stacks, wastewater pipes, overflows, ducts and vent pipes;
- Mix the adhesive (for bonding the EPS insulation to the supporting wall) in accordance with the Agrément holder's recommendations;
- Roofs/copings shall have sufficient overhang at eaves, verges and parapets.

2.4.3 Outline installation procedure

Detailed installation procedures can be found in the Agrément Holder's Installation Manual.

The outline procedure is as follows:

- Fix the starter track horizontally to the base of the wall above DPC level, or 150 mm above ground level with fixings at maximum 300 mm centres;
- Apply adhesive to the EPS insulation boards to satisfy the minimum bonded area requirements;
- Position the EPS insulation boards on starter track and bond to the substrate; ensuring it is tightly butt-jointed and that a staggered bonding pattern is adhered to;
- Continue with additional EPS insulation boards, ensuring no edge or piece of insulation is smaller than 200 mm; L-shaped EPS insulation boards shall be placed on corners of windows and doors;
- Mechanically fix the EPS insulation boards into the supporting wall as follows:
  - For a service life of 50 years, apply the mechanical fixings in accordance with the fixing pattern;
  - For an extended service life of 60 years, apply the initial mechanical fixings;
- Fit ancillary materials or accessories in accordance with the project-specific design or specifications;
- Apply a layer of basecoat to the entire surface of the EPS insulation boards and bed reinforcing mesh into the wet basecoat, ensuring joints are overlapped by a minimum of 100 mm;
- Apply 250 mm by 500 mm reinforcing mesh patches at the corners of wall/door openings;
- For an extended service life of 60 years or multistorey buildings (from the second storey and above, where 50-year service life applies), apply stainless steel mechanical fixings through the reinforcement mesh and EPS insulation boards to the supporting wall, in accordance with the fixing pattern, and apply 150 mm by 150 mm mesh patches over fixing heads and fully encapsulate the mesh patches into the basecoat;
- For silicone finish, a second layer of basecoat is required prior to application of the finish;
- For silicone and brick slip finishes, primer is applied onto the basecoat prior to application of the finish;
- Apply System finishes as follows:
  - For silicone finish, apply silicone finish and rub down the material to the particle grain size;
  - For brick slip finish, adhesive is applied onto the primed basecoat prior to the application of the brick slips; apply pointing mortar between the joints of the brick slips;
  - For dry dash finish, apply Permarock Dashing Mortar and if required apply Permarock Dashing Stone;
  - For brick-effect render, apply a 6 to 8 mm thick Permarock Brick-effect Render Base Layer. Once the base layer has started to stiffen, apply a 3 to 5 mm thick layer of Permarock Brick-effect Render Face Layer onto the base layer; once it has stiffened, create the required Brick-effect pattern accordingly.

2.4.4 Finishing

The following finishing is required on completion of the installation:

- Check all trunked air vents and flues (by an appropriate test if necessary) to verify that they are clear and unobstructed;
- Where a proprietary window sealing strip has not been employed, apply mastic sealant around windows, door frames, etc., and where the installation abuts any other building or surface, to ensure a weathertight joint.

Post-installation inspection checks shall be carried out to ensure that the installation has been successfully completed and that the building has not been damaged. These shall be conducted as soon as possible after completion of the work and before removing scaffolding; any defects shall be reported immediately.

2.5 Independently assessed System characteristics

2.5.1 Moisture control

Test	Standard	System finish	Result
Hygrothermal conditioning	EAD 040083-01-0404	Silicone finish	No defects
		Dash finish	
		Brick slips	
		Brick-effect render	
Freeze-thaw conditioning	EAD 040083-01-0404	Dash finish	No defects
		Brick effect render	
Water vapour diffusion resistance, S_d	BS EN ISO 7783	Silicone finish	0.58 m
		Dash finish	0.42 m
		Brick slips	0.70 m
		Brick-effect render	0.37 m

2.5.2 Strength

Test	Standard	System finish	Result
Hard-body impact resistance (with one layer of reinforcement mesh)	EAD 040083-00-0404	Dash finish	Use Category I
		Brick slips	
		Brick-effect render	
		Silicone finish	Use Category II
Hard-body impact resistance (with two layers of reinforcement mesh)		Silicone finish	Use Category I

Test	Standard	Component	Result
Compressive stress at 10 % deformation	BS EN 13163	Permarock EPS Premium	70 kPa
Tensile strength			110 kPa

2.5.3 Fire performance

Test	Standard	System finish	Result
Reaction to fire	BS EN 13501-1	Brick slips	B-s1, d0
		Silicone finish	B-s2, d0
		Dash finish	
		Brick-effect render	

2.5.4 Thermal performance

Test	Standard	Component	Result
Thermal conductivity (λ_D)	BS EN 12667	Permarock EPS Premium	0.030 W/m.K

3 Regulations and third-party acceptance

3.1 Regulations

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

- The Construction (Design and Management) Regulations 2015.
- The Construction (Design and Management) Regulations (Northern Ireland) 2016.
- The Construction Products Regulation (EU 305/2011) and The Construction Products (Amendment) Regulations 2025 (SI 2025/1172).

3.2 National Building Regulations

In the opinion of Kiwa Ltd., the System, if installed and used in accordance with Section 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

- A1 Loading - the System can sustain and transmit combined dead and wind loads to the supporting wall
- B4(1) External fire spread - the System can adequately resist the spread of fire over walls and from one building to another
- C2(b) Resistance to moisture - the System can adequately protect the building from precipitation, including wind-driven spray
- C2(c) Resistance to moisture - the System can adequately protect the building from interstitial and surface condensation
- L1(a)(i) Conservation of fuel and power - the System can contribute to limiting heat gains and losses through walls
- Regulation 7(1) Materials and workmanship - the System is manufactured from suitably safe and durable materials for their application, and can be installed to give a satisfactory performance
- Regulation 23 Requirements relating to thermal elements - the System can contribute to walls 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 for new dwellings - the System can contribute to satisfying this Requirement
- Regulation 26C Target primary energy rates for new buildings - the System can contribute to satisfying this Requirement

3.2.2 Wales

The Building Regulations 2010 and subsequent amendments

- A1 Loading - the System can sustain and transmit combined dead and wind loads to the supporting wall
- B4(1) External fire spread - the System can adequately resist the spread of fire over walls and from one building to another
- C2(b) Resistance to moisture - the System can adequately protect the building from precipitation, including wind-driven spray
- C2(c) Resistance to moisture - the System can adequately protect the building from interstitial and surface condensation
- L1(a)(i) Conservation of fuel and power - the System can contribute to limiting heat gains and losses through walls
- Regulation 7(1) Materials and workmanship - the System is manufactured from suitably safe and durable materials for their application, and can be installed to give a satisfactory performance
- Regulation 23 Requirements relating to thermal elements - the System can contribute to walls 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 Primary energy rates for new buildings - the System can contribute to satisfying this Requirement
- Regulation 26B Fabric performance values for new dwellings - the System can contribute to satisfying this Requirement
- Regulation 26C Energy efficiency rating - the System can contribute to satisfying this Requirement

3.2.3 Scotland

The Building (Scotland) Regulations 2004 and subsequent amendments

- Regulation 8(1)(2) Durability, workmanship and fitness of materials - The System is manufactured from acceptable materials and is adequately resistant to deterioration and wear under normal service conditions
- Regulation 9 Building standards applicable to construction:
    - 1.1 Structure - the System can sustain and transmit combined dead and wind loads to the supporting wall
    - 2.6 Spread to neighbouring buildings - the System can inhibit the spread of fire to neighbouring buildings
    - 2.7 Spread on external walls - the System can inhibit the spread of fire on external walls
    - 2.8 Spread from neighbouring buildings - the System can inhibit the spread of fire to the building
    - 3.10 Precipitation - the System can resist precipitation penetrating to the inner face of the building
    - 3.15 Condensation - the System can be designed and constructed to inhibit surface or interstitial condensation
    - 6.2 Buildings insulation envelope - the System can contribute to satisfying this Requirement
    - 7.1(a)(b) Statement of sustainability - the System can contribute to meeting the relevant Requirements of Regulation 9, Standards 1 to 6, and therefore will contribute to a construction meeting a bronze level of sustainability as defined in this Standard. In addition, the System can contribute to a construction meeting a higher level of sustainability, as defined in this Standard
- Regulation 12 Building standards applicable to 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) and clause 0.12 of the Technical Handbook (Non-Domestic)

3.2.4 Northern Ireland

The Building Regulations (Northern Ireland) 2012 and subsequent amendments

- 23(1)(a)(i)(ii)(iii)(b) Fitness of materials and workmanship - the System is manufactured from materials which are suitably safe and acceptable as described in this Agrément
- 28(b) Resistance to moisture and weather - the System can be constructed to prevent the passage of moisture from the weather
- 29 Condensation - the System can be designed and constructed to prevent interstitial condensation
- 30 Stability - the System can sustain and transmit combined dead and wind loads to the supporting wall
- 36(a) External fire spread - the System can adequately resist the spread of fire over walls and from one building to another
- 39(a)(i) Conservation measures - the System can contribute to limiting heat gains and losses through walls
- 40(2) Target CO_2 emission rate - a wall incorporating the System shall be designed and constructed as not to exceed its target CO_2 emission rate
- 43 Renovation of thermal elements - the renovation work carried out to ensure a wall complies with requirement 39(a)(i)

3.3 Third-party acceptance

In the opinion of Kiwa Ltd. if installed, used, and maintained in accordance with this Agrément, this System can satisfy the appropriate structural, fire, moisture, thermal, acoustic and durability requirements of a Structural Warranty provider. Please contact the relevant Structural Warranty provider to ascertain their project specific design requirements and to confirm their acceptance on a case-by-case basis.

4 Sources

- BS EN ISO 6946:2017 Building components and building elements. Thermal resistance and thermal transmittance. Calculation methods
- BS EN ISO 7783:2018 Paints and varnishes. Determination of water-vapour transmission properties. Cup method
- BS EN ISO 9001:2015+A1:2024 Quality management systems. Requirements
- 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 573-3:2019+A2:2023 Aluminium and aluminium alloys - Chemical composition and form of wrought products Chemical composition and form of products
- BS EN 998-1:2016 Specification for mortar for masonry. Rendering and plastering mortar
- BS EN 1991-1-4:2005+A1:2010 Eurocode 1. Actions on structures. General actions. Wind actions
- BS EN 1992-1-1:2004+A1:2014 Eurocode 2: Design of concrete structures. General rules and rules for buildings
- BS EN 1996-1-1:2005+A1:2012 Eurocode 6. Design of masonry structures. General rules for reinforced and unreinforced masonry structures
- BS EN 1996-2:2006 Eurocode 6. Design of masonry structures. Design considerations, selection of materials and execution of masonry
- BS EN 10088-2:2024 Stainless steels. Technical delivery conditions for sheet/plate and strip of corrosion resistant steels for general purposes
- 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 13163:2012+A2:2016 Thermal insulation products for buildings. Factory made expanded polystyrene (EPS) products. Specification
- BS EN 13501-1:2007+A1:2009 Fire classification of construction products and building elements. Classification using test data from reaction to fire tests
- BS EN 13914-1:2016 Design, preparation and application of external rendering and internal plastering. External rendering
- BS EN 16382:2026 Thermal insulation products for building applications - Determination of the pull-through resistance of plate and spiral plate anchors through thermal insulation
- 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 7671:2018/A3:2024 Requirements for Electrical Installations. IET Wiring Regulations
- BS 8000-0:2014+A1:2024 Workmanship on construction sites. Introduction and general principles
- BS 8000-2.2:1990 Workmanship on building sites - Code of practice for concrete work - Sitework with in situ and precast concrete
- BS 8000-3: 2020 Workmanship on building sites - Code of practice for masonry
- BS 8104:1992 Code of practice for assessing exposure of walls to wind-driven rain
- BRE Information Paper 1/06:2006 Assessing the effects of thermal bridging at junctions and around openings
- BRE Defect Action Sheet 131:1989 External walls: combustible external plastics insulation: horizontal fire barriers
- BRE Defect Action Sheet 132:1989 External walls: external combustible plastics insulation: fixings
- BRE Report 135:2013 Fire performance of external thermal insulation for walls of multistorey buildings
- BRE Report 262:2002 Thermal insulation: avoiding risks
- BRE Report 443:2019 Conventions for U-value calculations
- BRE Report 497:2016 Conventions for calculating linear thermal transmittance and temperature factors
- CIGA Technician's guide to best practice: Flues, chimneys and combustion air ventilators:2016
- Construction Fixings Association Guidance note:2012 Procedure for site testing construction fixings
- Department of Education:2023 School Output Specification - Technical Annex 2C: External fabric
- Department of Health:2013 Health Building Note 00-10 Part B: Walls and ceilings
- Department of Health:2015 Health Technical Memorandum 05-02: Firecode - Guidance in support of functional provisions (Fire safety in the design of healthcare premises)
- EAD 330196-01-0604:2017 Plastic anchors made of virgin or non-virgin material for fixing of ETICS with rendering
- EAD 040083-00-0404:2019 External thermal insulation composite systems (ETICS) with rendering
- EAD 040083-01-0404:2024 External thermal insulation composite systems with rendering system
- EOTA TR 051:2018 Recommendations for job site tests of plastic anchors and screws
- INCA:2019 External wall insulation specification for weathering and thermal bridge control - Guide

- NIA Specification for the installation of external wall insulation ensuring the safety and operation of fuel burning appliances:2017
- PAS 2030:2023 Specification for the installation of energy efficiency measures in existing dwellings
- PAS 2035:2023 Retrofitting dwellings for improved energy efficiency. Specification and guidance
- PD 6697:2019 Recommendations for the design of masonry structures to BS EN 1996-1-1 and BS EN 1996-2
- Zurich Municipal 2014- School and academy design: A guide to the design and protection of school and academy buildings

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.

5 Amendment history

Revision	Amendment description	Author	Approver	Date
-	First issue	A Chapman	C Devine	February 2025
A	Update to Fire Performance	A Chapman	C Devine	March 2025
B	Update to fixing methods for increased durability	P Karakasi	C Devine	August 2026
C	Updates to Durability, alignment with EAD 040083-01-0404; migration to new Agrément template	M Haring	C Devine	20/10/2026

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 Kiwa 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 System specification or constituent elements/components after initial publication of this Kiwa Agrément.

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