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BAW-18-041-S-A-UK
BDA Agrément®
Cavity System 2 MW EWI Render Cladding System

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SCOPE

This Agrément relates to the Cavity System 2 (CS2) MW EWI Render Cladding System (hereinafter the "System"). The System is a mechanically fixed, external wall insulation (EWI) mineral wool (MW) insulated twin-sheathing board, render cladding system. The System is suitable for installation on external sheathed light gauge steel frame (LGSF) supporting walls and has a drained cavity behind the outer CS2 secondary sheathing boards. For use on existing or new, residential and non-residential high-rise buildings up to and over 18 m in height in the UK. The System can be designed for a 30 or 60-year service-life durability as required.

DESCRIPTION

CS2 Fillet Strips are vertically orientated and fixed into the primary sheathing boards, which are the outer face of the LGSF supporting wall. This forms a minimum 15 mm drained cavity between the primary and CS2 secondary sheathing boards (which are mechanically fixed through the CS2 Fillet Strips into the primary sheathing boards). MW insulation in slab form mechanically fixed through the plastic-coated glass-fibre reinforcing mesh embedded in the basecoat layer, into the CS2 secondary sheathing boards. The System is completed with one of two available render finishes.

SYSTEM ILLUSTRATION

THIRD-PARTY ACCEPTANCE

None requested by the Agrément holder.

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

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Kiwa Ltd. Technical Director

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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 performance of external walls and can contribute to satisfying the requirements of the national Building Regulations (see section 2.1.10).

Strength - the System has adequate strength and is designed to adequately resist impact damage and wind loads encountered in the UK (see section 2.1.10).

Moisture control - the System:

- can contribute to limiting the risk of interstitial and surface condensation;
- has adequate water vapour transmission resistance;
- will resist wind-driven rain penetration across the drained cavity between the primary and CS2 secondary sheathing boards;
- is resistant to moisture and humidity changes in normal occupation and use (see section 2.1.10).

Behaviour in relation to fire - the System is classified as Euroclass A2-s1, d0 according to BS EN 13501-1 (see section 2.1.10).

Durability - when installed and maintained in accordance with the Agrément holder's recommendations and this Agrément, will System will have a service-life durability of at least 30 years. The service-life durability can be extended to 60 years, if all fixings and fully exposed beads, trims, and profiles are specified as austenitic stainless-steel and the System is subject to a suitable inspection regime and is properly maintained accordingly (see section 2.1.8).

CE marking - The product manufacturers have taken responsibility for CE marking of the products 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 product manufacturer's Declaration of Performance (DoP).

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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 relevant DoPs, test reports, technical literature and factory and site visits. Factory Production Control has been assessed.

1.1.4 Installation supervision
It is recommended that the quality of installation and workmanship is controlled by the Agrément holder.

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 enough 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.

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CHAPTER 2 - TECHNICAL ASSESSMENT

2.1 - POINTS OF ATTENTION TO THE SPECIFIER

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

In circumstances where the Agrément holder generates the final project specific design, the Agrément holder retains full design responsibility unless the design is subsequently modified by others.

2.1.2 Applied building physics (heat, air, moisture)
The physical behaviour of 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 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
A project specific design is required. This should be done in close co-operation with the Agrément holder.

This Agrément covers the use of the System in any exposure zone in accordance with BS 8104.

The System should be installed above damp-proof course (DPC) level and a minimum of 150 mm above ground level.

Internal wet work (e.g. screed or plastering) should be completed and allowed to dry prior to the application of the System.

Assessment of the structural performance of the System should be carried out by the Agrément holder to confirm that the System can resist the design impact and wind loads, can safely transfer loads to the building and can accommodate all anticipated thermal movements without damage.

The sheathing board in the LGSF supporting wall must be a minimum of 9 mm thick.

Sheathing boards must be weather resistance Category A or B and bending strength class 2 or 3 in accordance with BS EN 12467. The boards must be A1 reaction to fire classification according to BS EN 13501-1.

New buildings should incorporate suitably deep window cills to adequately shed water clear of the System.

Rendered walls shall be detailed to reduce the risk of damage due to movement in the sheathed LGSF supporting wall, taking into consideration differential movement in dissimilar materials.

Properly constructed 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) should be carried through the System using movement beads of PVC, powder coated galvanised steel or stainless steel. Expansion joints should be provided at 7.5 m intervals when the length of the wall exceeds 12 m.

Examples of relevant detailing for external cladding systems with a drainage cavity used with LGSF can be found in SCI Publication P343.

The System's service-life durability can be extended to 60 years by using mechanical fixings and fully exposed beads, trims and profiles made of austenitic stainless-steel.

2.1.4 Project specific design considerations
A site assessment check and suitability survey must be conducted prior to installation, to the Agrément holder's specification.

During the assessment and survey, fixing pull-out strength (KN) tests must be conducted on the supporting wall surface in accordance with EOTA TR 051 and EAD 330196-01-0604. This assists in determining the type, size and minimum number of fixings required for each MW insulation slab. When using pull out data for fixings, the material safety factor γm must be considered.

Horizontal and vertical movement joints must be part of the project specific design and must be carried through the System using movement beads of plastic, galvanised or austenitic stainless-steel as appropriate.

The project specific design must ensure that:
- the System attachment to the substrate wall has adequate fixing pull-out capacity for the calculated wind loads;
- thermal expansion effects of the supporting wall and the System are taken into consideration in the design and detailing;
- the number of fixings per m^2 required through the System reinforcing mesh must be equal to or greater than that needed to achieve the required project specific design wind load.

A project specific condensation risk analysis shall be carried out in accordance with BS 5250 to minimise the risk of surface and interstitial condensation.

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

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.

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2.1.6 Installer competence level
The Agrément holder operates an Approved Installer Scheme for this System under which the installers are approved, registered and regularly reviewed by the Agrément holder to demonstrate that they are competent to carry out installations of the System in accordance with this Agrément. Approved Installers are fully responsible for their quality control for each installation of the System that they undertake.

2.1.7 Delivery, storage and site handling
The System components are delivered to site in a mixture of packets, boxes, bales and tubs, palletised and wrapped in plastic, as necessary.

Materials and products shall be protected and stored in a satisfactory manner to prevent damage, distortion, uneven weathering and degradation.

Components should be handled with care to avoid damage and should be kept in dry frost-free conditions, stored off the floor in ventilated areas, and should not be exposed to direct sunlight for prolonged periods.

Beads, trims and other profiles are supplied in varying lengths and must be stored flat to prevent buckling. To avoid bi-metallic corrosion, aluminium, galvanised steel or austenitic stainless-steel components should not be stored together. Do not use damaged, soiled or saturated System components.

The System packaging bears the System name, the Agrément holder's name and the BDA Agrément® logo incorporating the number of this Agrément.

2.1.8 Durability
The System is comprised of durable materials and products that are adequately resistant to deterioration and wear in normal service conditions. There is no mould risk to any component in the System.

The System is stable to pulsating load, temperature variation, humidity, shrinkage and/or swelling, freeze-thaw cycles, immersion in water, chemical and biological attacks, corrosion and UV radiation.

All components retain their properties during the overall service life of the System under normal conditions of use and maintenance.

The render finish contains a safe level of anti-fungicide to resist the growth of most fungi and algae found in the UK. It has a high resistance to dirt retention, rot and is non-swelling and UV-stable.

The service-life durability of the System will depend on the building location and height, degree of exposure, detailing, use of the building and maintenance and repairs being carried out. If there is regular inspection, maintenance and any defects are promptly repaired in accordance with the Agrément holder's recommendations, the System will have a working service-life durability of at least 30 years.

The System's service-life durability can be extended to 60 years by using mechanical fixings and fully exposed beads, trims and profiles made of austenitic stainless-steel. Components manufactured from uPVC in sheltered locations and not subject to direct UV light exposure do not need substitution with austenitic stainless-steel materials.

The render finish is compatible with the MW insulation and minimises the risk of de-bonding, cracking and crazing.

2.1.9 Maintenance and repair
The project specific design must incorporate appropriate access arrangements for cleaning, inspection, maintenance and repair.

The maintenance schedule for the installed System must include regular visual inspection of the System for:
- signs of damaged areas and cracks in the render exceeding 0.2 mm;
- sealant around openings and service entry points;
- external plumbing and fittings, gutter and drain pipes to confirm that they are performing properly.

The render finish may become discoloured by algae and lichens in wet areas. Cleaning with fresh warm water and light brushing 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.

Any damage should be repaired immediately in accordance with BS EN 13914-1 and the Agrément holder's Maintenance and Repair Manual.

Replace failed elements such as sealants, joint seals and corroded materials to ensure that water ingress does not occur.

Where required, a project specific 60-year service-life durability maintenance plan must be prepared. As a minimum, this should include an inspection for evidence of defects twelve months after the original installation and subsequently, every five years.

2.1.10 Performance factors in relation to the Major Points of Assessment
Thermal performance
The System can assist in reducing the thermal transmittance (U-value) of external walls. It is essential that detailing is carried out to a high standard if the ingress of water into the MW 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, but the thermal value will recover when the MW insulation dries out. The System is designed to minimise moisture penetration to the MW insulation layer.

Care must be taken in the overall design and construction of junctions with other elements and openings to minimise cold bridging and air infiltration. Due consideration should be given to the Government Accredited Construction Details.

Guidance on linear thermal transmittance, heat flows and surface temperatures can be found in the documents supporting the national Building Regulations and BS EN ISO 10211, BRE Information Paper IP1/06, BRE Report 262, BRE Report 497 and PAS 2030.

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 wall incorporating the System does not exceed the maximum and target U-values given in the national Building Regulations.

The U-value of a completed wall construction will depend on the MW insulation thickness, degree of ventilation to the drained cavity, fixing method, type of fixing and the insulating value of the supporting wall and its internal finish.

For 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 should 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 declared thermal conductivity (λ_D) of the MW insulation.

Strength
The sheathed LGSF supporting wall must have enough strength to withstand all dead loads from wind, racking, and self-weight of the System; and temporary loads that may be applied when installing the System. The strength of the LGSF supporting wall must be verified by a suitably qualified engineer.

Wind loads must be calculated for each specific project in accordance with BS EN 1991-1-4 and the CS2 Fillet Strip layout and fixing pattern must be designed accordingly.

CS2 Fillet Strips should be fixed into the existing LGSF supporting wall and must achieve a minimum pull-out strength resistance of 0.7 KN.

For wind loads > 1.5 KN/m^2, extra fixings may be required.

Positive wind load is transferred to the LGSF supporting wall directly via compression of the finished MW insulation and sheathing boards. Negative wind load is resisted by the mechanical fixings through the reinforcing mesh, sheathing boards and CS2 Fillet Strips and the bond between the basecoat and the render finish.

High Impact Mesh must be part of the design for wall areas that may be subject to high risk of impacts e.g. wall zones adjacent to pedestrian trafficked areas.

The basecoat has a high level of adhesion strength.

The MW insulation has adequate compressive strength to withstand:
- soft body impact to 300 J in accordance with ISO 7892;
- Category II hard body impact resistance for render coatings with High Performance (Standard) Mesh (minimum 160 g/m^2), after hygrothermal conditioning in accordance with ETAG 004 (for use in a zone liable to impacts from thrown or kicked objects, but in public locations where the height of the ETICS 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).

High Impact Mesh (Armour) mesh (minimum 370 g/m^2) has a higher impact resistance than the High Performance (Standard) Mesh (minimum 160 g/m^2).

Moisture Control
The System design must be suitably detailed to resist the penetration of water and wind and must allow water vapour to pass outwards from the core of the building.

Hygrothermal performance:
- the System has adequate hygrothermal resistance to heat-rain and freeze-thaw cycling in accordance with ETAG 034, ETAG 004 and BS EN 16383;
- the System has adequate resistance to moisture and humidity changes in accordance with ETAG 004.

Condensation risk:
- 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.

Surface condensation:
- the System can adequately limit the risk of surface condensation on internal walls when the thermal transmittance (U-value) of the wall does not exceed the maximum values given in the national Building Regulations.

Interstitial condensation:
- the 'dew' point position of a project specific design must be calculated to check that warm vapour transmitting through the supporting wall, from an internal space, will continue to pass through to the outer surface of the external wall;
- to avoid possible problems from interstitial condensation in walls, care must be taken in the design of rooms expected to have high humidity.

Water vapour transmission:
- the System is classed as breathable and allows the passage of water vapour to the outside. The LGSF should be suitably designed with vapour control layers (VCLs) and breather membranes to suit the building use.

Weather-tightness:
- the System can improve the weather resistance of existing external sheathed LGSF supporting walls;
- the System has adequate resistance to driving rain under pulsating air pressure in accordance with BS EN 12865 and BS EN 1027. Any moisture entering the System through poor detailing, inadequate seals or defective details will collect in the cavity behind and will be removed by natural gravity drainage and ventilation.

Moisture penetration:
- the sheathing boards and basecoat have a high resistance to water absorption if wetted. The System finish layer is water repellent;
- the System has a low propensity for water absorption by capillary action after hygrothermal conditioning in accordance with ETAG 004.

The insulation base track shall have a minimum open area of 600 mm^2/linear metre run of wall to allow any residual trapped moisture from construction to escape. The openings in the insulation base track shall be small enough to prevent the ingress of birds, animals or small insects and must be kept free of obstructions.

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The cavity rail (the L-shaped profile at the bottom of the cavity between the two sheathing boards) shall have a minimum of 600 mm²/linear metre run of wall to allow effective drainage.

Drainage openings at the heads of design features such as windows and doors should be considered to allow any residual trapped moisture from construction to escape.

Behaviour in relation to fire
Cavity fire barriers must be installed in line with compartment walls and floors, as advised in BRE Report 135 and as required under the national Building Regulations. Materials used for cavity barriers and firestops shall be capable of producing adequate resistance to fire and smoke. Intumescent strips must be applied behind each fire barrier.

The System must include a minimum of one stainless steel fixing (to the Agrément holder's specification) per/m² of MW insulation, or per insulation batt, whichever is the lesser, fixed through the reinforcing mesh and MW insulation, in addition to the other MW insulation fasteners normally specified.

The System is classified as Euroclass A2-s1, d0 in accordance with BS EN 13501-1.

2.2 - EXAMPLES OF DETAILS

Figure 1 - External corner detail

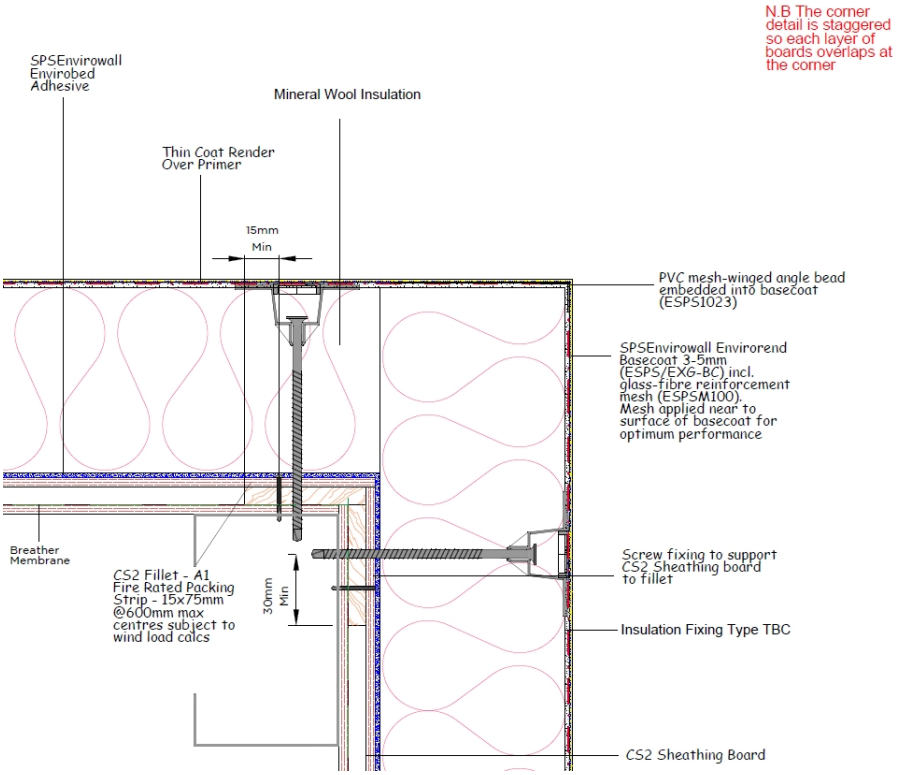


Figure 2 - Horizontal firebreak detail - plan view

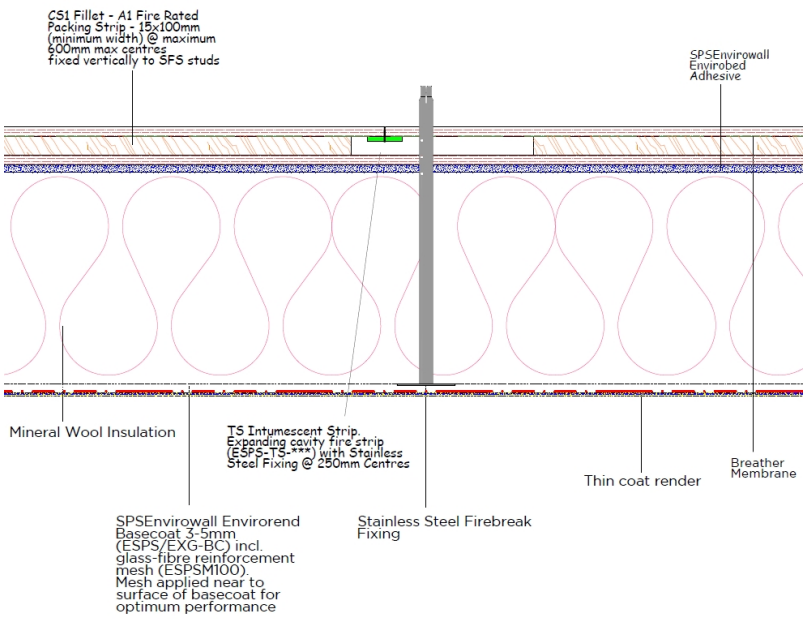


Figure 3 - Window reveal detail

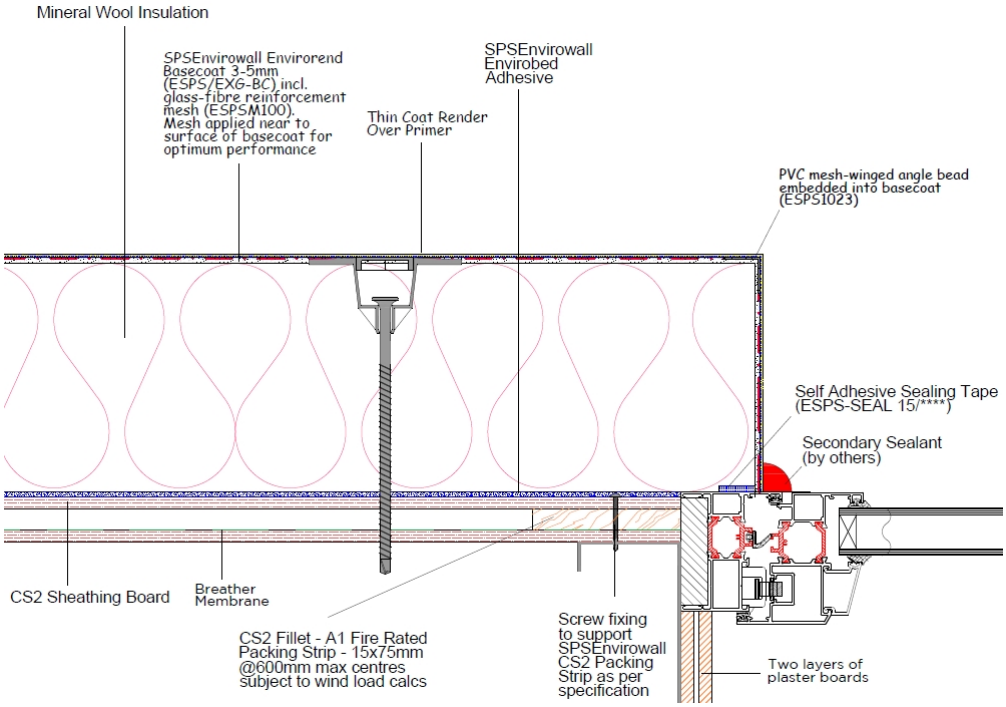


Figure 4 - Vertical firebreak detail

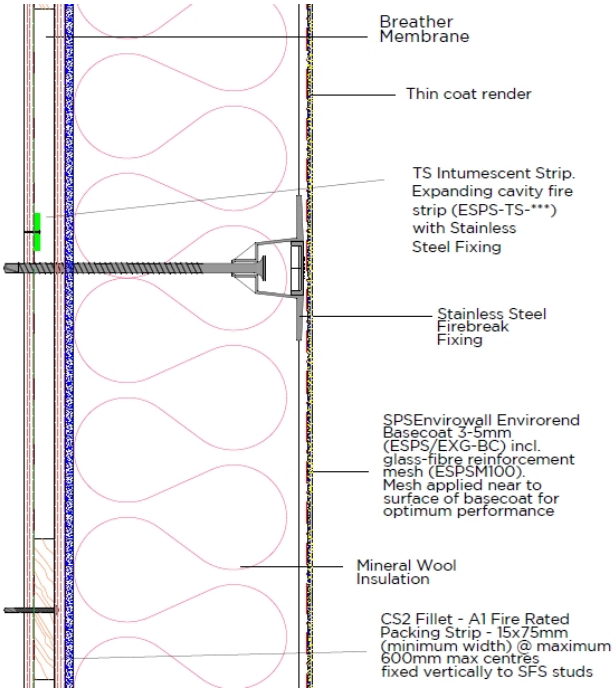


Figure 5 - Window head detail

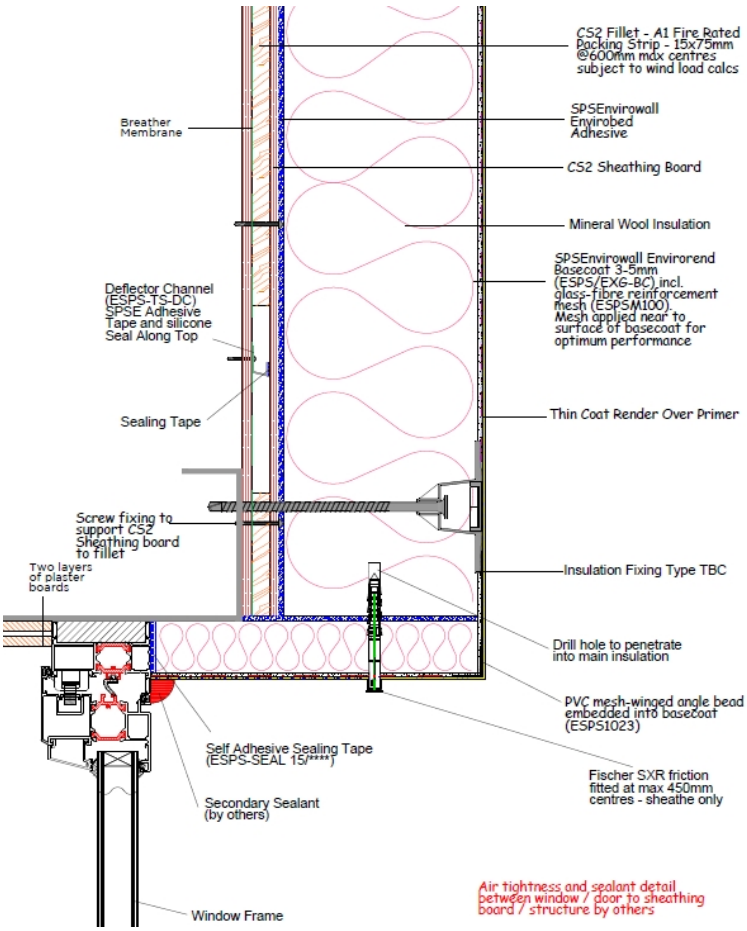


Figure 6 - Horizontal movement joint detail

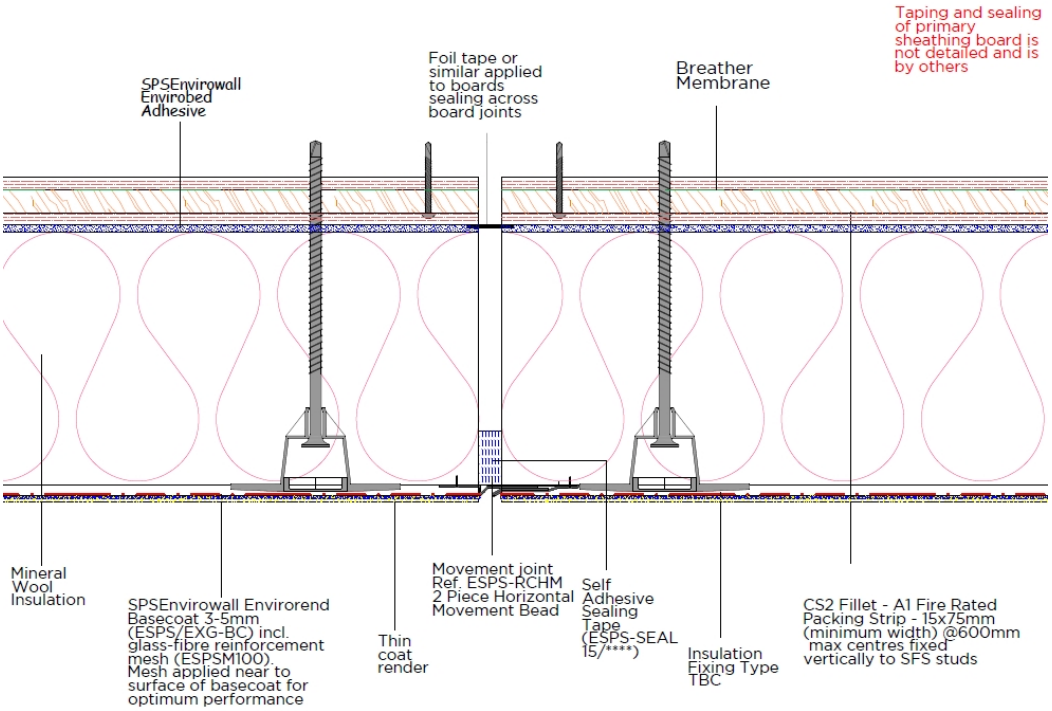


Figure 7 - Window cill detail

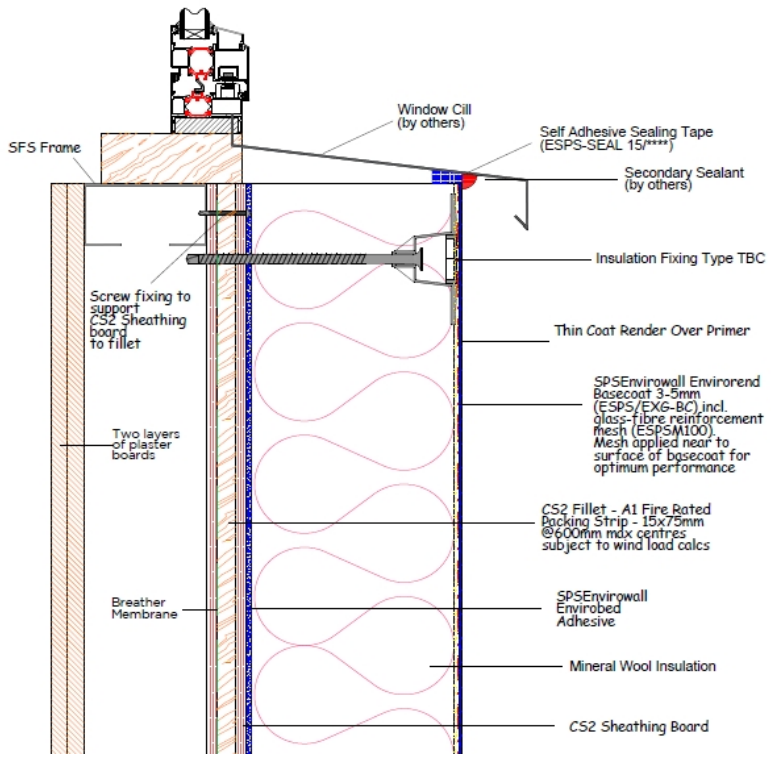
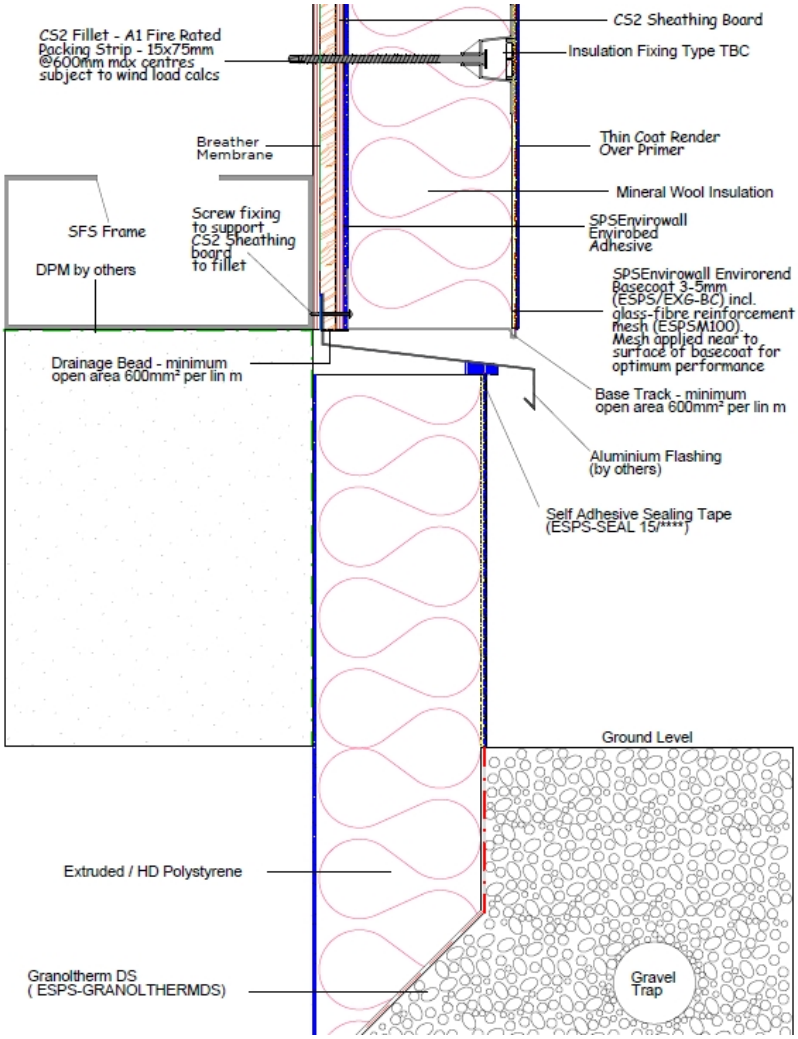


Figure 8 - Base bead below ground detail



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

2.3.2 Delivery, storage and site handling
See section 2.1.7

2.3.3 General
Project specific design drawings are supplied by the Agrément holder.

The basecoat must not be applied if the temperature will fall below 0 °C within 72 hours of completion of application.

Weather conditions should be monitored to allow the correct finishing application and curing conditions. Do not apply the render if any of the following conditions are likely to arise during application or shortly following application:

- rain, frost, fog or mist;
- a saturated or frost-bound base;
- if the basecoat surface or air temperature is < 5 °C or > 30 °C.

Care must be taken to securely fix all beads, trims and profiles plumb, square and true to line and level. The longest possible lengths of material should be used.

Where possible, application on individual wall surfaces should be completed without breaks in one operation. If breaks cannot be avoided they should be terminated where services or architectural features such as drainpipes, reveals or lines of doors and windows offer natural stop lines.

For whole elevations or long uninterrupted runs, render should be applied from the same batch to ensure colour consistency. Subsequent deliveries of material should be mixed with any residual original material to avoid obvious colour differences.

2.3.4 Preparation
Prior to commencement of work the supporting wall must be finished and free from protrusions and uneven jointing.

The flatness of substrate surfaces must be checked using a straight-edge tool spanning the storey height. Irregularities greater than 10 mm in a 1 m^2 area, must be made good or packed out prior to installation of the CS2 Fillet Strips to ensure that the sheathing boards that are the finished face of the LGSF supporting wall are installed with a smooth, in-plane finished surface. Packers can be used to ensure the CS2 Fillet Strips are set out correctly. Longer fixings may be required in areas that have been levelled to ensure the correct embedment depth is achieved.

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

The outline installation procedure is common to both the 30 and 60-year service-life durability System specifications.

EnviroSil Top Coat
The render should be stirred, and a small amount of water may be added (to a maximum of 2 % by volume) if required.

Apply onto the primer coat with a stainless-steel smoothing trowel and float to a thickness of 1.0 - 3.0 mm (thickness determined by grain size) and rub with a plastic float in a circular motion to create the required finish within 5 - 15 minutes after application.

A straight edge can be used to help ensure a flat surface, and wet sponges, wooden boards or similar tools can be used to create the desired textured finish.

Wipe clean all exposed nosing, cills etc.

EnviroMin Mineral Render Top Coat
The render is mixed with between 6.5 to 7.0 litres of cold water.

Apply onto the base coat with a stainless-steel smoothing trowel and float to a thickness of 1.0 - 3.0 mm (thickness determined by grain size) and rub with a plastic float in a circular motion to create the required finish within 5 - 15 minutes after application.

A straight edge can be used to help ensure a flat surface, and wet sponges, wooden boards or similar tools can be used to create the desired textured finish.

Wipe clean all exposed nosing, cills etc.

Completion
Apply APU Bead or flexible silicone sealant around windows, window cills and door frames and where the installation abuts any other building or surface to ensure a weather-tight joint.

2.4 - INDEPENDENTLY ASSESSED SYSTEM CHARACTERISTICS

2.4.1 Thermal insulation
The MW insulation has a declared thermal conductivity (λ_D) to BS EN 12667 - 0.036 W/mK*.

2.4.2 Hygrothermal behaviour Conditioning Test (accelerated weathering)
A wall incorporating the System was sealed into a hygrothermal chamber for testing to ETAG 034 - the System exhibited no failures in performance.

2.4.3 Structural loading
A wind uplift resistance test on LGSF to ETAG 017 demonstrated that the System withstood cycles up to 3.0 KPa suction load.

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2.4.4 Impact resistance

- Hard body impact resistance tests to ISO 7892 in accordance with ETAG 004 allow the System to be classified as Category II.
- Soft body impact resistance tests to ISO 7892 in accordance with ETAG 004 showed no damage at 300 J impact energy.

2.4.5 Resistance to precipitation including wind-driven rain

- A hygrothermal conditioning test (30-year weathering and UV) and wind-driven rain test on the installed System both indicate the suitability of the System in any exposure zone to BS 8104.

2.4.6 Water absorption

- Water absorption capillarity to ETAG 004 - < 0.5 kg/m^2 after 24 hours.

2.4.7 Water vapour transmission resistance

- Water vapour resistance to BS EN ISO 7783 - mean 1.41 to 2.73 MNs/g (depending on finish).
- Water vapour diffusion of air (m) to BS EN ISO 7783 - mean 0.28 to 0.54 m (of air) (depending on finish).

2.4.3 Behaviour in relation to fire

The full System make-up (MW insulation with render finishes) has been tested and classified in accordance with BS EN 13501-1 as Euroclass A2-s1, d0.

2.5 - SYSTEM COMPONENTS AND ANCILLARY ITEMS

2.5.1 System components included within the scope of this Agrément

The following components are integral to the System:

Component	Description		Dimensions
Horseshoe packers	Polypropylene, behind CS2 Fillet Strips to create a variable cavity		1, 2, 3, 5, 8, 10, 15, 30 mm
Supporting vertical CS2 Fillet Strips	Calcium silicate or fibre cement board with: • Weather resistance Category A, B and bending strength class 2, 3 to BS EN 12467 • A1 fire classification to BS EN 13501-1		15 mm thick, 2400 mm long, minimum 75 mm wide
Mechanical fixings for CS2 Fillet Strips	Wing tip fixings – Ejot TBF or Evolution WHX self-drilling self-tapping screw		
CS2 secondary sheathing boards	Calcium silicate or fibre cement board with: • Weather resistance Category A, B and bending strength class 2, 3 to BS EN 12467 • A1 fire classification to BS EN 13501-1		Minimum 9 mm thick, 2400 mm long, 1200 mm wide. Horizontal movement joints sealed with foil tape and expanding sealing tape.
MW insulation	Rockwool DD slab (110 kg/m^3 average density) to BS EN 13162, λ_D 0.036 W/mK*		Minimum 50 mm thick, 1.2 m long, 0.6 m wide
	Knauf Mono Density (105 kg/m^3 average density) to BS EN 13162, λ_D 0.036 W/mK*		
Mechanical fixings for MW insulation	ESPS Fischer FABS 31 self-drilling self-tapping metal screws Fischer Termofix H washers Fischer Dämmteller DT 90 or 110 extension washers Rawlplug R-UCF-A2 Stainless Steel Carbon TKR-4.8*35-300 mm screws Stainless steel TKE-4.8*50-100 mm screws		85 mm to 200 mm long x 5.8 mm diameter 10 mm to 150 mm deep tube washer, 60 mm diameter head 90 mm or 110 mm extension washer to be used with Termofix H washers 80 - 350 mm long, 6.0 and 8.0 diameter 35 mm to 300 mm long x 4.8 mm diameter 50 mm to 200 mm long x 4.8 mm diameter
Firebreak fixings	Rawlplug R-UCF-A2 Stainless Steel Stainless steel TKE-4.8*50-100 mm screws		80 - 350 mm long, 6.0 or 8.0 mm diameter 50 mm to 200 mm long x 4.8 mm diameter
Base coat mortar (EnviroRend)	Polymer-modified cement base coat to DIN 18557		Applied in one or two layers, 3 - 5 mm final thickness
High Impact Mesh (minimum 370 g/m^2)	Alkali resistant plastic-coated glass-fibre reinforcing mesh		50 m x 1 m rolls 4 mm x 4 mm grid size
High Performance Mesh (minimum 160 g/m^2)	Alkali resistant plastic-coated glass-fibre reinforcing mesh		50 m x 1 m rolls 4 mm x 4 mm grid size
Top coat render finish options:			
Option 1	EnviroSil Silicone primer	Resin-based emulsion, vapour permeable and colour matched to the top coat	One thin coat application
	EnviroSil Silicone finish	Thin-coat granular textured flexible render	Applied to a minimum 1.0 mm thickness
Option 2	EnviroMin Mineral finish	Thin-coat mineral based textured flexible render	Available in a range of grain sizes and colours

2.5.2 Ancillary items

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

Deflector channel - uPVC to prevent rainwater build-up over openings and deflect rainwater into the cavity behind the CS2 sheathing boards.

Drainage bead - metal with drainage slots, at bottom of the cavity between the sheathing boards.

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Insulation base track and connection clip - aluminium base rail profiles with drainage/ventilation holes, insect mesh and fixings.

Stop bead with mesh - uPVC, aluminium, galvanised steel or austenitic stainless-steel 2.5 m long, including connectors and fixings.

Corner bead with mesh - plastic, steel or aluminium with uPVC mesh 2.5 m long, including connectors and fixings.

Beads, trims and profiles - uPVC, aluminium, galvanised steel or austenitic stainless-steel, with mesh as appropriate, and including connectors and fixings.

Powder-coated aluminium flashings - aluminium, for detailing cills and copings.

Sealing tape - tape 3 - 5 mm thick, to seal joints with copings, cill flashings and underside of window cills as required.

Expansion movement joints - aluminium, steel or uPVC and fixings at party wall junctions and existing horizontal expansion joints within the structure.

APU bead profile with mesh - 6 mm wide, 2.4 m long, for window, door and aperture frame sealing.

Insect mesh - plastic with 4 mm drainage holes for fixing with the base beads.

Intumescent strip - 1.0 and 2.5 m long fixed behind each fire barrier using stainless steel self-drilling self-tapping screws.

Foam filler - polyurethane foam in spray can.

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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

- A1(1)(2) Loading - the System can sustain and transmit combined dead, imposed and wind loads to the ground
- B4(1) External fire spread - the System can adequately resist the spread of fire over the 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
- L1A(a)(b) Conservation of fuel and power in new dwellings - the System can contribute to limiting heat gains and losses through the wall
- Regulation 7 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 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

- A1(1)(2) Loading - the System can sustain and transmit combined dead, imposed and wind loads to the ground
- B4(1) External fire spread - the System can adequately resist the spread of fire over the 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
- L1A(a)(b) Conservation of fuel and power in new dwellings - the System can contribute to limiting heat gains and losses through the wall
- Regulation 7 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 26 CO_2 emission rates for new buildings - the System can contribute to satisfying this Requirement
- Regulation 26A Primary energy consumption rates for new buildings - the System can contribute to satisfying this Regulation
- 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 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

- 1.1(a)(b) Structure - the System can sustain and transmit combined dead, imposed and wind loads to the ground
- 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 the 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
- 6.1(b) Carbon dioxide emissions
- 6.2 Buildings insulation envelope - the System can contribute to satisfying these Standards, with reference to clauses
- 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.

3.2.3.3 Regulation 12 Building standards - conversions

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

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- 28(b) Resistance to moisture and weather - the System can be constructed to prevent the passage of moisture
- 29 Condensation - the System can be designed and constructed to prevent interstitial condensation
- 30(a) Stability - the System can sustain and transmit combined dead, imposed and wind loads to the ground
- 36(a) External fire spread - the System can be designed and constructed to resist the spread of fire over them and from one building to another
- 39(a)(i) Conservation measures - the System can contribute to satisfying this Regulation
- 39(a)(i) Conservation measures - the System can contribute to limiting heat gains and losses through the wall
- 40(2) Target CO_2 emission rate - the 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 the wall complies with requirement 39(a)(i)

3.3 - THIRD-PARTY ACCEPTANCE

None requested by the Agrément holder.

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CHAPTER 4 - SOURCES

- BS EN ISO 1716:2018 Reaction to fire tests for products. Determination of the gross heat of combustion (calorific value)
- 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 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 1027:2016 Windows and doors. Water tightness. Test method
- BS EN 1382:2016 Timber Structures. Test methods. Withdrawal capacity of timber fasteners
- BS EN 1383:2016 Timber structures. Test methods. Pull through resistance of timber fasteners
- BS EN 1990:2002+A1:2005 Eurocode. Basis of Structural Design
- BS EN 1991-1-4:2005+A1:2010 Eurocode 1. Actions on structures. General actions. Wind actions
- BS EN 1993-1-3:2006 Eurocode 3. Design of steel structures. General rules. Supplementary rules for cold-formed members and sheeting
- BS EN 10088-2:2014 Stainless steels. Technical delivery conditions for sheet/plate and strip of corrosion resisting steels for general purposes
- BS EN 12086:2013 Thermal insulating products for building applications. Determination of water vapour transmission properties
- BS EN 12467:2018 Fibre-cement flat sheets. Product specification and test methods
- BS EN 12524:2000 Building materials and products. Hygrothermal properties. Tabulated design values
- BS EN 12865:2001 Hygrothermal performance of building components and building elements. Determination of the resistance of external wall systems to driving rain under pulsating air pressure
- BS EN 13162:2012+A1:2015 Thermal insulation products for buildings. Factory made mineral wool (MW) products. Specification
- BS EN 13501-1:2018 Fire classification of construction products and building elements. Classification using test data from reaction to fire tests
- BS EN 13658-2:2005 Metal lath and beads. Definitions, requirements and test methods. External rendering
- BS EN 13823:2010+A1:2014 Reaction to fire tests for building products. Building products excluding floorings exposed to the thermal attack by a single burning item
- BS EN 13914-1:2016 Design, preparation and application of external rendering and internal plastering. External rendering
- BS 476-4:1970 Fire tests on building materials and structures. Non-combustibility test for materials
- BS 5080-2:1986 Structural fixings in concrete and masonry. Method for determination of resistance to loading in shear
- BS 5250:2011+A1:2016 Code of practice for control of condensation in buildings
- 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 8000-12:1989 Workmanship on building sites. Code of practice for decorative wallcoverings and painting
- BS 8104:1992 Code of practice for assessing exposure of walls to wind-driven rain
- DD CEN/TS 15117:2005 Guidance on direct and extended application
- Draft BS EN 16383:2012 Thermal insulating products for building applications. Determination of the hygrothermal behaviour of external thermal insulation composite systems with renders (ETICS)
- ISO 7892:1988 Vertical building elements - Impact resistance tests - Impact bodies and general test procedures
- DIN 18557:1997 Factory mortar - production, control and delivery
- BRE Report 135:2013 Fire performance of external thermal insulation for walls of multi-storey buildings
- 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 Information Paper 1/06:2006 Assessing the effects of thermal bridging at junctions and around openings
- EAD 330196-01-0604:2017 Plastic anchors made of virgin or non-virgin material for fixing of external thermal insulation composite systems with rendering
- ETAG 004:2013 Guideline for European Technical Approval of External Thermal Insulation Composite Systems (ETICS) with Rendering
- ETAG 017:2005 Veture Kits - Prefabricated Units for External Wall Insulation
- ETAG 034:2012 Kits for External Wall Claddings Part 1: Ventilated Cladding Kits comprising Cladding components and associated fixings
  ETAG 034:2012 Kits for External Wall Claddings Part 2: Cladding Kits comprising Cladding components, associated fixings, subframe and possible insulation layer
- EOTA TR 051:2018 Recommendations for job site tests of plastic anchors and screws
- SCI Publication P343:2006 Insulated Render Systems Used With Light Steel Framing
- PAS 2030:2017 Improving the energy efficiency of existing buildings. Specification for installation process, process management and service provision - Building Fabric Measures (BFM)
- Government Accredited Construction Details, Part L, Steel Frame Illustrations:2019
- Accredited Construction Details (Scotland):2015 Introduction and principles

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 Vurley	C Forshaw	December 2019

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