



Kiwa Ltd.
 Unit 5 Prime Park Way
 Prime Enterprise Park
 Derby
 DE1 3QB
 T: +44 (0)1332 383333
 E: uk.bpenquiries@kiwa.com
 W: www.kiwa.co.uk/bda

BAW-20-145-S-A-UK
BDA Agrément®
Wetherby Modular 2 EWI
Brick/Stone Slip
Façade Cladding System

Wetherby Building Systems Ltd.
 1 Kid Glove Road
 Golborne
 Warrington
 WA3 3GS
 T: +44 (0)1942 717100
 E: info@wbs-ltd.co.uk
 W: www.wbs-ltd.co.uk

SCOPE OF AGRÉMENT

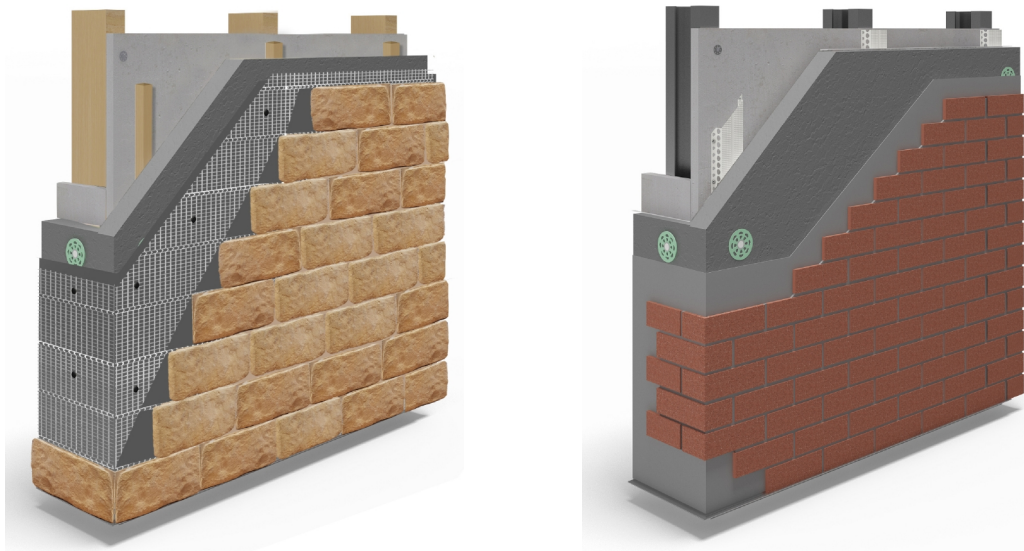
This Agrément relates to Wetherby Modular 2 EWI Brick/Stone Slip Façade Cladding System (hereinafter the 'System'). The System is a mechanically fixed, external wall insulation (hereinafter 'EWI'), expanded polystyrene (hereinafter 'EPS') insulated, brick/stone slip cladding system. The System is suitable for installation on existing or new, residential and non-residential buildings including buildings of modular off-site manufacture (hereinafter 'OSM'):

- above damp-proof course (hereinafter 'DPC') level on external sheathed light-gauge steel frame (hereinafter 'LGSF') or structural timber frame (hereinafter 'STF') supporting walls (where LGSF and STF include exterior-grade cement-bonded particle board (hereinafter 'CPB'), marine-grade plywood or exterior-grade orientated strand board (hereinafter 'OSB') with suitable strength and stiffness);
- above or below DPC level on buildings of modular OSM.

SYSTEM DESCRIPTION

The System consists of EPS insulation, which is mechanically fixed into/through vertically orientated timber battens or galvanised steel rails (hereinafter 'spacer support battens/rails') into sheathing boards which form the outer face of the LGSF or STF supporting wall. This forms a minimum 15 mm drained and partially ventilated cavity between the sheathing boards and the insulation layer. If required, the cavity can be formed to a maximum depth of 50 mm, depending on the profile of the spacer support battens/rails used. The System is finished with adhesive mortar, scrim cloth, stainless steel mesh and brick/stone slips bedded into brick/stone slip adhesive mortar.

SYSTEM ILLUSTRATION



THIRD-PARTY ACCEPTANCE

NHBC - for detailed information see section 3.3 (Third-Party Acceptance).

STATEMENT

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

Craig Devine
 Operations Manager, Building Products

Alpeo Mlotha CEng FIMMM MBA
 Head of Operations, Building Products

SUMMARY OF AGREEMENT

This document provides independent information to specifiers, building control personnel, contractors, installers and other construction industry professionals considering the safety and fitness for the intended use of the System. This Agreement 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 - the System (see section 2.2.9):

- can contribute to limiting the risk of interstitial and surface condensation;
- will resist wind-driven rain penetration across the partially ventilated cavity to the supporting wall.

Strength - the System has adequate strength and is designed to adequately resist impact damage and wind loads normally encountered in the UK (see section 2.2.10).

Fire performance - the System is classified as European Classification B-s1, d0, in accordance with BS EN 13501-1 (see section 2.2.11).

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 2.2.12).

Durability - the service life durability of the System will be dependent upon the environment (operating conditions) in which the System will be used (see section 2.2.13).

UKCA and CE marking - the product manufacturers have responsibility for conformity marking in accordance with all relevant British and European Product Standards (see section 2.2.14).

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CHAPTER 1 - GENERAL CONSIDERATIONS

1.1 - CONDITIONS OF USE

1.1.1 Design considerations

See section 2.2.

1.1.2 Application

The assessment of the 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, DoPs and site visit as appropriate. The NHBC Standards have also been taken into consideration.

1.1.4 Installation supervision

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

1.2 - PRODUCTION CONTROL AND QUALITY MANAGEMENT SYSTEM

Kiwa Ltd. has determined that the Agrément holder fulfils all 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 (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.

CHAPTER 2 - TECHNICAL ASSESSMENT

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

2.1 - SYSTEM COMPONENTS AND ANCILLARY ITEMS

2.1.1 System components included within the scope of this Agrément

The following components are integral to the use of the System:

Component	Description	Dimensions	
base rail	Wetherby Base Rail	aluminium base rail, incorporating 11 mm diameter drainage holes at 150 mm centres, 200 mm from each side of the edge, to create a drained and partially ventilated cavity, in accordance with BS 5250	2.5 m long
	mechanical fixings for Wetherby Base Rail	Ejot LS case-hardened, carbon steel, self-drilling screws	32 mm long by 5.5 mm diameter
spacer support battens/rails	Wetherby Cavity Spacer Rail	galvanized steel top-hat rail section to create a cavity [^]	minimum 15 mm by 48 mm
	timber battens	treated timber battens to create a cavity	minimum 15 mm by 50 mm
	mechanical fixings for spacer support battens/rails	R-QCP-4550 - hardened screws	50 mm long by 4.5 mm diameter
EPS insulation	Wetherby Enhanced EPS Insulation	15 kg/m ³ density, in accordance with BS EN 13163, λ_D 0.032 W/mK	1.2 m by 0.6 m, minimum 50 mm thick
	mechanical fixings for EPS insulation	Ejot TKR - case-hardened carbon steel self-tapping screws with Bravoll TIT washers	50 to 300 mm long by 4.8 mm diameter with 60 mm diameter washer
mesh	Wetherby Alkali Resistant Reinforcing Mesh Cloth	alkali-resistant, plastic-coated, glass fibre reinforcing mesh, weight 160 g/m ²	50 m by 1 m or 1.1 m by 0.52 mm thick rolls, 3.5 mm by 3.8 mm grid size
	Wetherby Stainless Steel Profiled Mesh	grade 304 stainless steel profiled mesh, weight 0.5 kg/m ²	1 mm thick sheets, 12.7 mm by 12.7 mm grid size
	mechanical fixings for EPS insulation and mesh	Ejot TKE - stainless steel self-tapping screws with stainless steel washer	60 mm to 200 mm long by 4.8 mm diameter
adhesive	Wetherby Brick Slip Adhesive	high adhesive-strength cementitious-based mortar conforming to BS EN 12004-1, cement conforming to BS EN 197-1 and additives	
	Wetherby Scrim Adhesive	cement-based, polymer-modified basecoat comprising limestone and sand, conforming to BS EN 13139, cement conforming to BS EN 197-1 and additives	
mortar	Wetherby Modular Pointing Mortar	pre-coloured, water-repellent, frost-resistant, cementitious pointing mortar, in accordance with BS EN 13888, with coverage between 3.10 kg/m ² for 9 mm slips to 8.33 kg/m ² for 25 mm slips	
	Wetherby Pointing Mortar Natural	polymer-modified sand/cement-based mortar, in accordance with BS EN 13888, with coverage between 2.5 kg/m ² for 9 mm slips to 8.33 kg/m ² for 25 mm slips	
brick slips	Wetherby Brick Slips	coarse ceramic brick slips/pistols/corners to BS EN 14411 with dry density of 2250 kg/m ³ ; available in a range of colours	215 mm by 65 mm by 9 mm to 25 mm thick
		coarse ceramic brick slips/pistols to BS EN 771-1 with dry density of 1520 kg/m ³ ; available in a range of colours	
stone slips	Wetherby Stone Slips	reconstructed stone slips/pistols to BS EN 771-5 with a dry density 2125 kg/m ³ , available in traditional, rough or square dressed finishes	200 to 337 mm by 75, 150 or 225 mm by 20 to 35 mm
	Wetherby Rock Panel Stone Slips	quartzite-based sedimentary stone slips to BS EN 771-5	200 mm by 50 mm by 15 to 25 mm

[^] wider top-hat sections can be used, provided they have similar or better characteristics and have been approved by the Agrément holder

2.1.2 Ancillary items falling outside the scope of this Agrément

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

- profiles - a range of standard profiles for end stop, corner mesh and expansion joints, available in 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;
- Wetherby Sealing Tape;
- silicone sealant;
- fire barriers (horizontal and vertical) and intumescent strips.

2.2 - POINTS OF ATTENTION TO THE SPECIFIER

2.2.1 Design responsibility

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.

2.2.2 Applied building physics (heat, air, moisture)

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

2.2.3 General design considerations

A project-specific design is required. This shall 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 shall be installed above DPC level and a minimum of 150 mm above ground level on LGSF or STF supporting walls.

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 shall be carried out by a suitably qualified structural engineer to confirm that the System can resist the design impact, dead, imposed and wind loads, can safely transfer loads to the building and can accommodate all anticipated thermal movements without damage. Deflection must be limited to prevent damage to the System.

Sheathing boards shall be weather resistance category A or B and bending strength class 2 or 3, in accordance with BS EN 12467.

Brick/stone slip walls shall be detailed to reduce the risk of damage due to movement in the sheathed LGSF or STF supporting wall, taking into consideration differential movement in dissimilar materials.

LGSF supporting walls shall be designed in accordance with BS EN 1993-1-1 and BS EN 1993-1-3; the steel structure shall be not less than 1.2 mm thick with a minimum of 50 mm flanges.

Supporting walls shall be designed in accordance with the relevant Standards to limit mid-span deflections - see section 2.2.10.

The System can be installed on supporting walls constructed from LGSF and STF where sheathing consists of CPB, marine-grade plywood or OSB:

- CPB shall be manufactured to BS EN 12467 or BS EN 634-2, with a minimum thickness of 10 mm;
- marine-grade plywood shall be manufactured to BS EN 313-1, with a minimum thickness of 12 mm;
- OSB shall be manufactured to BS EN 300, with a minimum thickness of 11 mm.

STF supporting walls shall be designed in accordance with BS EN 1995-1-1 and BS EN 14081-1; the timber structure shall not be less than 37 mm thick with a minimum width of 72 mm.

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 and this should be in accordance with BS 6093.

The System shall incorporate a drained and partially ventilated cavity between the sheathing boards and EPS insulation, a minimum depth of 15 mm.

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

The System shall be secured to the supporting wall with fixings that pass into/through the spacer support battens/rails that form the cavity between the supporting wall and the EPS insulation.

Where required, 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 shall be provided at 7.5 m intervals when the length of a wall exceeds 12 m.

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

2.2.4 Project-specific design considerations

The project-specific design shall take into account the service life durability required - see section 2.2.13.

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

A pre-installation survey is required to allow determination of the project-specific design - see section 2.4.3.

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

- structural adequacy of the supporting wall;
- 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.

The number of fixings per m² required through the stainless steel mesh (and EPS insulation) is a variable design value and shall be equal to or greater than that needed to achieve the required project-specific design wind load. The maximum spacing centres between EPS insulation anchor fixings are:

- 600 mm - horizontal;
- 300 mm - vertical.

Account shall be taken of Government Accredited Construction Details for Part L - Masonry External Wall Insulation Illustrations, Timber Frame Illustrations and Steel Frame Illustrations for England and Wales and Accredited Construction Details for Scotland (hereinafter 'Government Accredited Construction Details').

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 assist the Agrément holder in determining the type, size and minimum number of fixings required for each section of EPS insulation. When using pull-out data for fixings, the material safety factor γ_m must be considered.

For modular projects that incorporate the System below DPC level, the following specific conditions will apply:

1. the System shall not come into contact with the surrounding ground;
2. the section of the System below DPC level shall never become immersed in standing water under any circumstances;
3. a detailed ground condition site survey shall be undertaken for each case and suitable land drainage below the modular housing units shall be designed and implemented accordingly;
4. the land drainage solution provided in response to condition 2 above shall not rely on pipework that may become blocked or mechanical systems that could fail;
5. where the design below DPC level creates a 'bund', the land drainage solution provided in response to condition 2 above shall prevent the accumulation of rain or groundwater;
6. the section of the System installed below DPC level shall be separated from the remainder of the System DPC level.

2.2.5 Permitted applications

Only applications designed according to the specifications given in this Agrément are permitted. In each case the Approved Installer will have to co-operate closely with the Agrément holder.

2.2.6 Installer competence level

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

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

2.2.7 Delivery, storage and site handling

The System components are delivered to site in suitable packaging bearing the System component name and the production identification date or batch number; and where applicable the BDA Agrément[®] logo incorporating the number of this Agrément.

Store the System components in accordance with the Agrément holder's requirements. Particular care shall be taken to:

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

2.2.8 Maintenance and repair

Once installed, the System requires regular maintenance. For 60-year durability, a bespoke extended repair and maintenance protocol will apply. For advice in respect of repair and maintenance, consult the Agrément holder. Maintenance shall include the replacement and resealing of joints at window and door frames at regular intervals.

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

- signs of disbandment in brick/stone slips; dislodged slips shall be refixed using brick slip adhesive;
- signs of damage in brick/stone slips; damaged slips must be removed and replaced with new ones, fixed using brick slip adhesive;
- sealant around openings and service entry points;
- architectural details designed to shed water to confirm that they are performing properly;
- external plumbing and fittings, gutter and drainpipes to confirm that they are performing properly.

The brick/stone slip finish may become discoloured by algae and lichens in damp 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 shall be repaired immediately in accordance with BS EN 13914-1 and the Agrément holder's Maintenance and Repair Manual.

Maintenance shall include the replacement and resealing of joints at window and door frames at regular intervals to prevent failure. Replace failed elements such as sealants, joint seals and corroded materials to ensure that water ingress does not occur.

Performance factors in relation to the Major Points of Assessment

2.2.9 Moisture control

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.

A condensation risk analysis shall be completed at 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.

The base rail shall have a minimum open area of 600 mm² per 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.

Resistance to precipitation including wind-driven rain

The System, when properly installed in accordance with this Agrément, will resist rain penetration across the drained and partially ventilated cavity to the supporting wall surface and satisfy this requirement as given in either the relevant national Building Regulations or BRE Report 262.

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 drained and partially ventilated cavity between the back of the EPS insulation and supporting wall shall be a minimum of 15 mm deep. Any moisture passing through the EPS insulation joints and collecting in the cavity will be removed by drainage and ventilation.

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

The guidance given in BRE Report 262 should be followed in connection with the weathertightness of wall constructions. The Agrément holder shall select a construction appropriate to the local wind-driven rain index, paying due regard 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.

Drainage deflection beads are incorporated into the System to deflect any water present in the drained and partially ventilated cavity around openings, penetrations or items that block the cavity.

The System has adequate resistance to artificial weathering and to thermal shock, in accordance with ETAG 017.

2.2.10 Strength

Structural loading

The supporting wall must 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 suitably qualified engineer. The project-specific design must ensure that:

- the System attachment to the supporting wall has adequate fixing pull-out capacity for the calculated wind loads;
- thermal expansion effects of both metal rails and metal structural frame and the cladding to be supported are taken into consideration in the design and detailing.

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

The supporting wall shall be designed in accordance with the relevant Standards to limit mid-span deflections to L/200 (mid-span) and L/150 (cantilever).

The System has adequate dynamic wind uplift load (suction) resistance and suitable mechanical strength to ETAG 017. For the design load value, see section 2.5.2. For fixing pattern, see Diagram 1.

Spacer support battens/rails shall be fixed into the sheathing board and/or existing studwork with fixings that achieve a minimum pull-out of 0.7 kN (subject to wind load calculations).

Positive wind load is transferred to the supporting wall directly via bearing and compression of the brick/stone slips, EPS insulation to the spacer support battens/rails and through the sheathing boards. Negative wind load is resisted by the bond between EPS insulation and brick/stone slips reinforced with steel mesh or scrim cloth. The EPS insulation is retained by steel mesh and mechanical anchors, which are fixed through stainless steel mesh and scrim cloth to the supporting wall.

Impact resistance

When tested for hard- and soft-body impact resistance, in accordance with ETAG 004 and ETAG 034 respectively, the System is categorised as being for Use Category I and can therefore be used in all Use Categories 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 kit 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;
- IV - a zone out of reach from ground level.

2.2.11 Fire performance

The System is classified as European Classification B-s1, d0, in accordance with BS EN 13501-1.

For non-residential buildings in England, Wales and Northern Ireland, 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, Wales, Northern Ireland and all buildings in Scotland, the System is not classified as non-combustible and is restricted to buildings with no floor more than 11 m above ground 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 System shall include a minimum of one stainless steel fixing per m² of enhanced EPS insulation, or per insulation batt, whichever is the lesser, fixed through the reinforcing mesh and enhanced EPS insulation, in addition to the other enhanced EPS insulation fasteners normally specified.

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 60-minute intervals thereafter.

Cavity fire barriers shall 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 shall be applied behind each fire barrier.

Walls shall be designed and constructed:

- to adequately resist the passage and penetration of fire;
- so that the unseen spread of fire and smoke within concealed spaces in the walls is inhibited.

For guidance and detailed conditions of use regarding supporting wall fire performance, cavity closers and 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.

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.

Guidance on separation in STF supporting walls can be found in:

- IGEN IGE/UP/7;
- BSRIA/TRADA IEP6.

2.2.12 Thermal performance

Thermal insulation

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, but the thermal value will recover when the EPS insulation dries out. 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, degree of ventilation to the drained cavity, fixing method, type of fixing and insulating value of the supporting wall and its internal finish.

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 declared thermal conductivity (λ_D) of the EPS insulation (refer to section 2.5.4).

Thermal bridging at junctions and around openings

Care must be taken in the overall design and construction of junctions with other elements and openings, to minimise 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 1/06, BRE Report 262, BRE Report 497 and PAS 2030.

2.2.13 Durability

The service life durability of the System will be dependent upon the environment (operating conditions) in which the System will be used. The expected service life durability will be in excess of 30 years.

Regular inspection and maintenance of the System below DPC level is not required for the System to achieve a working service-life durability of at least 30 years.

2.2.14 UKCA and CE marking

There is no relevant product standard for the System.

2.3 - EXAMPLES OF TYPICAL DETAILS

Diagram 1 - Typical mechanical fixing arrangement

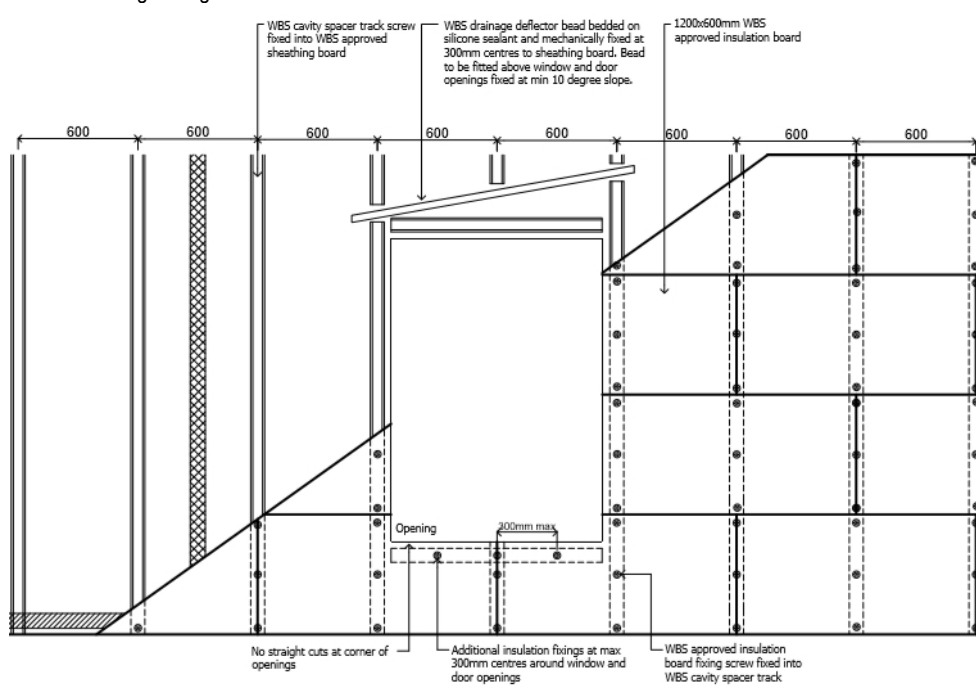


Diagram 2 - Typical build up detail

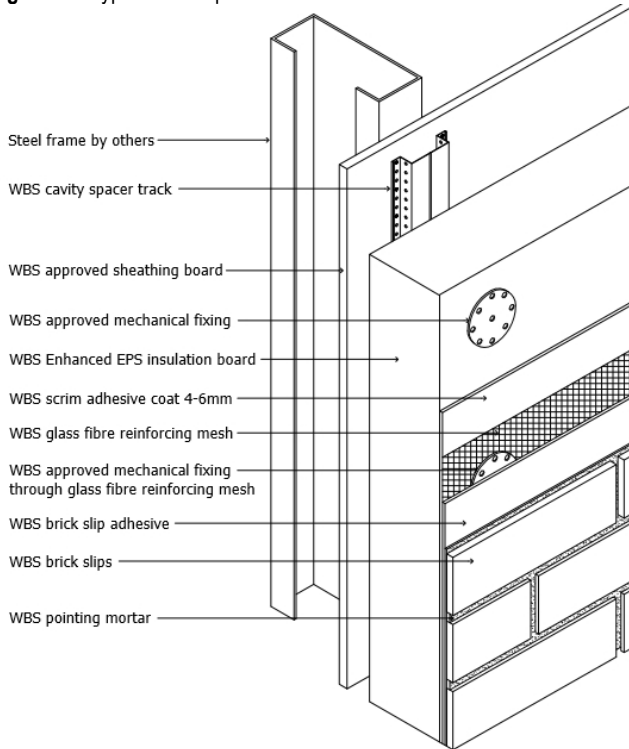


Diagram 3 - Typical movement joint detail

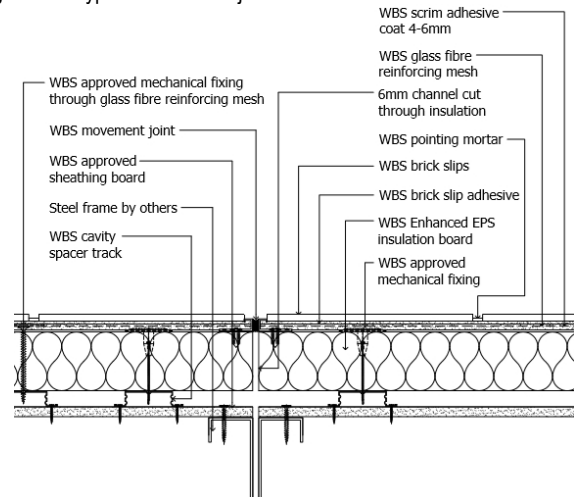


Diagram 4 - Typical base detail

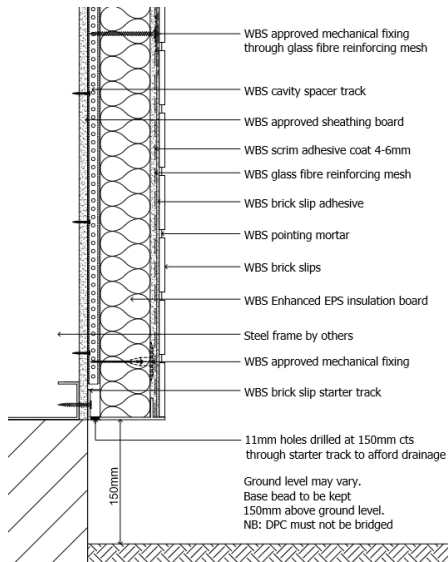


Diagram 5 - Typical base detail (below DPC for modular OSM projects)

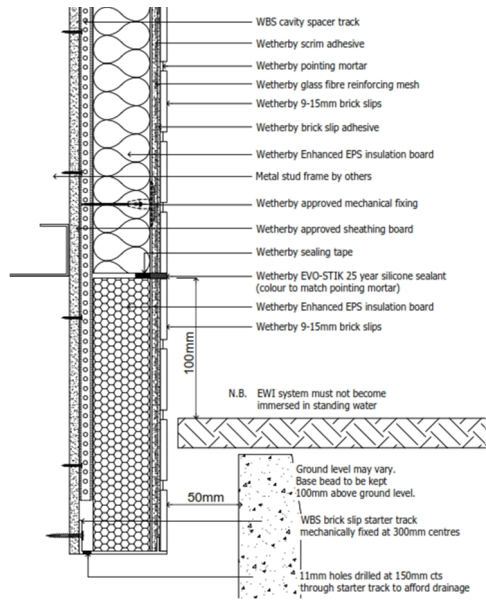


Diagram 6 - Typical window cill detail

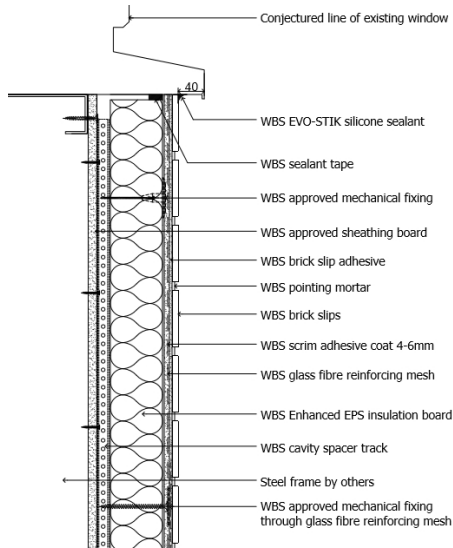


Diagram 7 - Typical window/door head detail

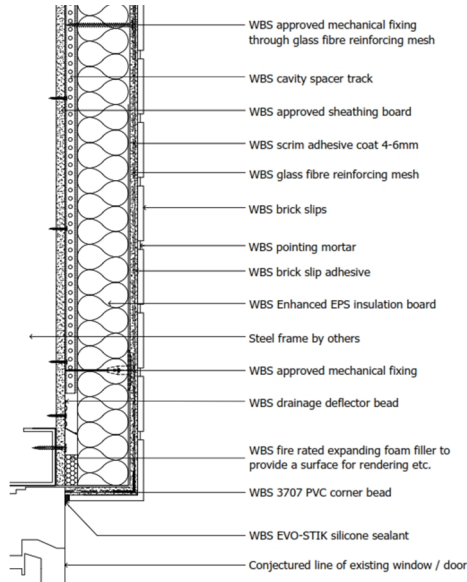


Diagram 8 - Typical horizontal fire barrier detail

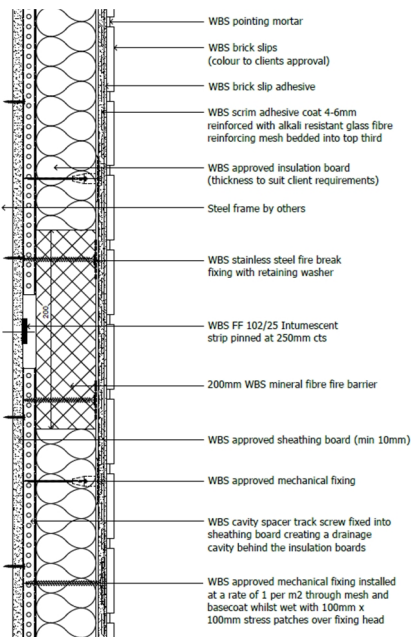
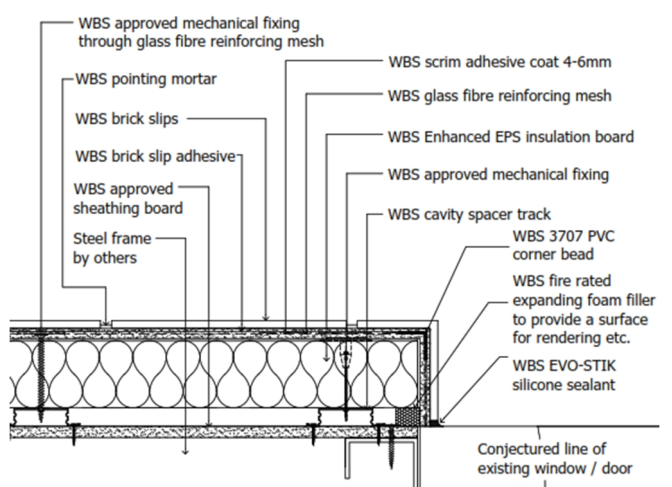


Diagram 9 - Typical window/door jamb detail



The System shall be installed strictly in accordance with the instructions (hereinafter 'Installation Manual') of the Agrément holder and the requirements of this Agrément.

2.4.1 Installer competence level

See section 2.2.6.

2.4.2 Delivery, storage and site handling

See section 2.2.7.

2.4.3 Project-specific installation considerations

The project-specific design has been determined from a pre-installation survey.

A specification has been prepared for each elevation of the building indicating where appropriate:

- DPC level, the position of base rail, water deflection beads/battens/channels, expansion joints and weather seals;
- detailing around windows, doors, etc.;
- cavity fire barriers shall be installed in line with compartment walls and floors;
- services and any fittings requiring removal or alteration to facilitate installation of the System;
- areas where silicone/flexible sealants must 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 (see section 2.2.4). Pull-out test loads must be 2.5 x design load. The pull-out resistance strengths of the supporting wall, spacer support rails and board anchor fixings must be checked by a competent person and shown 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;
- existing walls are watertight, clean and meet the requirements of the relevant Standards and national Building Regulations for airtightness.

2.4.4 Preparation

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

- the supporting wall finished and free from protrusions and uneven jointing;
- any necessary repairs or modifications made (e.g. provision for fire stopping, removal of fittings which can be relocated after the System is installed, pipes and vents extended beyond the surface etc.);
- fence posts, clothes lines, electronic equipment (e.g. satellite dishes, alarms, security lights etc.) removed, along with any associated cables and control boxes. These can be relocated after the System is installed;
- if necessary, protection channel to safely sleeve cabling installed;
- roof in place and window and door openings sealed;
- surfaces made clean, dry and free from dirt, grease, oils, solvents and loose particles;
- flues, chimneys and combustion air ventilators continuously sleeved through the wall. Reference should 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, fixed back to the supporting wall; no load is to be transferred to the System;
- where necessary, protection channel conduits installed so that any PVC-insulated cables avoid contact with the EPS insulation;
- external power cables covered over by cover plates must be well labelled with warning signs;
- external soil stacks, waste water pipes, overflows, ducts, vent pipes extended beyond the surface and securely refixed where required.

2.4.5 Outline installation procedure

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

The key sequence for installation is:

- fix the base rail horizontally to the wall above DPC level at base of the wall, a minimum of 150 mm above ground level;
- fix stop beads vertically on Wetherby Sealing Tape and fully seal with silicone;
- fix angle verge trim on Wetherby Sealing Tape at the top of the System and seal with silicone at the top of the verge;
- extend cills so that there will be a minimum 40 mm overhang from the drip edge of the cill to the front edge of the System; similar overhangs should also be achieved at the soffit; if there is no soffit, or it is of insufficient depth, then a verge trim will be required;
- fix Wetherby Cavity Spacer Rails (vertical rails at maximum 150 mm or 300 mm centres for timber or metal rails respectively, horizontal rails at maximum 600 mm centres); additional Wetherby Cavity Spacer Rails must be installed around openings;
- fix drainage deflector beads above all openings at a 10 ° minimum fall;
- install intumescent strips or fire barriers at locations detailed in the project-specific design;
- place the first course of EPS insulation onto the base rail and secure into the spacer support rails fixed to the supporting wall. Fix the EPS insulation mechanically to the spacer support rails using approved fixings at a rate of six fixings per board (subject to wind load calculations) in accordance with the fixing pattern (two initial fixings for stainless steel mesh applications). Continue with additional EPS insulation, ensuring they are tightly butt-jointed and that a staggered bonding pattern is adhered to; joints shall not occur within 200 mm of the corners of openings and shall be staggered and overlapped at building corners;
- fix movement beads at specified locations; structural movement joints must be carried through the System;
- fix surface-mounted beads directly to the EPS insulation at required locations;

- apply a 4 to 6 mm thick coat of Wetherby Scrim Adhesive to the entire surface of the EPS insulation and bed Wetherby Alkali Resistant Reinforcing Mesh Cloth into top third of the wet adhesive, overlapping joints by minimum 75 mm; for Systems incorporating brick slips, install secondary fixings through the wet adhesive and mesh cloth whilst adhesive is wet, with 100 mm by 100 mm patches of scrim cloth over each fixing head;
- install additional pieces of Wetherby Alkali Resistant Reinforcing Mesh Cloth (minimum 250 mm by 250 mm) diagonally across corners of all wall openings;
- for Systems incorporating stone slips, temporarily position Wetherby Stainless Steel Profiled Mesh onto the Wetherby Scrim Adhesive, leaving a 5 mm horizontal gap between sheets and ensuring the correct vertical spacing for the brick/stone slips; fix the steel mesh using 12 fixings per sheet (subject to wind load calculations, with additional fixings at corners and openings); all fixings must hit studs and be installed at maximum 300 mm centres at building corners and around any openings;
- apply brick/stone slips using Wetherby Brick Slip Adhesive, ensuring the brick/stone slips are firmly pushed into place and leaving consistent mortar joints between each brick/stone slip; natural variations in colour, texture and dimensions of the brick/stone slips may be present. It is advisable to mix brick/stone slips from at least five different boxes to minimise grouping of colours;
- once brick/stone slips have set in place, point with Wetherby Pointing Mortar using a pointing gun and a pointing trowel; once dry, brush down the wall with a stiff brush to remove all excess mortar.

2.4.6 Finishing

The following finishing is required on completion of the installation:

- all trunked air vents and flues must be checked (by an appropriate test if necessary) to verify they are clear and unobstructed;
- silicone sealant should be applied around windows, door frames etc., and where the installation abuts any other building or surface, to ensure a weathertight joint.

Post-installation inspection checks must be carried out to ensure that the installation has been successfully completed and that no damage has occurred to the building; these shall be conducted as soon as possible after completion of the work or at a minimum of seven days after completion of the work and before removing scaffolding; any defects must be reported immediately.

2.5 - INDEPENDENTLY ASSESSED SYSTEM CHARACTERISTICS

2.5.1 Moisture control

Test	Standard	System finish or component	Result
Water absorption	BS EN ISO 10545-3	Wetherby Brick Slips/Pistols (9 mm thick)	≤ 6 %
	BS EN 772-21	Wetherby Brick Slips/Pistols (25 mm thick)	19 %
	BS EN 772-11	Wetherby Stone Slips	< 9.0 g/m ² s ^a
Hygrothermal and freeze-thaw conditioning	ETAG 017 and BS EN 16383	Wetherby Brick Slips/Pistols (9 mm thick)	no defects
		Wetherby Brick Slips/Pistols (25 mm thick)	
		Wetherby Stone Slips	
		Wetherby Rock Panel Stone Slips	

^a Water absorption due to capillary action

2.5.2 Strength

Test	Standard	System finish or component	Result
Dynamic wind uplift ^a	ETAG 017	Wetherby Brick Slips/Pistols (9 mm thick)	3.0 kN/m ²
		Wetherby Brick Slips/Pistols (25 mm thick)	3.0 kN/m ²
		Wetherby Stone Slips	3.7 kN/m ²
		Wetherby Rock Panel Stone Slips	3.7 kN/m ²
Hard-body impact	ETAG 034 and ISO 7892	Wetherby Brick Slips/Pistols (9 mm thick)	Use Category I
	ETAG 034 and ISO 7892	Wetherby Brick Slips/Pistols (25 mm thick)	
	EAD 040287-000404	Wetherby Stone Slips	
	ETAG 004	Wetherby Rock Panel Stone Slips	
Soft-body impact	ETAG 034	Wetherby Brick Slips/Pistols (9 mm thick)	Use Category I
	ETAG 034	Wetherby Brick Slips/Pistols (25 mm thick)	
	EAD 040287-000404	Wetherby Stone Slips	
	ETAG 034	Wetherby Rock Panel Stone Slips	
Tensile strength	BS EN 13163	EPS	200 kPa
Compressive stress at 10% deformation	BS EN 13163	EPS	70 kPa

^a Design load with partial factor of 1.5

2.5.3 Fire performance

Test	Standard	System finish or component	Result
Reaction to fire	BS EN 13501-1	Wetherby Brick Slips/Pistols (9 mm thick)	B-s1, d0
		Wetherby Brick Slips/Pistols (25 mm thick)	
		Wetherby Stone Slips	
		Wetherby Rock Panel Stone Slips	
		EPS	E

2.5.4 Thermal performance

Test	Standard	System finish or component	Result
Thermal conductivity (λ_D)	BS EN 12667	EPS	0.032 W/mK

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 - THE 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.

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

3.2.1 - ENGLAND 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 via a supporting structure
- 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 a building from precipitation, including wind-driven spray
- C2(c) Resistance to moisture - the System can adequately protect a 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(1) Requirements relating to thermal elements - the System can contribute to walls complying with the requirements of L1(a)(i)
- Regulation 26 CO₂ emission rates for new buildings - the System can contribute to satisfying this Requirement
- Regulation 26A Fabric energy efficiency rates - the System can contribute to satisfying this Requirement
- Regulation 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(1)(2) Loading - the System can sustain and transmit combined dead, imposed and wind loads to the ground via the supporting structure
- 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(1) Requirements relating to thermal elements - the System can contribute to walls complying with the requirements of L1(a)(i)
- Regulation 26 CO₂ 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 Requirement
- Regulation 26B Fabric performance values for new dwellings - the System can contribute to satisfying this Requirement
- Regulation 26C Minimum energy efficiency rating - the System can contribute to satisfying this Requirement

3.2.3 - SCOTLAND

THE BUILDING (SCOTLAND) REGULATIONS 2004 AND SUBSEQUENT AMENDMENTS

3.2.3.1 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, 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 via the supporting structure
- 2.4 Cavities - the System can inhibit the unseen spread of fire and smoke within concealed spaces
- 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
- 6.1(b) Carbon dioxide emissions - the System can contribute to satisfying this Requirement
- 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

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

THE BUILDING REGULATIONS (NORTHERN IRELAND) 2012 AND SUBSEQUENT AMENDMENTS

- 23(1)(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
- 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)(b) Stability - the System can sustain and transmit combined dead, imposed and wind loads to the ground via the supporting structure
- 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 CO₂ emission rate - a wall incorporating the System shall be designed and constructed as not to exceed its target CO₂ 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

NHBC - In the opinion of Kiwa Ltd., the System, if installed, used and maintained in accordance with this Agrément, can satisfy or contribute to satisfying the relevant requirements in relation to NHBC Standards, Chapter 6.9 Curtain walling and cladding.

- BS EN ISO 6946:2017 Building components and building elements. Thermal resistance and thermal transmittance. Calculation methods
- BS EN ISO 10211:2017 Thermal bridges in building construction. Heat flows and surface temperatures. Detailed calculations
- BS EN ISO 10456:2007 Building materials and products. Hygrothermal properties. Tabulated design values and procedures for determining declared and design thermal values
- BS EN ISO 10545-3:2018 Ceramic tiles. Determination of water absorption, apparent porosity, apparent relative density and bulk density
- BS EN 197-1:2011 Cement. Composition, specifications and conformity criteria for common cements
- BS EN 300:2006 Orientated strand boards (OSB). Definitions, classification and specifications
- BS EN 313-1:1996 Plywood. Classification and terminology. Plywood. Classification and terminology. Classification
- BS EN 634-2:2007 Cement-bonded particleboards. Specifications. Requirements for OPC bonded particleboards for use in dry, humid and external conditions
- BS EN 771-1:2011+A1:2015 Specification for masonry units. Clay masonry units
- BS EN 771-5:2011+A1:2015 Specification for masonry units. Manufactured stone masonry units
- BS EN 772-11:2011 Methods of test for masonry units. Determination of water absorption of aggregate concrete, autoclaved aerated concrete, manufactured stone and natural stone masonry units due to capillary action and the initial rate of water absorption of clay masonry units
- BS EN 772-21:2011 Methods of test for masonry units. Determination of water absorption of clay and calcium silicate masonry units by cold water absorption
- BS EN 826:2013 Thermal insulating products for building applications. Determination of compression behaviour
- BS EN 1607:2013 Thermal insulating products for building applications. Determination of tensile strength perpendicular to faces
- BS EN 1991-1-4:2005+A1:2010 Eurocode 1. Actions on structures. General actions
- NA to BS EN 1991-1-4:2005+A1:2010 UK National Annex to Eurocode 1. Actions on structures. General actions
- BS EN 1993-1-1:2005+A1:2014 Eurocode 3. Design of steel structures. General rules and rules for buildings
- NA+A1:2014 to BS EN 1993-1-1:2005+A1:2014 UK National Annex to Eurocode 3. Design of steel structures. General rules and rules for buildings
- BS EN 1993-1-3:2006 Eurocode 3. Design of steel structures. General rules
- NA to BS EN 1993-1-3:2006 UK National Annex to Eurocode 3. Design of steel structures. General rules
- BS EN 1995-1-1:2004+A2:2014 Eurocode 5: Design of timber structures. General. Common rules and rules for buildings
- NA to BS EN 1995-1-1:2004+A2:2014 UK National Annex to Eurocode 5: Design of timber structures. General. Common rules and rules for buildings
- BS EN 12004-1:2017 Adhesives for ceramic tiles. Requirements, assessment and verification of constancy of performance, classification and marking
- BS EN 12467:2012+A2:2018 Fibre-cement flat sheets. Product specification and test methods
- 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 13139:2013 Aggregates for mortar
- BS EN 13163:2012+A2:2016 Thermal insulation products for buildings. Factory made expanded polystyrene (EPS) products. Specification
- BS EN 13501-1:2018 Fire classification of construction products and building elements. Classification using data from reaction to fire tests
- BS EN 13888:2009 Grout for tiles. Requirements, evaluation of conformity, classification and designation
- BS EN 13914-1:2016 Design, preparation and application of external rendering and internal plastering. External rendering
- BS EN 14081-1:2016+A1:2019 Timber structures. Strength graded structural timber with rectangular cross section. General requirements
- BS EN 16383:2016 Thermal insulation products for building applications. Determination of the hygrothermal behaviour of external thermal insulation composite systems with renders (ETICS)
- BS 5250:2021 Code of practice for control of condensation in buildings
- BS 6093:2006+A1:2013 Design of joints and jointing in building construction. Guide
- BS 8104:1992 Code of practice for assessing exposure of walls to wind-driven rain
- Accredited Construction Details, Scotland: 2019
- BRE Information Paper 1/06:2006 Assessing the effects of thermal bridging at junctions and around openings
- 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
- BSRIA/TRADA IEP6:2006 Services in Timber Framed Construction
- CIGA Technician's guide to best practice: Flues, chimneys and combustion air ventilators:2016
- ETAG 004:2013 Guideline for European Technical Approval of External Thermal Insulation Composite Systems (ETICS) with Rendering
- ETAG 017:2005 Guideline for European Technical Approval of Vecture Kits - Prefabricated Units for External Wall Insulation
- ETAG 034:2012 Guideline for European Technical Approval of Kits for External Wall Claddings Part II: Cladding Kits Comprising Cladding Components, Associated Fixings, Subframe and Possible Insulation Layer
- Government Accredited Construction Detail for Part L:2019
- IGEM IGE/UP/7:2008 Gas installation in timber framed and light steel framed buildings
- NHBC Standards 2021
- PAS 2030:2019 Specification for the installation of energy efficiency measures in existing buildings
- SCI Publication P343:2006 Insulated Render Systems Used with Light Steel Framing

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

CHAPTER 5 - AMENDMENT HISTORY

Revision	Amendment description	Amended by	Approved by	Date
-	First Issue	C Devine	C Vurley	November 2021
A	Updates to Building Regulations and Fire Performance	A Chapman	C Devine	May 2023

CHAPTER 6 - CONDITIONS OF USE

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

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