



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



BAW-25-384-S-A-UK
BDA Agrément®
E.I.SIP OSB
Structural Insulated Panel (SIP)
System



Etopia Eco Holdings Ltd.
Millbank Tower
London
SW1P 4QP
+44 (0)20 3781 8444
info@projectetopia.com
www.etopia.eco

SCOPE OF AGRÉMENT

This BDA Agrément® (hereinafter 'Agrément') relates to E.I.SIP OSB (hereinafter the 'System'). The System consists of prefabricated structural insulated panels (hereinafter 'SIPs') for use as a loadbearing inner leaf of external walls and gable-end walls, in new residential and non-residential buildings.

DESCRIPTION

The System comprises SIPs consisting of oriented strand board type 3 (hereinafter 'OSB3') on both faces, bonded to a rigid polyurethane (hereinafter 'PU') insulation core. The SIPs incorporate tongue-and-groove connections to interlock with adjacent panels, connected together using plywood splines and fixed with galvanised steel nails.

ILLUSTRATION



THIRD-PARTY ACCEPTANCE

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
Technical Compliance Manager,
Building Products

Alpheo Mlotha CEng FIMMM MBA
Business Unit Manager,
Building Products

SUMMARY OF AGRÉMENT

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

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

MAJOR POINTS OF ASSESSMENT

Moisture control - see Section 2.2.7 - the System can contribute to limiting the risk of interstitial and surface condensation.

Strength - see Section 2.2.8 - the System has adequate strength and stiffness to resist wind, dead and imposed loads expected during installation and in service.

Fire performance - see Section 2.2.9 - the System:

- components are classified for reaction to fire, in accordance with BS EN 13501 1;
- has a fire resistance of 60 minutes, in accordance with BS EN 1365-1.

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

Durability - see Section 2.2.11 - the System shall have a service life durability equivalent to that of the building into which it is incorporated.

UKCA, UKNI and CE marking - see Section 2.2.12 - the manufacturers of the constituent products used within the System have responsibility for conformity marking, in accordance with all relevant British and European Product Standards.

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1 GENERAL CONSIDERATIONS

1.1 CONDITIONS OF USE

1.1.1 Limitations

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

1.1.2 Application

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

1.1.3 Assessment

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

1.1.4 Installation supervision

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

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

1.1.5 Geographical scope

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

1.1.6 Validity

The purpose of this Agrément is to provide well-founded confidence to apply the System within the scope described. The validity of this Agrément is as published on www.kiwa.co.uk/bda.

1.2 PRODUCTION CONTROL AND QUALITY MANAGEMENT SYSTEM

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

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

1.3 ANNUAL VERIFICATION PROCEDURE - CONTINUOUS SURVEILLANCE

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

2 TECHNICAL ASSESSMENT

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

2.1 SYSTEM COMPONENTS AND ANCILLARY ITEMS

2.1.1 Components included within the scope of this Agrément

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

Table 1 - Integral components

Component		Description	Dimensions
E.I.SIP OSB panel	external wall panel	SIPs comprising 163 mm thick rigid PUR insulation core with density 42 kg/m ³ and $\lambda_{90/90}$ 0.026 W/m.K, manufactured in accordance with BS EN 13165, sandwiched between 11 mm thick OSB3 facings, manufactured in accordance with BS EN 300	185 mm thick by 1,125 mm wide by 2,400 mm high
	window base panel		185 mm thick; height and width vary, based on the project-specific design
	gable-end panel		
splines		plywood for panel joints and ring beam joints, manufactured in accordance with BS EN 13986	12 mm thick by 150 mm wide by 2,250 mm high
mechanical fixings		galvanised ring-shank nails, used for panel connection fixing through the panel and spline	2.8 mm diameter by 51 mm long

The following components listed in Table 2 are used in conjunction with the System.

Table 2 - Components used with the System

Component		Description	Dimensions
floor skirts for intermediate floors	ring beam	5.5 mm thick plywood section sandwiched between 66 mm thick GL 24 grade glulam beams, manufactured in accordance with BS EN 14080. 12 mm thick plywood splines are located on each side of the glulam beams, with 11 mm thick OSB3 boards on the external faces of the splines	Maximum 185.5 mm wide by 390 mm high - refer to Diagram 5
	binder plate assembly	consisting of two 38 mm thick C16 timber binder plates, fixed externally with two 12 mm thick plywood splines, to provide support for the roof system	Maximum 159 mm wide by 151 mm high - refer to Diagram 6
base plate		treated ^a C16 timber base plate, manufactured in accordance with BS EN 14081-1, fitted over the damp-proof course (hereinafter 'DPC')	38 mm thick by 185 mm wide
sole plate		treated ^a C24 timber sole plate over the base plate	38 mm thick by 137 mm wide
mechanical fixings		galvanised steel fasteners, used for sole and base plate	2.8 mm diameter by 63 mm long
timber battens		treated ^a C16 vertical timber battens, used in corner details, mechanically and adhesively fixed	45 mm thick by 45 mm wide
D4 adhesive		polyurethane-based joint and joist D4 wood adhesive, used in 45 mm by 45 mm corner battens	

^a preservative-treated in accordance with the recommendations of BS 8417

2.1.2 Ancillary items falling outside the scope of this Agrément

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

- lintel support studs - fitted around the openings to provide support, 11 mm thick OSB3, 12 mm thick plywood spline and hardwood;
- mechanical fixings for masonry foundation - 130 mm long, fixed 100 mm from edge of each base plate;
- DPC;
- breather membrane;
- vapour control layer (hereinafter 'VCL');
- temporary support system;
- external finish e.g. cladding system, external wall insulation (hereinafter 'EWI') system or a leaf of masonry units;
- mechanical fixings for external finish;
- 12.5 mm thick plasterboard;
- internal finishes, fixtures and fittings;
- air tightness tapes, sealant adhesives;
- floor panels/system;
- roof panels/system.

2.2.1 Design**2.2.1.1 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.

2.2.1.2 Basis of design

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

2.2.1.3 General design considerations

A project-specific design is required and shall give due consideration to the combination of the System with other structural elements (such as floor and roof panels), which are outside the scope of this Agrément.

The System shall be designed in accordance with:

- BS EN 1990;
- BS EN 1991-1-1;
- BS EN 1991-1-3;
- BS EN 1991-1-4.

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

The System shall be used in conjunction with a suitable foundation (outside the scope of this Agrément), designed by a suitably qualified engineer.

External walls incorporating the System shall be:

- detailed to reduce the risk of damage due to movement in the supporting wall, taking into consideration differential movement in dissimilar materials;
- designed in accordance with the relevant standards to limit mid-span deflection.

A suitably qualified engineer shall ensure that, where required, temporary supports are adequate to resist the loads applied during installation (including wind actions).

Care is needed for design detailing of joints around openings, penetrations and movement joints, in accordance with BS 6093. Openings for windows and doors can be supplied as individual panels or supplied pre-assembled for incorporation in the project-specific design.

Where required, properly constructed movement joints shall be designed to cater for the calculated degree of movement to control expansion, contraction and cracking without reducing the stability and weathertightness of the wall.

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

A watertight breather membrane shall be installed on the external face of the SIPs and shall be continuous and airtight across the entire wall surface. All junctions, edges, overlaps, service penetrations and interfaces (including at windows, doors, intermediate floors and service openings) shall be sealed using compatible tapes and/or appropriate sealants to maintain the integrity of the membrane.

Where a VCL is required, it shall be applied continuously on the warm side of the SIPs.

Electrical and plumbing services shall be designed and installed with precaution to prevent potential long-term damage to the structure or services, such as damage caused by water ingress, water vapour or condensation from cold water pipes (outside the scope of this Agrément).

2.2.1.4 Project-specific design considerations

The project-specific design shall:

- be determined by the Agrément holder;
- take into account the requirements of the relevant national Building Regulations - see Section 3.2;
- take into account the service life durability required - see Section 2.2.11.

A pre-installation survey is required to allow determination of the project-specific design - see Section 2.4.1.

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

- adequacy of foundation system;
- structural adequacy of the load-bearing wall;
- thermal transmittance (hereinafter 'U-value') requirements;
- thermal expansion effects;
- effect of wind actions on the System;
- accommodation of structural movement.

2.2.2 Applied building physics (heat, air, moisture)

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

2.2.3 Permitted applications

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

2.2.4 Installer competence level

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

Installation shall be by an Approved Installer, trained and approved by the Agrément holder.

2.2.5 Delivery, storage and site handling

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

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

Particular care shall be taken to:

- store the System components in a clean, dry and flat area;
- 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 sources of ignition.

2.2.6 Maintenance and repair

Once installed, the System does not require regular maintenance. Any damaged components of the System shall be repaired immediately, in accordance with the Agrément holder's Maintenance and Repair Manual. For further advice in respect of repair, consult the Agrément holder.

Performance factors in relation to the Major Points of Assessment

2.2.7 Moisture control

Condensation risk

At the project-specific design stage, a condensation risk analysis (hereinafter 'CRA') shall be completed by a competent specialist, in accordance with BS 5250, to determine if a VCL is required. The CRA shall:

- consider internal and external environmental conditions;
- include the envisaged wall finishes (i.e. the internal linings and external cladding);
- confirm that interstitial and surface condensation will not occur and the System will not suffer from any detrimental effect (e.g. moisture accumulation).

External walls shall:

- have suitable weather protection on the outside, such as a breather membrane;
- have all joints filled and sealed adequately;
- be ventilated or vented, as required by the external façade design;
- have weatherproof cladding;
- have rapid protection from weather during installation.

Ground moisture

A DPC shall be installed beneath the sole plates.

Resistance to precipitation including wind-driven rain

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

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

2.2.8 Strength

The System shall be designed in accordance with the relevant parts of the following standards:

- BS EN 1990;
- BS EN 1991-1-1;
- BS EN 1991-1-3;
- BS EN 1991-1-4.

Assessment of the structural performance of the System shall be carried out by a suitably qualified engineer to confirm that the System can:

- withstand the applied load and is suitable for its intended use;
- safely transfer the dead, imposed and wind load to foundation system, including any temporary loads that could be applied during installation;
- accommodate all anticipated thermal movements without damage.

The System shall have sufficient strength and rigidity to withstand all wind, dead and imposed loads applied, including racking and any temporary loads that could be applied during installation. The strength of a completed wall shall be verified by a suitably qualified engineer. For racking resistance values - see Section 2.5.2.

The designer shall ensure shear deformation and the long-term creep effects of permanent loading, cracking to internal finishes and any fire-resistance requirements are taken into consideration.

For strength verification, the appropriate K_{mod} for short-term wind loading shall be applied, in accordance with BS EN 1995-1-1. Creep effects under permanent and long-term variable actions shall be assessed using the appropriate deformation factors.

The OSB3 components of the SIPs shall be fully supported by directly bearing onto the top and bottom sill to ensure safe transfer of in-plane forces to the supporting structure. Any gaps or discontinuities at bearing interfaces shall be eliminated or appropriately detailed to ensure continuity of load transfer.

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

A suitably qualified engineer shall ensure that:

- connection details of the System to other structural elements (such as walls, floors and roofs) shall be designed to have adequate strength for the stability of the building. For connection details, consult the Agrément holder;
- lintels for openings in the System shall have adequate strength to transfer the loads to the substrate.

2.2.9 Fire performance

Reaction to fire

The reaction to fire classification of the individual components of the System, in accordance with BS EN 13501-1, can be found in Section 2.5.3.

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

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

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

Proximity of flues and appliances

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

Fire resistance

The System has been tested under loaded conditions, in accordance with BS EN 1365-1. When subjected to applied load of 100 kN, the System demonstrated fire resistance properties (insulation performance, integrity and loadbearing capacity) - see Section 2.5.3.

In Scotland, the System is classified as having a fire resistance of 'medium duration' (at least 60 minutes).

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

For detailed conditions of use regarding requirements for substrate 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.

2.2.10 Thermal performance

For the purposes of U-value calculations and to determine if the requirements of national Building Regulations (or other statutory) are met, the thermal resistance of the wall constructions 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 as appropriate).

The initial thermal conductivity value of the PUR insulation component is given in Section 2.5.4.

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 Product 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 PUR insulation thickness, fixing method, type of mechanical fixing and insulating value of the supporting wall and its internal and external finishes.

Care shall be taken in the overall design and construction of junctions with other elements to minimise thermal bridges and air infiltration. 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 IP 1/06, BRE Report 262 and BRE Report 497.

2.2.11 Durability

The System shall have a service life durability equivalent to that of the building into which it is incorporated. The expected lifespan of the building itself shall be at least 60 years.

Once installed, the System is not susceptible to damage from environmental conditions normally encountered in the UK.

2.2.12 UKCA, UKNI and CE marking

There is no relevant Product standard for the System.

Diagram 1 - Panel, ring beam, baseplate and soleplate exploded detail



Diagram 2 - External corner panel connection detail

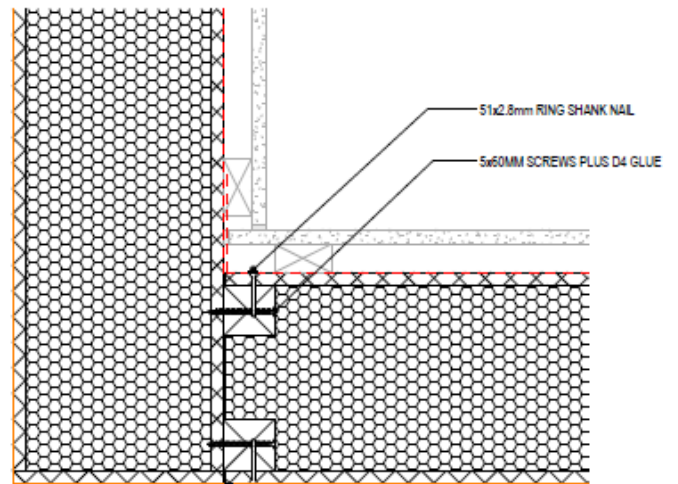


Diagram 3 - Panel to panel connection detail

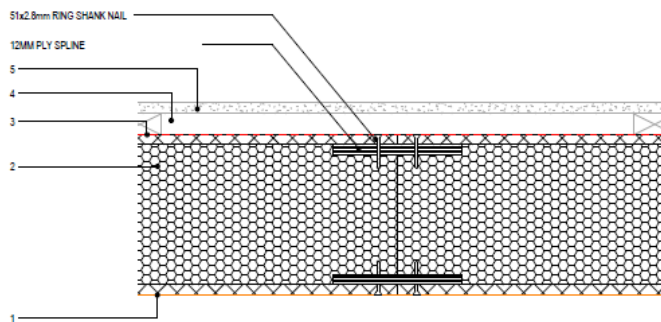


Diagram 4 - Suspended ground floor detail

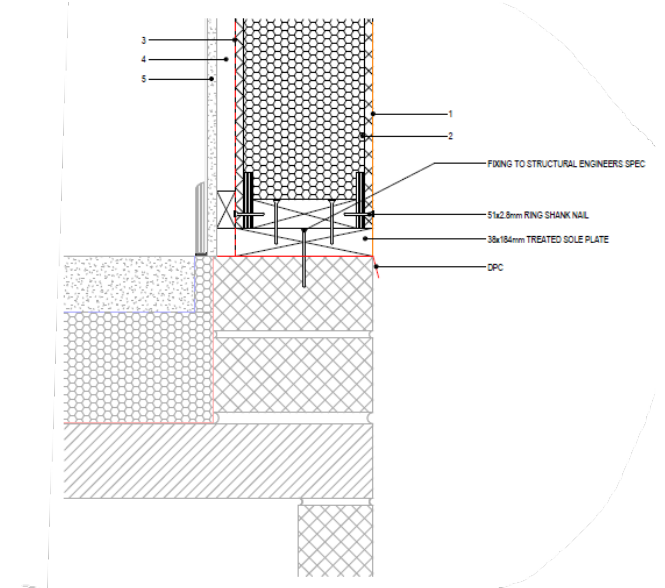


Diagram 5 - Ring beam

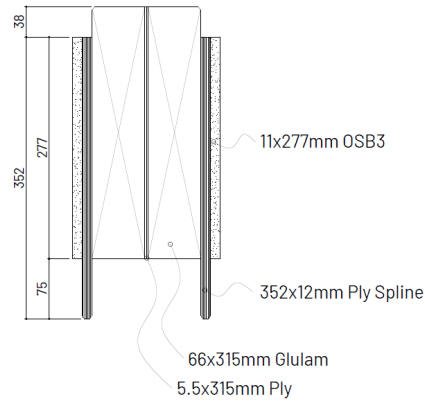


Diagram 6 - Binder plate

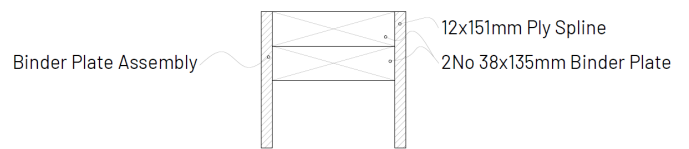


Diagram 7 - Jamb detail

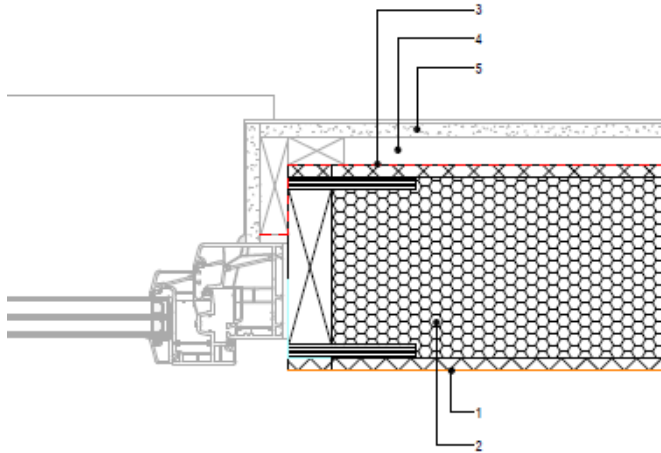


Diagram 8 - Intermediate floor detail

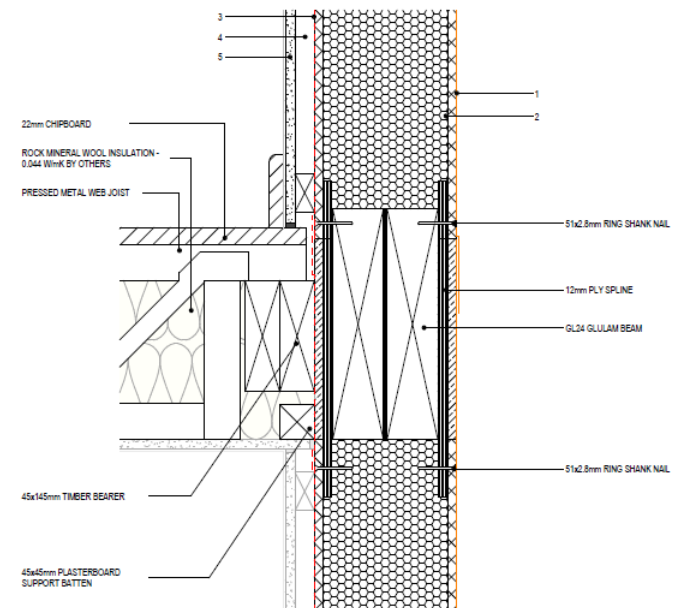
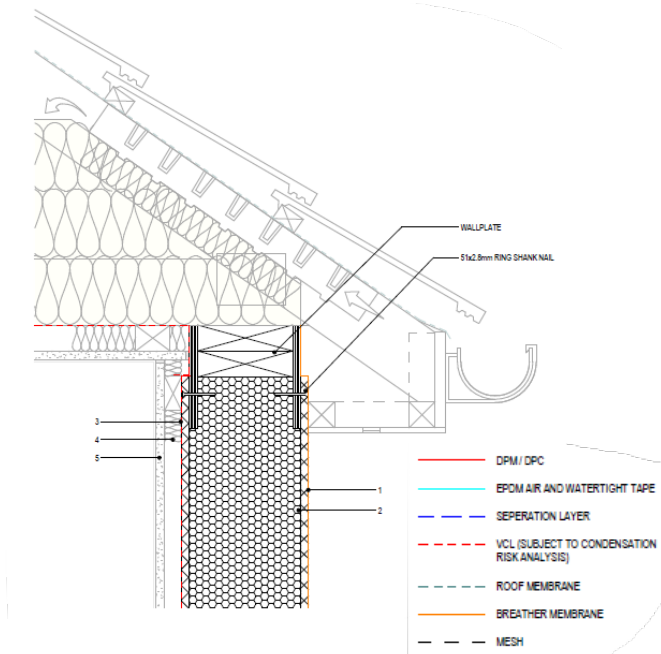


Diagram 9 - Eaves detail



Annotations for Diagrams

- 1 breather membrane
- 2 E.I.SIP OSB3 panel
- 3 AVCL
- 4 Service void, formed of 25 mm by 50 mm treated timber battens at maximum 600 mm centres
- 5 minimum 12.5 mm thick plasterboard

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

2.4.1 Project-specific installation considerations

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

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

- access routes for panel delivery;
- sufficient access for crane/lifting access and positioning;
- storage space for panels (flat, dry, protected) are considered;
- ground conditions for safe movement of lifting equipment are checked;
- weather exposure risks (rain/wind during assembly) are considered;
- the design of foundations, ground floor construction and any flood-mitigation measures shall be appropriate to the site conditions and any identified flood risk;
- details on ground preparation and pre-installation shall be in accordance with the Agrément holder's Installation Manual.

2.4.2 Preparation

The following considerations apply before starting the work:

- safe and adequate access around the working area shall be provided for the installation of the System;
- care shall be taken to avoid damaging the System components before and during installation; any damaged System components shall be repaired or replaced according to the Agrément holder's requirements before resuming installation.

The following works shall be undertaken before installing the System:

- scaffolding or a safe working platform shall be erected by a competent scaffolding contractor, in accordance with the project-specific design, prior to the delivery of the System to site;
- the foundation and ground floor structure (e.g. beams, blockwork, structural slab or masonry floor substrate) shall be correctly constructed and structurally sound, as per the project-specific design;
- the levels of the floor system (outside the scope of this Agrément) shall be measured to ensure they are within acceptable tolerances;
- once the foundations and floor system have been set in place, level and dimensions of the floor area shall be checked and marked with chalk lines to show the positioning of the inside edge of the base plate;
- the perimeter of the floor areas shall be free from dust and debris;
- the System components shall be checked for damage and repairs enacted prior to installation;
- any debris that may have lodged in grooves or recessed areas of the System components shall be cleaned;
- masonry shall be cleared of debris and levels shall be checked (± 3 mm vertical, ± 10 mm diagonal, ± 5 mm overall).

2.4.3 Outline installation procedure

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

The outline procedure is as follows:

- lay a 225 mm wide DPC along the entire masonry length with 20 mm overhang; overlap DPC by 225 mm at corners and by 100 mm overlaps in straight joints;
- align the base plate over the DPC centrally, fix using masonry fixings at 900 mm centres; level and square the base plates using solid packers, especially around openings;
- align and fix the first and second sole plates onto the base plate using ring-shank nails; check levels, dimensions and ensure plates are correctly lapped;
- verify perimeter levels with laser are within ± 3 mm before installation of any SIPs;
- clear the sole plate and the insulation channels within the SIPs;
- lower the first SIP fully onto the sole plate; plumb, and temporarily fix at ends and midpoint;
- position the second SIP to form the corner; slide tight over 45 mm by 45 mm battens;
- ensure full contact at insulation edges and apply temporary fixings;
- ensure the wall panel is vertically plumb using a levelling tool on the interior surface of the wall panel and square at the corner using a framing square;
- insert ply splines into cleared grooves;
- lower the next SIP; slide tight, and apply fixings partially in;
- ensure maintaining running dimensions and allowing 1-2 mm expansion gap for the OSB3;
- repeat the process of positioning over the baseplate, levelling and plumbing for the adjacent panels, until the first wall is completed;
- place the first panel of the next wall into position at the relevant angle and fasten together at the corner;
- continue the installation until all panels are in position, ensuring they are levelled and plumbed;
- for window and door openings:
 - install jamb and cill splines;
 - fit window or door panels; adjust, and apply partial fixings;
 - install support studs and lintel panels; fix at 150 mm centres;
- once all panels are aligned, fully nail the sole plate edge, all vertical edges and all window/door openings;
- clear the insulation channels and fix floor skirt sections (ring beam sections) around the perimeter;
- insert splines and connect skirts; fix with screws where required;
- fix joists/cassettes to bearers/ledger using two nails per end; fix chipboard deck at 300 mm centres (outside the scope of this Agrément, it is to aid installation sequence);
- install the first-floor SIPs (clear skirt, lower first panel, plumb and brace; fix bottom edge and connect next panels with splines; continue around perimeter, checking level and alignment);
- install the binder plate (ring beam):

- slide the binder plate fully into position, and fix at 75 mm centres, 50 mm down from the top edge of the OSB3;
- install corner return and joint plates; fix all temporary fixings.

2.4.4 Finishing

The following finishing is required on completion of the installation:

- temporary push-props can be removed;
- carry out post-installation inspection checks to ensure that installation has been successfully completed;
- floor and roof elements shall be installed in accordance with the project-specific design;
- the wall construction shall be completed with appropriate internal linings and external finishes, in accordance with the project specification and the relevant national Building Regulations.

2.5 INDEPENDENTLY ASSESSED SYSTEM CHARACTERISTICS

2.5.1 Moisture control

Test	Standard	System component	Result
Water vapour diffusion resistance factor, μ	BS EN 12524	OSB3	Wet cup 30
			Dry cup 50
	BS EN ISO 10456	PUR insulation	60

2.5.2 Strength

Test		Standard	System component	Result
Design wind loading [^]		Laboratory own test method	185 mm thick SIP	8.29 kN/m ²
Design Universally Distributed Load (UDL) - eccentric ^{^,§}		BS EN 1995-1-1		30.0 kN/m
Axial characteristic load [^]	with ring beam ^{^^}			131.6 kN/m
	without ring beam ^{§§}			132.7 kN/m
Characteristic racking strength [†] (Fmax)		BS EN 594		32.15 kN

[^] a safety factor of 3 is applied

[§] three E.I.SIP panels in a timber frame of 2,753 mm high by 3,465 mm wide with glulam ring beam 315 mm high fixed at 150 mm centres with eccentric loading beam applied on top of one face of the panels, covering 50 mm in from the panels' face

^{^^} three E.I.SIP panels in a timber frame of 2,760 mm high by 2,340 mm wide with glulam ring beam 390 mm high by 2,250 mm wide fixed at 150 mm centres (panel to panel) and at 75 mm centres panels to sole plate assembly

^{§§} three E.I.SIP panels in a timber frame of 2,515 mm high by 2,340 mm wide fixed at 150 mm centres (panel to panel) and at 75 mm centres panels to sole plate assembly

[†] three E.I.SIP panels in a timber frame of 2,559 mm high by 2,340 mm wide fixed at 150 mm centres (panel to panel) and at 75 mm centres panels to sole plate assembly

2.5.3 Fire performance

Test	Standard	System component	Result
Reaction to fire	BS EN 13501-1	Structural timber frame	D-s2, d0 [^]
		OSB3	D-s2, d0 [^]
		PUR insulation	F
		Mechanical fixings	A1 [^]
Test	Standard	System	Result
Fire resistance of load-bearing wall	BS EN 1365-1	Wall incorporating the System ^{^^}	72 minutes
			72 minutes
			72 minutes

[^] based on classification without further testing (CWFT)

^{^^} tested specimen subject to applied load of 100 kN, comprising:

- three SIP panels, 185 mm thick by 3.0 m high, connected with plywood splines, and secured with 2.8 mm diameter by 51 mm long screws at 150 mm centres vertically and horizontally;
- 12 mm thick cement particle board installed along the vertical perimeter side edges of the panel wall, connected with timber battens fixed at the top of the wall and along the sides between the cement board and panel insulation;
- fully covered with VCL, lapped and sealed by 100 mm at all joints and fixed with staples, secured perimetrically with timber battens 25 mm by 50 mm; vertically over the VCL at 600 mm centres and horizontally on the top, bottom and at height of 2325 mm from the bottom of the wall;
- timber battens creating a 25 mm cavity;
- two layers of 12.5 mm thick Gyproc Wallboard fixed to the timber battens with 3.5 mm diameter by 40 mm long drywall screws;
- jointing paper tape, 90 mm long by 50 mm wide and jointing compound of 220 ready mixed skim and fine finish applied on the final fire exposed side.

2.5.4 Thermal performance

Test	Standard	System component	Result
Initial thermal conductivity	BS EN 12667	PUR insulation	0.026 W/m.K

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 Section 2 of this Agrément, can satisfy or contribute to satisfying the relevant requirements of the following national Building Regulations.

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

3.2.1 England

The Building Regulations 2010 and subsequent amendments

- A1 Loading - the System can sustain and transmit wind, dead and imposed loads
- B3(1) Internal fire spread (structure) - the System will contribute to the requirement for the building when designed and constructed that, in the event of fire, its stability will be maintained for a reasonable period
- B3(3)(a) Internal fire spread (structure) - the System, when installed with an appropriate lining, can contribute to satisfying this Requirement
- B3(4) Internal fire spread (structural) - the System can be designed to contribute to inhibiting the unseen spread of fire and smoke within concealed spaces
- C2(a) Resistance to ground moisture - the System, when incorporating a DPC, can contribute to satisfying this Requirement
- C2(b) Resistance to moisture - the System can contribute to adequately protecting a building from precipitation, including wind-driven spray
- C2(c) Resistance to moisture - the System can adequately limit the risk of surface condensation and contribute to minimising the risk of interstitial 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 the application and can be installed to give a satisfactory performance
- Regulation 26 CO₂ emission rates for new buildings - the System can contribute to satisfying this Requirement
- Regulation 26A Fabric energy efficiency rates for new dwellings - the System can contribute to satisfying this Requirement
- Regulation 26C Target primary energy rates for new buildings - the System can contribute to satisfying this Requirement

3.2.2 Wales

The Building Regulations 2010 and subsequent amendments

- A1 Loading - the System can sustain and transmit wind, dead and imposed loads
- B3(1) Internal fire spread (structure) - the System will contribute to the requirement for the building when designed and constructed that, in the event of fire, its stability will be maintained for a reasonable period
- B3(3)(a) Internal fire spread (structure) - the System, when installed with an appropriate lining, can contribute to satisfying this Requirement
- B3(4) Internal fire spread (structural) - walls incorporating the System can be designed to contribute to inhibiting the unseen spread of fire and smoke within concealed spaces
- C2(a) Resistance to ground moisture - the System, when incorporating a DPC, can contribute to satisfying this Requirement
- C2(b) Resistance to moisture - the System can contribute to adequately protecting a building from precipitation, including wind-driven spray
- C2(c) Resistance to moisture - the System can adequately limit the risk of surface condensation and contribute to minimising the risk of interstitial 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 the application and can be installed to give a satisfactory performance
- Regulation 26 CO₂ emission rates for new buildings - the System can contribute to satisfying this Requirement
- Regulation 26A Primary energy rates for new buildings - the System can contribute to satisfying this Requirement
- Regulation 26B Fabric performance values for new dwellings - the System can contribute to satisfying this Requirement
- Regulation 26C Energy efficiency rating - the System can contribute to satisfying this Requirement

3.2.3 Scotland

The Building (Scotland) Regulations 2004 and subsequent amendments

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

3.2.3.2 Regulation 9 Building Standards - Construction

- 1.1 Structure - the System can sustain and transmit wind, dead and imposed loads
- 2.1 Compartmentation - the System, when installed with an appropriate lining, can contribute to satisfying this Requirement
- 2.2 Separation - the System, when installed with an appropriate lining, can contribute to satisfying this Requirement
- 2.3 Structural protection - the System, when installed with an appropriate lining, can contribute to satisfying this Requirement
- 2.4 Cavities - walls incorporating the System can be designed to contribute to inhibiting the unseen spread of fire and smoke within concealed spaces
- 2.6 Spread to neighbouring buildings - the System, when installed with an appropriate lining, can contribute to satisfying this Requirement
- 3.4 Moisture from the ground - the System, when incorporating a DPC, can contribute to satisfying this Requirement
- 3.10 Precipitation - the System can contribute to adequately protecting a building from precipitation penetrating to the inner face
- 3.15 Condensation - the System can adequately limit the risk of surface condensation and contribute to minimising the risk of interstitial condensation
- 6.2 Building insulation envelope - the System can contribute to satisfying this Requirement

- 7.1 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

The Building Regulations (Northern Ireland) 2012 and subsequent amendments

- 23(1)(a)(i)(ii)(iii)(iv)(b) Fitness of materials and workmanship - the System is manufactured from acceptable materials and is adequately resistant to deterioration and wear under normal service conditions
- 28(a) Resistance to moisture from the ground - the System, when incorporating a DPC, can contribute to satisfying this Requirement
- 28(b) Resistance to moisture - the System can contribute to adequately protecting a building from precipitation, including wind-driven spray
- 29 Condensation - the System can adequately limit the risk of surface condensation and contribute to minimising the risk of interstitial condensation
- 30 Stability - the System can sustain and transmit wind, dead and imposed loads
- 35(1) Internal fire spread - the System will contribute to the requirement for the building when designed and constructed that, in the event of fire, its stability will be maintained for a reasonable period
- 35(2) Internal fire spread - the System, when installed with an appropriate lining, can contribute to satisfying this Requirement
- 35(3) Internal fire spread - the System, when installed with an appropriate lining, can contribute to satisfying this Requirement
- 35(4) Internal fire spread - walls incorporating the System can be designed to contribute to inhibiting the unseen spread of fire and smoke within concealed spaces
- 39(a)(i) Conservation measures - the System can contribute to limiting heat gains and losses through walls
- 40(2) Target carbon dioxide emission rate - the System can contribute to satisfying this Requirement

3.3 THIRD-PARTY ACCEPTANCE

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

4 SOURCES

- BS EN ISO 6946:2017 Building components and building elements. Thermal resistance and thermal transmittance. Calculation methods
- BS EN ISO 9001:2015+A1:2024 Quality management systems. Requirements
- BS EN ISO 10211:2017 Thermal bridges in building construction. Heat flows and surface temperatures. Detailed calculations
- BS EN ISO 10456:2007 Building materials and products. Hygrothermal properties. Tabulated design values and procedures for determining declared and design thermal values
- BS EN 300:2006 Oriented strand boards (OSB). Definitions, classification and specification
- BS EN 594:2011 Timber structures. Test methods. Racking strength and stiffness of timber frame wall panels
- BS EN 1365-1:2012 Fire resistance tests for loadbearing elements. Walls
- BS EN 1990:2002+A1:2005 Eurocode: Basis of structural design
- NA to BS EN 1990:2002+A1:2005-National Annex to Eurocode: Basis of structural design
- BS EN 1991-1-1:2002 Eurocode 1. Actions on structures - General actions - Densities, self-weight, imposed loads for buildings
- NA to BS EN 1991-1-1:2002 UK National Annex to Eurocode 1. Actions on structures - General actions. Densities, self-weight, imposed loads for buildings
- BS EN 1991-1-3:2003+A1:2015 Eurocode 1. Actions on structures - General actions. Snow loads
- NA+A2:2018 to BS EN 1991-1-3:2003+A1:2015 UK National Annex to Eurocode 1: Actions on structures - General actions. Snow loads
- BS EN 1991-1-4:2005+A1:2010 Eurocode 1. Actions on structures - General actions - Wind actions
- NA to BS EN 1991-1-4:2005+A1:2010 UK National Annex to Eurocode 1. Actions on structures - General actions - Wind actions
- 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 12524:2000 Building materials and products. Hygrothermal properties. Tabulated design values
- 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 13165:2012+A2:2016 Thermal insulation products for buildings. Factory made rigid polyurethane foam (PU) 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 13986:2004+A1:2015 Wood-based panels for use in construction. Characteristics, evaluation of conformity and marking
- BS EN 14080:2013 Timber structures. Glued laminated timber and glued solid timber. Requirements
- BS EN 14081-1:2016+A1:2019 Timber structures. Strength graded structural timber with rectangular cross section. General requirements
- BS 5250:2021 Management of moisture in buildings. Code of practice
- BS 6093:2006+A1:2013 Design of joints and jointing in building construction. Guide
- BS 8000-0:2014+A1:2014 Workmanship on construction sites. Introduction and general principles
- BS 8104:1992 Code of practice for assessing exposure of walls to wind-driven rain
- BS 8417:2024 Preservation of wood. Code of practice
- BRE Information Paper IP 1/06:2006 Assessing the effects of thermal bridging at junctions and around openings
- BRE Report 262:2002 Thermal insulation: avoiding risks. 3rd edition
- BRE Report 443:2019 Conventions for U-value calculations
- BRE Report 497:2016 Conventions for calculating linear thermal transmittance and temperature factors. 2nd edition

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

5 AMENDMENT HISTORY

Revision	Amendment description	Author	Approver	Date
-	First issue	A Tsourlini	C Devine	May 2026

6 CONDITIONS OF USE

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