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BAF-24-348-S-A-UK
BDA Agrément®
Kingspan Aeroground Insulated Foundation System

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SCOPE OF AGRÉMENT

This BDA Agrément® (hereinafter 'Agrément') relates to Kingspan Aeroground Insulated Foundation System (hereinafter the 'System'). The System comprises a range of interlocking expanded polystyrene (hereinafter 'EPS') elements which act as permanent insulated shuttering for in-situ reinforced concrete, contributing to the thermal performance of foundations and ground floor concrete slab. The System is for use in the formation of insulated concrete foundations in new residential and non-residential buildings.

DESCRIPTION

The System comprises Base, Sub-base and Top boards (EPS 100 and EPS 300 grades) with prefabricated Ringbeam shutter profiles (EPS 300 grade) for edge and corner applications. The EPS components are supplied in a range of thicknesses, manufactured in accordance with BS EN 13163.

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
Operations 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;
- has adequate water vapour transmission resistance;
- has adequate resistance to water absorption.

Strength - see Section 2.2.8 - the System will have sufficient strength to sustain and transmit both dead and imposed superstructure and floor loads.

Thermal performance - see Section 2.2.9 - the System improves the thermal performance of a floor and can contribute to satisfying the requirements of the national Building Regulations.

Durability - see Section 2.2.10 - 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 2.2.11 - the Agrément holder has responsibility for conformity marking, in accordance with all relevant British and European Product Standards.

CONTENTS

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, Northern Ireland and 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	EPS grade	Dimensions (mm)		
			Width	Length	Thickness
Base board	white, rectangular EPS boards laid to receive a concrete slab, with compressive stress (10 % deformation) level of CS(10)100 for EPS 100 or CS(10)300 for EPS 300	EPS 100^	1,200	1,800	100
Sub-base board		EPS 300	400 to 1,200	600 to 1,200	200 to 450
Top board					
Base board (for loadbearing applications)	white EPS boards used as baseboards for loadbearing walls and support pads compressive stress (10 % deformation) level of CS(10)300				
Ringbeam shutter profiles (for edge and corner applications)	prefabricated white EPS boards consisting of bespoke edge profiles, laid around the perimeter of the foundation area (to receive the steel reinforcement and concrete slab) compressive stress (10 % deformation) level of CS(10)300		400 to 1,200	600, 1,000 or 1,200	100 to 450

^ EPS 100 includes a fire-retardant additive

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:

- PU expanding foam for sealing around pipes and ducts;
- vapour control layer;
- concrete slab, designed according to structural requirements;
- floor slab;
- damp-proof membrane (hereinafter 'DPM');
- radon barrier;
- damp-proof course (hereinafter 'DPC');
- blinding layer of aggregate;
- compacted engineering fill layer;
- drainpipes;
- steel combs;
- plastic nails;
- U-shape stainless steel rods;
- plastic spacers;
- FOAMGLAS® blocks™;
- steel re-bars;
- mesh / reinforcement;
- brickwork.

2.2 POINTS OF ATTENTION TO THE SPECIFIER

2.2.1 Design

2.2.1.1 Design responsibility

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

2.2.1.2 Basis of design

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

2.2.1.3 General design considerations

The System shall be laid on the following:

- blinding and levelling layer - 30 to 50 mm thick layer of 1 to 4 mm fine aggregate;
- sub-base - minimum of 150 mm (or 200 mm for Ireland) thick layer of 4 to 40 mm compacted engineering fill; specified by a structural engineer, which will act as a capillary break between the ground and the System.

For structural design, the System shall be considered as a layer of engineering fill, with known compressive strength. For use of the System on ground which is subject to clay heave, follow the relevant precautions.

The System is protected from water by the provision of drainage under the System by the capillary break of 150 to 200 mm thick engineering fill layer between the ground and the System.

A flat and level blinding is important to avoid potential concentrated point loads, which can damage the System.

The Structural Engineer shall ensure that:
- the ability of a concrete slab to resist loads in service is determined;
- the structure above the System has movement joints, to take into account any deformation of the System;
- the concrete slab shall be reinforced in accordance with the Structural Engineer's recommendations;
- appropriately sized plastic spacers are used under the bottom layer of reinforcement to protect the membrane;
- alternatively, if plastic spacers are not used, spreader plates or spacers of adequate surface area shall be used when placing steel reinforcement mesh to minimise risk of puncture of the DPM and System components and hold the mesh away from the insulation to maintain concrete cover.

Due consideration shall be taken to the routing and incorporation of gas and water pipes in accordance with the project-specific design. Drains and ducts shall be laid after the sub-base is compacted to protect them from damage.

A suitable ground gas/volatile organic compound (hereinafter 'VOC') protective membrane will be required below the System where the presence of ground gases or VOCs may occur.

Ground-supported concrete floor bases shall incorporate a suitable DPM to resist moisture from the ground, in accordance with CP 102 and BS 8102.

The DPM and/or radon barrier shall be placed under the System, where it is less likely to get damaged. Sufficient membrane shall be left at the perimeter of the System to protect the edges from excess concrete.

The ground shall be prepared to support the concrete foundation. Precautions shall be put in place with respect to the proposed end use and to ensure adequate durability of the building fabric.

The depth of compacted fill shall be at least 50 % of the derived foundation depth, no more than 1.25 m deep, and shall be determined by whichever is deeper:
- frost heave depth;
- the depth required to achieve a suitable bearing capacity;
- the depth required to avoid heave due to clay;
- the minimum depth required to comply with the relevant Building Regulations.

Compacted fill shall be non-shrinkable. Material containing more than 35 % fine particles (silt and clay) with a plasticity index of 10 % or greater is defined as shrinkable and is susceptible to clay heave.

Fill material shall be placed in layers and compacted in accordance with Table 8/5 of Manual of Contract Documents for Highway Works (MCHW) Volume 1 Specification for Highway Works Series 0800.

2.2.1.4 Project-specific design considerations

The project-specific design shall:
- be determined by the Specifier;
- 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 2.2.10.

A pre-installation site survey is required to determine the project-specific design and confirm suitability of the System. This shall include:
- an assessment of the ground conditions, including loadbearing capacity of the underlying soil strata;
- a site investigation to determine the nature and extent of the conditions, including invasive geotechnical and contamination investigations, in accordance with BS EN 1997-2 / I.S. EN 1997-2; this on-site testing shall be supplemented by subsequent laboratory testing where necessary;
- investigation for ground VOC and ground gas contamination, in accordance with BS 8576 and BS 10175;
- the modulus of subgrade reaction of the ground and of the System;
- relevant construction details of the structure intended to be installed above the System.

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 is 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. Where required, particular care shall be taken to:

- avoid exposure to direct sunlight for extended periods of time;
- avoid exposure to high or low temperatures for extended periods of time;
- store System components indoors and in a well-ventilated area to them protect from frost;
- store System components away from possible sources of ignition.

2.2.6 Maintenance and repair

Once installed, the System:

- is not susceptible to damage from environmental conditions normally encountered in the UK and Ireland;
- does not require regular maintenance. For advice in respect of repair, consult the Agrément holder.

Performance factors in relation to the Major Points of Assessment

2.2.7 Moisture control

Water vapour transmission

The EPS components have adequate water vapour diffusion resistance factor μ, in accordance with BS EN 12086, and is given in Section 2.5.1.

Condensation risk

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

To minimise the risk of surface and interstitial condensation, a condensation risk analysis shall be completed at the project-specific design stage for all elements of the floor construction, in accordance with BS EN ISO 13788, BS EN 15026 or BS 5250.

To minimise the risk of surface condensation, care shall be taken to diminish gaps in the insulation layer. Appropriate expanding foam shall be used to fill gaps around pipes and ducts in accordance with this Agrément and the instructions of the Agrément holder.

2.2.8 Strength

A qualified structural engineer shall ensure that foundations for use with the System shall be designed in accordance with BS EN 1991-1-1 / I.S. EN 1991-1-1, BS EN 1992-1-1 / I.S. EN 1992-1-1 and BS EN 1997-1 / I.S. EN 1997-1.

The concrete slab used with the System shall be in accordance with BS EN 206, BS 8500-1 and BS 8500-2.

The System has adequate:

- compressive strength, in accordance with BS EN 826;
- bending strength; in accordance with BS EN 12089.

The System contributes to the short- and long-term structural performance of the concrete foundation by transmitting vertical design loads and imposed floor loads to the ground. The long-term compressive creep of the System remains within the acceptable limit of 2 % strain after 50 years, when subjected to a permanent compressive stress of 0.3 σ_{10}.

A qualified structural engineer shall ensure that an appropriate factor of safety for the sub-grade ground condition is incorporated, in accordance with BS EN 1997-1 / I.S. EN 1997-1.

The System is suitable for use in residential buildings when covered with an appropriate floor overlay and can resist a uniformly distributed load of 2 kN/m^2 or a concentrated load of 2 kN for category A1 and A2 situations as defined in BS EN 1991-1-1 / I.S. EN 1991-1-1.

The differential settlement of the System due to short and long-term reduction in EPS thickness are within acceptable limits.

The System components have adequate compressive strength to resist applied dead and imposed loads from the concrete slab at serviceability limit state (SLS) and ultimate limit state (ULS) conditions.

The qualified structural engineer shall ensure the concrete floor slab has been designed for possible ground movement and is adequately reinforced using steel bars or steel mesh.

2.2.9 Thermal performance

The thermal conductivity of System does not change with time. The System components may come into contact with water, and consideration shall therefore be given on a project-specific basis when analysing the thermal performance of the System.

The requirements for limiting heat loss through floors, including the effect of thermal bridging, can be satisfied if the thermal transmittance (hereinafter 'U-value') of a floor, incorporating an appropriate thickness of the System, does not exceed the maximum U-value requirement in the national Building Regulations.

U-Value calculations of a complete floor shall be carried out in accordance with BS EN ISO 6946, BS EN ISO 13370 and BRE Report 443, using the declared thermal conductivity (λ_D) values given in Section 2.5.4.

The U-value of the entire floor will depend on the ratio of the exposed (and semi-exposed) floor perimeter length to floor area and ground conductivity.

Thermal bridging at junctions and around openings

Care shall be taken in the overall design and construction of junctions with other elements and openings, to minimise cold bridging and air infiltration. Due consideration shall be given to the Agrément holder's thermally modelled performance junction details and the Government Accredited Construction Details.

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

2.2.10 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 and Ireland.

2.2.11 UKCA, UKNI and CE marking

The British and European standard for the System is BS EN 13163.

2.3 EXAMPLES OF TYPICAL DETAILS

Diagram 1 - Typical internal load-bearing wall detail

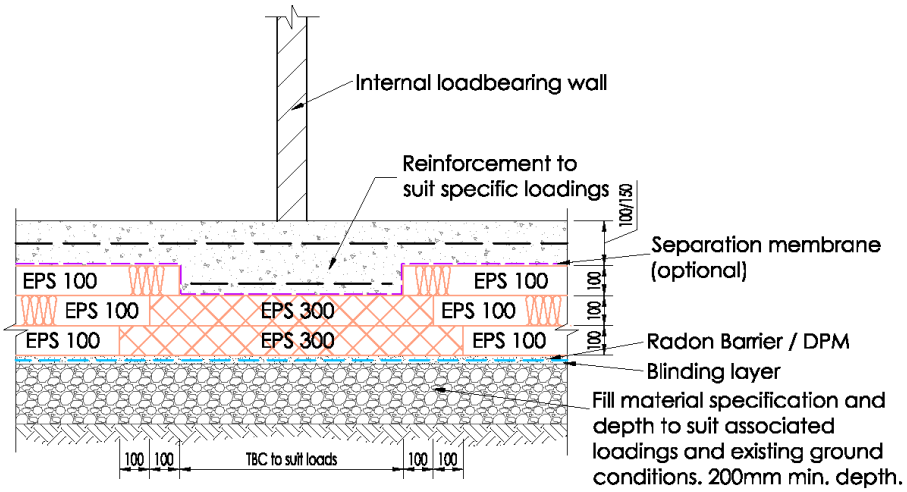


Diagram 2 - Typical masonry cavity wall detail

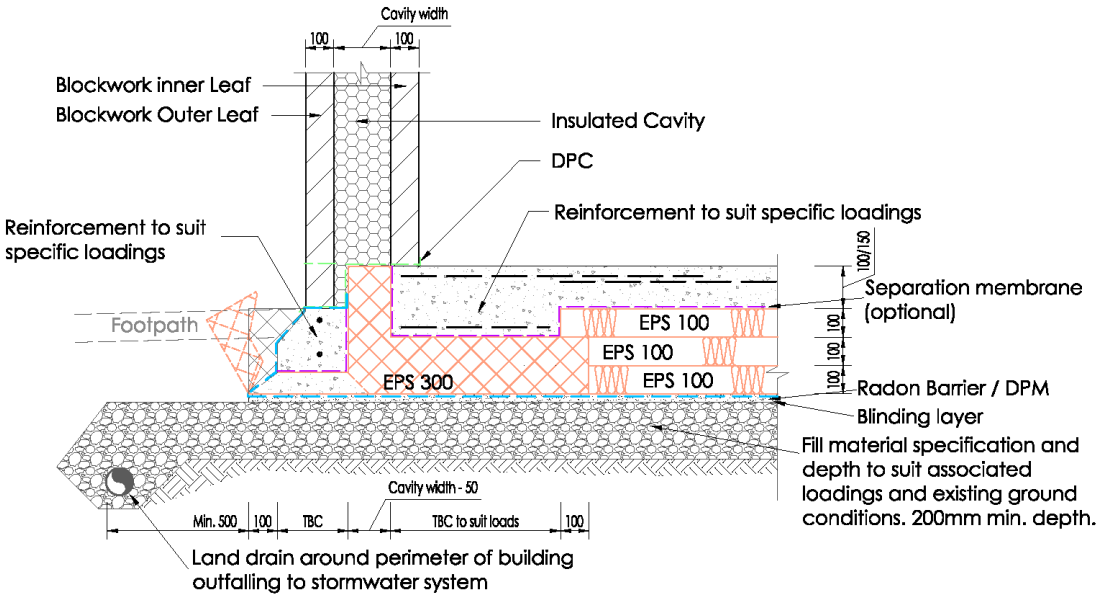


Diagram 3 - Typical timber frame cavity wall details (1)

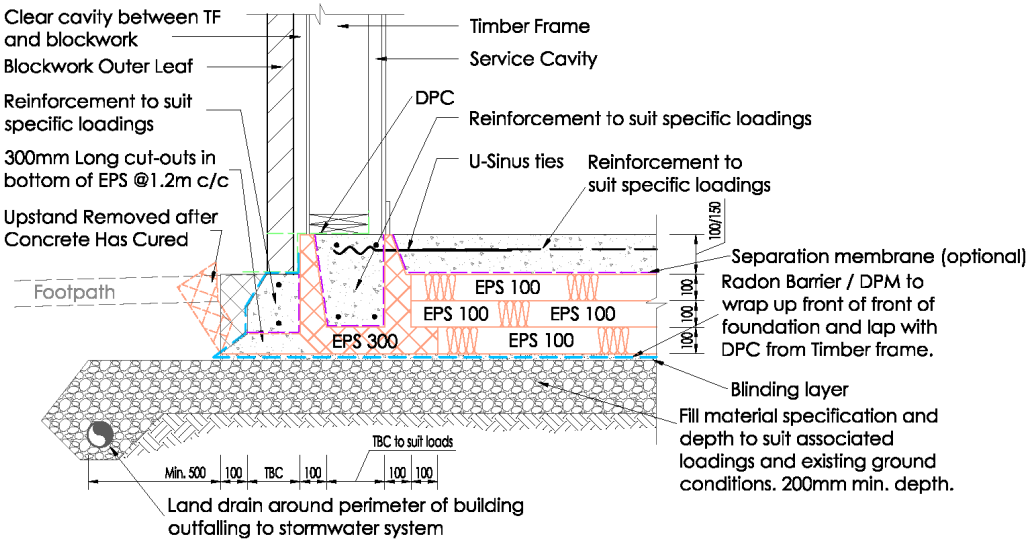
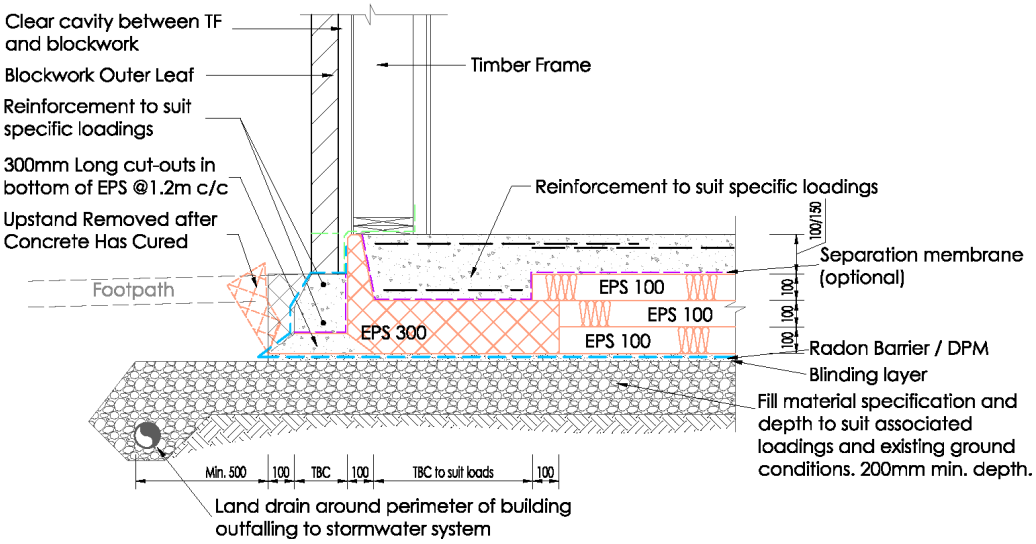


Diagram 4 - Typical timber frame cavity wall details (2)



2.4 INSTALLATION

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

2.4.1 Project-specific installation considerations

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

2.4.2 Preparation

The following considerations apply before starting the work:

- the System is supplied with project-specific detailed drawings. System components for use at corners, and any non-standard lengths, are identifiable with the detailed drawings;
- the sub-base shall be free-draining and constructed in accordance with the specification provided by the qualified Engineer;
- wherever possible, to avoid walking on the blinding, work from the outside of the slab.

The following works shall be undertaken before installing the System:

- the level of the site shall be reduced to a minimum of 580 to 700 mm below the intended finished floor level of the building, allowing for:
  - 150 mm (or 200 mm for Ireland) of compacted hardcore;
  - 30 to 50 mm thickness of levelling layer of pee gravel or fine chip (0 to 4 mm diameter);
  - 400 to 450 mm overall thickness of the System;
- the sub-base shall be laid in multiple flat layers, with each layer compacted in accordance with the project-specific design;
- drains and ducts shall be laid after the sub-base is compacted;
- the blinding shall extend at least 150 mm beyond the perimeter of the System;
- install the DPM / radon barrier;
- complete the sub-base by screeding the top of the blinding using appropriate equipment.

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:

- start the assembly of ringbeam shutter profiles from a corner, as per the drawings;
- assemble the two shutter profiles by pinning them together using the steel combs provided;
- drive the combs to half the depth into the shutter profiles during initial assembly, only drive/hammer them into full depth after the entire perimeter of the building has been assembled;
- check for dimensional accuracy and repeat this procedure at the next adjacent corner;
- proceed to place shuttering sections along the line between these corners;
- if pipe or ductwork is encountered, mark out the position on the edge module of the Ringbeam shutter profile and cut to fit around the obstruction;
- repeat the above procedure for each run of foundation until the complete perimeter of the building has been assembled;
- check that installation has been carried out as per the drawings, any errors found shall be adjusted;
- for large, concentrated loads, install FOAMGLAS® blocks™ in the base layer as required;
- starting at a corner, install EPS 300 boards in locations for loadbearing walls and support pads, as specified in the detail drawings;
- install the remainder of Base and Sub-base EPS boards, as specified;
- ensure that joints in alternate layers are crossed to avoid thermal bridging;
- once all System components are installed, seal around pipes and ductwork using PU expanding foam;
- if required, lay a DPM on top of the System as a separation membrane, in accordance with the project-specific detail, ensuring there is adequate coverage at corners and that it is sealed around pipes and ductwork;
- allow sufficient DPM at the perimeter to protect the edges of the System from excess concrete.

2.4.4 Finishing

The following finishing is required on completion of the installation:

- install the steel re-bar, steel mesh and U-Sinus rods as necessary;
- the System shall be filled with a concrete slab, in accordance with the project-specific design.

2.5 INDEPENDENTLY ASSESSED SYSTEM CHARACTERISTICS

2.5.1 Moisture control

Test	Standard	Result	
		EPS 100	EPS 300
Water vapour diffusion resistance factor μ	BS EN 12086	39.8	61.3
Long-term water absorption by total immersion (28 days)	BS EN ISO 16535	2.9 %	3.5 %

2.5.2 Strength

Test	Standard	Result	
		EPS 100	EPS 300
Compressive strength at 10% strain	BS EN 826	CS(10)100	CS(10)300
Declared level of compressive creep	BS EN 1606	2 % or less after 50 years	2 % or less after 50 years
Bending strength	BS EN 12089	BS150	BS450

2.5.3 Fire performance

Test	Standard	Result	
		EPS 100^	EPS 300
Reaction to fire classification	BS EN 13501-1	E	F

^ EPS 100 includes a fire-retardant additive

2.5.4 Thermal performance

Test	Standard	Result	
		EPS 100	EPS 300
Declared thermal conductivity (λ_D)	BS EN 12667	0.035 W/mK	0.034 W/mK

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 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(1)(2) Loading - the System can sustain and transmit combined dead and imposed floor loads safely to the ground
- C2(a) Resistance to moisture - the System contributes to resist water absorption from the ground
- C2(c) Resistance to moisture - a floor incorporating the System can adequately protect a building from interstitial and surface condensation
- L1(a)(i) Conservation of fuel and power - the System can limit heat gains and losses through a floor
- Regulation 7(1) Materials and workmanship - the System is manufactured from suitably safe, durable materials for the application and can be installed to give a satisfactory performance
- Regulation 26 CO_2 emission rates for new buildings - a floor incorporating the System can contribute reducing CO_2 emissions
- Regulation 26A Fabric energy efficiency rates for new dwellings - the System can contribute to satisfying this Regulation
- Regulation 26C Target primary energy rates for new buildings - the System can contribute to satisfying this Regulation

3.2.2 Wales

The Building Regulations 2010 and subsequent amendments

- A1(1)(2) Loading - the System can sustain and transmit combined dead and imposed floor loads safely to the ground
- C2(a) Resistance to moisture - the System contributes to resist water passage from the ground
- C2(c) Resistance to moisture - a floor incorporating the System can adequately protect a building from interstitial and surface condensation
- L1(a)(i) Conservation of fuel and power - the System can limit heat gains and losses through a floor
- Regulation 7(1) Materials and workmanship - the System is manufactured from suitably safe, durable materials for the application and can be installed to give a satisfactory performance
- Regulation 26 CO_2 emission rates for new buildings - a floor incorporating the System can contribute reducing CO_2 emissions
- Regulation 26A Primary energy rates for new buildings - the System can contribute to satisfying this Regulation
- Regulation 26B Fabric performance values for new dwellings - the System can contribute to satisfying this Regulation
- Regulation 26C Energy efficiency rating - the System can contribute to satisfying this Regulation

3.2.3 Scotland

The Building (Scotland) Regulations 2004 and subsequent amendments

3.2.3.1 Regulation 8(1) 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 Structure - the System can sustain and transmit combined dead and imposed floor loads safely to the ground
- 3.4 Moisture from the ground - the System contributes to resist water passage from the ground
- 3.15 Condensation - a floor incorporating the System can adequately protect a building from interstitial and surface condensation
- 6.2 Building insulation envelope - the System will contribute to the insulation envelope to resist thermal transfer
- 7.1(a)(b) Statement of sustainability - the System can contribute to satisfying the relevant Requirements of Regulation 9, Standards 1 to 6, and will therefore 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)(i)(ii)(iii)(b) Fitness of material and workmanship - the System is manufactured from materials which are considered to be suitably safe and acceptable for use
- 28(a) Resistance to moisture and weather - the System contributes to resist water passage from the ground
- 29 Condensation - a floor incorporating the System can adequately protect a building from interstitial and surface condensation
- 30 Stability - the System can sustain and transmit combined dead and imposed floor loads safely to the ground
- 39(a)(i) Conservation measures - the System can limit heat gains and losses through a floor
- 40(2) Target carbon dioxide emission rate - a floor incorporating the System can contribute reducing CO_2 emissions

3.2.5 Ireland

Building Regulations 1997 and subsequent amendments

In order to demonstrate compliance with Irish Building Regulations, this BDA Agrément® certifies that the System complies with the requirements of a recognised document and indicates it is suitable for its intended purpose and use.

- A1(1)(2) Loading - the System can sustain and transmit combined dead and imposed floor loads safely to the ground
- C4 Resistance to weather and ground moisture - floors incorporating the System can contribute to protecting a building from moisture in the form of interstitial condensation
- D1 Materials and workmanship - the System is manufactured from suitably safe and durable materials for their application
- L1 Conservation of fuel and energy - floors incorporating the System can contribute to limiting heat gains and losses through a building envelope, and can contribute to limiting CO_2 emissions from a building
- L5(c) Conservation of fuel and energy (for new buildings other than dwellings) - the System can contribute to satisfying this Requirement
- Regulation 8(c) Conservation of fuel and energy (for new dwellings) - 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 13370:2017 Thermal performance of buildings. Heat transfer via the ground. Calculation methods
- BS EN ISO 13788:2012 Hygrothermal performance of building components and building elements. Internal surface temperature to avoid critical surface humidity and interstitial condensation. Calculation methods
- BS EN ISO 16535:2019 Thermal insulating products for building applications. Determination of long-term water absorption by immersion
- BS EN 206:2013+A2:2021 Concrete. Specification, performance, production and conformity
- BS EN 826:2013 Thermal insulating products for building applications. Determination of compression behaviour
- BS EN 1606:2013 Thermal insulating products for building applications. Determination of compressive creep
- 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 1992-1-1:2004+A1:2014 Eurocode 2: Design of concrete structures - General rules and rules for buildings
- NA+A2:2014 to BS EN 1992-1-1:2004+A1:2014 UK National Annex to Eurocode 2. Design of concrete structures - General rules and rules for buildings
- BS EN 1997-1:2004+A1:2013 Eurocode 7. Geotechnical design - General rules
- NA+A2:2022 to BS EN 1997-1:2004+A1:2013 UK National Annex to Eurocode 7. Geotechnical design - General rules
- BS EN 1997-2:2007 Eurocode 7. Geotechnical design - Ground investigation and testing
- NA to BS EN 1997-2:2007 UK National Annex to Eurocode 7. Geotechnical design - Ground investigation and testing
- BS EN 12086:2013 Thermal insulating products for building applications. Determination of water vapour transmission properties
- BS EN 12089:2013 Thermal insulating products for building applications. Determination of bending behaviour
- BS EN 12667:2001 Thermal performance of building materials and products. Determination of thermal resistance by means of guarded hot plate and heat flow meter methods. Products of high and medium thermal resistance
- BS EN 13163:2012+A2:2016 Thermal insulation products for buildings. Factory made expanded polystyrene (EPS) products. Specification
- BS EN 13501-1:2018 Fire classification of construction products and building elements - Classification using data from reaction to fire tests
- BS EN 15026:2023 Hygrothermal performance of building components and building elements. Assessment of moisture transfer by numerical simulation
- BS 5250:2021 Management of moisture in buildings. Code of practice
- BS 8000-0:2014+A1:2024 Workmanship on construction sites. Introduction and general principles
- BS 8102:2022 Protection of below ground structures against water ingress. Code of practice
- BS 8500-1:2023 Concrete. Complementary British Standard to BS EN 206. Method of specifying and guidance for the specifier
- BS 8500-2:2023 Concrete. Complementary British Standard to BS EN 206. Specification for constituent materials and concrete
- BS 8576:2013 Guidance on investigations for ground gas. Permanent gases and Volatile Organic Compounds (VOCs)
- BS 10175:2011+A2:2017 Investigation of potentially contaminated sites. Code of practice - 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
- BRE Report 443:2019 Conventions for U-value calculations
- BRE Report 497:2016 Conventions for calculating linear thermal transmittance and temperature factors
- CP 102:1973 Code of practice for protection of buildings against water from the ground
- I.S. EN 1991-1-1:2002 Eurocode 1: Actions on structures. Part 1-1: General actions. Densities, self-weight, imposed loads for buildings
- I.S. EN 1991-1-1:2002/NA:2013 Irish National Annex to Eurocode 1: Actions on structures. Part 1-1: General actions. Densities, self-weight, imposed loads for buildings
- I.S. EN 1992-1-1:2004+AC:2010+A1:2014 Eurocode 2: Design of concrete structures. Part 1-1: General rules and rules for buildings
- I.S. EN 1992-1-1/NA:2004/NA:2010/AC2:2020 Irish National Annex to Eurocode 2: Design of concrete structures. Part 1-1: General rules and rules for buildings
- I.S. EN 1997-1:2004+A1:2013 Eurocode 7: Geotechnical design. Part 1: General rules
- I.S. EN 1997-1:2004+A1:2013/NA:2015 Irish National Annex to Eurocode 7: Geotechnical design. Part 1: General rules
- I.S. EN 1997-2:2007 Eurocode 7: Geotechnical design. Part 2: Ground investigation and testing
- Manual of Contract Documents for Highway Works (MCHW) Volume 1 Specification for Highway Works - Series 0800 - Road pavements - Unbound, cement and other hydraulicly bound mixtures, Amendment - November 2021

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 Chapman	C Devine	March 2025

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