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

BAF-20-179-S-A-UK
BDA Agrément®
Isoquick
Insulating Foundation System

Build Homes Better Ltd.
Blythe Farm
Mill Street, Gamlingay
Sandy
SG19 3JW
+44 (0)1202 909106
enquiries@buildhomesbetter.co.uk
www.buildhomesbetter.co.uk

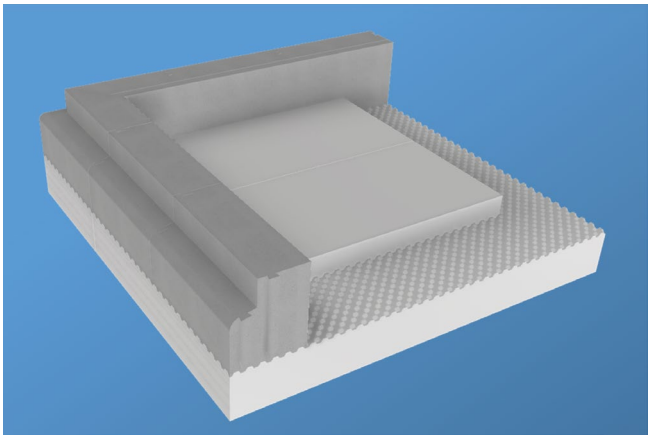
SCOPE OF AGRÉMENT

This Agrément relates to the Isoquick insulating foundation system (hereinafter the 'System'). The System comprises a range of interlocking expanded polystyrene (hereinafter 'EPS') elements which act as thermally insulating permanent shuttering for in-situ reinforced concrete, contributing to the thermal performance of raft foundations and ground floor concrete slab. The System is for use in the formation of insulated concrete raft foundations in new dwellings.

DESCRIPTION

The System comprises Base and Top boards, with prefabricated Edge profiles formed from EPS. The EPS components are available with declared compressive strength of 200 kPa, 300 kPa and 700 kPa, supplied in a range of thicknesses, manufactured in accordance with BS EN 13163. The System also comprises resin composite profile, manufactured in accordance with BS EN 13706-2.

ILLUSTRATION



THIRD-PARTY ACCEPTANCE

None requested by the Agrément holder.

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 - the System (see Section 2.2.9):

- can contribute to limiting the risk of interstitial and surface condensation;
- has adequate water vapour transmission resistance;
- has adequate resistance to water absorption.

Strength - the System will have sufficient strength to sustain and transmit both dead and imposed superstructure and floor loads (see Section 2.2.10).

Thermal performance - the System improves the thermal performance of a floor (see Section 2.2.11).

Durability - the System shall have a service life durability equivalent to that of the building into which it is incorporated (see Section 2.2.12).

UKCA and CE marking - the Agrément holder has responsibility for conformity marking, in accordance with all relevant British and European Product Standards (see Section 2.2.13).

CONTENTS

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.

1.1.4 Installation supervision
The quality of installation and workmanship shall be controlled by a competent person who shall be an employee of the installation company (hereinafter '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 determined that the Agrément holder fulfils all its 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 its 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 following components are integral to the use of the System:

Component	Product name	Colour	Description	Dimensions (mm)		
				Width	Height	Thickness
Base and Top boards	IQ-60e	grey	EPS elements laid to receive a concrete raft slab, with compressive stress (10 % deformation) level of CS(10)200 for IQ-60e, CS(10)300 for IQ-90 or CS(10)700 for IQ-210	600	1,200	50 to 200 mm, in 25 mm increments
	IQ-90	white				
	IQ-210	white				
Edge profile	IQ-60e^	grey	prefabricated EPS elements consisting of an Edge profile bonded to a Base board, laid around the perimeter of a concrete raft slab to form a shutter, with compressive stress (10 % deformation) level of CS(10)200	100, 150, 200	600	350

^ the vertical phase of the Edge profile is IQ-60e; the vertical phase is bonded to a Base board which may be IQ-60e, IQ-90 or IQ-210

The following component can be used in conjunction with the System:

Component		Description	Dimensions (mm)		
			Width	Height	Thickness
Resin composite structural profile	I-beam	Resin composite profile of minimum properties of grade E23, manufactured in accordance with BS EN 13706-2. See Section 2.5.2 for mechanical properties	70	120	8
	Angle		101.6	101.6	9.5

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 (hereinafter 'VCL');
- radon barrier;
- concrete raft slab, designed according to structural requirements;
- damp-proof membrane (hereinafter 'DPM'), in accordance with CP 102;
- 50 mm thick blinding layer of stone (2 to 6 mm diameter);
- compacted engineering fill layer of appropriate specifications (minimum of 150 mm).

2.2 POINTS OF ATTENTION TO THE SPECIFIER

2.2.1 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.

2.2.2 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 General design considerations

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.

Guidance on linear thermal transmittance heat flows and surface temperature factors 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.

Account shall be taken of Government Accredited Construction Details for Part L - Masonry and Timber detail illustrations in England and Wales, Accredited Construction Details for Scotland, Accredited Construction details for Northern Ireland.

The System shall be laid on the following:

- blinding and levelling layer - typically 50 mm thick layer of 2 to 6 mm clean stone; acting as a capillary break between the ground and the System;
- sub-base - minimum of 150 mm thick layer of compacted engineering fill; specified by a structural engineer, typically type 3 limestone in accordance with Ministry of Transport Specification for Highway Works Clause 805.

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 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 50 mm thick blinding layer between the ground and the System.

A flat and level blinding is important to avoid potential concentrated point loads, which could overload the System. It is recommended that the clean stone shall be angular in nature and shall extend at least 150 mm beyond the edge of the bottom of the System.

The structural engineer shall ensure that:
- the ability of a concrete raft 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 raft slab shall be reinforced in accordance with the structural engineer's recommendations;
- appropriately sized 'concrete bar' spacers are used under the bottom layer of fabric reinforcement to spread any point load and protect the membrane;
- if 'concrete bar' spacers are not used, spreader plates shall be used when placing steel reinforcement mesh to minimise risk of puncture of the DPM and System components.

The System shall not be applied over existing vents or ventilation gaps.

The System could be reinforced with resin composite profiles to link the perimeter reinforced concrete beam to the raft foundation to prevent differential settlement, without creating a thermal break - see Diagram 4.

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.

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

Where practical, a DPM and/or gas barrier shall be placed on top of 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 raft 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 not exceed 1,250 mm 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.

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 Ministry of Transport Specification for Highway Works Clause 800.

The System can be used to construct party walls incorporating a reinforced concrete slab of minimum 200 mm thickness underneath, as per Diagram 5. Such walls themselves fall outside the scope of this Agrément.

2.2.4 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 2.2.12).

A pre-installation walkover site survey is required to allow determination of 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; 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.

2.2.5 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.

2.2.6 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 can be undertaken by competent persons experienced in this type of work.

2.2.7 Delivery, storage and site handling
The System is delivered in suitable packaging bearing the System name, production identification date or batch number, the Agrément holder's name 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, such as:

- avoid exposure to direct sunlight for extended periods of time;
- store in a well-ventilated covered area to protect from frost;
- store away from possible ignition sources.

2.2.8 Maintenance and repair

Once installed, the System:

- is not susceptible to damage from environmental conditions normally encountered in the UK;
- 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

2.2.9 Moisture control

Water vapour transmission

Due to the nature of the cell structure, the EPS elements have a low level of water vapour transmission (high water vapour resistance), in accordance with BS EN 12086.

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. A condensation risk analysis shall be completed at the project-specific design stage for all elements of the floor construction, to minimise the risk of surface and interstitial condensation 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 minimise 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.

2.2.10 Strength

Raft foundations for use with the System shall be designed by a structural engineer in accordance with BS EN 1991-1-1, BS EN 1992-1-1 and BS 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 raft 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 is incorporated, in accordance with BS EN 1997-1.

The System is suitable for dwellings when covered with a suitable floor overlay and can resist a uniformly distributed load of 1.5 kN/m^2 or a concentrated load of 2 kN for category A1 and A2 (domestic) situations as defined in BS EN 1991-1-1.

The I-beam profile is spanned between perimeter reinforced concrete beam and is used to structurally link the brick supporting perimeter RC beam to the main slab to prevent differential settlement. A combined factor of safety 4 shall be applied to the properties of the I-beam profile.

In case of provision of resin composite I-beam profile, the structural engineer shall design the foundation system and provide the necessary details (including beam spacing, connections with the perimeter beam and the concrete raft foundation).

The resin composite angle profile could be used above the edge profile, mechanically fixed in situ with bolts. The angle profile supports applied load and transfers them directly to the raft foundation.

A qualified structural engineer shall design the angle profile as per the project-specific specifications. For a uniformly distributed load across the full width of the top flange, the maximum allowable load is 380 kg/m, with a deflection of 1 mm.

The resin composite I-beam profile will be within the concrete with enough cover and no cracks closer, protecting it from the chemical attack from soil and ground water. The profile durability aspects have been verified in accordance with test standard ISO 10406 - see Section 2.5.2.

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 Structural Engineer shall ensure the concrete floor slab has been designed for possible ground movement and is adequately reinforced using steel bar or steel mesh.

2.2.11 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 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.

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 2.5.3.

2.2.12 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.

The System is rot-proof, has a stable cell structure and is dimensionally stable. There is no reduction in performance over the lifetime of the System.

2.2.13 UKCA and CE marking

The European standard for the System BS EN 13163.

2.3 EXAMPLES OF TYPICAL DETAILS

Diagram 1 - Typical element

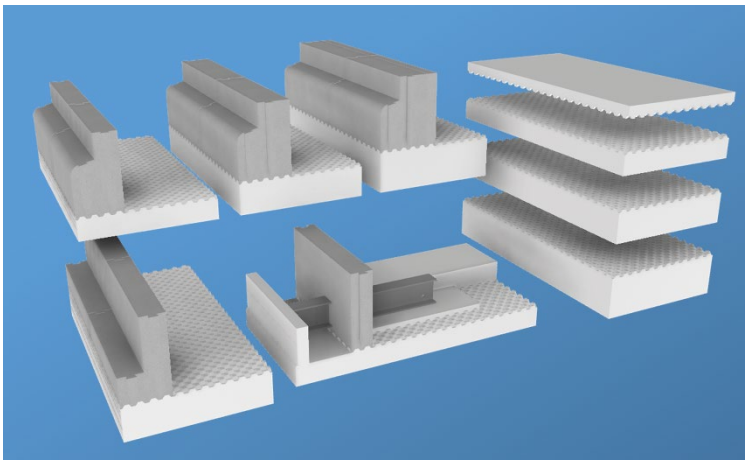
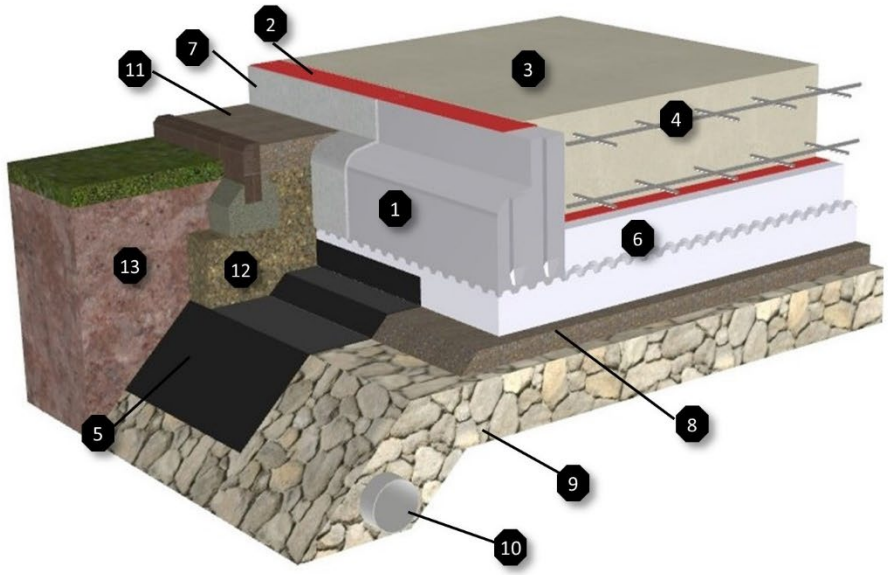


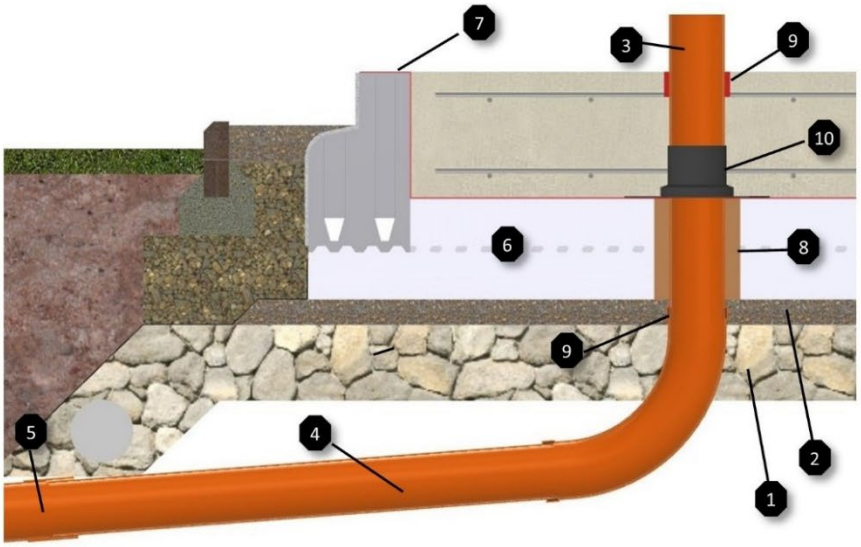
Diagram 2 - Typical edge detail



Typical Edge Profile

1: **ISOQUICK EM10** Edge Profile
2: DPM/Gas Barrier
3: RC slab to Engineers Specification
4: Reinforcement to Engineers specification
5: Geotextile membrane
6: **ISOQUICK Base Boards**
7: Protective coating, e.g. Water resistant render
8: Nominal 50mm blinding, typically 2-6mm clean stone
9: Sub base to Engineers Specification,
Min; 150mm compacted MOT type 3
10: Land drain, if required*
11: French (gravel) drain
12: Free draining back fill
13: soil
Typical sizes, other sizes on request
For Further information see Standard detail
SD-0002 & SD-0003

Diagram 3 - Typical drain and duct section detail

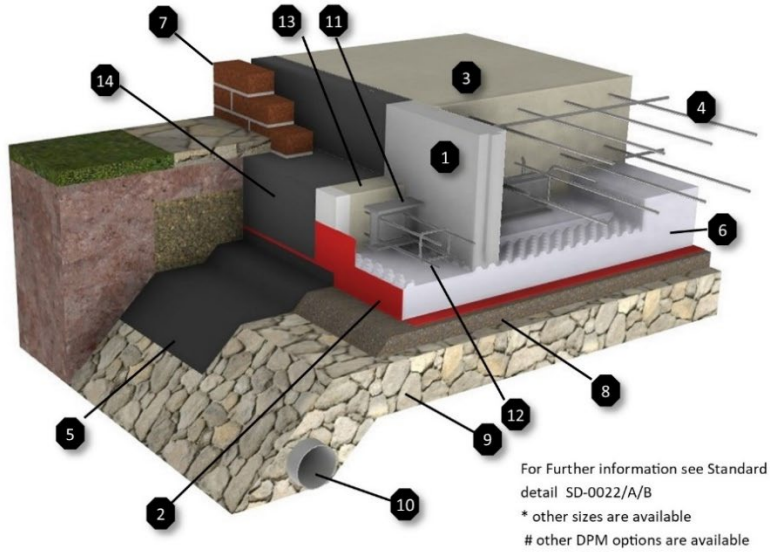


Ducts and Drains

1: Sub base to Engineers Specification,
Min; 150mm compacted MOT type 3
2: Nominal 50mm blinding, typically 2-6mm clean stone
3: Service duct /Waste pipe
4: laid to fall
5: Rocker /flexible joint, outside building foot-print
6 : ISOQUICK Base Boards
7 : DPM/Gas Barrier
8: FR Pu foam
9: Intumescent Pipe Wrap, min 60min rating, fitted flush to top of slab
10: Dpm sealed to pipe/duct
11: Where possible collar kept below top of blinding

For Further information see Standard detail SD-0018

Diagram 4 - Brick wall support detail

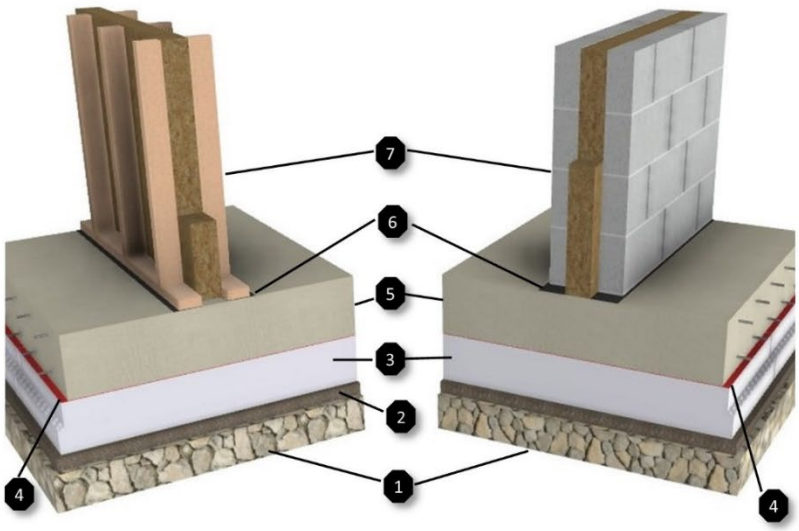


Brick Wall Support Detail

1: **ISOQUICK EM10-BW*** Edge Profile
2: DPM/Gas Barrier#
3: RC slab to Engineers Specification
4: Reinforcement to Engineers specification
5: Geotextile membrane
6: **ISOQUICK Base Boards**
7: Brick/stone wall. Tied to wall superstructure above dpm level
8: Nominal 50mm blinding, Sand or concrete.
9: Sub base to Engineers Specification,
Min; 150mm compacted MOT type 3
10: Land drain, if required*
11: ISOQUICK concrete-resistant GRP I-beam
12: Reinforcement cage
13: RC beam to engineer's specification
14: Self Adhesive DPM/tanking membrane

For Further information see Standard detail SD-0022/A/B
* other sizes are available
# other DPM options are available

Diagram 5 - Party wall detail

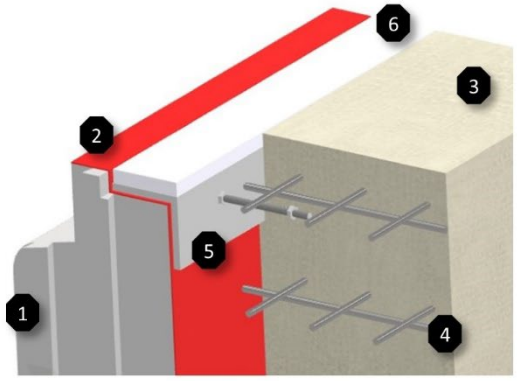


Party Wall Detail

1: Sub base to Engineers Specification, Min; 150mm compacted MOT type 3
2: Nominal 50mm blinding, typically 2-6mm clean stone
3: **ISOQUICK Base Boards**
4: DPM/Gas Barrier
5: RC slab to Engineers Specification, Min 200mm thick, min density 2200 kg/m3
6: DPC
7: Wall Construction, complete with acoustic insulation to Architects detail.

For Further information see Standard detail SD-0004

Diagram 6 - Typical threshold detail



Typical Threshold detail

1: EM15 Edge Profile
2: DPM/Gas Barrier
3: RC slab to Engineers Specification
4: Reinforcement to Engineers specification
5: **ISOQUICK** Concrete resistant GRP angle profile with cast in situ bolts @ max 200mm centers
6: Compacfoam200 (or equivalent)

For more information see **ISOQUICK** Standard Detail SD-0032.
Loading: Max. UDL = 360kg/lm
Door cill, seal to dpm and fixings omitted for clarity. To architects details.

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 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 shall be determined from a pre-installation survey.

2.4.4 Preparation
The following considerations apply before starting the work:
- the System is supplied with a project-specific assembly plan. System components for use at corners, and any non-standard lengths, are individually numbered and identifiable with the assembly plan;
- the sub-base shall be free-draining and constructed in accordance with the specification provided by the Engineer;
- for accuracy, a hot wire cutter is the preferred method of cutting the EPS elements.

The following works shall be undertaken before the installation of the System:
- the sub-base shall be laid in multiple flat layers, with each layer compacted in accordance with the requirements of the Agrément holder and structural design;
- drains and ducts shall be laid after the sub-base is compacted;
- where the DPM is placed above the System, the sub-base shall be blinded with a 50 mm thick layer of clean stone (2 to 6 mm diameter) to achieve a flat, level and free-draining layer;
- the blinding shall extend at least 150 mm beyond the perimeter of the System;
- complete the sub-base by screeding the top of the blinding using appropriate equipment.

2.4.5 Outline installation procedure

The outline installation procedure is as follows:

- wherever possible, to avoid walking on the blinding, work from the outside of the slab;
- starting just before a corner, lay the first perimeter Edge profile;
- working in a clockwise direction, install subsequent Edge profiles by sliding together via their dovetail joints. The final Edge profile will need cutting to fit the dovetail joint of the first Edge profile laid;
- if pipe or ductwork is encountered, mark out the position on the Edge profile and cut to fit around the obstruction;
- starting at a corner, lay a complete row of Base boards. The final Base board of a row may need to be cut to size, and the off-cut may then be used to start the next row;
- lay subsequent rows of Base boards;
- lay the first row of Top boards after at least two rows of Base boards are completed. The final Top board of a row may need to be cut to size, and the off-cut may then be used to start the next row;
- when all System components are installed, seal around pipes and ductwork using PU expanding foam;
- lay a DPM on top of the System, ensuring there is adequate coverage at corners and that it is sealed around pipes and ductwork. Sufficient DPM shall be left at the perimeter to protect the edges of the System from excess concrete;
- as per the project-specific design, the resin composite I-beam profile shall be installed in accordance with the site specific engineering details and Agrément holder installation guide.

2.4.6 Finishing

The following finishing is required on completion of the installation:

- prior to backfilling, Edge profiles shall be protected from ultraviolet (UV) light and mechanical damage. Advice on the selection and suitability of materials shall be sought from the Agrément holder;
- the System shall be filled with a concrete raft slab in accordance with the project-specific design;
- the slab may be cast prior to backfilling around the perimeter;
- the perimeter backfill shall consist of a free draining material, or a drainage membrane shall be installed between the Edge profile and the backfill material.

2.5 INDEPENDENTLY ASSESSED SYSTEM CHARACTERISTICS

2.5.1 Moisture control

Test	Standard	Result		
		IQ-60e	IQ-90	IQ-210
Water vapour diffusion resistance factor μ	BS EN 12086	40 to 100		450
Water vapour permeability		0.006 to 0.015 mg/(Pahm)		0.0015 mg/(Pahm)
Long-term water absorption by total immersion (28 days)	BS EN ISO 16535	WL(T)2		WL(T)5

2.5.2 Strength

EPS components

Test	Standard	Result		
		IQ-60e	IQ-90	IQ-210
Declared level of compressive strength σ_{10}	BS EN 826	CS(10)200	CS(10)300	CS(10)700
Declared level of compressive creep	BS EN 1606	cc(2/1.5/50) 60	cc(2/1.5/50) 90	cc(2/1.5/50)210
Bending strength	BS EN 12089	BS280	BS305	BS950

Resin composite profile

Test	Standard	Result
Characteristic tensile strength	BS EN 13706-2	459.10 MPa
Characteristic tensile modulus	BS EN ISO 527-4	33.70 GPa
Characteristic flexural strength	BS EN 13706-2 BS EN ISO 14125	490.20 MPa
Durability (characteristic tensile strength retention rate)	ISO 10406-1 BS EN ISO 527-4	82.50 %

2.5.3 Thermal performance

Test	Standard	Result		
		IQ-60e	IQ-90	IQ-210
Declared thermal conductivity (λ_D)	BS EN 12667	0.031 W/mK	0.033 W/mK	0.034 W/mK

2.5.4 Fire performance

Test	Standard	Result		
		IQ-60e	IQ-90	IQ-210
Reaction to fire classification	BS EN 13501-1	E		

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) 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 - the System can contribute to satisfying this Regulation

3.2.2 Wales

The Building Regulations 2010 and subsequent amendments

- A1(1) 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 consumption rates for new buildings - the System can contribute to satisfying this Regulation
- Regulation 26B Fabric performance values for new dwellings - the System can contribute to satisfying this 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 Structures - 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
- 6.1(b) Carbon dioxide emissions - a floor incorporating the System can contribute reducing CO_2 emissions
- 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 meting 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)

3.2.4 Northern Ireland

The Building Regulations (Northern Ireland) 2012 and subsequent amendments

- 23 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

3.3 THIRD-PARTY ACCEPTANCE

None requested by the Agrément holder.

4 SOURCES

- BS EN ISO 527-4:2023 Plastics. Determination of tensile properties - Test conditions for isotropic and orthotropic fibre-reinforced plastic composites
- 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 14125:1998+A1:2011 Fibre-reinforced plastic composites. Determination of flexural properties
- 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+A1:2014 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 13706-2:2002 Reinforced plastics composites. Specifications for pultruded profiles - Method of test and general requirements
- 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
- ISO 10406-1:2008 Fibre-reinforced polymer (FRP) reinforcement of concrete - Test methods - Part 1: FRP bars and grids
- ISO 10406-2:2008 Fibre-reinforced polymer (FRP) reinforcement of concrete - Test methods - Part 2: FRP sheets
- 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 443:2006 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
- Ministry of Transport Specification for Highway Works Clause 800:2016
- Ministry of Transport Specification for Highway Works Clause 805:2016

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	C Devine	C Vurley	February 2022
A	Addition of T21 and fiberglass pultruded profile; Re-issue upon successful 3 Year Renewal	M Javed	C Devine	July 2025

6 CONDITIONS OF USE

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

Where a National Annex exists in respect of a BS EN (or other) standard, its use is deemed mandatory wherever the original standard is referenced.

Kiwa Ltd. has used due skill, care and attention in the preparation of this BDA Agrément®.

Whilst all due diligence has been used, no liability or warranty is extended by Kiwa Ltd.

The Agrément holder is responsible for advising Kiwa Ltd. immediately if there is a variation to the System specification or constituent elements/components after initial publication of this BDA Agrément®.

For full terms and conditions, refer to Kiwa Ltd.