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BAF-18-042-S-A-UK
BDA Agrément®
energystore TLA®
Bound EPS Ballasting for Floors



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SCOPE OF AGRÉMENT

This Agrément relates to energystore TLA® (hereinafter the 'System'), a thermally insulating, non-structural, bound expanded polystyrene (BEPS) ballasting which contributes to the thermal performance of floors. The System is for internal application to ground-supported and suspended ground floors in existing and new domestic and non-domestic buildings in the UK and Ireland. The System is available in three grades depending on the thermal performance required; TLA110, TLA150 and TLA200. Other grades are available but fall outside the scope of this Agrément.

SYSTEM DESCRIPTION

The System consists of grey, spherical, expanded polystyrene (hereinafter 'EPS') beads manufactured in accordance with BS EN 13163 and BS EN 16809-1, factory-coated with a liquid additive (EIA). The coated EPS beads are mixed with cement and water to form homogeneous fresh mortar in accordance with BS EN 16025-1. The System can be mixed on-site or transported to site pre-mixed in traditional concrete mixer vehicles. The System shall be installed to a minimum depth of 50 mm; for special requirements where the minimum depth cannot be achieved, consult the Agrément holder.

SYSTEM 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.

Chris Vurley, CEng
Technical Manager, Building Products

Mark Crowther, M.A. (Oxon)
Kiwa Ltd. Technical Director

SUMMARY OF AGRÉMENT

This document provides independent information to specifiers, building control personnel, contractors, installers and other construction industry professionals considering the safety and fitness for the intended use of the System. This 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 - a floor incorporating the System can contribute to limiting the risk of interstitial and surface condensation (see section 2.2.9).

Strength - subject to design and specification, a floor incorporating the System can have adequate strength (see section 2.2.10).

Fire performance - a floor incorporating the System is classified as European Classification A2-s1, d0, in accordance with BS EN 13501-1 (see section 2.2.11).

Thermal performance - the System improves the thermal performance of floors (see sections 2.2.12 and 2.5.4).

Durability - a floor incorporating the System shall have a service life durability equivalent to that of the building into which it is incorporated (see section 2.2.13).

CE marking - the Agrément holder has responsibility for CE marking in accordance with all relevant harmonised European Product Standards (see section 2.2.14).

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CHAPTER 1 - GENERAL CONSIDERATIONS

1.1 - CONDITIONS OF USE

1.1.1 Design considerations

See section 2.2.

1.1.2 Application

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

1.1.3 Assessment

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

1.1.4 Installation supervision

The quality of installation and workmanship must be controlled by a competent person who must 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 Chapter 3 of this Agrément (CDM, national Building Regulations and Third-Party Acceptance).

1.1.6 Validity

The purpose of this BDA Agrément® is to provide for well-founded confidence to apply the System within the Scope described. The validity of this Agrément is three years after the issue date, and as published on www.kiwa.co.uk/bda.

1.2 - PRODUCTION CONTROL AND QUALITY MANAGEMENT SYSTEM

Kiwa Ltd. has determined that the Agrément holder fulfils all obligations in relation to this Agrément, in respect of the System.

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

1.3 - ANNUAL VERIFICATION PROCEDURE - CONTINUOUS SURVEILLANCE

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

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

2.1 - SYSTEM COMPONENTS & ANCILLARY ITEMS

2.1.1 Components included within the scope of this Agrément

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

Item	Description
EPS bead	grey bead, 2 to 8 mm diameter, density $12 \pm 2 \text{ kg/m}^3$
liquid additive (EIA)	proprietary liquid for factory-coating EPS beads to ensure homogenous mixing with cement and water
cement	minimum grade Portland 32.5 Cem I or Cem II, in accordance with BS EN 197-1
water	potable water, in accordance with BS 8204-1

2.1.2 Ancillary items falling outside the scope of this Agrément

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

- latex adhesive.

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 installing contractor is responsible for the final as-built design.

2.2.2 Applied building physics (heat, air, moisture)

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

2.2.3 General design considerations

The System is for use in fully-bonded, partially-bonded, unbonded and floating floor applications on compacted hardcore or dry concrete bases (including ground-supported and suspended ground floor applications).

The requirement 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 does not exceed the target U-value requirement in the national Building Regulations.

New concrete floors shall be designed and constructed in accordance with the national Building regulations, British Standards and Codes of Practice to prevent moisture penetration.

A project-specific design shall take into account PAS 2030 and PAS 2035 as appropriate.

The minimum applied depth of the System shall be 50 mm. If pipes or conduits are present on the base, a minimum depth of 50 mm shall be measured from the highest level of all pipes/conduits.

For ground-supported floors, a damp proof membrane (hereinafter 'DPM') laid between the System and the compacted hardcore is sufficient to prevent ground moisture penetration.

Concrete placed prior to the application of the System shall be fully cured and structurally sound.

The System shall be covered by a screed prior to the installation of a wearing surface. The screed shall be a wearing screed if no subsequent wearing surface is required by the project-specific design.

The System:

- can be used in conjunction with underfloor heating and cooling systems;
- shall not be installed over unprotected electrical cables, existing vents or ventilation gaps. Consider rerouting or re-laying in conduit or trunking.

Acoustic measures shall be installed in a floor:

- beneath any pipes and conduits/trunking prior to the installation of the System; or
- above the System prior to screed.

Care shall be taken in design detailing of joints at service pipe openings and should be in accordance with BS 6093.

Existing structural joints and/or expansion joints in a concrete base shall be maintained after installation of the System.

Care shall be taken in the overall design and construction at junctions with external walls and openings 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 IP1/06, BRE Report 262 and BRE Report 497.

2.2.4 Project-specific design considerations

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

The project-specific design shall consider the service life durability required - see section 2.2.13.

No pre-installation survey is required for the installation of the System - see section 2.4.3.

An inspection shall be carried out prior to the installation of the System. Typical checks should include:

- the suitability and condition of the base;
- underfloor and room space ventilation requirements.

U-value calculations for a completed floor should be carried out in accordance with BS EN ISO 10211 (taking into consideration BS EN ISO 6946, BS EN ISO 13370 and BRE Report 443), using the System's declared thermal conductivity (λ_D). Design and declared thermal values can be found in BS EN ISO 10456.

A Condensation Risk Analysis can be carried out by the Agrément holder in accordance with BS 5250, if required.

2.2.5 Permitted applications

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

2.2.6 Installer competence level

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

Installation must be by employees trained and approved by the Agrément holder and subject to inspections by Kiwa Ltd. under a Kiwa Installation Assessment & Surveillance Scheme.

2.2.7 Delivery, storage and site handling

The System is delivered to site in suitable packaging, bearing the System name, the Agrément holder's name and the BDA Agrément® logo incorporating the number of this Agrément.

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

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

2.2.8 Maintenance and repair

Once installed, the System does not require maintenance provided the wearing surface is maintained in good condition. Damaged or poorly applied areas of the System shall be removed and fresh mortar applied. Minor cracks may be repaired using a suitable smoothing compound. 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

The System will:

- be resistant to atmospheric moisture and will resist the passage of moisture from the ground when used with a DPM;
- have adequate performance in respect of water vapour transmission, in accordance with BS EN 12086.

Condensation risk analysis calculations in accordance with BS 5250 are not required for floors with a ground-bearing base.

2.2.10 Strength

The System can:

- have adequate strength to resist normal non-structural loadings for internal applications;
- be installed effectively to comply with floor use categories A, B or C, in accordance with BS EN 1991-1-1.

2.2.11 Fire performance

A floor incorporating the System is classified as European Classification A2-s1, d0, in accordance with BS EN 13501-1.

2.2.12 Thermal performance

The System will improve thermal performance when incorporated in a non-structural floor.

2.2.13 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 should be at least 60-years.

The System is non-toxic, non-absorbent, rot-proof, stable over time and does not sustain fungi or mould.

The System:

- will maintain its shape, size, structure and appearance;
- has similar movement characteristics to concrete and traditional sand/cement-based mixes.

To achieve the service life durability indicated, the wearing surface shall be maintained in good condition.

2.2.14 CE marking

The harmonised European standard for the System is BS EN 16025-1.

2.3 - EXAMPLES OF TYPICAL DETAILS

Diagram 1 - typical floor make-up with a concrete sub-floor

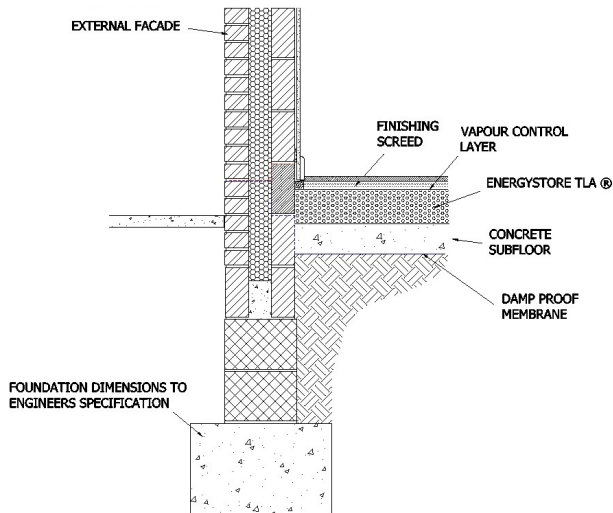
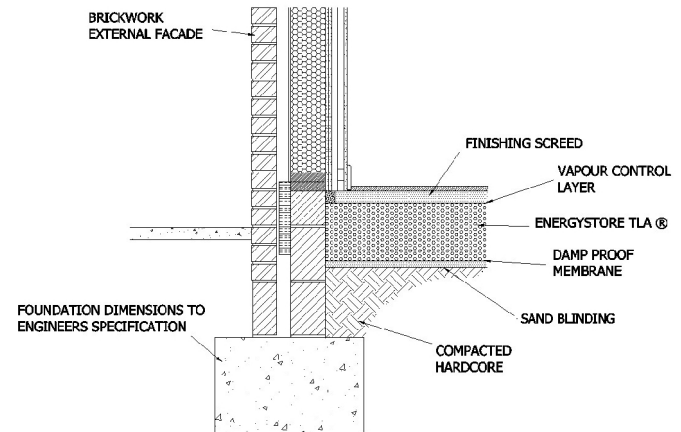


Diagram 2 - typical floor make-up without a sub-floor



2.4 - INSTALLATION

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

2.4.1 Installer competence level

See section 2.2.6.

2.4.2 Delivery, storage and site handling

See section 2.2.7.

2.4.3 Project-specific installation considerations

No pre-installation survey is required for the installation of the System.

Installation shall be in accordance with BS 8000-0, BS 8000-3, and BS EN 16025-2.

Fresh mortar shall be installed:

- at ambient temperatures between 5 and 35 °C;
- within three hours of mixing.

Expansion joints are not generally required. For further guidance, contact the Agrément holder.

When required, day joints should be cast vertically. Prior to recommencing work, day joints shall be treated with latex adhesive.

Ensure the installation area is adequately ventilated during, and after installation of the System.

Once installed, avoid artificial heating of the area for 72 hours. The System will dry at the rate of 10 mm of thickness per day and must be protected from frost for seven days after installation.

When unprotected, the System should not be subject to any pedestrian site traffic for 36 to 72 hours after installation, subject to weather conditions and the ambient air temperature. If overlaid with temporary protection, pedestrian site traffic is permitted after 36 hours.

If the finished floor is in an area of a building that is likely to become wet, the wearing surface shall include watertight seams at all junctions, details and edges.

2.4.4 Preparation

The base over which the System is to be placed shall be prepared in advance of installation. Different requirements apply for fully-bonded, partially-bonded, unbonded and floating floor applications.

Typically, the following works shall be undertaken prior to the installation of the System:

- removal of dust, fragments, organic or other extraneous matter;
- removal of any laitance;
- sealing with suitable primer;
- removal and repair of damaged or friable sections to ensure the surface is as regular as possible;
- checks for any evidence of ponding on the base;
- where required, install a suitable DPM.

2.4.5 Outline installation procedure

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

The key sequence for installation is:

- batch the fresh mortar prior to use;
- install the fresh mortar to the base via a hose-delivery system;
- spread as required; level and smooth using a straight edge;
- check the installation is correct in respect of finished level, surface regularity and thickness.

After installation, testing shall be undertaken by the Installer in accordance with the requirements of BS EN 16025-2, to ensure the System supplied on-site meets the required specification.

2.4.6 Finishing

The following finishing is required on completion of the installation:

- a screed shall be installed in accordance with BS 8204-7;
- a screed can be installed as soon as the System is suitable to walk on. This will be conditional on the System thickness and drying conditions;
- a vapour control layer (VCL) may be required between the System and screed;
- a wearing surface shall be installed in accordance with BS 8203;
- for moisture-sensitive wearing finishes such as carpet and laminate flooring, the ambient relative humidity shall be below 75 % before the application of gypsum-compatible primers.

2.5 - INDEPENDENTLY ASSESSED SYSTEM CHARACTERISTICS

2.5.1 Moisture control

Test	Standard	Result		
		TLA 110	TLA 150	TLA 200
Water vapour permeability (μ , indicative value only)	BS EN 12086	5 to 20		

2.5.2 Strength

Test	Standard	Result		
		TLA 110	TLA 150	TLA 200
Compression behaviour (kPa)	BS EN 826	200	300	350

2.5.3 Fire performance

Test	Standard	Result		
		TLA 110	TLA 150	TLA 200
Reaction to fire classification	BS EN 13501-1	A2-s1, d0		

2.5.4 Thermal performance

Test	Standard	Result		
		TLA 110	TLA 150	TLA 200
Thermal conductivity (λ_D) (W/mK)	BS EN 12667	0.043	0.051	0.054

2.5.5 Other

Test	Standard	Result		
		TLA 110	TLA 150	TLA 200
Determination of apparent density (kg/m^3)	BS EN 1602	136	175	225

CHAPTER 3 - CDM, NATIONAL BUILDING REGULATIONS AND THIRD-PARTY ACCEPTANCE

3.1 - THE CONSTRUCTION (DESIGN AND MANAGEMENT) REGULATIONS 2015 AND THE CONSTRUCTION (DESIGN AND MANAGEMENT) REGULATIONS (NORTHERN IRELAND) 2016

Information in this Agrément may assist the client, Principal Designer/CDM co-ordinator, designer and contractors to address their obligations under these Regulations.

3.2 - THE NATIONAL BUILDING REGULATIONS

In the opinion of Kiwa Ltd., the System, if installed and used in accordance with Chapter 2 of this Agrément, can satisfy or contribute to satisfying the relevant requirements of the following national Building Regulations.

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

3.2.1 - ENGLAND THE BUILDING REGULATIONS 2010 AND SUBSEQUENT AMENDMENTS

- C2(c) Resistance to moisture - floors incorporating the System can contribute to adequately protecting a building from interstitial and surface condensation
- L1(a)(i) Conservation of fuel and power - floors incorporating the System can contribute to limiting heat gains and losses through a building envelope
- Regulation 7(1) Materials and workmanship - the System is manufactured from suitably safe and durable materials for their application
- Regulation 23(1) Requirements relating to thermal elements - the System can contribute to a building envelope complying with the Requirements of L1(a)(i)
- Regulation 26 CO₂ emission rates for new buildings - the System can contribute to a building to not exceed its CO₂ emission rate
- Regulation 26A Fabric energy efficiency rates - the System can contribute to satisfying this Requirement

3.2.2 - WALES THE BUILDING REGULATIONS 2010 AND SUBSEQUENT AMENDMENTS

- C2(c) Resistance to moisture - floors incorporating the System can contribute to adequately protecting a building from interstitial and surface condensation
- L1(a)(i) Conservation of fuel and power - floors incorporating the System can contribute to limiting heat gains and losses through a building envelope
- Regulation 7(1) Materials and workmanship - the System is manufactured from suitably safe and durable materials for their application
- Regulation 23(1) Requirements relating to thermal elements - the System can contribute to a building envelope complying with the requirements of L1(a)(i)
- Regulation 26 CO₂ emission rates for new buildings - the System can contribute to a building to not exceed its CO₂ emission rate
- Regulation 26A Primary energy consumption rates for new buildings - the System can contribute to satisfying this Regulation
- Regulation 26B Fabric performance values for new dwellings - the System can contribute to satisfying this Requirement

3.2.3 - SCOTLAND THE BUILDING (SCOTLAND) REGULATIONS 2004 AND SUBSEQUENT AMENDMENTS

3.2.3.1 Regulations 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

- 3.15 Condensation - floors incorporating the System can contribute to protecting a building from moisture caused by surface or interstitial condensation
- 6.1(b) Carbon dioxide emissions - floors incorporating the System can contribute to limiting CO₂ emissions from a building
- 6.2 Building insulation envelope - floors incorporating the System can contribute to the thermal performance of a building
- 7.1(a)(b) Statement of sustainability - the System can contribute to satisfying the relevant Requirements of Regulation 9, Sections 1 to 6, and therefore will contribute to a construction meeting a bronze level of sustainability as defined in this Standard; in addition, the System can contribute to a construction meeting a higher level of sustainability as defined in this Standard

3.2.3.3 Regulation 12 Building standards - conversions

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

3.2.4 - NORTHERN IRELAND THE BUILDING REGULATIONS (NORTHERN IRELAND) 2012 AND SUBSEQUENT AMENDMENTS

- 23(a)(b) Fitness of materials and workmanship - the System is manufactured from suitable materials for their application
- 29 Condensation - floors incorporating the System can contribute to protecting a building from moisture in the form of interstitial condensation
- 39(a)(i) Conservation measures - floors incorporating the System can contribute to limiting heat gains and losses through a building envelope
- 40(2) Target carbon dioxide emission rate - the System will contribute to a building not exceeding its target CO₂ emission rate
- 43 Renovation of thermal elements - floors incorporating the System can contribute to renovation work to ensure a floor complies with requirement 39(a)(i)

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.

- 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 CO₂ emissions from a building

3.3 - THIRD-PARTY ACCEPTANCE

None requested by the Agrément holder.

CHAPTER 4 - SOURCES

- BS EN ISO 6946:2017 Building components and building elements. Thermal resistance and thermal transmittance. Calculation methods
- BS EN ISO 10211:2017 Thermal bridges in building construction. Heat flows and surface temperatures. Detailed calculations
- BS EN ISO 10456:2007 Building materials and products. Hygrothermal properties. Tabulated design values and procedures for determining declared and design thermal values
- BS EN ISO 13370:2017 Thermal performance of buildings. Heat transfer via the ground. Calculation methods
- BS EN 826:2013 Thermal insulating products for building applications. Determination of compression behaviour
- BS EN 197-1:2011 Cement. Composition, specifications and conformity criteria for common cements
- BS EN 1602:2013 Thermal insulating products for building applications. Determination of the apparent density
- BS EN 12086:2013 Thermal insulating products for building applications. Determination of water vapour transmission properties
- 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 16025-1:2013 Thermal and/or sound insulating products in building construction. Bound EPS ballastings. Requirements for factory premixed EPS dry plaster
- BS EN 16025-2:2013 Thermal and/or sound insulating products in building construction. Bound EPS ballastings. Processing of the factory premixed EPS dry plaster
- BS EN 16809-1:2019 Thermal insulation products of buildings. In-situ formed products from loose-fill expanded polystyrene (EPS) beads and bonded expanded polystyrene beads. Specification for the bonded and loose-fill products before installation
- BS 5250:2011+A1:2016 Code of practice for control of condensation in buildings
- BS 6093:2006+A1:2013 Design of joints and jointing in building construction. Guide
- BS 8000-0:2014 Workmanship on construction sites. Introduction and general principles
- BS 8000-3:2020 Workmanship on construction sites. Masonry. Code of practice
- BS 8203:2017 Code of practice for installation of resilient floor coverings
- BS 8204-1:2003+A1:2009 Screeds, bases and in situ floorings. Concrete bases and cementitious levelling screeds to receive floorings. Code of practice
- BS 8204-7:2003 Screeds, bases and in situ floorings. Pumpable self-smoothing screeds. Code of practice
- Accredited Construction Details for Scotland
- BRE Information Paper 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
- Government Accredited Construction Details for Part L - England and Wales
- PAS 2030:2019 Specification for the installation of energy efficient measures in existing dwellings and insulation in residential park homes
- PAS 2035:2019 Retrofitting dwellings for improved energy efficiency - Specification and guidance

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

CHAPTER 5 - AMENDMENT HISTORY

Revision	Amendment description	Amended by	Approved by	Date
-	First Issue	C Devine	C Vurley	October 2020

CHAPTER 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.

For full terms and conditions refer to Kiwa Ltd.