IRISH AGRÉMENT BOARD
CERTIFICATE NO. 12/0368
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FAST EcoBuild External Insulation System

Système d'isolation pour murs extérieurs
Wärmedämmung für Außen-wand

NSAI Agrément (Irish Agrément Board) is designated by Government to issue European Technical Approvals.

NSAI Agrément Certificates establish proof that the certified products are **'proper materials'** suitable for their intended use under Irish site conditions, and in accordance with the **Building Regulations 1997 to 2017**.

PRODUCT DESCRIPTION:
This Certificate relates to the FAST S and FAST W External Insulation Systems. All systems are partially bonded with supplementary mechanical fixings. The system is comprised of:

- Surface preparation of masonry or concrete substrate;
- Adhesive; lizard
- Insulation board (standard white EPS, graphite-enhanced EPS, mineral wool);
- Cementitious base coat with reinforcement;
- Decorative finish (Cementitious mineral plaster, acrylic with silicone or silicate, Brick effect render);
- Mechanical fixings;
- Weather tight joints;
- Movement joints;
- Provision for limiting cold bridging at external wall/floor junctions in compliance with Acceptable Construction Details published by the DHPLG.
- Provision for fire stopping at external compartment walls and floors.

FAST Sp. Z o.o. is responsible for the design, manufacture and supply of all components to approved specifications. FAST Sp z o.o. has appointed FAST EcoBuild Ltd Agent as their sole distribution partner in Ireland.

The system is designed by FAST EcoBuild Ltd on a project specific basis in accordance with an approved design process.

The installation of the system is carried out by installers who have been trained by FAST EcoBuild Ltd and are approved by FAST EcoBuild Ltd and NSAI Agrément to install the system. Applicators must adhere to strict installation guidelines as specified by FAST Ecobuild Ltd.

This Certificate certifies compliance with the requirements of the Building Regulations 1997 to 2017.

USE

The FAST S and FAST W systems are for the external insulation of:

(a) Existing concrete or masonry dwellings;

(b) New concrete or masonry commercial or industrial buildings, which are designed in accordance with the Building Regulations 1997 to 2014.

Systems that achieved a Class B Reaction to Fire Classification (see Table 3 of each of the Detail sheets) are suitable for use up to a maximum of six storeys (18m) in height on purpose groups 1(a), 1(c), 2(a), 2(b), 3, 4(a) and 4(b), and for use up to a maximum of five storeys (15m) in height in purpose group 1(b) as defined in TGD to Part B of the Building Regulations 1997 to 2017.

The system has not been assessed for use with timber frame or steel frame construction, or where a design life in excess of 30 years is required.

In an Irish context, Category I 'Impact Resistance' includes a wall at ground level readily accessible to the public and vulnerable to hard body impacts but not subjected to abnormally rough use. Category II excludes any wall at ground level adjacent to a public footpath, but includes one with its own private, walled-in garden. Category III does not include any wall at ground level.

For all systems, reference should also be made to Table 3 & 4 of this Certificate for the Impact Classifications that apply and any resulting restrictions imposed.

MANUFACTURE, DESIGN & MARKETING:

The system is designed and manufactured by:

P.W FAST Sp zo.o.,
St Foluszova 112,
65-751 Zielona Gora,
Poland.

Project specific design, technical support, sales, and applicator approval are performed by:

FAST EcoBuild Ltd,
Taney Hall,
Eglinton Terrace,
Dundrum,
Dublin 14.
T: 045 440700
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1.1 ASSESSMENT

In the opinion of NSAI Agrément, the FAST S and FAST W External Insulation Systems, when installed by FAST Ecobuild Ltd recommended contractors, in accordance with this Certificate and FAST EcoBuild Ltd specific design, can meet the requirements of the Building Regulations 1997 to 2017, as indicated in Section 1.2 of this Agrément Certificate.

1.2 BUILDING REGULATIONS 1997 to 2017

REQUIREMENTS:

Part D – Materials and Workmanship

D3 – Proper Materials

The FAST S and FAST W External Insulation Systems, as certified in this Certificate, are comprised of 'proper materials' fit for their intended use (see Part 3 and 4 of this Certificate).

D1 – Materials & Workmanship

The FAST S and FAST W External Insulation Systems, as certified in this Certificate, meet the requirements for workmanship.

Part A - Structure

A1 – Loading

The FAST S and FAST W External Insulation Systems, once appropriately designed and installed in accordance with this Certificate, have adequate strength and stability to meet the requirements of this Regulation (see Part 3 of this Certificate).

A2 – Ground Movement

The FAST S and FAST W External Insulation Systems can be incorporated into structures that will meet this requirement (see Parts 3 and 4 of this Certificate).

Part B – Fire Safety

Part B Vol 2 – Fire Safety

B4 & B9 – External Fire Spread

The FAST S and FAST W External Insulation Systems can be incorporated into structures that will meet this requirement (see Part 4 of this Certificate).

Part C – Site Preparation and Resistance to Moisture

C4 – Resistance to Weather and Ground Moisture

When the FAST S and FAST W External Insulation Systems are used in accordance with this Certificate, the external walls will have adequate weather resistance in all exposures to prevent the passage of moisture from the external atmosphere into the building as specified in Parts 3 and 4 of this Certificate.

Part F – Ventilation

F2 – Condensation in Roofs

The system as certified can be incorporated into structures that will meet the requirements of this Regulation (see Parts 3 and 4 of this Certificate).

Part J – Heat Producing Appliances

J3 – Protection of Building

When the FAST S and FAST W External Insulation Systems are used in accordance with this Certificate, wall lining, insulation and separation distances meet this requirement (see Part 4 of this Certificate).

Part L – Conservation of Fuel and Energy

L1 – Conservation of Fuel and Energy

When the FAST S and FAST W External Insulation Systems are used in accordance with this Certificate the external walls can be readily designed to incorporate the required thickness of insulation to meet the Elemental Heat Loss method calculations for walls as recommended in Part L of the Building Regulations 1997 to 2017 (see Part 4 of this Certificate).

2.1 PRODUCT DESCRIPTION

The FAST S and FAST W External Insulation Systems consist of fixing thermal insulation boards with a base coat layer incorporating reinforcement mesh and a decorative finish. See Table 1 for the full list of components of the FAST S and FAST W External Insulation Systems.

The system can be applied on a variety of existing external surfaces such as brick or rendered masonry walls. It can also be fixed on surfaces of horizontal or tilted structural elements provided that they are not directly exposed to precipitation. These may include ceilings over passageways, internal walls and roofs (on the ceiling side) of garages or cellars adjacent to heated rooms.

The substrate on which the FAST S and FAST W External Insulation Systems will be used should have a reaction to fire class A1 or A2-s1 d0 in accordance with I.S. EN 13501-1.

2.2 MANUFACTURE, SUPPLY AND INSTALLATION

FAST Sp. z o.o is responsible for the design and manufacture of all components to approved specifications. FAST Sp. z o.o has appointed FAST EcoBuild Ltd., as sole distribution partner in Ireland with responsibility for:

- Project specific design in accordance with approved design process;
- Preliminary project assessment support to their Approved applicators incorporating wind load calculations, U-value calculations, condensation risk analysis, impact resistance, substrate suitability and pull-out testing of fixings;
- Training, monitoring and review of licensed applicators in accordance with approved training and assessment procedures;
- Product supply and documentation control;
- Technical support, site support and inspection;
- Sales and marketing.

The installation of the FAST S and FAST W External Insulation Systems are carried out by FAST EcoBuild Ltd trained and approved installers in accordance with FAST EcoBuild Ltd project specific specifications and method statements. Installers must also be approved and registered by NSAI Agrément under the NSAI Agrément External Thermal Insulating Composite Systems (ETICS) Approval Scheme (See Section 2.4.1 of this Certificate).

2.2.1 Quality Control

The Certificate holder, and the manufacturer, operate a quality management system, and a quality plan is in place for system manufacture, system design and system installation.

2.3 DELIVERY, STORAGE AND HANDLING

The insulation is delivered to site in packs. Each pack is marked with the manufacturer's details, product identification marks and batch numbers. See Table 1 & 2 for the designation code that must be included on the insulation identification label. Each container for other components, e.g. renders, adhesives etc., bears the manufacturer's and the product's identification marks and batch number.

Insulation should be stored on a firm, clean, dry and level base, which is off the ground. The insulation should be protected from prolonged exposure to sunlight by storing opened packs under cover in dry conditions or by re-covering with opaque polythene sheeting.

Care must be taken when handling the insulation boards, to avoid damage and contact with solvents or bitumen products. The boards must not be exposed to ignition sources.

Meshcloth, primers, renders, paints, texture synthetic finish coatings and sealants should be stored in accordance with the manufacturer's instructions, in dry conditions, at the required storage temperatures. They should be used within the stated pot life.

2.4 INSTALLATION

2.4.1 Approved Installers

Installation shall be carried out by FAST EcoBuild Ltd trained applicators who:

1) Are required to meet the requirements of an initial site installation check by NSAI Agrément prior to approval and are subject to the NSAI Agrément ETICS Approval Scheme.
2) Are approved by FAST EcoBuild Ltd and NSAI Agrément to install the product.
3) Have undertaken to comply with the FAST EcoBuild Ltd installation procedure, requirements of this Certificate, and the FAST EcoBuild Ltd Code of Practice for approved contractors.
4) Are employing Supervisors and Operatives who have been issued with appropriate identity cards by FAST Ecobuild Ltd. Each team must consist of at least one ETICS Operative and ETICS Supervisor (can be the same person).
5) Are subject to inspection by FAST EcoBuild Ltd, including unannounced site inspections by both the Certificate holder and NSAI Agrément, in accordance with the NSAI Agrément ETICS Approval Scheme.
6) Are subject to periodic surveillance by the system manufacturer (FAST z o.o) – site visits and office records.

Table 1: FAST S External Insulation System Component Specification				
Components			**Coverage (kg/m^2)**	**Thickness (mm)**
Adhesives		**FAST Normal S** (cement based powder requiring addition of water 0.22l/kg) **FAST Specjal/ FAST Specjal M** (cement based powder requiring addition of water 0.20l/kg) **FAST Specjal DS** (ready to use paste)	3.0 – 5.0 (dry) 2.0- 3.0	-
Insulation	**Graphite Enhanced EPS**	EPS-EN 13163-T1/T2-L2/L3-W2/W3-S2/S5-P5/P10-DS (70,-) 1-DS (70)-2-TR100. Fire Class E. Aged Thermal Conductivity (w/mK) 0.031 Maximum Density 15kg/m^3	-	20-200
Below DPC Insulation	**XPS Insulation Plinth Board**	XPS -EN 13164 CFC/HCFC-free. Fire Class E. Aged Maximum Density 36kg/m^3	-	50-200
Base coat		**FAST Specjal M** (cement based powder requiring addition of 0.20 l/kg of water	3.0 -5.0 (dry)	3– 5mm
Glass fibre mesh reinforcement		**AKE 145 A / R 117 A101** (size 4.0 x 4.5 mm) **AKE 160 / R 131 A101** (size 3.5 x 3.8 mm) **117S** (size 4.6 x 3.2 mm) **SECCO E 145** (size 3.3 x 4.5 mm) **SECCO E 160** (size 3.5 x 3.8 mm) **REDNET E 145** (size 3.3 x 4.5 mm) **REDNET E 160** (size 3.5 x 3.8 mm) **Valmieras SSA-1363-160** (size 3.5 x 3.7 mm)	-	-
Anchors		**Ejotherm STR U. STR U 2G** plastic screw-in anchors **Ejotherm NT U** plastic nailed-in anchors **Ejotherm NTK U** plastic nailed-in anchors **EJOT SDM-T plus** plastic screwed-in anchors **EJOT H1 eco** plastic nailed-in anchors **EJOT H3** plastic nailed-in anchors **KOELNER TFIX-8M** plastic nailed-in anchors **KOELNER TFIX-8S. TFIX-8ST** plastic nailed-in anchors **KOELNER K1-10N** plastic nailed-in anchors		

Table 1 (cont.): FAST S External Insulation System Component Specification				
Components			**Coverage (kg/m^2)**	**Thickness (mm)**
Anchors		**KOELNER K1-10NS** plastic nailed-in anchors **BRAVOLL PTH-KZ 60/8-La** **BRAVOLL PTH 60/8-La** plastic nailed-in anchors **WKRET-MET LFN 8. LFM 8** plastic nailed-in anchors **WKRET-MET LFN 10. LFM 10** plastic nailed-in anchors **WKRET-MET LTX 10. LMX 10** plastic nailed-in anchors **KEW TSD 8** plastic nailed-in anchors **fischer TERMOZ 8N. 8 NZ** plastic nailed-in anchors **fischer TERMOZ 8U. 8 UZ** plastic screw-in anchors **Hilti XI-FV** plastic gun-nailed anchors **Hilti SX-FV** plastic screw-in anchors **Hilti SD-FV8** plastic nailed-in anchors **Hilti SDK-FV 8** plastic nailed-in anchors **Hilti D-FV. D-FV T** plastic screw-in anchors In addition to the following list. other anchors can be used provided that they comply with the requirements introduced in the Annex 2 of ETA 14/0464.	-	-
Key coat		**FAST Grunt M** *Product as delivered:* ready-to-use liquid **FAST Grunt S-T** *Product as delivered:* ready-to-use liquid	0.35	-
Finishing coat	**Mineral renders**	• Powder – mineral binder: **FAST Baranek** grain structure (particle size 2.0;2.5;3.0 mm) powder requiring the addition of water 2.20 – 0.22l/kg. **FAST Kornik** ribbed structure (particle size 2.0;3.0 mm) powder requiring the addition of water 2.20 – 0.22l/kg **FAST WD** surface treated by crushed stones powder requiring addition of water 0.18 l/kg **FAST MS** powder requiring addition of water 0.22 – 0,28 l/kg	2.2 to 3.5 2.2 to 3.5 12.5 dry 3.0 - 4.5	Regulated by particles size 8- 10 2.0 - 3.0
	Silicate renders	• Ready to use paste – binder based on silicate: **FAST Baranek S** grain structure (particle size 1.0; 1.5; 2.0 mm) **FAST Kornik S** ribbed structure (particle size 2.0; 3.0 mm)	1.7 – 3.5	Regulated by particles size

Table 1 (cont.): FAST S External Insulation System Component Specification				
Components			**Coverage (kg/m^2)**	**Thickness (mm)**
Finishing coat	**Acrylic renders**	• Ready to use paste – binder based on acrylic: **FAST Baranek A** Circular rendering, max. particle size 1.0 mm **FAST Kornik A** Scratch rendering, max. particle size 3.0 mm **FAST Granit** (for plinth application only) Mosaic rendering, max. particle size 1.5 mm	1.7 – 3.5	Regulated by particles size
		• Ready to use paste –binder based on siloxane: **FAST Baranek SI** grain structure (particle size 1.0; 1.5; 2.0 mm) 1.7 to 3.5 **FAST Kornik SI** ribbed structure (particle size 2.0; 3.0 mm)	1.7 – 3.5	Regulated by particles size
	Silicone	• Ready to use paste –binder based on silicone: **FAST Baranek SIL** Grain structure (particle size 1.0;1.5;2.0 mm) **FAST Kornik SIL** Ribbed structure (particle size 2.0; 3.0 mm)	1.7 – 3.5	Regulated by particles size
Protective coats		Only to be used with finishing coats FAST Barank. FAST Kornikand FAST MS		
		FAST F - S silicate protective coat ready to use liquid, two layers, dilute up to 5 % of volume with FAST Grunt S	0.10 - 0.20 (l/m^2) per layer	-
		FAST Silikon silicone protective coat, ready to use liquid. one or two layers, first layer to be diluted up to 10 % of volume with water	0.12 (l/m^2) per layer	
		FAST SI-SI siloxane protective coat. ready to use liquid, one or two layers, first layer to be diluted up to 10 % of volume with water	0.10 - 0.20 (l/m^2) per layer	
		FAST F-AZ acrylic protective coat. ready to use liquid, one or two layers, first layer to be diluted up to 10 % of volume with water.	0.10 - 0.20 (l/m^2) per layer	-
Brick Effect Paint		**FAST KWARC** Paint for brick stencil finish. To be applied to acrylic finishes only after finish render coat. (pointing line)	0.30 – 0.60 (l/m^2)	Per layer
Beads & Trims		Protektor or equiv. range of standard PVC, aluminium, stainless steel and galvanised steel profiles for use at wall base, stop ends and movement joint.	2.5m to 3m lengths.	-

Table 2: FAST W External Insulation System Component Specification			
Components		**Coverage (kg/m^2)**	**Thickness (mm)**
Adhesives	**FAST Normal W** *Product as delivered:* powder requiring addition of 0.22 l/kg of water *Composition:* dry mineral-based cement mixture modified with synthetic polymers	4.0 – 6.0 of dry mixture	-
Insulation	**Mineral Wool** (RW6) MW-EN 13162-T5-DS(TH)-CS(10)40-TR15-WS-WL(P)-MU1 Thermal Conductivity (W/mK) 0.035 Nominal Density 140 kg/m^3	-	50-200
Below DPC XPS Insulation	XPS -EN 13164 CFC/HCFC-free. Fire Class E. Aged	-	50-200
Base coat	**FAST Specjal W** *Product as delivered:* powder requiring addition of 0.22 l/kg of water *Composition:* dry mineral-based cement mixture modified with synthetic polymers	4.0 -6.0 of dry mixture	3mm per coat
Glass fibre mesh	**AKE 145 A / VERTEX R 117 A101** Alkali resistant glass fibre reinforced mesh, weight per unit area 145g/m^2 and mesh size about 3.5 x 4.5 mm)	1.1 – 1.2 m^2/m^2	-
Anchors	**WKRET-MET LFN o 8, LFM o 8** plastic nailed-in anchors **Ejotherm NT U** plastic nailed-in anchors **Ejotherm NTK U** plastic nailed-in anchors **Ejotherm STR U** plastic screwed-in anchors **KOELNER KI8M** plastic nailed-in anchors **Bravoll PTH-KZ 60/8-La, Bravoll PTH-KZL 60/8-La, Bravoll PTH 60/8-La, Bravoll PTH-L 60/8-La** plastic nailed-in anchors ((To include steel pin anchor)) **Fischer termoz PN8** **Fischer Termoz 8 NZ** **Fischer Termoz 8UZ** **Fischer DIPK** **Fischer DHM** **Fischer TERMOFIX CN 8 (ETA 07/0287)** with zinc coated steel nail **Ejot EJOTHERM STR-U (ETA 04/0023)** **w**ith zinc coated steel nail Fire anchor fixing **Fischer DHM** in grade A2 stainless steel **Hilti IDMR** in stainless steel grade 1.4031 **Ejotherm** SK U **Ejotherm** SKM-T plus **Ejotherm** SKM-T plus U **Hilti** SX-FV **Hilti** SDK-FV8 **Hilti** D 8-FV	-	-
Primer/Key coat	**FAST Grunt M** *Product as delivered:* ready-to-use liquid *Preparation:* do not dilute *Composition:* dispersion of acrylic resin with mineral additives	0.35	-

Table 2 (cont.): FAST W External Insulation System Component Specification				
Components			**Coverage (kg/m²)**	**Thickness (mm)**
Finishing coat	**Mineral renders**	**FAST Baranek** Mineral rendering circulated, max. particle size 2.0 mm **FAST Baranek** Mineral rendering circulated, max. particle size 2.5 mm **FAST Baranek** Mineral rendering circulated, max. particle size 3.0 mm **FAST Kornik** Mineral rendering scratch, max. particle size 2.0 mm **FAST Kornik** Mineral rendering scratch, max. particle size 3.0 mm *Product as delivered:* powder *Preparation:* powder requiring addition of 0.20 - 22 l/kg of water *Composition:* dry mineral-based mixture with sorted silica aggregate and plasticizers	2.25 3.00 3.85 2.80 3.50	Regulated by particles size
	Silicone Finish Coats	**FAST Baranek SIL** Circular rendering, max. particle size 1.0 mm **FAST Baranek SIL** particle Circular rendering, max. particle size 1.5 mm **FAST Baranek SIL** Circular rendering, max. particle size 2.0 mm **FAST Kornik SIL** Scratch rendering, max. particle size 2.0 mm **FAST Kornik SIL** Scratch rendering, max. particle size 3.0 mm *Product as delivered:* ready-to-use paste do not dilute *Composition:* silicone water dispersion, siloxane emulsion and styrene-acrylic dispersion with mineral additives and pigments	1.70 2.50 3.20 2.80 3.50	Regulated by particles size
Primer /Key coat for Protective coating		**FAST Grunt S** Key coat under silicate protective coat	0.08 - 0.10	-
Protective Coatings		**FAST F-S** Silicate protective coating. Product as delivered: ready- to- use- liquid	0.10 -0.20 (l/m²)	-
		FAST Silikon Silicone protective coating Product as delivered: ready- to- use- liquid	0.12 (l/m²)	-
Beads & Trims		Protektor or equiv. range of standard PVC, aluminium, stainless steel and galvanised steel profiles for use at wall base, stop ends and movement joint.	2.5m to 3m lengths.	-

2.4.2 General

FAST EcoBuild Ltd prepare a site package for each project, including wind loading and U-value calculations, requirements for materials handling and storage, method statements for installation, building details, fixing requirements, provision for impact resistance, maintenance requirements etc. This document forms part of the contract documentation for circulation to the home owner and the installer. Installers will be expected to adhere to the specification. Deviations must be approved by a FAST EcoBuild Ltd technical representative. FAST EcoBuild technical representatives will visit each site on a regular basis to ensure that work is carried out in accordance with the project specific site package, including the Certificate holder's installation manual. FAST guarantee and home owner's manual will be issued on successful completion and sign-off of completed projects.

Mineral fibre board and lamella must be protected from moisture prior to and during installation. It may be necessary to remove and replace any unsuitable/wet material.

External works that leave the external appearance of the building inconsistent with neighbouring buildings may require planning permission. The status of this requirement should be checked with the local planning authority as required.

2.4.3 Site Survey and Preliminary Work

A comprehensive pre-installation site survey of the property shall be carried out by a suitably qualified FAST EcoBuild Ltd technical representative or FAST EcoBuild Ltd and NSAI Agrément approved contractor and all key information is recorded on the site survey form. The FAST EcoBuild Ltd pre-installation survey is also used to price the project and identify all the relevant factors/technical information which needs to be considered in the design of the external cladding system and important information to be included in the site specific pack. This pack would typically include wind load calculations and a fixing specification summary sheet, thermal bridging evaluation, condensation risk analysis, elemental wall U-value calculation, and a full set of project specific building details. The survey will also establish the suitability of the substrate, and the FAST EcoBuild Ltd technical representative will determine if pull-out resistance testing is required and what substrate preparation is required.

The substrate must be free of water repellents, dust, dirt, efflorescence and other harmful contaminants or materials that may interfere with the adhesive bond. Remove projecting mortar or concrete parts mechanically as required.

Where discrepancies exist preventing installation of the system in accordance with this Certificate and the Certificate holder's instructions, these discrepancies must be discussed with the Certificate holder and a solution implemented with the approval of the Certificate holder.

2.4.4 Procedure

- Following award of contract, the site specific pack is prepared by FAST EcoBuild Ltd., based on the information recorded in the site survey form.
- Prepare substrate in accordance with the project specific site package. This will include brushing down of walls, washing with clean water and treatment with a fungicidal wash as required.
- Check the substrate surface for loose render by tapping with a hammer and listening for a hollow sound. If render is loose it must be removed and replaced.
- At external window & door frame reveals the plaster reveals should only be removed if a minimum clearance of 25mm cannot be achieved between the reveal and the window/door frame. This is to allow the application of insulation around the reveals and heads of the doors and windows to significantly reduce cold bridging.
- An adhesion test should be carried out if in doubt to the quality of the substrate surface. Adhesion test involves bonding 8 to 10 pieces of 100mm x 100mm polystyrene at various locations on the substrate surface of the building. The insulation pieces are attached using a 10mm layer of Fast Normal S adhesive. After a minimum of 3 days an attempt to manually remove the polystyrene should be made. If the polystyrene breaks the surface is strong enough. If the samples of polystyrene break away together with the layer of mortar, then the surface has not been properly prepared or the top layer is too strong. In this situation extra additional supplementary mechanical fixings will be required in addition to the adhesive. Project specific structural design must be provided by the Certificate holder when there is an adhesion test failure.
- Weather conditions must be monitored to ensure correct application and curing conditions. Renders (adhesives, base coats, primers, finish coats) must not be applied if the temperature is below 5°C or above 25°C at the time of applications. In addition, Cementitious-based renders must not be applied if the temperature will be below 0°C at any time during 72 hours after application; cement-free, synthetic-resin and silicone-resin plasters must not be applied if the temperature will be below 5°C at any time during 72 hours after application.

- Until fully cured, the coatings must be protected from rapid drying, precipitation, direct sunlight and strong wind.
- Refer to the site package for guidance on modifications of down pipes, soil and vent pipes, pipe extensions etc.
- Where possible all pipe work should be relocated as required to accommodate the insulation. Where pipe work cannot be relocated and is to be housed in the depth of the system, access for maintenance must be maintained through the use of removable covers or alternative design to be approved by the Certificate holder.
- A plinth strip/starter track is mechanically fixed with a minimum of 3 fixings per linear meter to the substrate level with the DPC line. This provides a horizontal line for the installation of insulation panels as well as providing reinforcement to the lower edge of the system. Starter track profiles are connected using special mounting clips.
- XPS boards are then fixed to the wall below the starter track to provide the necessary resistance to impact and capillary action. To minimise the effects of cold bridging, the XPS boards should extend below ground level where possible. Where this is not possible, the first run of XPS boards should be positioned at ground level as detailed in Figure 1.
- The entire contents of the bag of Fast adhesive must be thoroughly mixed with about 5.5 litres of clean cold water using a slow rotation drill with a suitable mixer. After achieving a homogeneous mixture free of any lumps, wait about 10 minutes and mix again before use. Adhesive prepared in this way is suitable for use for 2.5 to 3 hours. Adhesive should be mixed during work every 30 minutes. Additional water must not be added to improve consistency.
- The insulation boards are bonded to the wall by applying the specified adhesive (see Table 1 & 2) to the boards. The adhesive is applied to the entire surface of thin EPS/HD boards (reveal & plinth boards) using a notched trowel with square 10 to 12 notches. The adhesive is applied to the main EPS insulation wall boards using the "circumference and points" method which means applying it with a trowel around the circumference of the board with a ribbon of adhesive at least 30mm to 40mm wide in diameter. 6 to 8 evenly distributed patches of adhesive 80 – 120mm in diameter are then applied to the boards so that an adhesive surface of at least 40% is achieved (60% after application and pressing). Alternatively, for even and smooth substrates, the whole panel can be coated with adhesive using a notched trowel to produce a coat 2 – 5mm in thickness.
- The insulation board should be immediately placed on the substrate and pressed into place. Adhesive properly distributed along the circumference should be sufficiently far away from edge, so it does not extend outside the board when the latter is pushed into place.
- When applying adhesive to mineral wool panels, it is very important that the mineral wool slabs are cleared of dust and loose particles. The boards should be initially covered with adhesive by applying a thin layer of adhesive using a smooth edge trowel in order to increase adhesion. On the surface of the mineral wool prepared as described above the actual adhesion layer can be applied as a thin layer using a notched trowel or using the "circumference and points" method as described previously for the EPS insulation boards.
- Subsequent rows of insulation boards are installed on top of the starter track and positioned so that the vertical board joints are staggered and overlapped at the building corners.
- To avoid thermal bridging, ensure a tight adhesive free joint connection between adjacent insulation boards. A foam filler approved by the Certificate holder may be used for filling gaps up to 5mm. Larger gaps should be avoided, where larger gaps greater than 5mm cannot be practically avoided these gaps shall be filled with ETICS insulation material cut to size and sufficiently fixed to substrate.
- At façade openings, e.g. windows and doors, insulation boards must be continued around the corner. Insulation boards must overlap at these locations and can be cut to size to facilitate this. Any projecting EPS boards should be levelled out using a rubbing board with local trimming as required on mineral wool boards.
- Window and door reveals should, where practicable, be insulated to minimise the effects of cold bridging in accordance with the recommendations of the Acceptable Construction Details Document published by the DoEHLG, Detail 2.21, to achieve an R-value of 0.6m^2K/W. Where clearance is limited, strips of approved insulation should be installed to suit available margins and details recorded as detailed in Section 4.5 of this Certificate.
- To minimise the effects of cold bridging in all other junctions over and above windows and doors, designers should consider the recommendations of the Acceptable Construction Details Document (published by the DoEHLG), Section 2 – External Wall Insulation. Where clearance is limited, strips of approved insulation (with better thermal resistance values) should be installed to suit available margins and details recorded as outlined in Section 4.5 of this Certificate.

- Details of mechanical fixings (including their arrangement in the insulation boards) are specified in the project specific design based on pull-out test results, substrate type and wind loading data. Installation of mechanical fixings shall commence no earlier than 3 days after the insulation panels have been adhesively fixed as this is the proper setting time for mortar glue. A minimum number of 2 mechanical fixings per 1m x 0.5m or 4 No per m^2 of EPS insulation board shall be installed unless otherwise specified in the project specific design. A minimum number of 8 mechanical fixings per m^2 for mineral wool shall be installed unless otherwise specified in the project specific design. Anchors must be installed to the required depth into the substrate, with the head fixed tightly to the insulation board to ensure there is no risk of pull off. Above two stories an additional stainless steel fire fixing is provided at a rate of 1 per m^2.
- For drilling holes in thin or cavity materials, (hollow block) a drill with an engaged hammer action should not be used.
- Refer to the Certificate holder's instructions and the project specific site package regarding the installation method and location of the SS fixings through the reinforcing mesh where fire stops have been installed. Additional layers of mesh are also applied at these locations. Stainless steel fire fixings to be provided at a rate of one per square metre above two stories. The fixing design should take account of the extra duty required under fire conditions.
- Mechanical fixings should be carefully fitted. The heads of fixings cannot protrude beyond the plane of the boards i.e. they should be exactly flush. Excessively deep insertion of fixing heads in the insulation material can cause cracking of the boards which in turn weakens the insulation. Filling indentations in these areas can cause thermal bridges and consequently may lead to plaster loosening in such areas.
- Purpose-made and FAST approved powder coated aluminium window cills (complete with welded side and rear up-stands) are installed in accordance with the Certificate holder's instructions. They are designed to prevent water ingress and incorporate drips to shed water clear of the system. The Certificate holder also offers a GRC (Glass Reinforced Concrete) cill for use with the FAST EcoBuild EWI System. See Cl. 2.4.5 for details.
- Lamella fire stops are installed in accordance with the Certificate holder's instructions as defined in Section 4.2 of this Certificate, at locations defined in the project specific site package.
- For EPS insulation, any high spots or irregularities should be removed by lightly planning with a rasp to ensure the application of an even thickness of base coat. After sufficient stabilisation of the installed insulation (normally 2 days, during which time the insulation should be protected from exposure to extreme weather conditions to prevent degradation), the insulated wall is ready for the application of the base and finish coats.
- EPS boards exposed to UV light for extended periods prior to the application of the render coatings are subject to breakdown and should be rasped down as required in preparation for rendering.
- Movement joints shall be provided in accordance with the project specific site package.
- At all locations where there is a risk of insulant exposure, e.g. window reveals, eaves or stepped gables, the system must be protected, e.g. by an adequate overhang or by purpose-made sub-cills, seals or flashings.
- Building corners, door and window heads and jambs are formed using angle beads bonded to the insulation in accordance with the Certificate holder's instructions.
- To minimise the thermal bridge effect during the installation of railings, exterior lighting, shutter guide rails, canopies, aerials, satellite dishes etc., the Certificate holder offers a range of anchoring options, utilising high density polyurethane cylindrical blocks incorporated into the insulation. These anchors must be installed in accordance with the Certificate holder's instruction, as defined in the project specific site package, during the installation of the insulation boards.
- Where the external insulation meets intersecting walls etc. and the abutting structure cannot be cut back, the edge of the insulation where it meets the wall should be protected using PVC universal stop-trim, followed by the application of a low modular silicone sealant between the top coat and the abutting structure.
- Prior to application of base coat and finish coat, all necessary protective measures such as taping off of existing window frames and covering of glass should be in place.
- If it is not possible to install the EWIS system to all external walls, alternative forms of thermal upgrades, such as full fill cavity wall insulation or dry lining should be provided where physically and economically feasible. There should be an adequate overlap at the junction between the EWIS system and the alternative insulation method selected to limit thermal bridging at this interface.

- If unusual levels of movement are expected then the use of an expansion joint at the intersection is recommended and should be incorporated into the project specific-design provided by the Certificate holder. In the case of un-heated lean-two buildings, the EWIS system should continue around the lean-two.
- In sunny weather, work should commence on the shady side of the building and be continued following the sun to prevent the rendering drying out too rapidly.
- The base coat is prepared in a similar way as previously described for preparing the adhesive. Additional water must not be added.
- Base coat is applied on the board in a continuous layer about 3mm thick. A notched trowel with square 10 to 12 notches is (held at 45^{o} to the insulation board) is used to leave castellation in the basecoat. In the case of mineral wool insulation, be sure to clean the entire surface of the panels clear of loose particles and dust. Then to increase the adhesion of the reinforcing layer, a preliminary application of a thin layer of base coat, so called rubbing of base coat onto the surface of the panel is required. The base coat is applied in vertical stripes upwards with a width equal to the fibreglass mesh.
- A layer of alkali-resisting glass-fibre mesh is then applied (see Table 1 for the approved meshes and Table 3 & 4 for the impact resistance specification) either vertically or horizontally ensuring the mesh is overlapped at joint by a minimum coverage of 100mm. Mesh reinforcement must always be carried around corners - overlaps in quoins should be minimum 150mm.
- The reinforcing mesh must be pressed into the base coat and the mesh should always be embedded in such a way that in the case of thin-layered reinforcement the mesh is in the middle of the base coat layer, and in the case of thick-layered reinforcement it is in the upper third of the base coat layer. The mesh should be evenly stretched over the entire surface, without any waves, humps or bumps.
- It is unacceptable to insert the reinforcing mesh directly onto the boards or have it protruding from the exterior. Sinking the mesh too deep or too shallow can cause it to exert an eccentric force, which can lead to cracking and the formation of humps in reinforcement layer. The layer thickness when a single sheet of AKE 145 A / Vertex R 117 A101 mesh is used should be between 3 and 5mm.
- In most cases (see table 3), for category II & category I impact resistance (walls at ground floor level) for the External Insulation Systems, and a second reinforcement layer is required. See table 4 for details. A second layer of reinforcement is applied only when the first base coat layer with fibreglass mesh has set (typically 24hrs later). A second layer of base coat should be applied and another layer of fibreglass mesh sunk. The thickness of the reinforcement layer with double fibreglass mesh should be between 6 & 8mm.
- An additional diagonal reinforcement must be applied at the corners of openings to provide the necessary reinforcement in these areas. This involves embedding the diagonal reinforcement strips of mesh 200x350mm into the basecoat at a 45^{o} angle in relation to the lines determined by the reveal.
- A thin layer of basecoat is then applied in vertical stripes equal to that of the fibreglass mesh. Rubbing of the basecoat is then carried out.
- Base profiles and corner profiles are fixed as specified in the site specific pack. Existing structural expansion joints should be extended through the surface of the ETICS system with full system expansion beads.
- Refer to the Certificate holder's instructions and project specific site package regarding the requirement of additional fixings to be provided at a rate one per square metre above two stories. The fixing design should take account of the additional layers of mesh that are also applied at these locations.
- The primer and/or finish coat must not be applied until after the base coat has dried out fully (3 days approximately dependent on weather conditions).
- The basecoat must be allowed to dry/cure (3 days approx.) prior to the application of the primer/finish coat. Prior to the application of the finished coat, sealant should be applied as required as defined in the project specific site package in accordance with the certificate holders instructions.
- Primers (see Table 1 & 2 for approved list of primers and their compatibility with finishing coats) shall be applied in accordance with the Certificate holder's instructions and allowed to dry fully prior to the application of the finishing coat. Render primers prevent penetration of impurities from the adhesive into the render, protects and reinforces the substrate, and increases the bond strength between the render and the substrate.
- Finishing coats and their compatibility with the primer are given in Table 1 & 2 and shall be applied in accordance with the Certificate holder's instructions.

- It is imperative that weather conditions are suitable for the application and curing of the FAST finish coats. Finish coats should not be applied when the air or wall temperature is below +5°C or above 25°C for the duration of the curing time. In wet weather the finished walls should be protected to prevent wash-off. It is also advisable that protective covers remain in place as required to maximise the drying process.
- To minimise colour shade variations and to avoid dry line jointing, continuous surfaces should be completed without a break. If breaks cannot be avoided they should be made where services or architectural features, such as reveals or lines of doors and windows, help mask cold joints. Where long uninterrupted runs are planned, planned containers of the finish coat should be checked for batch numbers. Bags with different batch numbers should be checked for colour consistency.
- All rendering should follow best practice guidelines, e.g. BS 8000-0:2014 and IS EN 13914-1:2016
- On completion of the installation, external fittings, rainwater goods etc. are fixed through the system into the substrate in accordance with the Certificate holder's instructions.
- When obstructions abut external walls such as a boundary wall, best practice would be to cut back the boundary wall to allow for the continuation of the external insulation system, (care must be taken not to interfere with the structural stability of the wall) or in the case of unheated lean-to buildings the external insulation system should continue around the lean-to.
- All necessary post-application inspections should be performed and the homeowner's manual completed and handed over to the homeowner accordingly.
- Figures 1 to 6 give a sample of illustrative examples to be complied with in accordance with section 2.4.4 of this Certificate. In accordance with clause 5.4 of this Certificate, approved applicators should always refer to project specific design pack and current project specific details supplied by Cert holder.

2.4.5 GRC Cill

The Certificate holder also offers a GRC (Glass Reinforced Concrete) cill for use with the FAST EcoBuild EWI System on buildings up to 6 stories (18m).The FEB GRC EcoCills are manufactured to a Grade 8 GRC standard from a cement based matrices and (AR) glass fibre mix with materials supplied from a GRC Council registered manufacturer. The manufacturing process involves moulding the cills to various lengths which can be cut to size on site as required.

The FEB GRC EcoCill are installed in conjunction with a minimum thickness of 15mm HD EPS insulation as specified by the Certificate holder (min. thermal conductivity λ of 0.034W/mK) installed underneath the sill to reduce the risk of condensation occurring due to cold bridging. In addition, the nose of the existing cill is cut back to the face of the substrate wall to accommodate the FEB GRC EcoCill. **Installation of the FEB GRC EcoCill (in conjunction with the insulation layer) shall not proceed if it would result in the window weep holes being covered.** In such instances, approved powder coated metal cills shall be used or the existing cill scabbled back to allow for the installation of the FEB GRC EcoCill. The FEB GRC EcoCill is cut to size to meet the window opening dimensions. In addition, pockets on both sides of the external insulation at the window opening are cut out to accommodate the FEB GRC EcoCill as detailed in the Certificate holders installation instructions. Figure 6 illustrates the FEB GRC EcoCill installed.

All cills are mechanically fixed through the cill and insulation into the existing concrete cill or suitable substrate with appropriate pull out properties using two M 8mm x 60mm Hammerfix fixings supplied and approved by the Certificate holder, at the location of the window reveals. Joints at the reveals and at the intersection with the window frame are sealed using UPVC beads (if butted to window frame) embedded in a one compound low modular polymer sealant (Zwaluw Hybrifix Super 7) or other suitable approved sealant, specified and supplied in the certificate holder's project specific pack. Best installation practice is to install the FEB GRC EcoCill under the window frame. Cills shall be installed in single lengths where possible (max length 3.2M).

Where sills require joints (bay windows) each cill must be mechanically fixed at both ends and incorporate an additional HYLOAD Damp-Proof-Course System to be in installed in accordance with the Certificate holder's installation instructions, project specific details and normal good practice for the detailing of DPC. See Fig. 6, Detail 3.

The approved DPC should be installed to extend the full width and depth of the FEB EcoCill and thickness of wall insulation. The DPC must maintain the fall outwards of the existing cill with a minimum 10 degree fall. All lap joints in DPC must be bonded using Hyload DPC Lap Adhesive and jointed in accordance with manufacturer's instructions. The FEB EcoCill is joined using a bead of Hyload mastic sealant at bottom of joint. The top of the joint and countersink holes for mechanical fixings are filled with FAST Specjal polymer modified adhesive and left proud of surface. After 24 hours cure time, these areas are sanded down flush with the surface of the FEB EcoCill.

Once installed, the cills are cleaned and can be left in their natural GRC finish or primed (with FAST Grunt M primer) prior to the application of the approved range of Fast EcoBuild finishes listed in Table 1 of this Certificate. Refer to the Certificate holder's installation manual for all other installation instructions.

2.4.6 FAST Brick Effect Render

The FAST Brick Effect Render is the combination of two finish coat renders used together to create a brick-effect finish on the system.

It is important to note that the pointing line to both brick effect systems is a complete finished system installed in accordance with section 2.4.4 of this Certificate. The pointing line in itself is a weatherproof system designed to the required impact resistance in accordance with the project specific design. Both brick effect finishes applied over the finish coat pointing line are decorative finishes only. These finishes do not reduce the overall performance of the FAST EcoBuild External Insulation System however they are decorative finishes only and will need to be maintained on an ongoing basis to maintain aesthetic appearance.

Procedure (Stencil Acrylic)

- Applied to FAST SA & FAST SM only.
- Apply FAST basecoat and mesh to required impact resistance as described in section 2.4.4.
- Apply primer once basecoat has dried fully.
- Apply chosen finish coat as listed in table 1 to the particle thickness size of the finish coat.
- This will act as the pointing line therefore colour of finish coat to match desired pointing line colour.
- A self-adhesive stencil (brick stencil, stone stencil) is then stuck on to the properly dried finish coat. While sticking the stencil make sure that the stencil is firmly adjoined to the substrate to prevent the FAST KWARC brick finish coat getting under the stencil. Stick 1 to 2 stencils at a time. For a vast surface stick 4 to 5 stencils at a time.
- Apply FAST KWARC (Acrylic brick effect finish) on a stencil that had been previously adhered to the surface. Remove the stencil after applying the FAST KWARC.
- FAST KWARC is a structural paint that can be prepared in a desired colour.
- After removing the stencil a light brushing or tooling of the surface of the brick face may be required to blend the brick into its surroundings.
- The stencils should be stored and in dry conditions, ensuring positive temperature above +5°C.
  All technical data, including consumption of FAST KWARC and FAST F-AZ are to be found in FAST product data sheets.

Procedure (Hand Finish Cementitious)

- Applied to FAST SA, FAST SM & FAST W.
- Apply FAST basecoat and mesh to required impact resistance as described in section 2.4.4.
- Apply primer once basecoat has dried fully.
- Apply chosen finish coat as listed in table 2 to the particle thickness size of the finish coat.
- This will act as the pointing line therefore colour of finish coat to match desired pointing line colour.
- Once fully dry apply additional 3 to 5mm layer on mineral render (brick red) wall top coat over pointing line coat. See table 2 for approved list of mineral renders.
- To create desired textured finish of brick, spray on liquid release agent to moist surface.
- Press texture mat to surface until the texture is in the top coat, and then release mat.
- After the top coat has been textured, the brickwork pattern is marked out (use template) to the size and shape of the brick required.
- Carve through the brick red top coat until you reach the mortar coat. A special cutting tool is provided by FAST Ecobuild for the carving process. Sprit levels and straight edges should be used for guiding this process.
- When surface is dry using a soft bristle brush, lightly brush off any release agent and any materials left by the cutting out process.
- Brush on flex seal protector, sealing the entire surface.

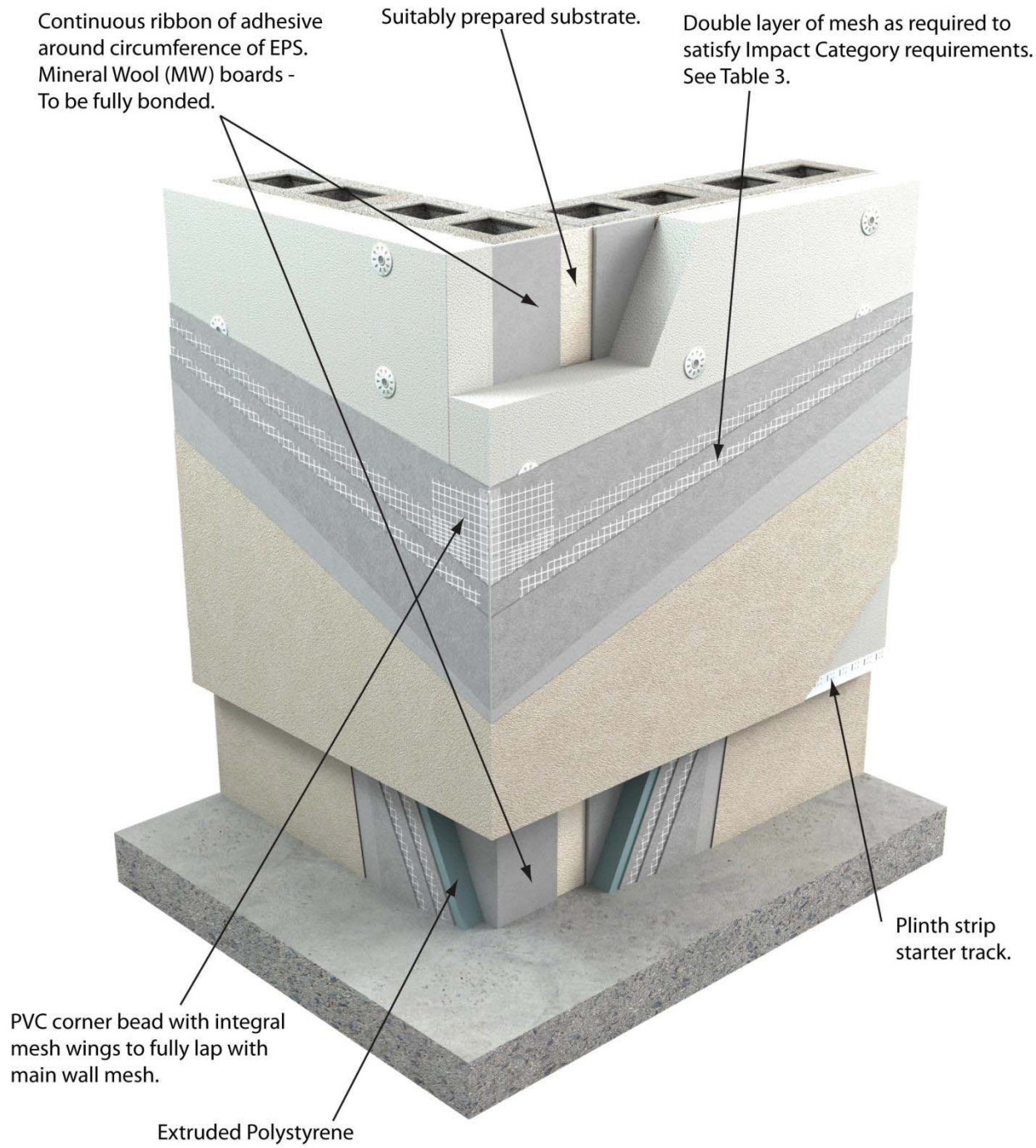


Figure 1 Corner/Plinth/Wall Details

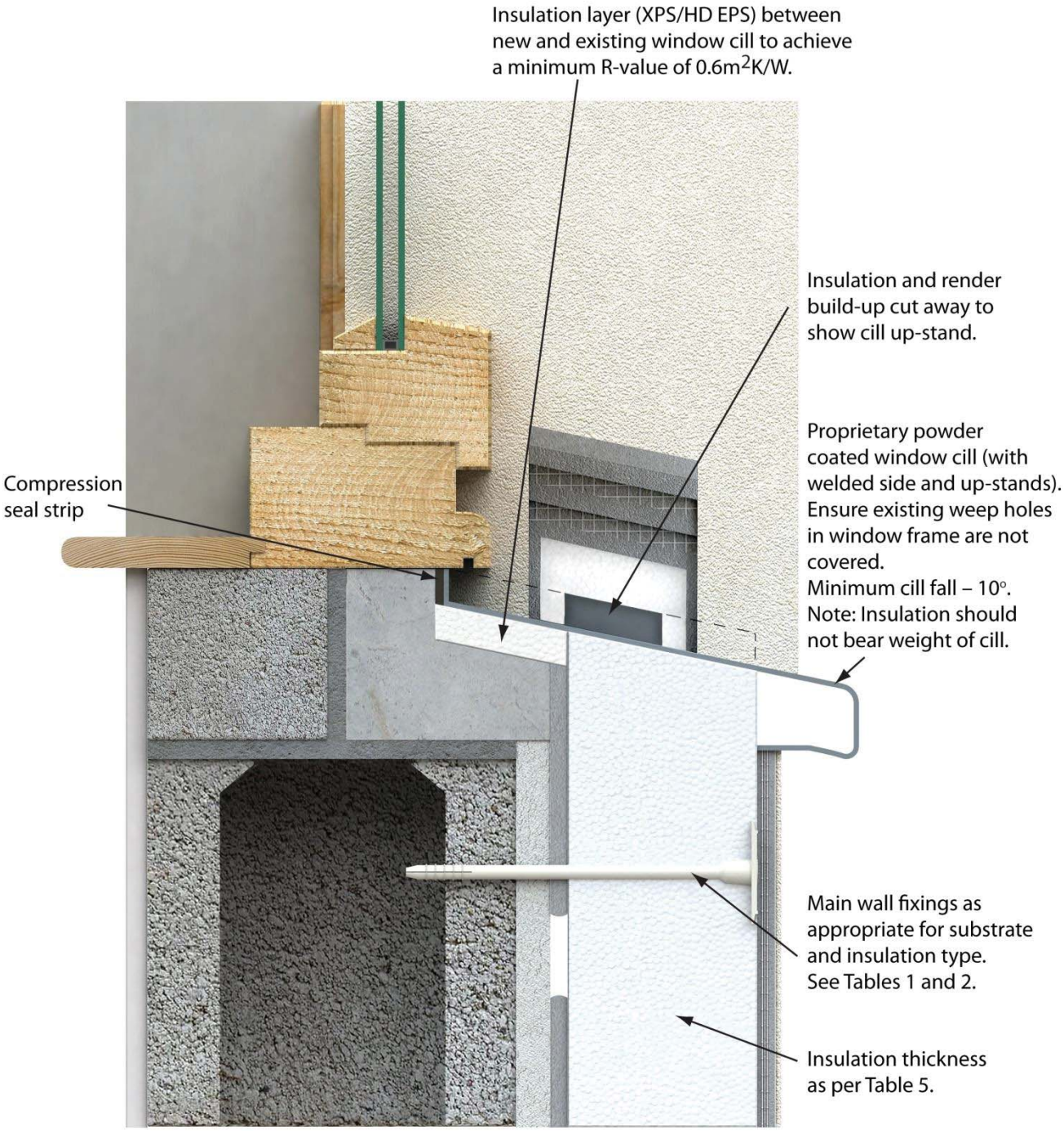


Figure 2 Cill Details

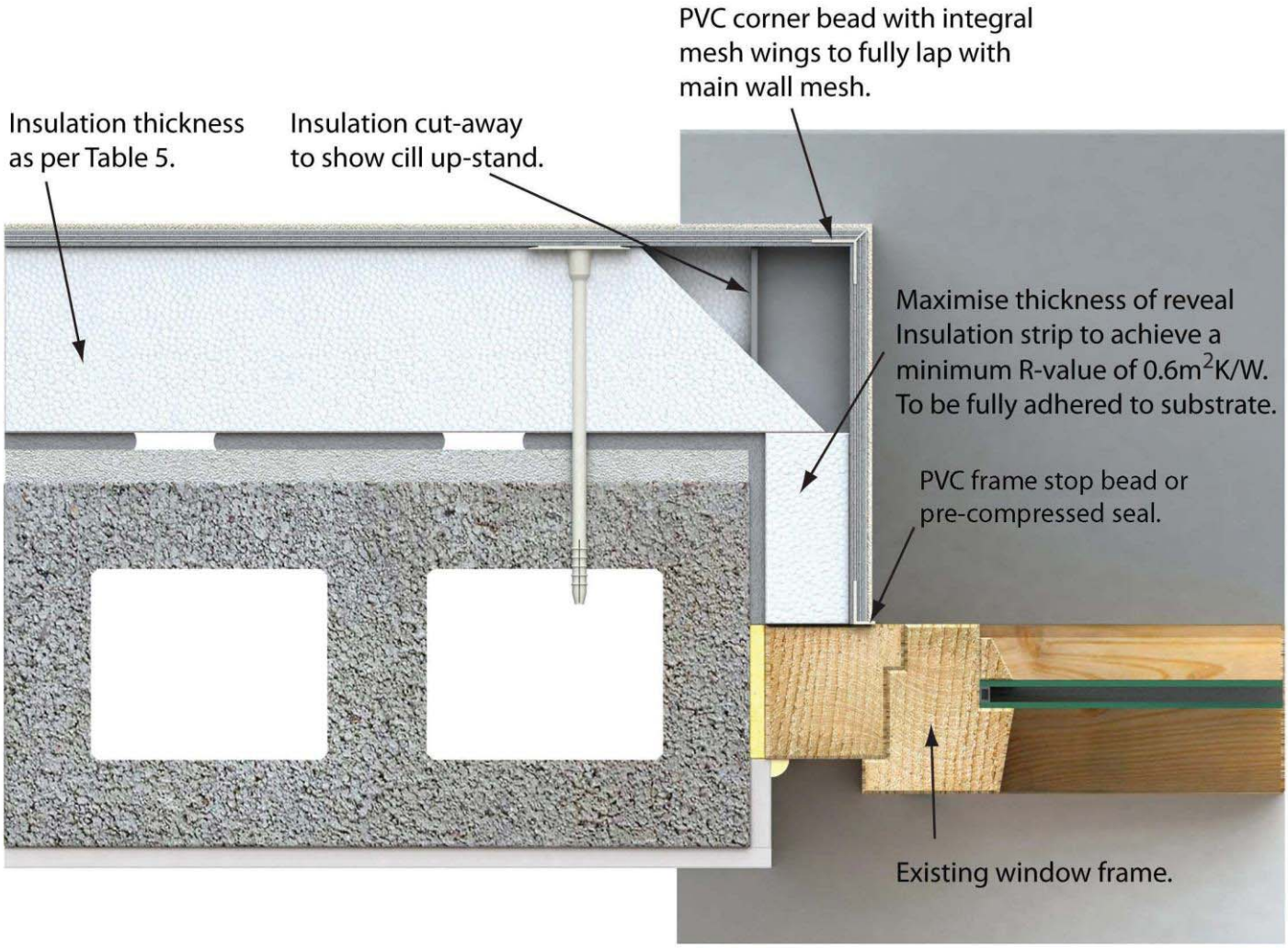


Figure 3 Cill and Reveal Detail

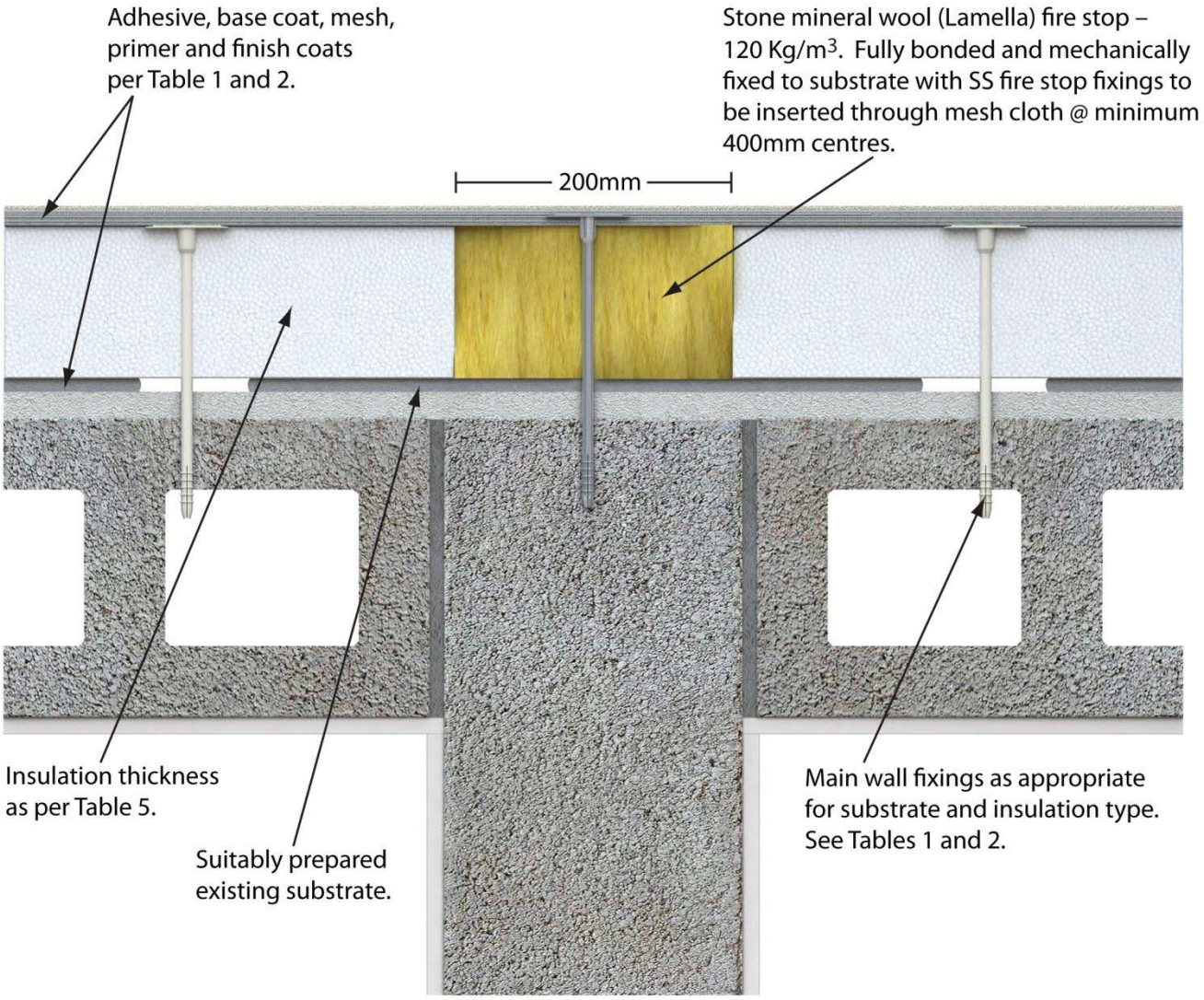


Figure 4 Vertical Fire-Stop Detail

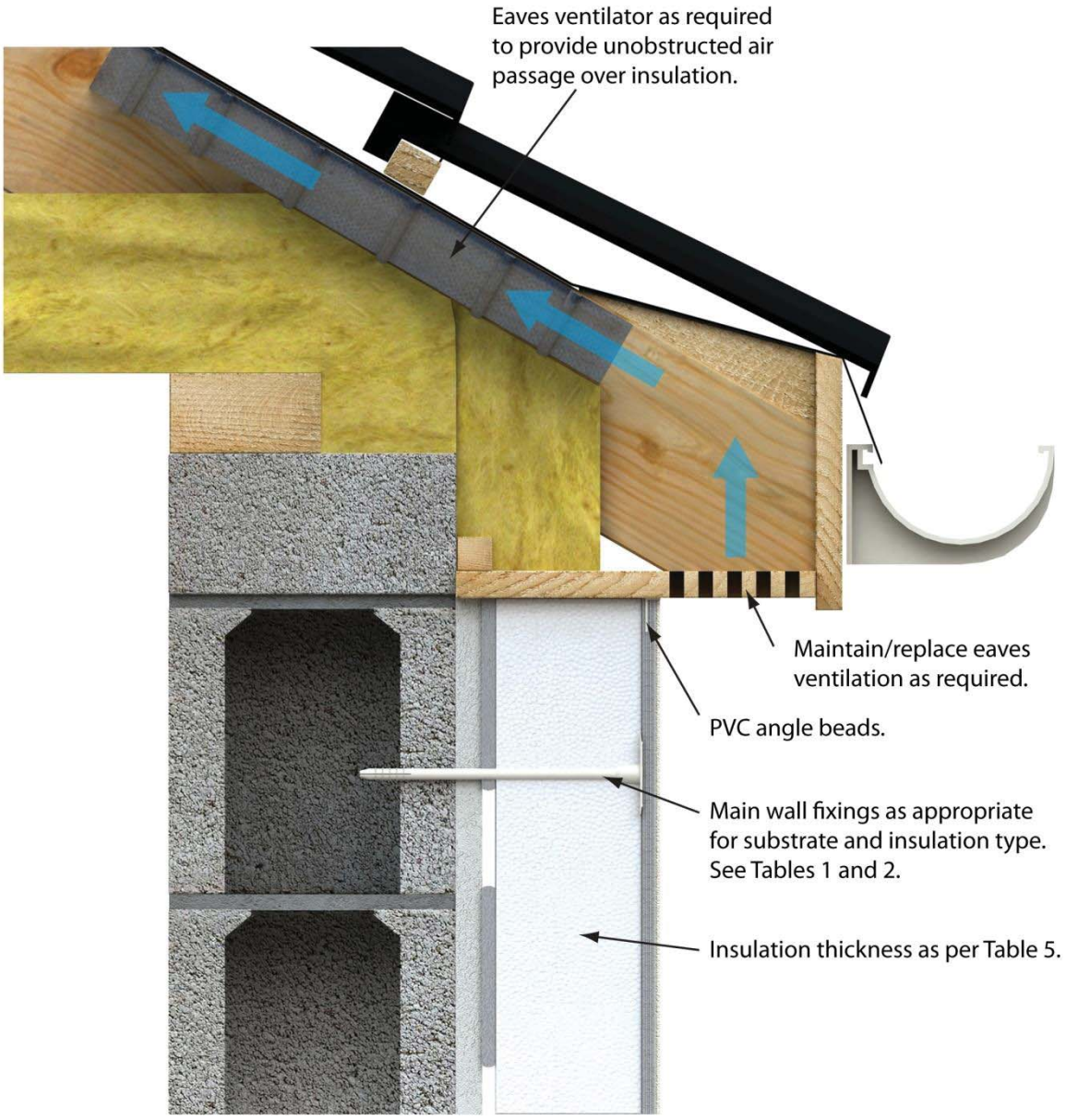
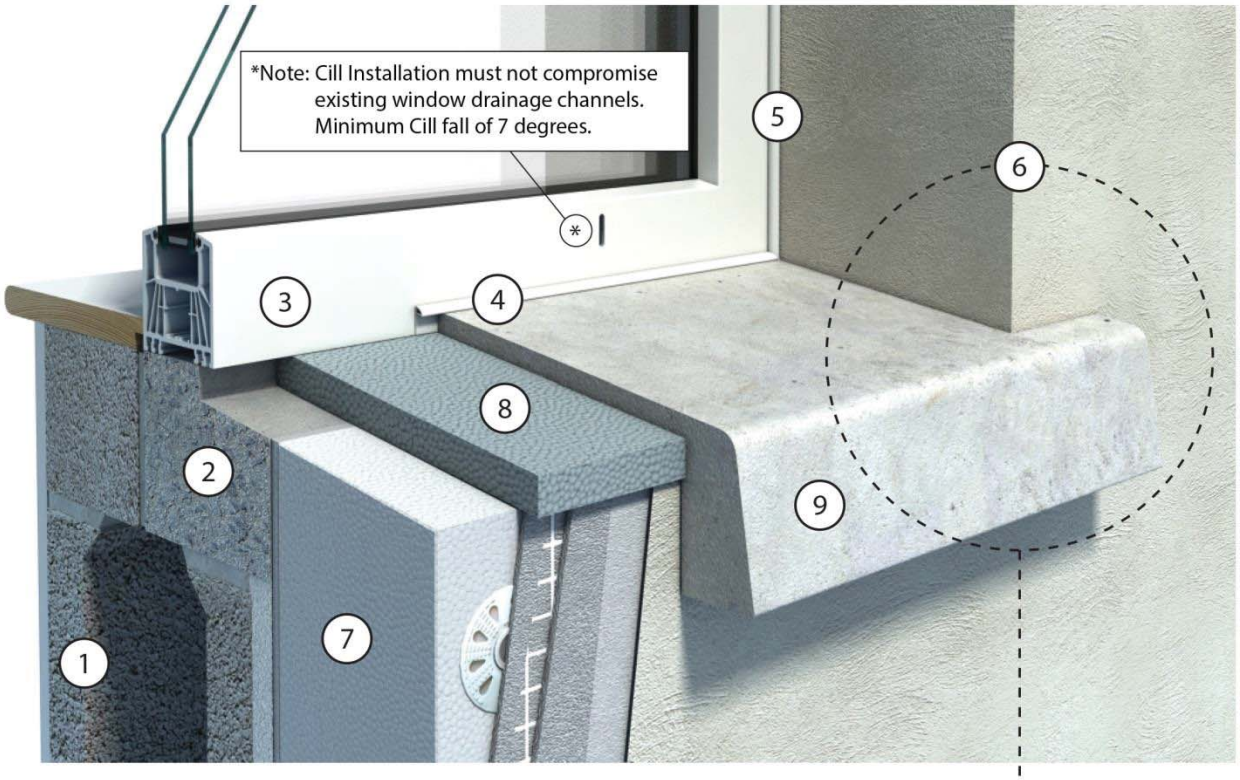
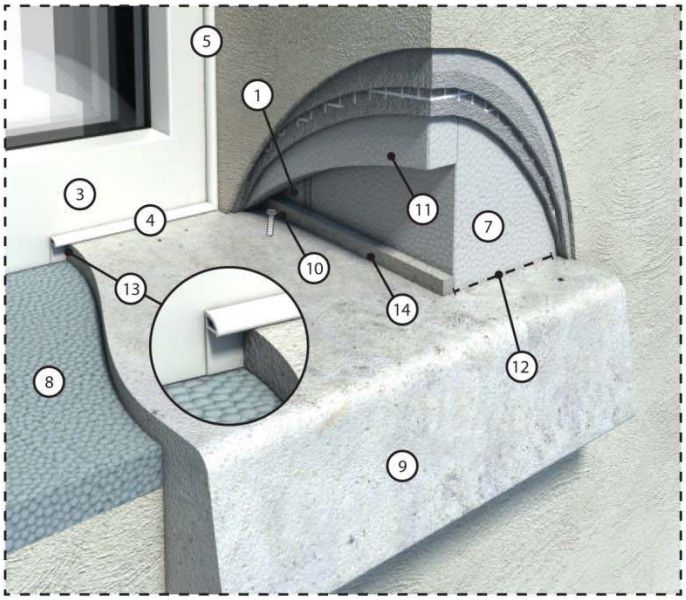


Figure 5 Eaves Detail

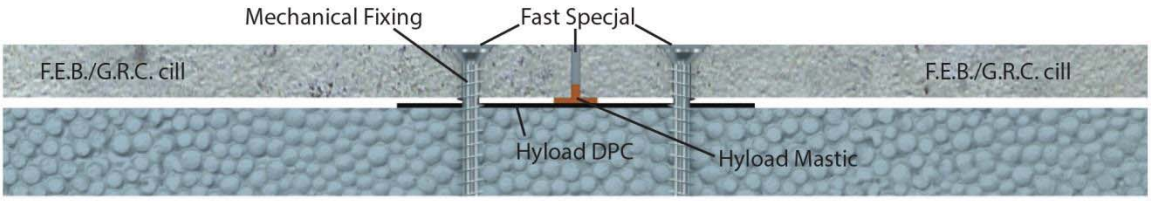


Detail 1: F.E.B. G.R.C EcoCill - Section through typical FEB EIFS.

1. Existing Rendered Concrete Wall Substrate
2. Existing Concrete Sill (Shown Cut Back)
3. Existing Window Frame
4. Upstand Sealing bead
5. Window Reveal Bead
6. Corner Detail
7. Graphite Enhanced EPS/Mineral Wool to Main Walls
8. Min 15mm high desity Insulation
9. F.E.B. G.R.C EcoCill
10. Location of Mechanical fixing for overcill
11. Reveal Insulation
12. Pocket cut out of Insulation for sill
13. Polymer sealant applied to secure and seal junctions of upstand seal & cill /window
14. 10mm x10mm G.R.C Stop End



Detail 2: Cut through Section of Installed F.E.B. G.R.C. EcoCi



Joint Detail 3: Section through Joint Detail in F.E.B G.R.C EcoCill

Figure 6 G.R.C. EcoCill Detail

3. GENERAL

The system is designed by FAST EcoBuild Ltd on a project specific basis. Where the external insulation system is being applied to improve the thermal performance of an existing building, FAST EcoBuild Ltd will assess the building and provide advice on how to maximise the benefits of the external insulation system for that building. The design will include for:

a) The completion and recording of a site survey. For existing buildings, U-value calculations, condensation risk analysis, pull-out resistance etc. should be based on the existing structure.
b) Evaluation and preparation of substrate.
c) Minimising risk of condensation in accordance with the recommendations of BS 5250: 2011+A1:2016. This includes the use of approved detailing as shown in Figures 1 to incorporating the requirements of SR 54:2014 and, where possible, meeting all of the Acceptable Construction Details published by the DHPLG.
d) Thermal insulation provision to Part L of the Building Regulations 1997 to 2017.
e) Resistance to impact and abrasion.
f) Resistance to thermal stresses.
g) Resistance to wind loading.
h) Design of fixings to withstand design wind loadings, using a safety factor of 3 (three) for mechanical fixings and a safety factor of 9 (nine) for adhesive. In addition, fixings around window and door openings shall be at a maximum of 300mm centres in each board or section of board so as to provide positive and robust restraint over the life of the system.
i) Design for fire resistance, fire spread and fire stopping, as defined in Section 4.2 and 4.3 of this Certificate.
j) Design of a water management system to prevent ingress of water at movement joints, windows, doors, openings for services etc. Particular attention is required to ensure that window and cill design are coordinated to achieve a fully integrated design.
k) Movement joints.
l) A site specific maintenance programme for inclusion in the home owner's documentation.
m) Durability requirements.

Detailing and construction must be to a high standard to prevent the ingress of water and to achieve the design thermal performance.

Window details should be designed such that, where possible, they can be removed and replaced from within the building. Consideration should be given to maximising improvement of thermal insulation at window reveals, door openings etc.

Adequate provision should be made at design and installation stage for the release of trapped moisture e.g. above window heads.

When designed and installed in accordance with this Certificate, the system will satisfy the requirements of Part L of the Building Regulations 1997 to 2017. The design shall include for the elimination/minimising of cold bridging at window and door reveals, eaves and at ground floor level in compliance with Acceptable Construction Details published by the DEPLG.

The system is intended to improve the weather resistance of the external walls. Seals to windows and doors shall be provided in accordance with the project specific site plan.

When new powder coated aluminium window cills are face fixed to window frame, a compressible gasket must be used to create a weathertight seal between frame and cill.

Care should be taken to ensure that any ventilation or drainage openings are not obstructed.
Refer to section 4.6.2 of this Certificate.

In areas where electric cables can come into contact with EPS, in accordance with good practice all PVC sheathed cables should be run through ducting or be re-routed.

The durability of the render systems is influenced by the colour of the render used. The Certificate Holder recommends that where renders are used in thermal insulation systems, dark colours with a reflection coefficient of scattered light below 20% should be avoided. The use of dark colour renders for such applications should not exceed 10% of the façade surface. This should be considered when choosing the finishing coat to be used. Exceptions include north facing or shaded walls. In case of doubt, the advice of the Certificate holder should be sought.

In areas where frost heave is likely to occur, plinth insulation must be kept 10mm above ground level.

4.1 STRENGTH AND STABILITY

4.1.1 Wind Loading

The FAST S and FAST W External Insulation Systems can be designed to withstand the wind pressures (including suction) and thermal stresses in accordance with the Building Regulations 1997 to 2017. The design for wind loading on buildings greater than two stories should be checked by a chartered engineer in accordance with Eurocode 1, I.S. EN 1991-1-4:2005. A general factor of safety of 1.5 is applied to design wind loads.

4.1.2 Impact Resistance

a) The FAST S and FAST W External Insulation Systems has been classified as defined in Table 3 & 4 of this Certificate to be suitable for use as defined in ETAG 004 Cl. 6.1.3.3 Table 8 as follows:

   Category I: A zone readily accessible at ground level to the public and vulnerable to hard impacts but not subject to abnormally rough use. There are no restrictions on the use of Category 1 Systems.

   Category II: A zone liable to impacts from thrown or kicked objects, but in public locations where the height of the system will limit the size of the impact; or at lower levels where access to the building is primarily to those with some incentive to exercise care. Class II excludes use on wall at ground level adjacent to a public footpath, but includes use on properties with their own private, walled in garden.

   Category III: A zone not likely to be damaged by normal impacts caused by people or by thrown or kicked objects. Category III is taken to exclude the use on any wall at ground level.

   Note: The above classifications do not include acts of vandalism.

b) The design should include for preventing damage from impact by motor vehicles or other machinery. Preventive measures such as provision of protective barriers or kerbs should be considered.

4.2 BEHAVIOUR IN RELATION TO FIRE

See Table 6 for details of the reaction to fire classification according to IS EN 13501-1:2007+ A1 2009 for the FAST S External Insulation System. The FAST W External Insulation System is defined as A2- s2, d0.

The mineral wool board is classified as non-combustible as per Table A8 (d) of TGD to Part B of the Building Regulations 1997 to 2017.

Systems that achieved a Class B (or better i.e. Class A) Reaction to Fire Classification (see Table 3 of each of the Detail sheets) are Suitable for use up to a maximum of six storeys (18m) in height on purpose groups 1(a), 1(c), 2(a), 2(b), 3, 4(a) and 4(b), and for use up to a maximum of five storeys (15m) in height on purpose group 1(b) as defined in TGD to Part B of the Building Regulations 1997 to 2017.

Systems that achieved a Class C Reaction to Fire Classification (see Table 3 of each of the Detail sheets) are suitable for use on Residential Dwellings (Purpose Groups 1(a) and 1(b), not more than 15m high and for Flats and Maisonettes (Purpose Group 1(c)) not more than 10m high as defined in TGD to Part B of the Building Regulations 1997 to 2017. These systems may not be used on a wall which is less than 1m away for a boundary. Reference should be made to Section 4.1 and 4.2 of TGD to Part B of the Building Regulations 1997 to 2017.

The mineral wool board is classed as non-combustible as per Table A8 (d) of TGD to Part B of the Building Regulations 1997 to 2017.

With regard to fire stopping and limitations on use of combustible materials, walls must comply with Sections B3.2, B3.3, B3.4 and B4 of TGD to Part B of the Building Regulations 1997 to 2017.

Stainless steel fire fixings to be provided at the rate of one per square metre when specified. The fixing design should take account of the extra duty required under fire conditions.

Vertical and horizontal lamella fire barriers shall be provided at each compartment floor and wall, with fixings provided at 400mm vertical centres and 400mm horizontal centres respectively, including the second floor level of a three-storey single occupancy house. Refer to Diagram 12 of TGD B, Volume2. Firebreaks should be adhesively bonded to the substrate (i.e. ribbons or dabs of adhesive is not acceptable) and mechanically fixed with stainless steel fire fixings at 400mm centres. The fire barrier shall be of non-combustible material (i.e. stone mineral wool (lamella), slab of minimum density 120kg/m^3), be at least 200mm high, continuous and unbroken for the full perimeter of the building and for the full thickness of the insulation. Glass wool is not suitable for use as a fire stop.

4.3 PROXIMITY OF HEAT PRODUCING APPLIANCES

Combustible material must be separated from a brick or blockwork chimney by at least 200mm from a flue and 40mm from the outer surface of the brick or blockwork chimney, in accordance with Clause 2.15 of TGD to Part J of the Building Regulations 1997 to 2017. Metal fixings in contact with combustible materials should be at least 50mm from a flue.

4.4 THERMAL INSULATION

Assessments were carried out to verify that the requirements of Part L of the Building Regulations 1997 to 2017 can be achieved using the FAST S and FAST W External Insulation Systems.

The manufacturer's declared thermal conductivity values ($\lambda_{90/90}$) are 0.038W/mK for the standard white EPS board, 0.031W/mK for the graphite enhanced EPS board, and 0.035W/mK for the mineral wool (density 140Kg/m^3), taken from the manufacturers individual DOP's. These have not been assessed by NSAI Agrément. Table 5 shows typical insulation thicknesses to achieve the required elemental U-Values of 0.27W/m^{2}K and 0.15W/m^{2}K. Calculation of U-values will be required on individual projects to confirm a U-value of 0.27W/m^{2}K has been achieved, based on the wall construction and the insulation used. The thermal conductivity (λ) value of the insulation to be used in all U-value calculations must be the $\lambda_{90/90}$ value.

When the system is to be applied to a masonry cavity wall construction, consideration should be given to the treatment of the ventilated cavity. In order to maximise the thermal effectiveness of the improved U-value created by the external insulation system in a cavity wall/block of an external wall of a building, it is critical to significantly reduce or eliminate airflow within the cavity void. It is a requirement to fill or seal a cavity at all openings as this will prevent airflow and maximise the thermal effectiveness of the FAST ETICS system. Ventilation to the building must be maintained in accordance with the requirements of TGD F.

4.5 LIMITING THERMAL BRIDGING

The linear thermal transmittance 'ψ' (Psi) describes the heat loss associated with junctions and around openings. Window and door reveal design used on the FAST S and FAST W External Insulation Systems have been assessed and when detailed in accordance with this Certificate can meet the requirements of Table D2 of TGD to Part L of the Building Regulations 1997 to 2017. When **all** bridged junctions within a building comply with the requirements of Table D2 of TGD to Part L, the improved 'y' factor of 0.08 can be entered into the DEAP building energy rating (BER) calculation.

Alternatively if **all** junctions can be shown to be equivalent or better than the Acceptable Construction Details published by the DoEHLG, then the improved 'y' factor of 0.08 can be used, i.e. R value = 0.6m^{2}K/W for window/door reveals.

Where either of the above options are shown to be valid, or when the required values cannot be achieved, all relevant details should be recorded on the 'Certificate of Compliance' for that project for use in future BER calculations.

'ψ' values for other junctions outside the scope of this Certificate should be assessed in accordance with BRE IP1/06 *Assessing the effects of thermal bridging at junctions and around openings* and BRE BR 497 *Conventions for calculating linear thermal transmittance and temperature factors* in accordance with Appendix D of TGD to Part L of the Building Regulations 1997 to 2017.

4.6 CONDENSATION RISK

Areas where there is a significant risk of condensation due to high levels of humidity should be identified during the initial site survey.

Where a condensation risk is identified, a condensation risk analysis will be carried out by FAST Ecobuild Ltd in accordance with BS 5250: 2011+A1:2016 and the design modified as appropriate to reduce the risk of surface condensation to acceptable levels.

4.6.1 Internal Surface Condensation

When improving the thermal performance of the external envelope of a building through external wall insulation, designers need to consider the impact of these improvements on other untouched elements of the building. As discussed in Section 4.5 of this Certificate, thermally bridged sections of the envelope such as window jambs, cills and eaves will experience a lower level of increased thermal performance. The degree of improvement to these junctions can be limited due to physical restrictions on site i.e. footpaths, soffit boards or hinges for windows.
When bridged junctions meet the requirements of Appendix D Table D2 of TGD to Part L of the Building Regulations 1997 to 2017, the coldest internal surface temperature will satisfy the requirements of Section D2, namely that the temperature factor shall be equal to or greater than 0.75. As a result, best practice will have to be adopted in order to limit the risk of internal surface condensation which can result in dampness and mould growth.

When site limiting factors give rise to substandard levels of insulation at bridged junctions, guidance should be sought from the Certificate holder as to acceptable minimum requirements.

4.6.2 Interstitial Condensation

Where a condensation risk is identified, a condensation risk analysis will be carried out by FAST EcoBuild Ltd. in accordance with BS 5250: 2011+A1:2016 and the design modified as appropriate to reduce the risk of surface condensation to acceptable levels.

4.6.2 Ventilation

When installing the external insulation system, the works to be undertaken must not compromise the existing ventilation provisions in the home including the ventilation of suspended timber floors, where existing vents must be sleeved across the rising wall and sealed. When these existing ventilation provisions do not meet the requirements of Part F of the Building Regulations, the homeowner should be informed and remedial action should be taken before the external insulation system is installed.

4.7 MAINTENANCE

Adequate provision should be made in the initial design phase for access and maintenance over the life of the system.

The system shall be inspected and maintained in accordance with the Certificate holder's instructions, as detailed in the Repair and Maintenance Method Statement, which is incorporated into the Home Owner's Manual.

Necessary repairs should be carried out immediately and must be in accordance with the Certificate holder's instructions. Repairs to plumbing etc. should also be carried out as required to prevent deterioration or damage, and to protect the integrity of the system.

Synthetic finishes may be subject to aesthetic deterioration due to exposure to UV light. They should be re-painted every 18 to 20 years to maintain appearance. Care should be taken to ensure that the synthetic finish used is compatible with the original system and that the water vapour transmission or fire characteristics are not adversely affected.

Sealants shall be subject to regular inspection (at least annually). They should be replaced as required and fully replaced every 18 to 20 years to maintain performance.

4.8 WEATHERTIGHTNESS

When designed and detailed in accordance with this Certificate, the system will prevent moisture from the ground coming in contact with the insulation.

The external render has adequate resistance to water penetration when applied in accordance with the Certificate holder's instructions.

Joint designs, sealant specifications and recommendations for detailing at windows and doors were assessed and are considered adequate to ensure that water penetration will not occur, assuming that regular maintenance is carried out in accordance with the Certificate holder's instructions.

Recommendations for detailing at windows and doors have been assessed and are considered adequate to ensure that water penetration will not occur, assuming that regular maintenance is carried out in accordance with the Certificate holder's instruction.

4.9 DURABILITY

4.9.1 Design Life

An assessment of the life of the system was carried out. This included an assessment of:

- Design and installation controls;
- Proposed building heights;
- Render thickness and specification;
- Material specifications, including insulant, mesh, beading and fixing specifications;
- Joint design;
- Construction details;
- Maintenance requirements.

The assessment indicates that the system should remain effective for at least 30 years, providing that it is designed, installed and maintained in accordance with this Certificate.
Any damage to the surface finish shall be repaired immediately and regular maintenance shall be undertaken as outlined in Section 4.7 of this Certificate.

The F.E.B. GRC EcoCills has been assessed as having a durability 30 years once they have been installed in accordance with this certificate and are subject to regular inspections and maintenance.

4.9.2 Aesthetic Performance

As with traditional renders, the aesthetic performance of the systems, e.g. due to discolouration, soiling, staining, algae growth or lime bloom, is depended on a range of factors such as:

- Type, colour and texture of surface finish;
- Water retaining properties of the finish;
- Architectural form and detailing;
- Building orientation/elevation;
- Local climate/atmospheric pollution;
- Proximity of vegetation.

Where cleaning of walls is required, the procedure in the FAST EcoBuild Ltd Maintenance document must be followed. For the removal of algae growth the certificate holder recommends the use of FAST Protektor which shall be applied strictly in accordance with their maintenance manual. It is the homeowner's responsibility to inspect the walls every year and clean when required; however the homeowner may contract the approved installer to provide this service.

Adequate consideration should be given at the design stage to all of the above to ensure that the level of maintenance necessary to preserve the aesthetics of the building is acceptable.

4.10 PRACTICABILITY

The practicability of construction and the adequacy of site supervision arrangements were assessed and considered adequate. The project specific designs and method statements for application, inspection and repair were reviewed and found to be satisfactory.

4.11 TESTS AND ASSESSMENTS WERE CARRIED OUT TO DETERMINE THE FOLLOWING

- Structural strength and stability
- Behaviour in fire
- Impact resistance
- Pull-out resistance of fixings
- Thermal resistance
- Hygrothermal behaviour
- Condensation risk
- Site erection controls
- Durability of components
- Dimensional stability of insulant

4.12 OTHER INVESTIGATIONS

(i) Existing data on product properties in relation to fire, toxicity, environmental impact and the effect on mechanical strength/stability and durability were assessed.

(ii) The manufacturing process was examined including the methods adopted for quality control, and details were obtained of the quality and composition of the materials used.

(iii) Special building details (e.g. ground level, window and door openings, window cill and movement joints) were assessed and approved for use in conjunctions with this Certificate.

(iv) Site visits were conducted to assess the practicability of installation and the history of performance in use of the product.

Table 3: Impact Resistance- FAST S		
Rendering system: Base coat **FAST Specjal / FAST Specjal M** + reinforcement and finishing coats indicated hereafter:	**Single standard mesh**	**Double standard mesh**
FAST Baranek FAST Kornik	Category III	Category III for particle size 1.0 and 1.5 mm Category I for particle size ≥ 2.0 mm
FAST WD	Category 1	NPD
FAST MS	Category III	Category I
FAST Baranek S FAST Kornik S	Category III	Category I
FAST Baranek A	Category III	Category III for particle size 1.0 mm Category I for particle size ≥ 1.5 mm
FAST Kornik A	Category III	Category III for particle size 1.0 and 1.5 mm Category I for particle size ≥ 2.0 mm
FAST Granit (for plinth only)	Category III	Category I
FAST Baranek SI FAST Kornik SI	Category III	Category I
FAST Baranek SIL FAST Kornik SIL	Category III	Category III for particle size 1.0 and 1.5 mm Category I for particle size ≥ 2.0 mm
◦ See Clause 4.1.2 of this Certificate for definitions of Category I / II / III impact resistance		

Table 4: Impact Resistance – FAST W			
Base Coat	**Finishing Coat**	**Reinforcement**	**Impact Resistance**
FAST Specjal W	FAST Baranek Mineral render minimum particle size 2.0 mm FAST Kornik Mineral render, min 2.0 mm	2 No layers of AKE 145 A / VERTEX R 117 A101	Category 1 Category 1
FAST Specjal W	FAST Baranek Mineral render minimum particle size 2.0 mm FAST Kornik Mineral render, min 2.0 mm	1 No layers of AKE 145 A / VERTEX R 117 A101	Category 3 Category 3
FAST Specjal W	FAST Baranek SIL Silicone render min particle size 2.0 mm FAST Kornik SIL Silicone render min particle size 2.0 mm	2 No layers of AKE 145 A / VERTEX R 117 A101	Category 1 Category 1
FAST Specjal W	FAST Baranek SIL Silicone render min particle size 2.0 mm FAST Kornik SIL Silicone render min particle size 2.0 mm	1 No layers of AKE 145 A / VERTEX R 117 A101	Category 2 Category 2
◦ See Clause 4.1.2 of this Certificate for definitions of Category I / II / III impact resistance ◦ Minimum 2 layers of VERTEX 145A/AKE 145/R 117 A 101 mesh required to achieve minimum Category I or II at ground floor level			

Table 5: Typical U-values (W/m²K)								
Existing Wall Structure	**Insulation Type**	**Declared Thermal Conductivity ($\lambda_{90/90}$) of Insulation (W/mK)**	**Thickness of Insulation (mm)**					
			None	**100**	**110**	**125**	**140**	**170**
215mm Block-on-Flat (No insulation)	Standard White EPS 70	0.038	2.47	-	-	0.27		0.21
	Grey Graphite enhanced EPS 70.	0.031	2.47	-	0.26		0.21	
	Mineral Wool RW6 140kg/m³	0.035	2.47	0.32	0.29	0.26	0.24	0.20
215mm Hollow Block (No insulation	Standard White EPS 70	0.038				0.27		0.21
	Grey Graphite enhanced EPS 70.	0.031			0.26		0.21	
	Mineral Wool RW6 140kg/m³	0.035	2.53	0.32	0.29	0.26	0.24	0.29
Concrete Block Cavity Wall (No insulation)	Standard White EPS 70	0.038	-	-	-	0.27	-	0.21
	Grey Graphite enhanced EPS 70.	0.031	-	-	0.26	-	0.21	-
	Mineral Wool RW6 140kg/m³	0.035	1.67	0.30	0.28	0.25	0.23	0.19
Concrete Block Cavity Wall with 50mm existing partial fill insulation.	Standard White EPS 70	0.038		0.26			0.21	
	Grey Graphite enhanced EPS 70.	0.031		0.23 (75mm is 0.27)		0.21		
	Mineral Wool RW6 140kg/m³	0.035	0.57	0.23	0.22	0.20	0.19	0.16
Concrete Block Cavity Wall fully filled with insulation	Standard White EPS 70	0.038		0.27			150mm is 0.21	
	Grey Graphite enhanced EPS 70.	0.031		80mm is 0.27		0.21		
	Mineral Wool RW6 140kg/m³	0.035	0.63	0.24	0.23	0.21	0.19	0.17
450mm Rubble wall	Standard White EPS 70	0.038	-	-	-	0.27	-	0.21
	Grey Graphite enhanced EPS 70.	0.031		0.27	0.26	-	0.21	-
	Mineral Wool RW6 140kg/m³	0.035	2.73	0.32	0.29	0.26	0.24	0.20
Clay Brick-Concrete Block Cavity Wall (No insulation)	Standard White EPS 70	0.038				0.27		0.21
	Grey Graphite enhanced EPS 70.	0.031			0.26		0.21	
	Mineral Wool RW6 140kg/m³	0.035	1.70	0.30	0.27	0.25	0.23	0.19

These values are based on the following construction (External to Internal):

- Render finish with mesh basecoat – 6mm.
- Insulation material as specified.
- Render on existing concrete blockwork – 15mm (not on brickwork).
- Existing wall structures:
  - Blockwork on flat – 2000kg/m³ (440x215x100) – 215mm
  - Hollow blockwork – 2000kg/m³ (440x215x215) – 215mm
  - Concrete blockwork in cavity wall – 2000kg/m³ (440x215x100) – 100mm
    Unventilated air cavity – 50mm
    Concrete blockwork in cavity wall - 2000kg/m³ (440x215x100) – 100mm
  - Clay brickwork external leaf in cavity wall – 1700kg/m3 (215x65x102.5) – 102.5mm
    Unventilated air cavity – 50mm
    Concrete blockwork in cavity wall - 2000kg/m³ (440x215x100) – 100mm
- Render – 15mm.
- Plaster, gypsum – 15mm.

Table 6 – Reaction to Fire for the FAST S System			
Configuration	**Organic content / Heat of combustion**	**Flame retardant content**	**Euroclass according to EN 13501-1**
Adhesive	Max 4.81 MJ/kg	No flame retardant	B – s1, d0
Panels of expanded polystyrene EPS Maximal density of 15 kg/m^3 (see Table 1)	In quantity ensuring Euroclass E according to EN13501-1	In quantity ensuring Euroclass E according to EN 13501-1	
Base coat render	max. 0.13 MJ/kg	No flame retardant	
Glass fiber mesh	max. 8.32 MJ/kg		
Finishing coats with mineral binder Finishing coats with acrylic binder - except finishing coat fast granit Finishing coats with silicate binder Finishing coats with siloxane binder Finishing coats with silicone binder	max. 2.30 MJ/kg		
Reaction to fire valid only for ETICS in lower part of wall (Plinth)			
Configuration	**Organic content / Heat of combustion**	**Flame retardant content**	**Euroclass according to EN 13501-1**
Adhesive FAST Normal S FAST Specjal/FAST Specjal M	Max 0.14MJ/kg	No flame retardant	B – s1, d0
Panels of expanded polystyrene EPS Maximal density of 36 kg/m^3 (see Table 1)	In quantity ensuring Euroclass E according to EN13501-1	In quantity ensuring Euroclass A1 according to EN 13501-1	
Base coat render	Max 0.13 MJ/kg	No flame retardant	
Glass fibre mesh	Max 8.2 MJ/kg		
Finishing coats FAST Granit	Max 2.9 MJ/kg		

5.1 National Standards Authority of Ireland ("NSAI") following consultation with NSAI Agrément has assessed the performance and method of installation of the product/process and the quality of the materials used in its manufacture and certifies the product/process to be fit for the use for which it is certified provided that it is manufactured, installed, used and maintained in accordance with the descriptions and specifications set out in this Certificate and in accordance with the manufacturer's instructions and usual trade practice. This Certificate shall remain valid for five years from date of issue so long as:

(a) the specification of the product is unchanged.

(b) the Building Regulations 1997 to 2017 and any other regulation or standard applicable to the product/process, its use or installation remains unchanged.

(c) the product continues to be assessed for the quality of its manufacture and marking by NSAI.

(d) no new information becomes available which in the opinion of the NSAI, would preclude the granting of the Certificate.

(e) the product or process continues to be manufactured, installed, used and maintained in accordance with the description, specifications and safety recommendations set out in this certificate.

(f) the registration and/or surveillance fees due to NSAI Agrément are paid.

5.2 The NSAI Agrément mark and certification number may only be used on or in relation to product/processes in respect of which a valid Certificate exists. If the Certificate becomes invalid the Certificate holder must not use the NSAI Agrément mark and certification number

5.3 In granting Certification, the NSAI makes no representation as to;

(a) the absence or presence of patent rights subsisting in the product/process; or

(b) the legal right of the Certificate holder to market, install or maintain the product/process; or

(c) whether individual products have been manufactured or installed by the Certificate holder in accordance with the descriptions and specifications set out in this Certificate.

5.4 This Certificate does not comprise installation instructions and does not replace the manufacturer's directions or any professional or trade advice relating to use and installation which may be appropriate.

5.5 Any recommendations contained in this Certificate relating to the safe use of the certified product/process are preconditions to the validity of the Certificate. However the NSAI does not certify that the manufacture or installation of the certified product or process in accordance with the descriptions and specifications set out in this Certificate will satisfy the requirements of the Safety, Health and Welfare at Work Act 2005, or of any other current or future common law duty of care owed by the manufacturer or by the Certificate holder.

5.6 The NSAI is not responsible to any person or body for loss or damage including personal injury arising as a direct or indirect result of the use of this product or process.

5.7 Where reference is made in this Certificate to any Act of the Oireachtas, Regulation made there under, Statutory Instrument, Code of Practice, National Standards, manufacturer's instructions, or similar publication, it shall be construed as reference to such publication in the form in which it is in force at the date of this Certification.

Bibliography

Irish Building Regulations 1997 to 2017.

Acceptable Construction Details (ACD's) published by the DHPLG.

BS 8000-0:2014: *Workmanship on building sites – Code of practice for plastering and rendering*

BS 5250: 2011+A1:2016 *Code of practice for control of condensation in buildings.*

ETAG 004 Version 08/2011 - External Thermal Insulation Composite Systems with rendering.

Eurocode 1, I.S. EN 1991-1-4:2005 *Actions on structures – General actions – Wind actions*.

I.S. EN 13914-1:2016: *Design, preparation and application of external rendering and internal plastering – External rendering*.

I.S. EN13501-1: 2007+ A1 2009: Fire classification of construction products and building elements- Part 1: Classification using data from reaction to fire tests.

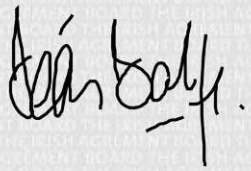
SR 54:2014 *Code of practice for the energy efficient retrofit of dwellings.*

NSAI Agrément

This Certificate No. 12/0368 is accordingly granted by the NSAI to FAST EcoBuild Ltd on behalf of NSAI Agrément.

Date of Issue: March 2012

Signed



Seán Balfe
Director of NSAI Agrément

Readers may check that the status of this Certificate has not changed by contacting NSAI Agrément, NSAI, 1 Swift Square, Northwood, Santry, Dublin 9, Ireland. Telephone: (01) 807 3800. Fax: (01) 807 3842. www.nsai.ie

Revisions:
26th January 2018: To add a GRC cill and update references to the Irish Building Regulations and other standards.