

## Cantillana External Wall 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 2010**.



#### PRODUCT DESCRIPTION:

This Certificate relates to the Cantillana External Wall Insulation System (EWIS). The system is comprised of:

- Surface preparation of masonry or concrete substrate;
- Full system beads and render only beads;
- Insulation board (standard white EPS, graphite-enhanced EPS);
- Cementitious base coat with reinforcement;
- Decorative finish (acrylic, silicate, silicone);
- Mechanical fixings;
- Adhesive 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 DoEHLG.
- Provision for fire stopping at external compartment walls and floors.

Cantillana N.V. is responsible for the design, manufacture and supply of all components to approved specifications. Cantillana N.V. has appointed Retrofit Technology Ltd as their distribution partner in Ireland.

The system is designed by Retrofit Technology 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 Retrofit Technology Ltd, and are approved by Retrofit Technology Ltd and NSAI Agrément to install the system. Applicators must adhere to strict installation guidelines as specified by Retrofit Technology Ltd.

This Certificate certifies compliance with the requirements of the Building Regulations 1997 to 2010.

**Readers are advised to check that this Certificate has not been withdrawn or superseded by a later issue by contacting NSAI Agrément, NSAI, Santry, Dublin 9 or online at <http://www.nsai.ie/modules/certificates/uploads/pdf/IAB110362.pdf>**

## **USE**

The Cantillana EWIS is 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 2010.

The system is suitable for use up to a maximum of six storeys (18m) in height in purpose groups 1(a), 1(b), 1(c), 2(a), 2(b), 3, 4(a) and 4(b) as defined in Part B of the Building Regulations 1997 to 2010.

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' (see Table 2) 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.

## **MANUFACTURE, DESIGN & MARKETING:**

The system is designed and manufactured by:

Cantillana N.V.,  
Pontstraat 82,  
B-9831 Deurle,  
Belgium.

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

Retrofit Technology Ltd,  
Unit B8 Clonlara Avenue,  
Baldonnell Business Park,  
Dublin 22.  
T: 01 4105854  
E: [info@retrofittechnology.ie](mailto:info@retrofittechnology.ie)  
W: [www.retrofittechnology.ie](http://www.retrofittechnology.ie)

### **1.1 ASSESSMENT**

In the opinion of NSAI Agrément, the Cantillana EWIS, when installed by Retrofit Technology Ltd recommended contractors, in accordance with this Certificate and Retrofit Technology Ltd specific design, can meet the requirements of the Building Regulations 1997 to 2010, as indicated in Section 1.2 of this Agrément Certificate.

### **1.2 BUILDING REGULATIONS 1997 to 2010**

#### **REQUIREMENTS:**

#### ***Part D – Materials and Workmanship***

##### **D3 – Proper Materials**

The Cantillana EWIS, as certified in this Certificate, is comprised of 'proper materials' fit for their intended use (see Part 3 and 4 of this Certificate).

##### **D1 – Materials & Workmanship**

The Cantillana EWIS, as certified in this Certificate, meets the requirements for workmanship.

#### ***Part A - Structure***

##### **A1 – Loading**

The Cantillana EWIS, once appropriately designed and installed in accordance with this Certificate, has adequate strength and stability to meet the requirements of this Regulation (see Part 3 of this Certificate).

##### **A2 – Ground Movement**

The Cantillana EWIS can be incorporated into structures that will meet this requirement (see Parts 3 and 4 of this Certificate).

#### ***Part B – Fire Safety***

##### **B4 – External Fire Spread**

The Cantillana EWIS 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**

External walls 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 Cantillana EWIS is 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**

The walls of the Cantillana EWIS 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 2010 (see Part 4 of this Certificate).

## 2.1 PRODUCT DESCRIPTION

The Cantillana EWIS consists of fixing thermal insulation boards, either factory-prefabricated expanded polystyrene (EPS), with a base coat layer incorporating reinforcement mesh and a decorative finish. See Table 1 for the fill list of components of the Cantillana EWIS.

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 Cantillana EWIS 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

Cantillana N.V. is responsible for the design and manufacture of all components to approved specifications. Cantillana N.V. has appointed Retrofit Technology Ltd as distribution partner in Ireland, with responsibility for:

- Project specific design in accordance with approved design process;
- Training, monitoring and review of licensed applicators in accordance with approved training and assessment procedures;
- Product supply and documentation control;
- Technical support and installation supervision;
- Sales and marketing.

The installation of the Cantillana EWIS is carried out by Retrofit Technology Ltd trained and approved installers in accordance with Retrofit Technology 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 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 Retrofit Technology 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 Retrofit Technology Ltd and NSAI Agrément to install the product.
- 3) Have undertaken to comply with the Retrofit Technology Ltd installation procedure, requirements of this Certificate, and the Retrofit Technology Ltd Code of Practice for approved contractors.
- 4) Are employing Supervisors and Operatives who have been issued with appropriate identity cards by Retrofit Technology Ltd. Each team must consist of at least one ETICS Operative and ETICS Supervisor (can be the same person).
- 5) Are subject to supervision by Retrofit Technology 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 – site visits and office records.

	Components	Coverage (kg/m <sup>2</sup> )	Thickness (mm)
<b>Adhesives</b>	<ul style="list-style-type: none"> <li>• <b>Granol'therm KB</b> Cement based powder requiring addition of 23 – 26% water</li> <li>• <b>Granol'therm G/W</b> Cement based powder requiring addition of 25 – 27% water (G is based on grey cement, W is based on white cement)</li> </ul>	3.0 to 5.0 (powder)	
<b>Insulation</b>	<b>EPS:</b> EPS-EN 13163-L2-W2-T2-S2-P4-DS(N)2-DS(70,-)1-TR80, TR100, TR150 Minimum compressive strength 70kN/m <sup>2</sup>		60 to 200
<b>Anchors</b>	<ul style="list-style-type: none"> <li>• Granol'therm NT U</li> <li>• Granol'therm STR U</li> <li>• Granol'therm NTK U</li> <li>• Ejotharm NT U</li> <li>• Ejotharm STR U</li> <li>• Ejotharm NTK U</li> <li>• Ejotharm SK U</li> <li>• Ejotharm SKM-T plus</li> <li>• Ejotharm SKM-T plus U</li> <li>• Ejotharm ST U</li> <li>• Hilti SX-FV</li> <li>• Hilti SDK-FV8</li> <li>• Hilti D 8-FV</li> <li>• IsoFux NDT-8Z</li> <li>• IsoFux NDT-8ZS</li> <li>• IsoFux NDS90Z</li> <li>• IsoFux NDM8Z</li> <li>• IsoFux NDM90Z</li> <li>• IsoFux NDS8Z</li> <li>• Koelner TFIX-8M</li> <li>• Koelner KI-8M</li> <li>• Fischer Termoz 8U</li> <li>• Fischer Termoz 8ZU</li> <li>• Fischer Termoz 8SV</li> <li>• Fischer Termoz CF 8</li> <li>• Fischer Termoz 8 N</li> <li>• Fischer Termoz 8 NZ</li> </ul>		
<b>Base coat</b>	<ul style="list-style-type: none"> <li>• <b>Granol'therm G/W</b> Cement based powder requiring addition of 25 – 27% water (G is based on grey cement, W is based on white cement)</li> <li>• <b>Granol'therm KB</b> Cement based powder requiring addition of 23 – 26% water</li> </ul>	4.5	3.0 – 4.0
<b>Glass fibre mesh</b>	<ul style="list-style-type: none"> <li>• <b>Granol'therm AGF (Standard Mesh)</b> Alkali resistant glass fibre reinforced mesh, weight per unit area of 165g/m<sup>2</sup> and mesh size of 4.0mm x 4.0mm.</li> <li>• <b>Granol'therm PZG (Reinforced Mesh)</b> Alkali resistant glass fibre reinforced mesh, weight per unit area of 540g/m<sup>2</sup> and mesh size of 6.0mm x 8.0mm, implemented in addition to the standard mesh to improve impact resistance)</li> </ul>		
<b>Primer/Key coat</b>	<ul style="list-style-type: none"> <li>• <b>Granol'plus STG</b> Ready to use pigmented liquid for use with Granol KR/RP</li> <li>• <b>Granosil'plus STF</b> Ready to use pigmented liquid for use with Granosil KR/RP</li> </ul>	0.2 – 0.3	
<b>Finishing coat</b>	<ul style="list-style-type: none"> <li>• Ready to use paste – acrylic binder               <ul style="list-style-type: none"> <li>- <b>Granol KR/RP</b> (particle size 1 – 5mm)</li> </ul> </li> <li>• Ready to use paste – acrylosiloxane binder               <ul style="list-style-type: none"> <li>- <b>Granosil KR/RP</b> (particle size 1 – 4mm)</li> </ul> </li> <li>• Ready to use paste – silicate binder               <ul style="list-style-type: none"> <li>- <b>Granokat</b> (particle size 1 – 4mm)</li> </ul> </li> </ul>	2.7 – 5.7 2.3 – 3.7 2.0 – 4.3	Regulated by particle size
<b>Ancillary materials</b>	Ancillary materials must be approved by the Certificate holder.		

**Table 1: Component Specification**

#### 2.4.2 General

Retrofit Technology 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 Retrofit Technology Ltd technical representative. Retrofit Technology Ltd 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. Certificates of Compliance, Retrofit Technology Ltd guarantee and home owners 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 Retrofit Technology Ltd technical representative or Retrofit Technology Ltd and NSAI Agrément approved contractor and all key information is recorded on the site survey form. The Retrofit Technology 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 Retrofit Technology Ltd technical representative will determine if pullout 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

- 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.
- 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; silicate plasters must not be applied if the temperature will be below 8°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.
- Base beads and all full system beads are fixed as specified. Insulation and render only beads are fixed as specified in the site package.
- The starter track is mechanically fixed 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.
- 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 should extend below ground level where possible. Where this is not possible the first run of XPS insulation boards is positioned at ground level.
- The insulation boards are bonded to the wall by applying the specified adhesive (see Table 1) to the boards using the "strip-point"

method. A circumferential ribbon of adhesive at least 30mm wide in diameter is applied to the insulation boards. 6 – 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.

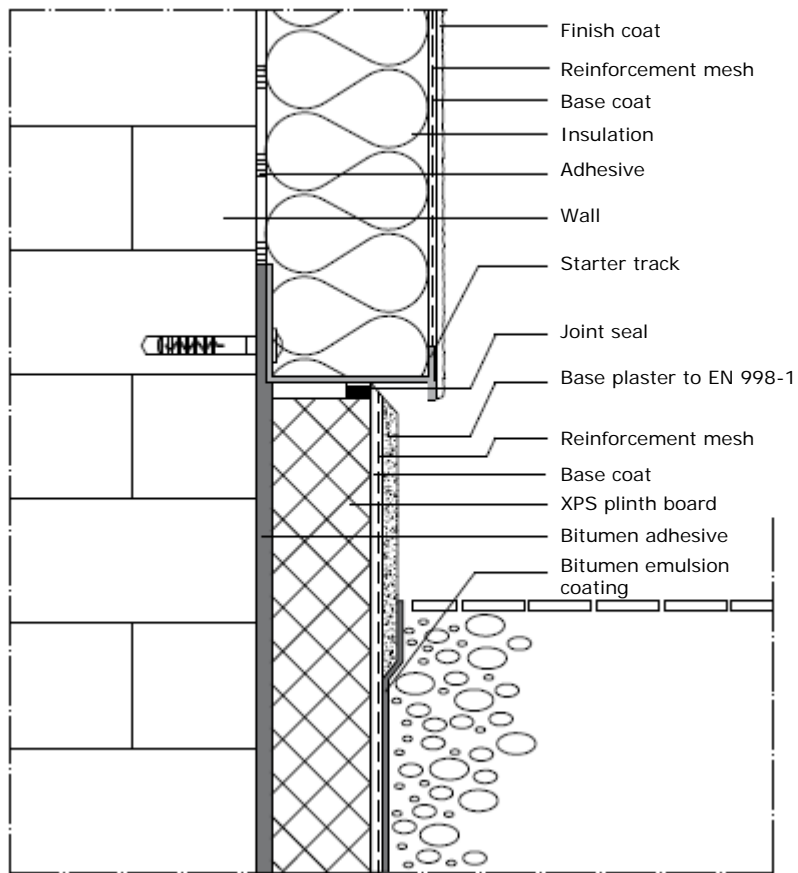
- Subsequent rows of insulation boards are installed on top of the starter track and positioned so that the vertical board joints are staggered and overlapped at the building corners.
- To avoid thermal bridging, ensure a tight adhesive free joint connection between adjacent insulation boards. A foam filler approved by the Certificate holder may be used for filling gaps up to 5mm.
- 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<sup>2</sup>K/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 pullout test results, substrate type and wind loading data. A minimum number of 2 mechanical fixings per board for EPS shall be installed unless otherwise specified in the project specific design. Above two stories an additional stainless steel fire fixing is provided at a rate of 1 per m<sup>2</sup>.
- 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.
- Purpose-made powder coated aluminium window sills with PVC stop-ends 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.
- 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-sills, 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. 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.

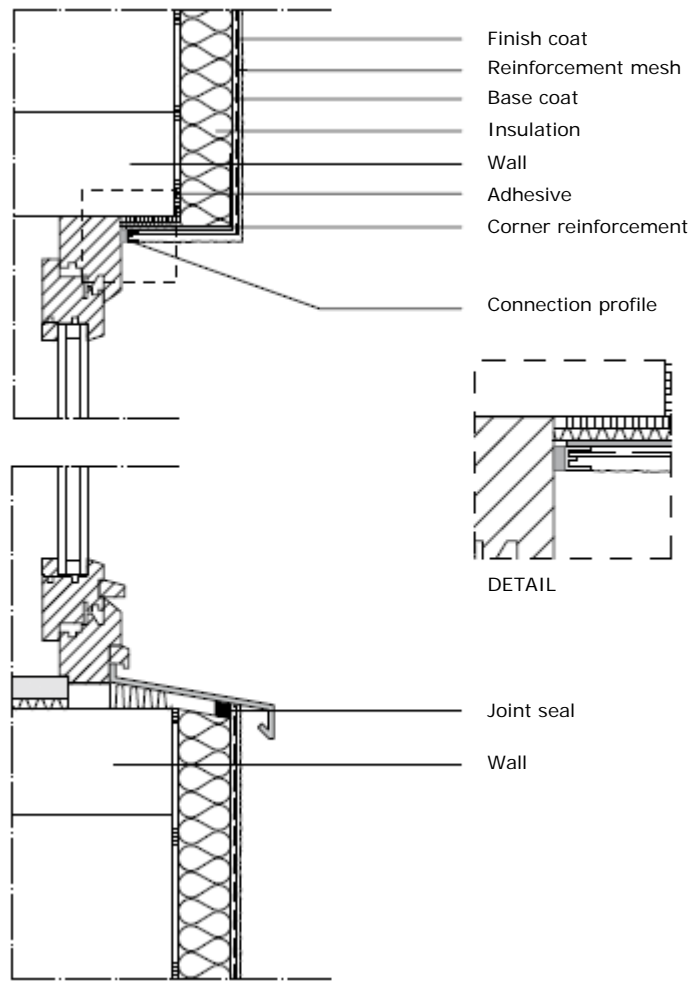
- Prior to application of base coat and finish coat, all necessary protective measures such as taping off of existing window frames and covering of glass should be in place.
- In sunny weather, work should commence on the shady side of the building and be continued following the sun to prevent the rendering drying out too rapidly.
- Base coat is prepared as described in Table 1 and is trowel applied to the surface of dry insulation boards at approximately 2/3 of the final base coat thickness. Base coats requiring the addition of water should be mixed mechanically using a drill and mixer.
- Apply the base coat to the insulation boards to the width of the mesh. The reinforcing mesh must be pressed into the base coat with a 100mm overlap. 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 can be laid either vertically or horizontally.
- An additional diagonal reinforcement must be applied around the façade openings. This involves embedding diagonal strips of mesh in the reinforcing mesh.
- The primer and/or finish coat must not be applied until after the base coat has dried out fully (3 days approximately).
- Primers (see Table 1 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 are applied in accordance with the Certificate holder's instructions.
- All rendering should follow best practice guidelines, e.g. BS 8000-10:1995 *Workmanship on building sites – Code of practice for plastering and rendering* and IS EN 13914-1:2005 *Design, preparation and application of external rendering and internal plastering – External rendering*.
- 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,

or in the case of unheated lean-to buildings the external insulation system should continue around the lean-to.

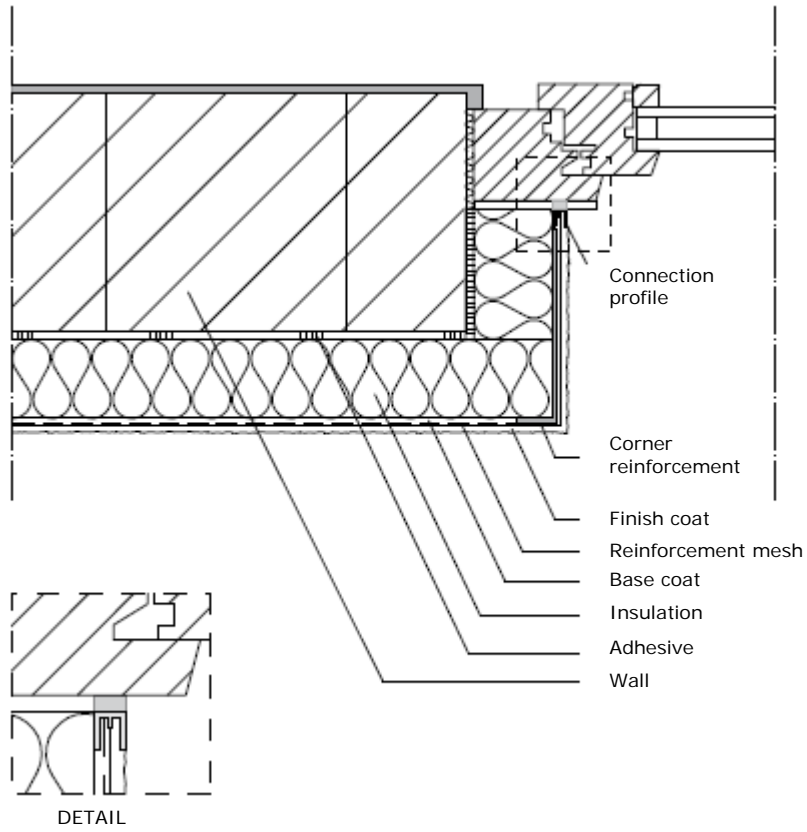
- All necessary post-application inspections should be performed and the homeowner's manual completed and handed over to the homeowner accordingly.



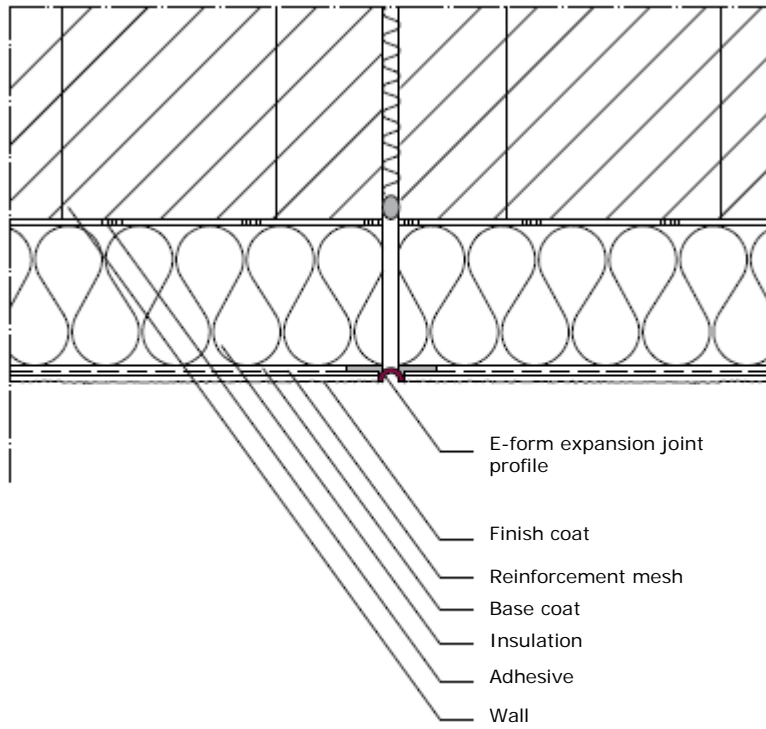
**Figure 1: Below DPC Detail**



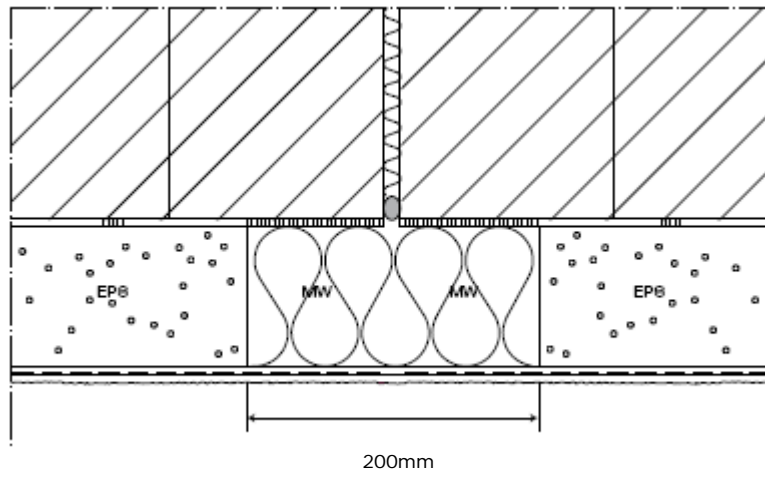
**Figure 2: Window Sill Detail**



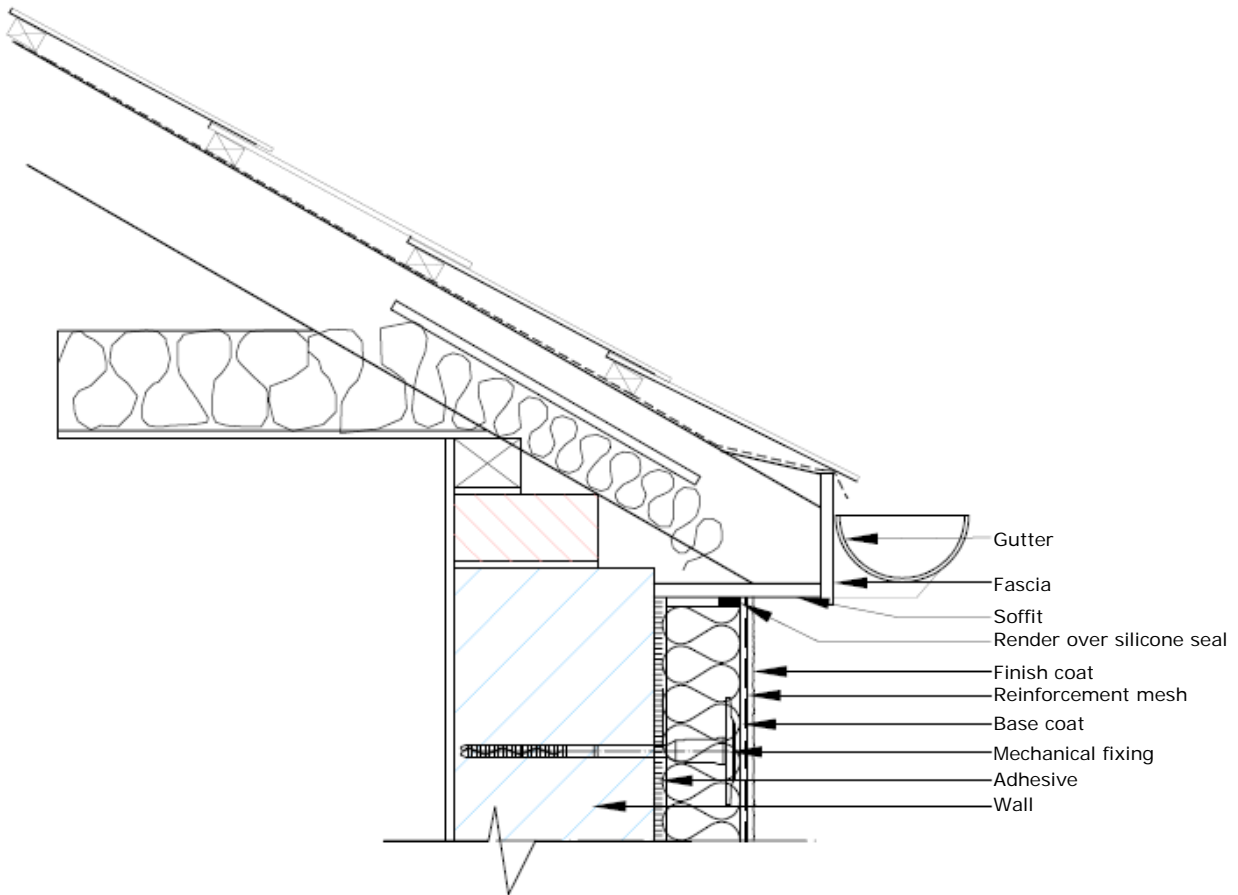
**Figure 3: Window Reveal Detail**



**Figure 4: Movement Joint Detail (5-10mm)**



**Figure 5: Fire Break Detail**



**Figure 6: Eaves Detail**

### 3. GENERAL

The system is designed by Retrofit Technology Ltd on a project specific basis. Where the external insulation system is being applied to improve the thermal performance of an existing building, Retrofit Technology Ltd will assess the building and advise 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 5250:2002 *Code of practice for control of condensation in buildings*. This includes the use of approved detailing as shown in Figures 1 to 6 incorporating the requirements of the Acceptable Construction Details published by the DoEHLG.
- d) Thermal insulation provision to Part L of the Building Regulations 1997 to 2010.
- 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 sill 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 2010. 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 DoEHLG.

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.

Care should be taken to ensure that any ventilation or drainage openings are not obstructed.

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. Further information is available by contacting the Certificate holder.

## 4.1 STRENGTH AND STABILITY

### 4.1.1 Wind Loading

The Cantillana EWIS can be designed to withstand the wind pressures (including suction) and thermal stresses in accordance with the Building Regulations 1997 to 2010. 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 *Actions on structures – General actions – Wind actions*. A general factor of safety of 1.5 is applied to design wind loads.

### 4.1.2 Impact Resistance

a) The Cantillana EWIS has been classified as defined in Table 2 of 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.

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.

Category III: A zone not likely to be damaged by normal impacts caused by people or by thrown or kicked objects.

**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

The reaction to fire classification according to IS EN 13501-1:2007 *Fire classification of construction products and building elements – Classification using data from reaction to fire tests* for the Cantillana EWIS is defined as B – s2, d0.

Systems that achieve a Class B Reaction to Fire Classification are suitable for use up to a maximum of six storeys (18 metres) in height on purpose groups 1(a), 1(b), 1(c), 2(a), 2(b), 3, 4(a) and 4(b) as defined in TGD to Part B of the Building Regulations 1997 to 2010.

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 2010.

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 2010.

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. 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. Rockwool, slab of minimum density 120kg/m<sup>3</sup>), 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 firestop.

## 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 2010. 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 2010 can be achieved using the Cantillana EWIS. The manufacturer's declared thermal conductivity values ( $\lambda_{90/90}$ ) are 0.038W/mK for the standard white EPS board, and 0.031W/mK for the graphite enhanced EPS board. These have not been assessed by NSAI Agrément. Table 3 shows typical insulation thicknesses to achieve the required 0.27W/m<sup>2</sup>K U-value.

Calculation of U-values will be required on individual projects to confirm a U-value of 0.27W/m<sup>2</sup>K has been achieved, based on the wall construction and the insulation used. The thermal conductivity ( $\lambda$ ) 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 impact of the external insulation system on the U-value of the wall, filling of the cavity or sealing to ensure no airflow occurs should be considered.

#### 4.5 LIMITING THERMAL BRIDGING

The linear thermal transmittance ' $\psi$ ' (Psi) describes the heat loss associated with junctions and around openings. Window and door reveal design used on the Cantillana EWIS have been assessed and when detailed in accordance with this Certificate can meet the requirements of Table D1 of TGD to Part L of the Building Regulations 1997 to 2010. When **all** bridged junctions within a building comply with the requirements of Table D1 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 =  $0.6\text{m}^2\text{K/W}$  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.

' $\psi$ ' 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 2010.

#### 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.

##### 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, sills 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 D1 of TGD to Part L of the Building Regulations 1997 to 2010, 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

An interstitial condensation risk analysis will be carried out by Retrofit Technology Ltd in accordance with BS 5250:2002 and the design modified as appropriate to reduce the risk of surface condensation to acceptable levels.

##### 4.6.3 Ventilation

When installing the external insulation system, the works to be undertaken must not compromise the existing ventilation provisions in the home. 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 Building 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.

##### **4.9.2 Aesthetic Performance**

As with traditional renders, the aesthetic performance of the systems, e.g. due to discolouration, soiling, staining, algal 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.

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 insulants

#### **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 sill 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.

Base Coat	Finishing Coat	Granol'therm AGF	Granol'therm AGF + Granol'therm PZG
Granol'therm KB	Granol KR/RP	Category II	Category I
	Granosil KR/RP		

**Table 2: Impact Resistance**

Insulation	Declared Thermal Conductivity ( $\lambda_{90/90}$ ) of Insulation (W/mK)	Thickness of Insulation (mm)	U-Value (W/m <sup>2</sup> K)
<b>No external insulation</b>	-	-	2.38
<b>Standard white EPS70</b>	0.038	130	0.27
<b>Graphite enhanced EPS70</b>	0.031	100	0.27

These values are based on a typical house of 215mm hollow block construction (Building Regulations Part L 2009) with the following construction (internal to external):

- Render to BS 5250 – 20mm.
- Hollow block with 10mm mortar joint – 215mm.
- Adhesive – 5mm.
- Insulation board – as specified.
- Render finish with mesh basecoat – 6mm.

**Table 3: Typical U-values (W/m<sup>2</sup>K)**

**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 2010 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 IAB 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 and must remove them from the products already marked.

**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.

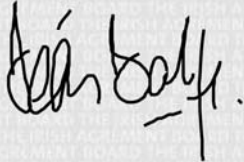
**5.7** Where reference is made in this Certificate to any Act of the Oireachtas, Regulation made thereunder, Statutory Instrument, Code of Practice, National Standards, manufacturer's instructions, or similar publication, it shall be construed as reference to such publication in the form in which it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

## NSAI Agrément

This Certificate No. **11/0362** is accordingly granted by the NSAI to **Retrofit Technology Ltd** on behalf of NSAI Agrément.

Date of Issue: **June 2011**

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](http://www.nsai.ie)