

Terraco EIFS External Insulation Systems

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 2019**.



PRODUCT DESCRIPTION:

This Certificate relates to the Terraco EIFS External Insulation Systems. The systems comprise:

- Surface preparation of masonry or concrete substrate;
- Full system beads and render only beads;
- Insulation boards:
 - Terraco EIFS Alpha – EPS insulation;
 - Terraco EIFS Perma – Mineral Wool;
- Base coat with reinforcement;
- Decorative finish (cementitious, acrylic, silicone, dry dash);
- Mechanical fixings;
- Adhesive fixings;
- Weather tight joints;
- Movement joints;
- Provision for limiting cold bridging at external junctions in compliance with Acceptable Construction Details published by the DHPLG.
- Provision for fire stopping at external compartment walls and floors.

Terraco AS is responsible for the manufacture and supply of all components to approved specifications.

Terraco AS has appointed Warmliving Ireland Ltd as their sole distribution partner in Ireland.

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

This Certificate certifies compliance with the requirements of the Building Regulations 1997 to 2019.

USE

The Terraco EIFS External Insulation Systems are for the external insulation of existing concrete or masonry dwellings.

The systems are suitable for use up to a maximum of six storeys (18m) in height in purpose groups 1(a), 1(c), 1(d), 2(a), 2(b), 3, 4(a) and 4(b), and for use up to a maximum of five storeys (15 metres) in height in purpose group 1(b), as defined in TGD to Part B of the Building Regulations 1997 to 2019.

The systems have not been assessed for use with timber frame or steel frame construction, or for new dwellings.

In an Irish context, the appropriate 'Impact resistance' category should be specified as described in Section 4.1.2, specifically Table 2 which lists a range of system build-ups and their corresponding impact resistance categories.

MANUFACTURE, DESIGN & MARKETING:

The system is designed and manufactured by:

Terraco AS,
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Organize Sanayi Bolgesi,
26110 Eskisehir,
Turkey
T: +90 222 236 0423
F: +90 222 236 0425
E: terraco@terraco.com.tr
W: www.terraco.com.tr

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

Warmliving Ireland Ltd,
Unit 2 Richmond House,
Newtown Avenue,
Malahide Industrial Park,
Coolock,
Dublin 17.
T: +353 1 8478053
E: info@warmliving.ie

1.1 ASSESSMENT

The external insulation systems included in this Certificate, which have been tested in accordance with the requirements of ETAG 004 (ref. ETA 15/0370 and 16/0170), have been assessed against the specific requirements of the Irish Building Regulations, including method of installation, approval and training of installers, and maintenance requirements of the installed system.

In the opinion of NSAI Agrément, the Terraco EIFS Systems, when installed by Warmliving Ireland Ltd trained and approved contractors registered with NSAI, in accordance with this Certificate and Warmliving Ireland Ltd specific design, can meet the requirements of the Building Regulations 1997 to 2019, as indicated in Section 1.2 of this Agrément Certificate.

1.2 BUILDING REGULATIONS 1997 to 2019

REQUIREMENTS:

Part D – Materials and Workmanship

D3 – Proper Materials

The Terraco EIFS 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 Terraco EIFS Systems, as certified in this Certificate, meet the requirements for workmanship.

Part A - Structure

A1 – Loading

The Terraco EIFS 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 Terraco EIFS Systems 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

Part B Vol 2 – Fire Safety

B9 – External Fire Spread

The Terraco EIFS 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

External walls have adequate weather resistance in all exposures to prevent the passage of moisture from the external atmosphere into the building.

Part F – Ventilation

F2 – Condensation in Roofs

The systems as certified can be incorporated into structures that will meet the requirements of this Regulation.

Part J – Heat Producing Appliances

J3 – Protection of Building

When the Terraco EIFS Systems are used in accordance with this Certificate, wall lining, insulation and separation distances meet this requirement.

Part L – Conservation of Fuel and Energy

L1 – Conservation of Fuel and Energy

The walls of the Terraco EIFS Systems can be readily designed to incorporate the required thickness of insulation to meet the Elemental Heat Loss method calculations for walls as recommended in TGD to Part L of the Building Regulations 1997 to 2019.

L2 – Conservation of Fuel and Energy

At interface junctions at windows and at junctions between elements, the Terraco EIFS Systems installation details have been assessed, and when installed in accordance with this Certificate and the Certificate holder's approved installation details, excessive heat losses and local condensation problems associated with thermal bridging will be avoided.

2.1 PRODUCT DESCRIPTION

See Tables 1a and 1b for the full list of components of the Terraco EIFS Systems.

The systems can be applied on a variety of existing vertical surfaces such as brick or rendered masonry walls. They can also be fixed on surfaces of horizontal or tilted concrete 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 Terraco EIFS Systems will be used must 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

Terraco AS is responsible for the manufacture of all components to approved specifications. Terraco AS has appointed Warmliving Ireland Ltd as distribution partner in Ireland, with responsibility for:

- Project specific design in accordance with approved design process;
- Preliminary project assessment 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 and installation supervision;
- Sales and marketing.

The installation of the Terraco EIFS Systems is carried out by Warmliving Ireland Ltd trained and approved installers in accordance with Warmliving Ireland 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 manufacturer operates 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 Tables 1a and 1b for the designation code that must be included on the insulation identification label.

Each container for other components, e.g. mesh, renders, adhesives etc., bears the manufacturer's and the product's identification marks and batch number, and the NSAI Agrément logo incorporating the Certificate number.

Insulation should be stored on a firm, clean, dry and level base, which is off the ground. The insulation must 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.

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

2.4 INSTALLATION

2.4.1 Approved Installers

Installation shall be carried out by Warmliving Ireland Ltd trained applicators who are registered with NSAI Agrément.

2.4.2 General

Warmliving Ireland Ltd prepare a site package for each project, in accordance with the NSAI Agrément ETICS Approval Scheme. Deviations must be approved by a Warmliving Ireland Ltd technical representative. Warmliving Ireland 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. Warmliving Ireland Ltd guarantees and home owner's manual will be issued on successful completion and sign-off of completed projects.

Mineral wool batts and lamella fire stop 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.

To maximise thermal performance, reference should be made to the requirements of Section 2 of the Acceptable Construction Details document (ACD).

2.4.3 Site Survey and Preliminary Work

A comprehensive pre-installation site survey of the property shall be carried out in accordance with the NSAI Agrément ETICS Approval Scheme.

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 the substrate contains dabs, it must be levelled as much as possible with a layer of adhesive base coat prior to the application of the insulation boards/batts.

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

The systems must be installed in accordance with the Certificate holder's instructions. Key points include:

- 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. The coatings must also be protected against freeze-thaw for 24 hours after application.
- To avoid thermal bridging, ensure a tight adhesive free joint connection between adjacent insulation boards. 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.

- 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 DHPLG, Detail 2.21, to achieve a minimum R-value of 0.6m²K/W. Ideally windows should be moved forward to the plane of the external insulation to limit the effects of thermal bridging at the reveal. 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.
- 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 are installed in accordance with the Certificate holder's instructions. These sills incorporate an insulation board fixed between them and the existing sill to limit the effects of thermal bridging. 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) sill for use with the Terraco EIFS Systems on buildings up to 2.5 stories in height. The GRC sills are manufactured on behalf of Terraco to a Grade 8 GRC standard from a cement based matrices and (AR) glass fibre mix with materials supplied from a GRCA registered manufacturer. **Installation of the GRC sill (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 sills shall be used.
- All necessary post-application inspections should be performed and the homeowner's manual completed and handed over to the homeowner accordingly.

Components		Coverage (kg/m ²)	Thickness (mm)
Adhesives	TERRACO STYROFIX Cement/vinyl based powder requiring addition of 0.25 l/kg water	4.0-5.0 (dry)	-
Insulation	Graphite Enhanced Polystyrene Insulation Board EPS-EN13163-T1-L3-W2-S2-P5-DS(N)2-DS(70,-)2-DS(70,90)1-TR100 Declared thermal conductivity ($\lambda_{90/90}$) 0.038W/mK for standard white and 0.031W/mK for graphite enhanced, diffusion factor (μ) 20 to 70 Minimum compressive strength 70kN/m ²	-	50-300
Plinth Insulation (Below DPC)	Extruded Polystyrene Insulation (XPS) XPS-EN 13164 CFC/HCFC-free, Fire Class 3	-	30 - 250
Anchors	Anchors (supplementary mechanical fixings) issued according to ETAG 014	-	-
Base Coat	TERRACO STYROBOND DP Cement/lime/resin based powder requiring addition of 0.25 l/kg water	4.0-5.0 (dry)	3.0-5.0
Glass Fibre Mesh	ECOTHERM MESH mesh size 3.0x4.5mm R 131 A101 mesh size 3.5x4.0mm STAR FILE mesh size 3.5x3.8mm	-	-
Primer/Key Coat	TERRACO PENETRATING PRIMER PIGMENTED Ready to use pigmented acrylic-resin dispersion liquid To be used with acrylic/coloured mineral finishing coats indicated hereafter	0.15-0.20	0.05-0.10
Finishing Coat	Ready to use paste – acrylic binder: TERRACOAT EXCEL (Particle size 2.0, 3.0mm)	2.5-4.5	Regulated by particle size
	TERRACOAT GRANULE (Particle size 1.0, 2.0mm)	2.5-4.5	
	TERRALITE FINE (Particle size 2.0mm)	3.5	
	TERRALITE COARSE (Particle size 3.0mm)	5.5	
	Ready to use paste – silicone binder: TERRACOAT SIL EXCEL (Grain size 2.0, 3.0mm)	2.5-4.5	Regulated by particle size
	TERRACOAT SIL GRANULE (Grain size 1.0, 2.0mm)	2.5-4.5	
Topcoat Finish	Ready to use paste – mineral binder: TEROL HB Receiver coat for use with SPAR DRY DASH STONE, nominal 6mm in diameter, supplied by Terraco	7.0-9.0	4.0-8.0
	TEROL ULTRA (Grain size 1.0, 1.5, 2.0mm)	2.0-4.0	Regulated by particle size
	TEROL GRANULE Always use with topcoat finish TERRACOAT STAIN (Grain size 1.0, 2.0mm)	3.0-5.0	
	TEROL DÉCOR Always use with topcoat finish TERRACOAT STAIN (Grain size 2.0mm)	3.0-4.0	
	TERRACOAT STAIN Ready to use pigmented acrylic resin coating To be used with mineral finishing coats	0.2-0.3 (in two coats)	0.05-0.10
Ancillary Materials	Ancillary materials in accordance with Clause 3.2.2.5 of ETAG 004. Must be approved by the Certificate holder.		

Table 1a: Terraco EIFS Alpha Component Specification (EPS)

Components		Coverage (kg/m ²)	Thickness (mm)
Adhesives	TERRACO STYROFIX Cement/vinyl based powder requiring addition of 0.20 l/kg water	4.0-5.0 (dry)	-
Insulation	Mineral Wool (MW) MW-EN13162-T5-DS(70,90)-WS-WL(P)-TR10 or TR7.5, Reaction to fire Class A1 with a maximum density of 150kg/m ³ , diffusion factor (μ) 1, Declared thermal conductivity ($\lambda_{90/90}$) 0.036W/mK	-	50-300
Plinth Insulation (Below DPC)	Extruded Polystyrene Insulation (XPS) XPS-EN 13164 CFC/HCFC-free, Fire Class 3	-	30 - 250
Anchors	Anchors (supplementary mechanical fixings) issued according to ETAG 014	-	-
Base Coat	TERRACO STYROBOND DP Cement/lime/resin based powder requiring addition of 0.20 l/kg water	4.0-5.0 (dry)	3.0-5.0
Glass Fibre Mesh	R 131 A101 mesh size 3.5x4.0mm STAR FILE mesh size 3.5x3.8mm	-	-
Primer/Key Coat	TERRACO PENETRATING PRIMER PIGMENTED Ready to use pigmented acrylic-resin dispersion liquid To be used with acrylic/coloured mineral finishing coats indicated hereafter	0.15-0.20	0.05-0.10
	TERRACO SIL PRIME Ready to use silane siloxany/acrylic-resin dispersion liquid To be used with silicone finishing coats indicated hereafter	0.10-0.20	0.05-0.10
Finishing Coat	<u>Ready to use paste – acrylic binder:</u> TERRACOAT EXCEL (Particle size 1.0, 2.0, 3.0mm)	2.5-4.5	Regulated by particle size
	TERRACOAT GRANULE (Particle size 1.0, 2.0mm)	2.5-4.5	
	<u>Ready to use paste – silicone binder:</u> TERRACOAT SIL EXCEL (Grain size 1.0, 2.0, 3.0mm)	2.5-4.5	Regulated by particle size
	TERRACOAT SIL GRANULE (Grain size 1.0, 2.0mm)	2.5-4.5	
	<u>Ready to use paste – mineral binder:</u> TEROL ULTRA (Grain size 1.0, 1.5, 2.0mm)	2.0-4.0	Regulated by particle size
	TEROL GRANULE Always use with topcoat finish TERRACOAT STAIN (Grain size 1.0, 2.0mm)	3.0-5.0	
TEROL DÉCOR Always use with topcoat finish TERRACOAT STAIN (Grain size 2.0, 3.0mm)	3.0-5.0		
Topcoat Finish	TERRACOAT STAIN Ready to use pigmented acrylic resin coating To be used with mineral finishing coats	0.2-0.3 (in two coats)	0.05-0.10
Ancillary Materials	Ancillary materials in accordance with Clause 3.2.2.5 of ETAG 004. Must be approved by the Certificate holder.		

Table 1b: Terraco EIFS Perma Component Specification (Mineral Wool)

Note: EPS insulation is shown in the following details for illustrative purposes only. Full installation details for both Terraco EIFS Alpha and Terraco EIFS Perma Systems can be obtained from the certificate holder.

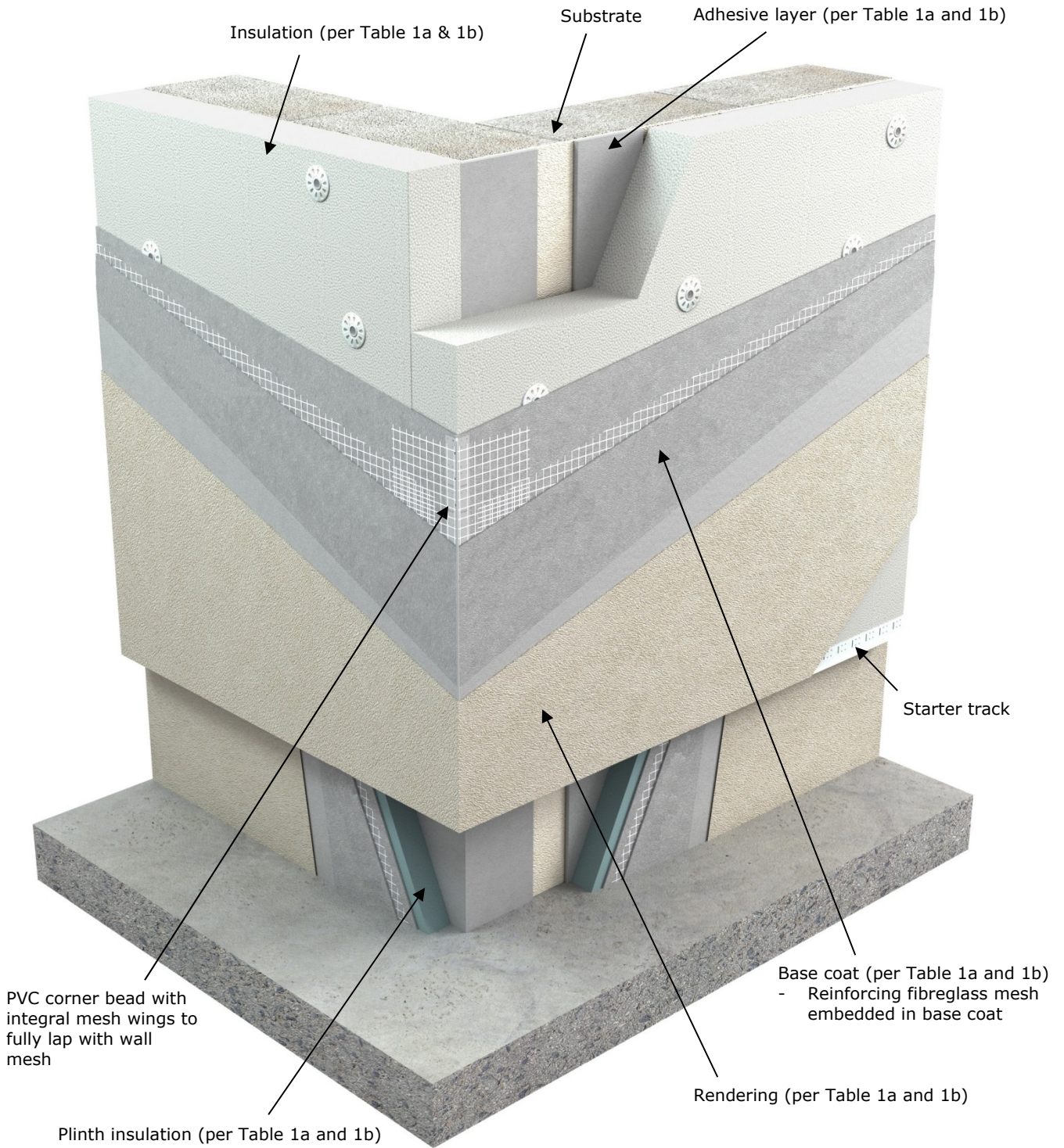


Figure 1: Build-up of System Components

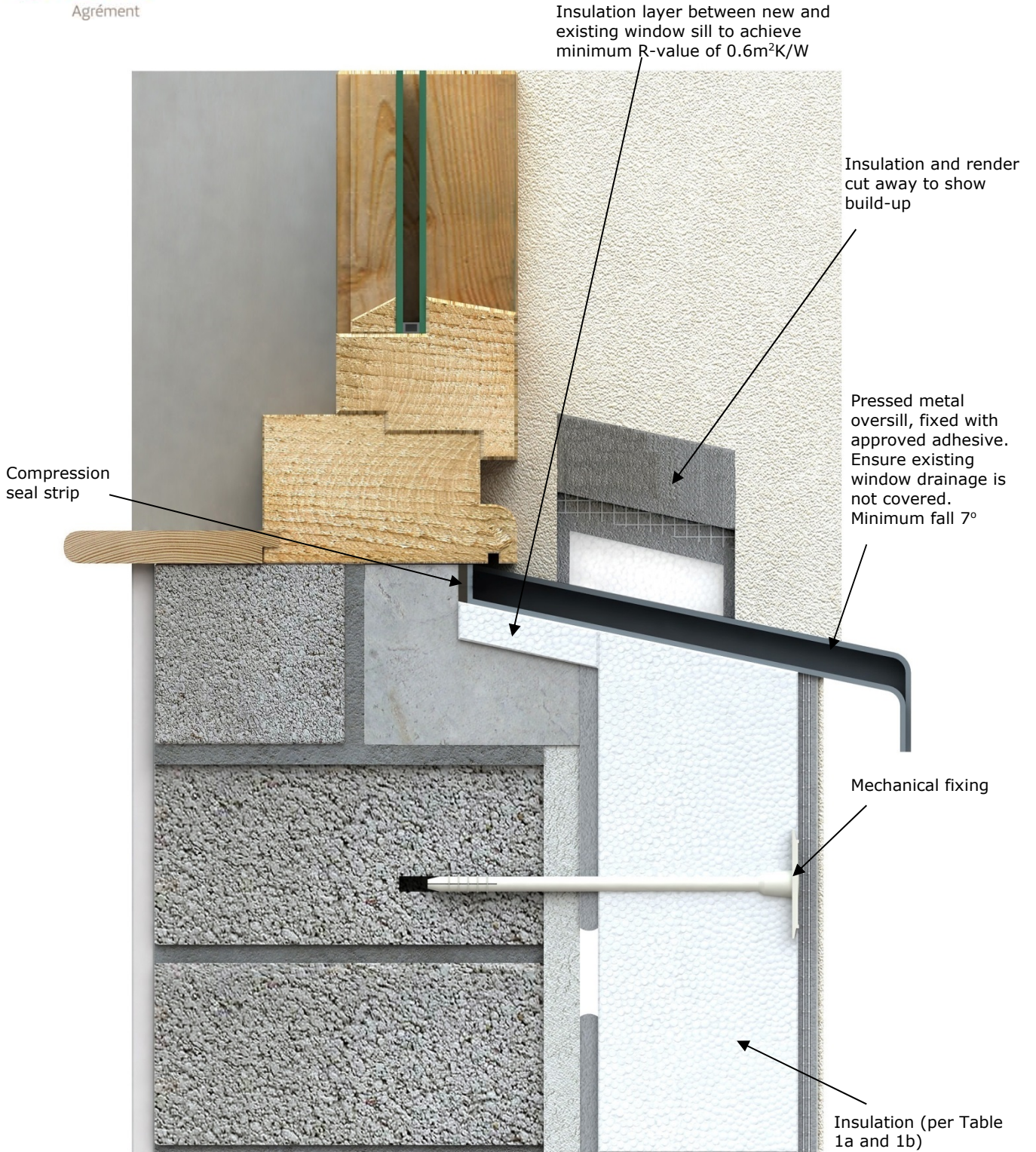


Figure 2: Aluminium Window Sill Detail

Note: Details for GRC window sill are available from the Certificate holder

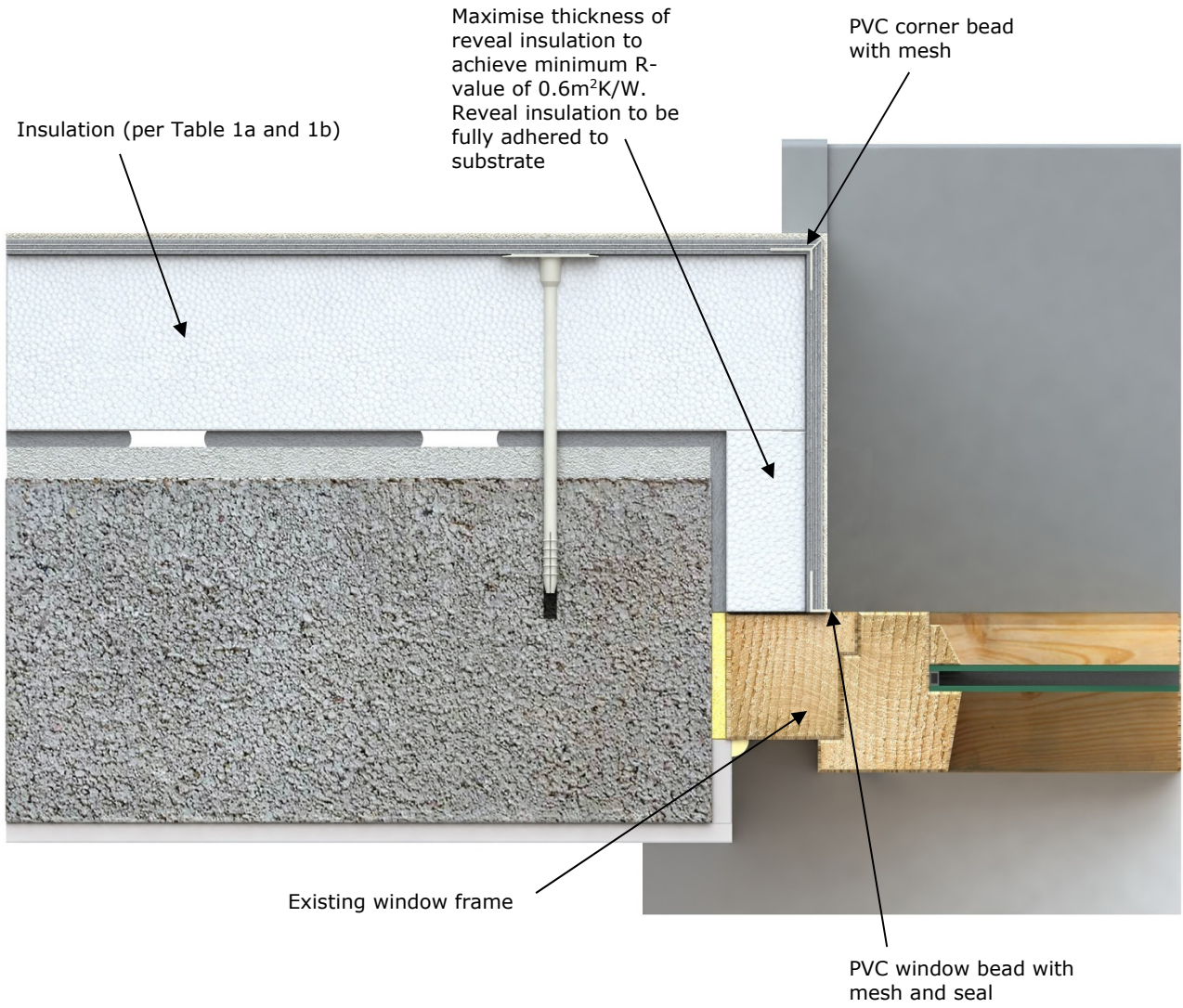


Figure 3: Window Reveal Detail

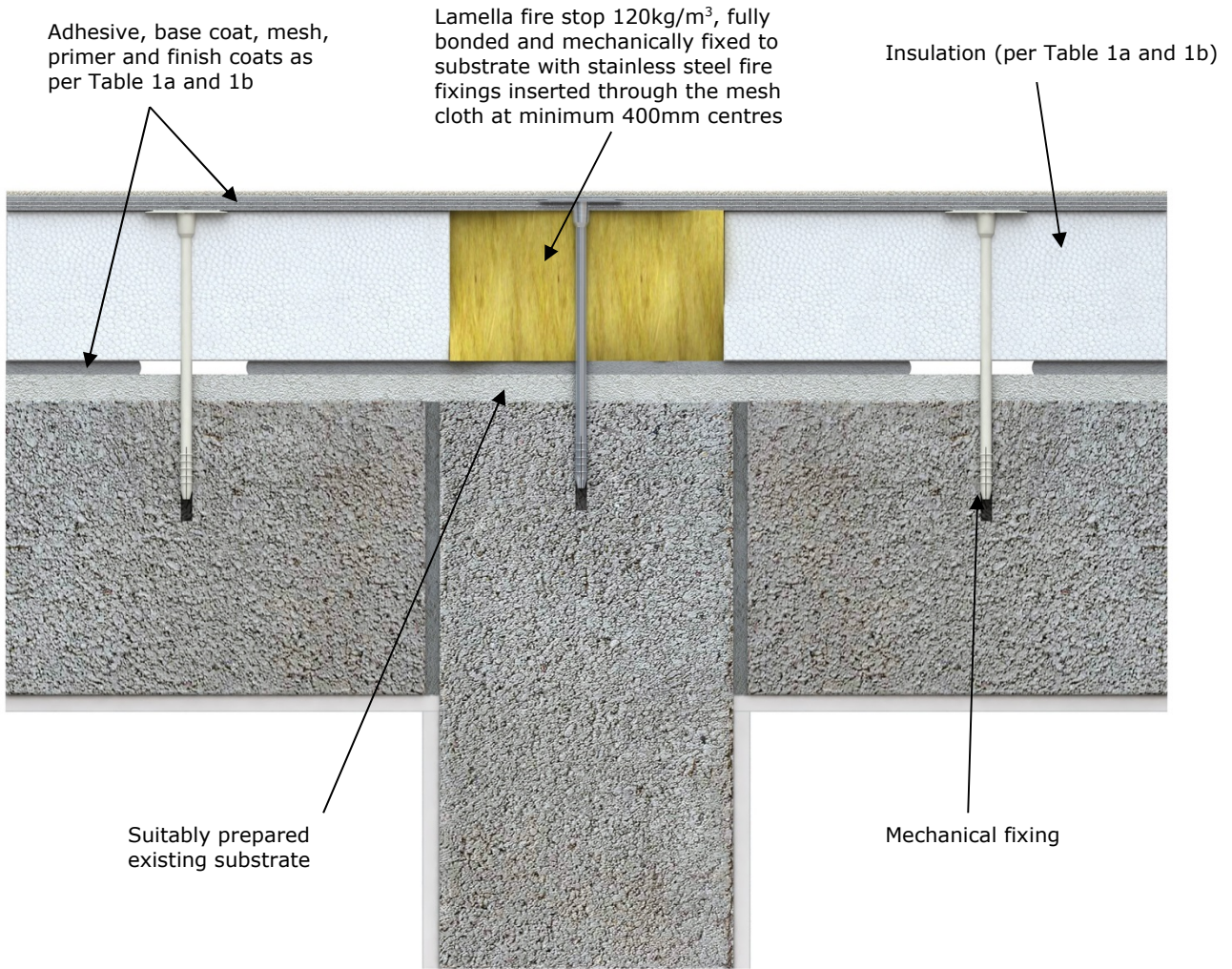


Figure 4: Fire Break Detail

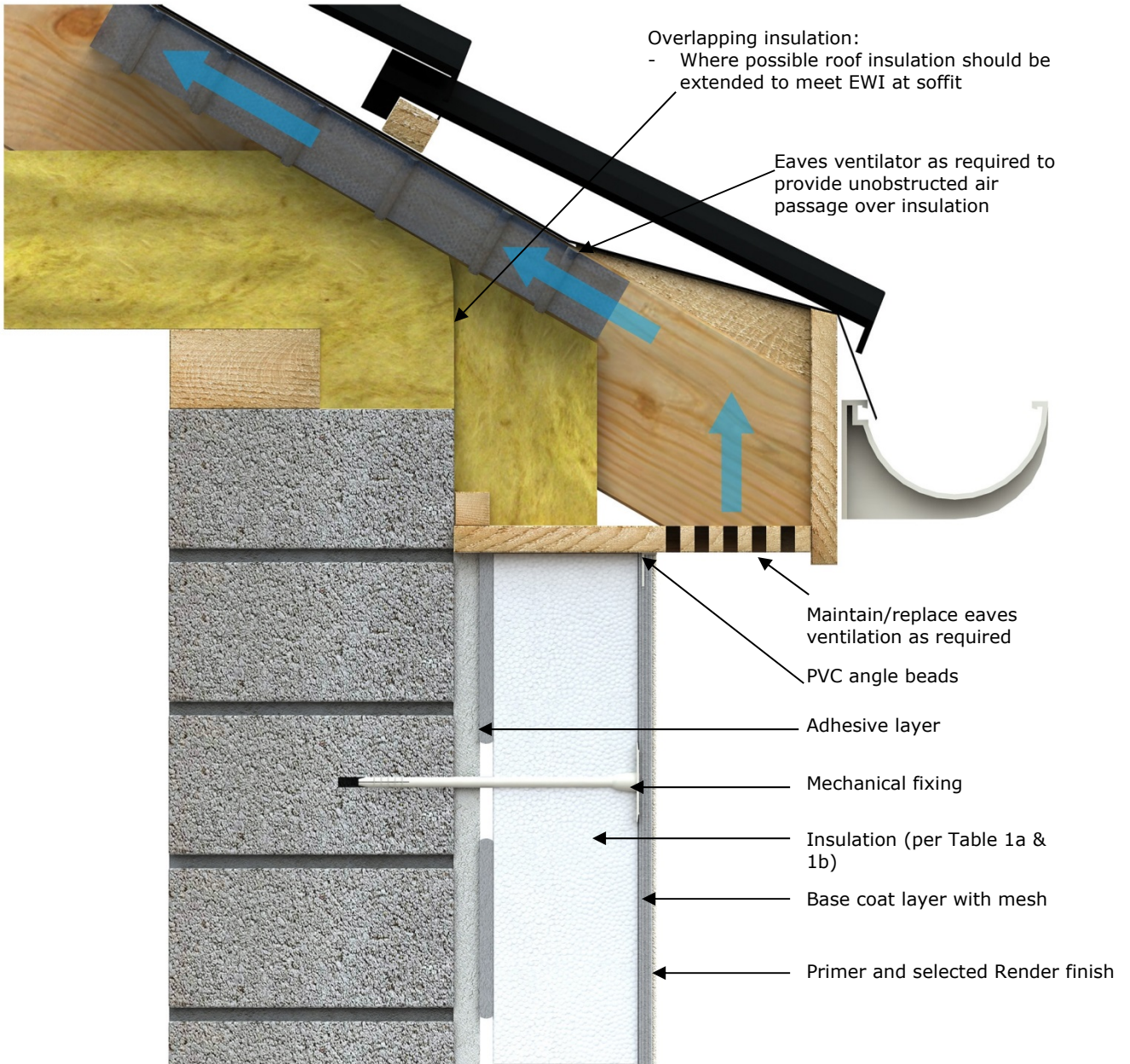


Figure 5: Eaves Detail

3.1 GENERAL

The systems are designed by Warmliving Ireland Ltd on a project specific basis. Where the external insulation system is being applied to improve the thermal performance of an existing building, Warmliving Ireland 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, 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^[2]. This includes the use of approved detailing as shown in Figures 1 to 5 incorporating the requirements of SR 54^[3] and, where possible, the Acceptable Construction Details published by DHPLG.
- d) Thermal insulation provision to Part L of the Building Regulations 1997 to 2019.
- 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) The design for wind loading on buildings greater than 2 stories should be checked by a chartered engineer in accordance with Eurocode 1 IS EN 1991-1-4.
- j) Design for fire resistance, fire spread and fire stopping, as defined in Section 4.2 and 4.3 of this Certificate.
- k) 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.
- l) Movement joints.
- m) A site specific maintenance programme for inclusion in the home owner's documentation.
- n) 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 wall elemental U-value and linear thermal transmittance requirements of Part L of the Building Regulations 1997 to 2019. 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 DHPLG.

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 and the Acceptable Construction Details. 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. Domestic gas installations must not be adversely affected by the fitting of external insulation. If the external insulation has an impact on the gas service line/meter location, then Bord Gáis Networks must be contacted so that a suitable solution can be achieved. If altering a gas installation, a Registered Gas Installer (RGI) must be employed.

The durability of the render systems is influenced by the colour of the render used. Further information is available by contacting the Certificate holder.

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

3.2 MAJOR RENOVATION

As external insulation over 25% of the building envelope is classified as Major Renovation in TGD to Part L of the Building Regulations 1997 to 2019, attention should be paid to Section 2.3 of TGD to Part L 2019 where external insulation is undertaken as part of a deep retrofit installation.

4.1 STRENGTH AND STABILITY

4.1.1 Wind Loading

The Terraco EIFS Systems can be designed to withstand the wind pressures (including suction) and thermal stresses in accordance with the Building Regulations 1997 to 2019. 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^[4]. A general factor of safety of 1.5 is applied to design wind loads.

4.1.2 Impact Resistance

a) The Terraco EIFS Systems have been classified as defined in Table 2 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. Class III is taken to exclude the use on any wall at ground level.

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

In an Irish context, Category II excludes any wall at ground level adjacent to a public footpath but includes on with its own private, walled-in garden. Category III excludes all walls at ground level.

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^[5] for the Terraco EIFS Systems are defined in Table 4.

Systems that achieve a Class A2 or B Reaction to Fire Classification are suitable for use up to a maximum of six storeys (18m) in height on purpose groups 1(a), 1(c), 1(d), 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 2019.

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 2019.

With regard to fire stopping and limitations on use of combustible materials, walls must comply with Sections 3.2, 3.3, 3.4 and 4 of TGD to Part B of the Building Regulations 1997 to 2019, and Sections 3.5, 3.6, 3.7 and 4 of TGD to Part B Volume 2 of the Building Regulations 1997 to 2019. Stainless steel fire fixings are 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 (see Diagram 12 of TGD to Part B Volume 2 of the Building Regulations 1997 to 2019). Firebreaks should be fully adhesively bonded to the substrate (i.e. ribbons or dabs of adhesive is not acceptable) and the firebreaks must be mechanically fixed with stainless steel fire fixings at 400mm centres. The fire barrier shall be of non-combustible material (i.e. lamella, slab of minimum density 120kg/m³), 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 (see Clause 3.6.3 of TGD to Part B Volume 2 of the Building Regulations 1997 to 2019 for types of suitable firestop).

4.3 PROXIMITY OF HEAT PRODUCING APPLIANCES

EPS insulation 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 2.5.6 of TGD to Part J of the Building Regulations 1997 to 2019. 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 2019 can be achieved using the Terraco EIFS 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 0.036W/mK for the mineral wool insulation. These have not been assessed by NSAI Agrément. Table 3 shows typical insulation thicknesses to achieve minimum U-values of 0.27W/m²K (retrofit only) and 0.21W/m²K for different construction types. The thermal resistance value for the render (R_{render}) can be taken as 0.02m²K/W.

Calculation of U-values will be required on individual projects to confirm a U-value of 0.27W/m²K or better 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, including hollow block walls, consideration should be given to the treatment of the ventilated cavity. In order to ensure the thermal effectiveness of the external insulation system, it is critical to eliminate airflow within the cavity void. It is essential to seal the cavity to achieve an unventilated air layer. This eliminates heat losses due to airflow within the cavity circumventing the ETIC system. Best practice is to fill the cavity void with an NSAI Agrément approved Cavity Wall Insulation (CWI) system. Ventilation to the building must be maintained in accordance with the requirements of TGD to Part F of the Building Regulations 1997 to 2019.

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 Terraco EIFS 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 2019.

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. If **all** junctions can be shown to be equivalent or better than the Acceptable Construction Details published by the DHPLG, then the values published in Table D2 apply.

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 by an NSAI approved thermal modeller.

As per Acceptable Construction Details, a minimum thermal resistance of 0.6m²K/W should be provided at window reveals, heads and sills.

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 D2 of TGD to Part L of the Building Regulations 1997 to 2019, 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 Warmliving Ireland Ltd in accordance with BS 5250^[2] and the design modified as appropriate to reduce the risk of surface condensation to acceptable levels. Table 5 lists the s_d values for a range of build-ups.

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, 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 1997 to 2019, 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 systems 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.

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 Terraco EIFS can last in excess of 30 years subject to normal use, regular inspection and

maintenance. It is important to note that the durability of the render system is entirely dependent on the correct installation of the product in accordance with this Certificate and the manufacturer's instructions. IS EN 13914-1^[1] and ongoing care and maintenance as described in Section 4.7 of this Certificate. Critical details include rendering at window sills, raised features, junctions with eaves and verges, and the use of suitably designed overhangs and flashings. Reference should be made to IS EN 13914-1^[1] for general advice on design, in particular on the use of angle, stop and movement joint beads.

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;
- Proximity to vegetation;
- Local climate/atmospheric pollution.

When cleaning of walls is required, for example in the case of algal growth, the procedure in the Terraco Maintenance document must be followed which contains detailed information on the removal of algae. 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 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.

TERRACO EIFS ALPHA SYSTEM				
Base Coat	Finishing Coat	Reinforcement	Impact Category	
			Render Thickness <6mm	Render Thickness >6mm
STYROBOND DP	TERRACOAT EXCEL	Single standard mesh	Category II	Category I*
	TERRACOAT GRANULE		Category II	Category I*
	TERRALITE		Category II	Category I*
	TERRACOAT SIL EXCEL		Category II	Category I*
	TERRACOAT SIL GRANULE		Category II	Category I*
	TEROL ULTRA		Category I	-
	TEROL HB		Category I	-
	TEROL GRANULE		Category I	-
	TEROL DÉCOR		-	Category II*
* The required base coat thickness for Category I is 5mm				
TERRACO EIFS PERMA SYSTEM				
Base Coat	Finishing Coat	Reinforcement	Impact Category	
			Render Thickness <6mm	Render Thickness >6mm
STYROBOND DP	TERRACOAT EXCEL	Single standard mesh	Category II	-
	TERRACOAT GRANULE		Category I	-
	TERRACOAT SIL EXCEL		Category II	-
	TERRACOAT SIL GRANULE		Category I	-
	TEROL ULTRA		Category I	-
	TEROL GRANULE		Category II	-
	TEROL DÉCOR		Category II	-

Table 2: Impact Resistance

Insulation	Declared Thermal Conductivity ($\lambda_{90/90}$) of Insulation (W/mK)	Thickness of Insulation (mm)	U-Value (W/m ² K)
No external insulation	-	-	2.05
Standard white EPS	0.038	130	0.25
		160	0.21
Graphite-enhanced EPS	0.031	100	0.27
		130	0.21
Mineral Wool	0.036	120	0.26
		150	0.21
These values are based on a typical house of hollow block construction (Building Regulations Part L 2017) with the following construction (internal to external): <ul style="list-style-type: none"> • 12.5mm plasterboard • 215mm hollow block • 15mm sand & cement render • Insulation board – as specified • Render finish with mesh basecoat – 8mm 			
No external insulation	-	-	0.27
Standard white EPS	0.038	40	0.21
Graphite-enhanced EPS	0.031	30	0.21
Mineral Wool	0.036	40	0.21
These values are based on a typical house of cavity wall construction (Building Regulations Part L 2017) with the following construction (internal to external): <ul style="list-style-type: none"> • 12.5mm plasterboard • 100mm concrete block • 130mm pumped cavity insulation • 100mm concrete block • 15mm sand & cement render • Insulation board – as specified • Render finish with mesh basecoat – 8mm 			

Table 3: Typical U-values (W/m²K)

TERRACO EIFS ALPHA SYSTEM			
Configuration	Organic content / heat of combustion	Flame retardant content	Euroclass according to EN 13501-1
Adhesives	Max 4.2% / -	No flame retardant	B – s1, d0
Boards of expanded polystyrene EPS Maximum density of 30 kg/m ³	/	In quantity ensuring Euroclass E according to EN 13501-1	
Base coat render	Max 5.7% / -	No flame retardant	
Glass fibre mesh	- / Max 7.24 MJ/kg	No flame retardant	
Finishing coats with acrylic binder Finishing coats with silicone binder Finishing coats with mineral binder	Max 35.4% / -	No flame retardant	
TERRACO EIFS PERMA SYSTEM			
Configuration	Organic content / heat of combustion	Flame retardant content	Euroclass according to EN 13501-1
Adhesives	Max 4.19% / 0.41 MJ/kg	No flame retardant	A2 – s1, d0
Boards of mineral wool MW Maximum density of 150 kg/m ³	/	In quantity ensuring Euroclass A1 according to EN 13501-1	
Base coat render	Max 5.66% / 1.34 MJ/kg	No flame retardant	
Glass fibre mesh	- / Max 5.98 MJ/kg	No flame retardant	
Key coat	- / 11.50 MJ/kg	No flame retardant	
Finishing coats with acrylic binder Finishing coats with silicone binder Finishing coats with mineral binder	Max 9.54% / 1.60 MJ/kg	No flame retardant	

Table 4 – Reaction to Fire

TERRACO EIFS ALPHA SYSTEM		
Base Coat	Finishing Coat	Equivalent Air Layer Thickness s_d
STYROBOND DP	TERRACOAT EXCEL	0.25
	TERRACOAT GRANULE	No performance assessed
	TERRALITE	No performance assessed
	TERRACOAT SIL EXCEL	0.21
	TERRACOAT SIL GRANULE	No performance assessed
	TEROL ULTRA	No performance assessed
	TEROL HB	No performance assessed
	TEROL GRANULE	No performance assessed
	TEROL DÉCOR	No performance assessed
TERRACO EIFS PERMA SYSTEM		
Base Coat	Finishing Coat	Equivalent Air Layer Thickness s_d
STYROBOND DP	TERRACOAT EXCEL	0.23
	TERRACOAT GRANULE	0.30
	TERRACOAT SIL EXCEL	0.11
	TERRACOAT SIL GRANULE	0.16
	TEROL ULTRA	0.16
	TEROL GRANULE	0.34
	TEROL DÉCOR	0.30

Table 5: Water Vapour Permeability

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 latest revision so long as:

- (a) the specification of the product is unchanged.
- (b) the Building Regulations 1997 to 2019 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.

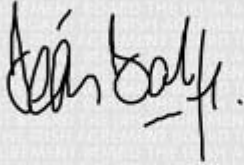
5.7 Where reference is made in this Certificate to any Act of the Oireachtas, Regulation made thereunder, Statutory Instrument, Code of Practice, National Standards, manufacturer's instructions, or similar publication, it shall be construed as reference to such publication in the form in which it is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

NSAI Agrément

This Certificate No. **12/0370** is accordingly granted by the NSAI to **Warmliving Ireland Ltd** on behalf of NSAI Agrément.

Date of Issue: **May 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.n sai.ie

Revisions:

May 2013: Addition of GRC sill option.

April 3rd 2020: Change of ownership and distribution of the system; references to Building Regulations and standards updated; addition of mineral wool.

Bibliography

- [1] IS EN 13914-1:2016 *Design, preparation and application of external rendering and internal plastering – External rendering.*
- [2] BS 5250:2016 *Code of practice for control of condensation in buildings.*
- [3] SR 54:2014 *Code of practice for the energy efficient retrofit of dwellings.*
- [4] I.S. EN 1991-1-4:2005 *Actions on structures – General actions – Wind actions.*
- [5] IS EN 13501-1:2007 *Fire classification of construction products and building elements – Classification using data from reaction to fire tests.*