

Powerwall External Wall Insulation Systems

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 2008**.



PRODUCT DESCRIPTION:

This Certificate relates to the following Powerwall External Wall Insulation Systems:

- Powerwall System 1 (Detail Sheet 1)
- Powerwall System 2 (Detail Sheet 2)
- Powerwall System 3 (Detail Sheet 3)

These ETIC systems are each comprised of:

- Surface preparation of masonry or concrete substrate;
- Full system beads and render-only beads;
- Insulation board (standard white EPS, carbon-enhanced grey EPS, mineral wool, PIR);
- Cement-based undercoat incorporating an alkali resistant fibreglass mesh;
- Decorative finish coat;
- Mechanical fixings;
- Weather-tight joints;

- Movement joints;
- Provision for limiting cold bridging at external wall/floor junctions in compliance with Acceptable Construction Details published by the DoEHLG;
- Provision for fire stopping at external compartment walls and floors.

PW Thermal Building Solutions Ltd are responsible for the design, supply and installation of the system, and for the integration of the design of the system into the building. The system is designed by PW Thermal Building Solutions Ltd on a project specific basis in accordance with an approved design process. The installation of each system is carried out by installers who have been trained by PW Thermal Building Solutions Ltd, and are approved by PW Thermal Building Solutions Ltd and NSAI Agrément to install the system.



This Certificate certifies compliance with the requirements of the Building Regulations 1997 to 2008.

This Certificate is a confirmation of BBA Certificate No. 93/2928 and 95/3090 issued by the British Board of Agrément, PO Box 195, Bucknalls Lane, Garston, Watford WD25 9BA.

USE:

The systems are for use as external insulation for refurbishment/retrofit of new/existing masonry or concrete buildings, up to a maximum of six storeys (18 metres) in height in purpose groups 1(a), 1(b), 1(c), 2(a), 2(b), 3, 4(a) and 4 as defined in TGD to Part B of the Building Regulations 1997 to 2008. The systems have not been assessed for use with timber frame or steel frame construction.

MANUFACTURE, DESIGN AND MARKETING:

The product is manufactured by:

Powerwall Systems Ltd.,
4 Netherton Road,
Wishaw,
Lanarkshire ML2 0EQ.

The product system is designed and marketed by:

PW Thermal Building Solutions Ltd.,
Unit 44 Cookstown Industrial Estate,
Tallaght,
Dublin 24.
T: 00353 1 5330430
M: 087 9231375
E: info@pwthermalsolutions.com

1.1 ASSESSMENT

In the opinion of NSAI Agrément, the Powerwall External Wall Insulation Systems if used in accordance with this Certificate can meet the requirements of the Building Regulations 1997 to 2008, as indicated in Section 1.2 of this Agrément Certificate.

1.2 BUILDING REGULATIONS 1997 to 2008

REQUIREMENTS:

Part D – Materials and Workmanship

D3 – Proper Materials

The Powerwall External Wall Insulation Systems, as certified in this Certificate, are comprised of 'proper materials' fit for their intended use (see Part 4 of this Certificate).

D1 – Materials & Workmanship

The Powerwall External Wall Insulation Systems, as certified in this Certificate, meet the requirements for workmanship.

Part A - Structure

A1 – Loading

The Powerwall External Wall Insulation Systems once appropriately detailed, designed and installed have adequate strength and stability to meet the requirements of this Regulation (see Part 3 of this Certificate).

A2 – Ground Movement

The Powerwall External Wall Insulation 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

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

Part C – Site Preparation and Resistance to Moisture

C4 – Resistance to Weather and Ground Moisture

External walls above DPC level have adequate weather resistance in all exposures to prevent the passage of moisture from the external atmosphere into the building as specified in Part 3 of this Certificate.

Part J – Heat Producing Appliances

J3 – Protection of Building

When the Powerwall External Wall Insulation Systems are used in accordance with Section 4.1 of 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 Powerwall External Wall Insulation 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 Part L of the Building Regulations 1997 to 2008 (see Part 4 of this Certificate).

2.1 PRODUCT DESCRIPTION

Each of the Powerwall External Wall Insulation Systems is given a detailed description in the relevant Detail Sheet.

2.2 MANUFACTURE, SUPPLY AND INSTALLATION

Powerwall Systems Ltd is responsible for the manufacture and supply of all components to approved specifications, in accordance with the Powerwall Systems Ltd approved supplier system. Powerwall Systems Ltd has appointed PW Thermal Building Solutions 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;
- Technical support;
- Sales and marketing.

The installation of each system is carried out by installers who have been trained by PW Thermal Building Solutions Ltd, and are approved by PW Thermal Building Solutions Ltd and NSAI Agrément to install the system.

2.2.1 Quality Control

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

2.3 DELIVERY, STORAGE AND MARKING

The insulation is delivered to site in packs. Each pack is marked with the manufacturer's details, product identification marks and batch numbers.

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 should 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.

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

components must be stored in accordance with the manufacturer's instructions, in dry conditions, and at the required storage temperatures. They should be used within the stated shelf life, where applicable.

2.4 INSTALLATION

2.4.1 General

Installation shall be carried out by PW Thermal Building Solutions Ltd trained applicators who have been approved by NSAI Agrément to install the system. Installation shall be in accordance with the Certificate holder's instructions and the requirements of this Certificate.

PW Thermal Building Solutions Ltd prepare a bespoke site packaged for each project, including 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 an PW Thermal Building Solutions Ltd technical representative.

PW Thermal Building Solutions Ltd technical representatives will visit the 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.

Mineral fibre board and lamella should be protected from moisture prior to and during installation. If the board or lamella gets wet during or post installation, it should not be rendered until dry. It may be necessary to remove and replace any unsuitable/wet material.

PIR boards should be protected from moisture prior to and during installation. Damaged boards should be removed and replaced.

2.4.2 Site Survey and Preliminary Work

A pre-installation survey of the property shall be carried out and recorded to confirm suitability of substrate for application, modifications/repairs necessary, pullout resistance of proposed mechanical fixings etc. The substrate must be free of water repellents, dust, dirt, efflorescence and other harmful contaminants or materials that may interfere with the adhesive bond. Where PIR boards are to be used, the substrate must be

clean, dry and level before installation of the boards.

Where discrepancies preventing installation of the Powerwall External Wall Insulation Systems in accordance with this Certificate and the Certificate holder's instructions exist, these discrepancies should be discussed with the Certificate holder and a solution implemented with the approval of the Certificate holder.

2.4.3 Procedure

Installation of each of the Powerwall External Wall Insulation Systems is given a detailed description in the relevant Detail Sheet.

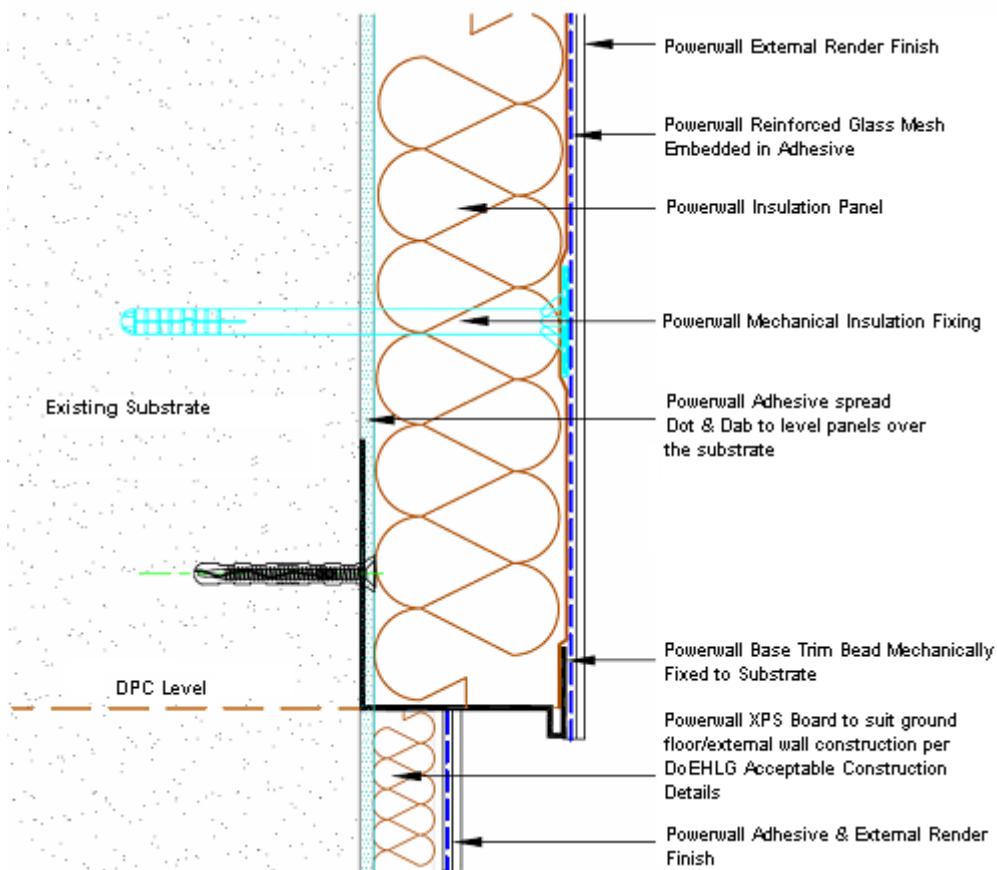


Figure 1: Base Trim Bead & Below DPC Level Detail

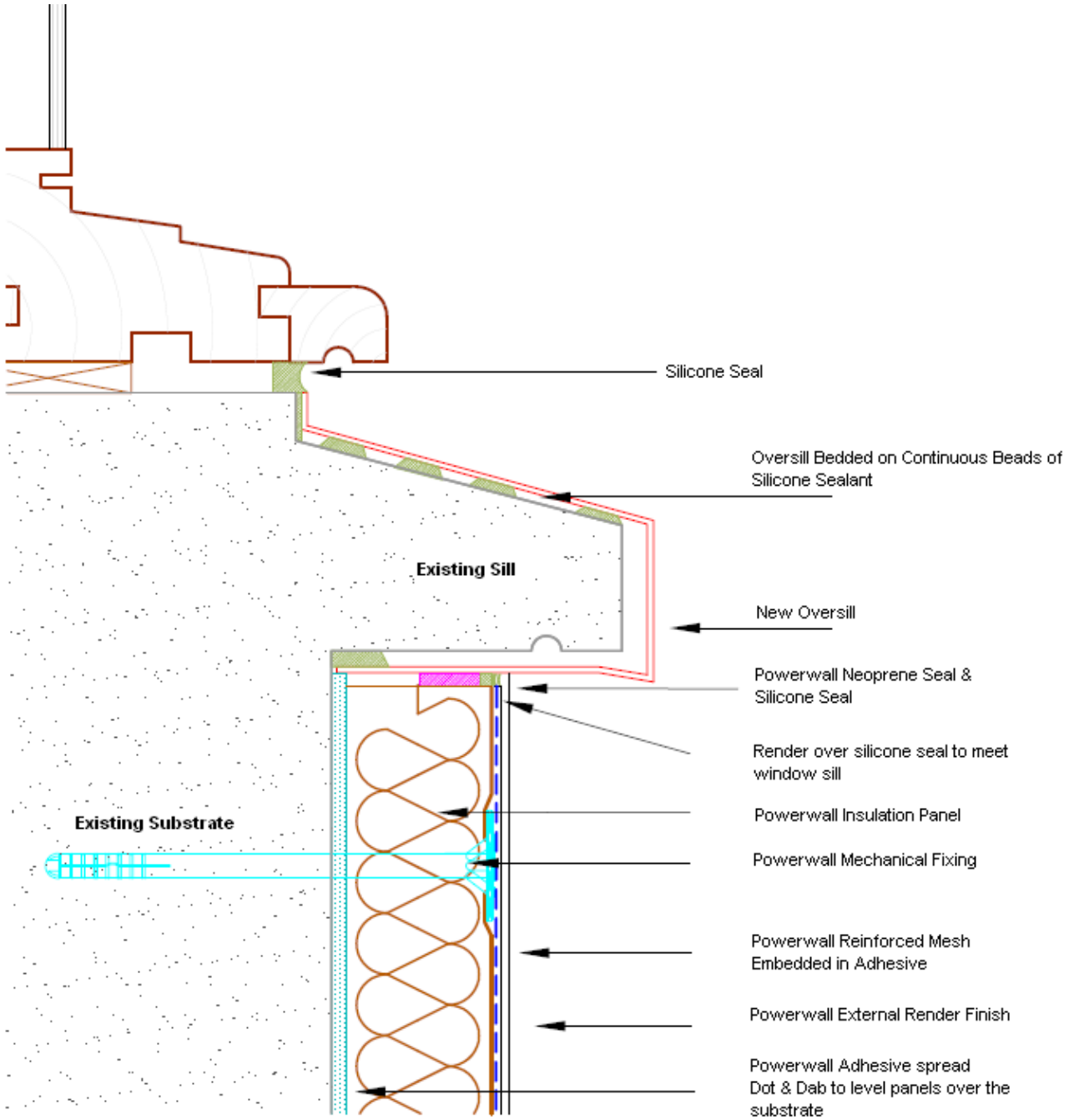


Figure 2: Window Sill Detail

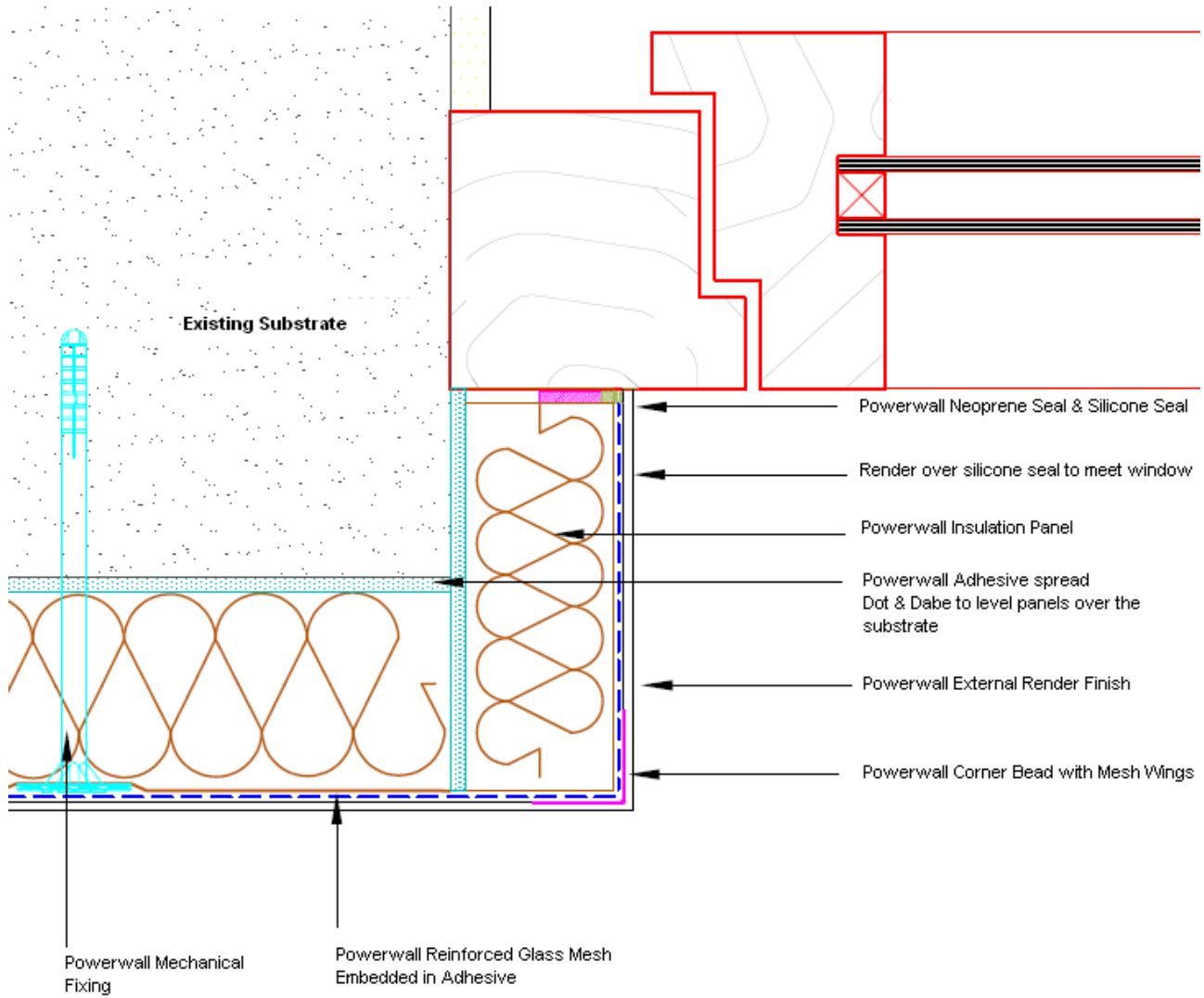


Figure 3: Window Reveal Detail

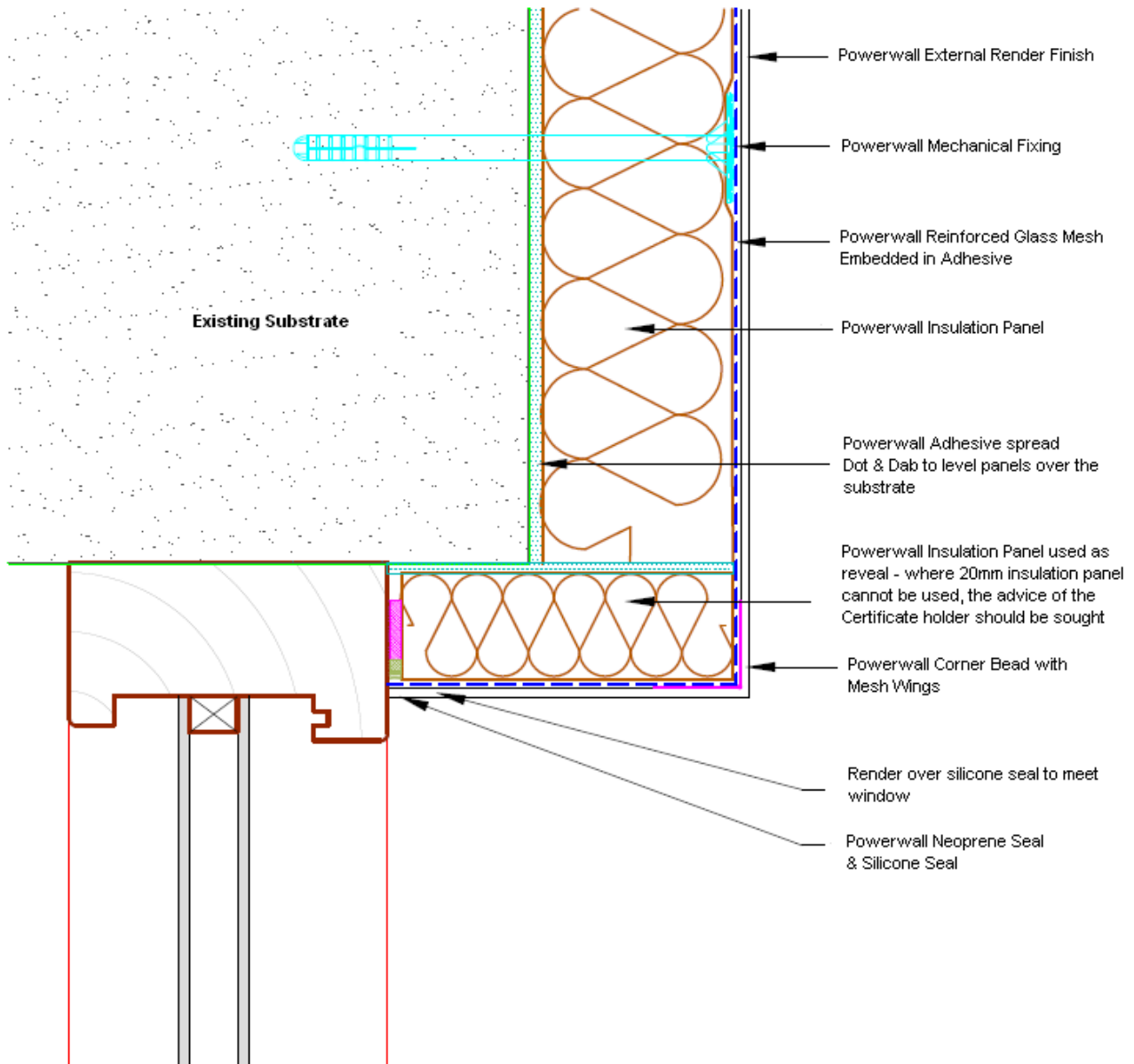


Figure 4: Window Head Detail

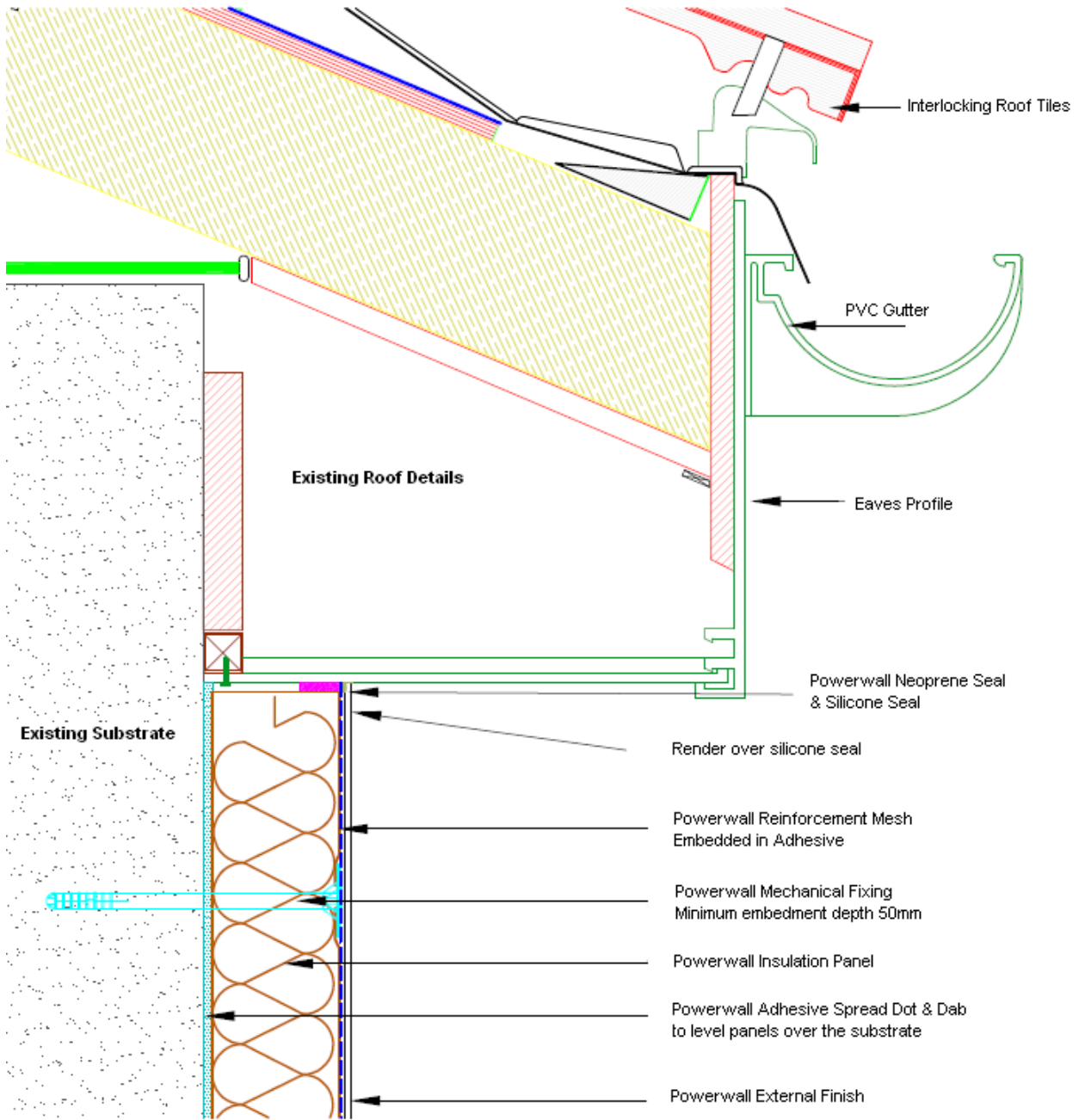


Figure 5: Eaves Detail

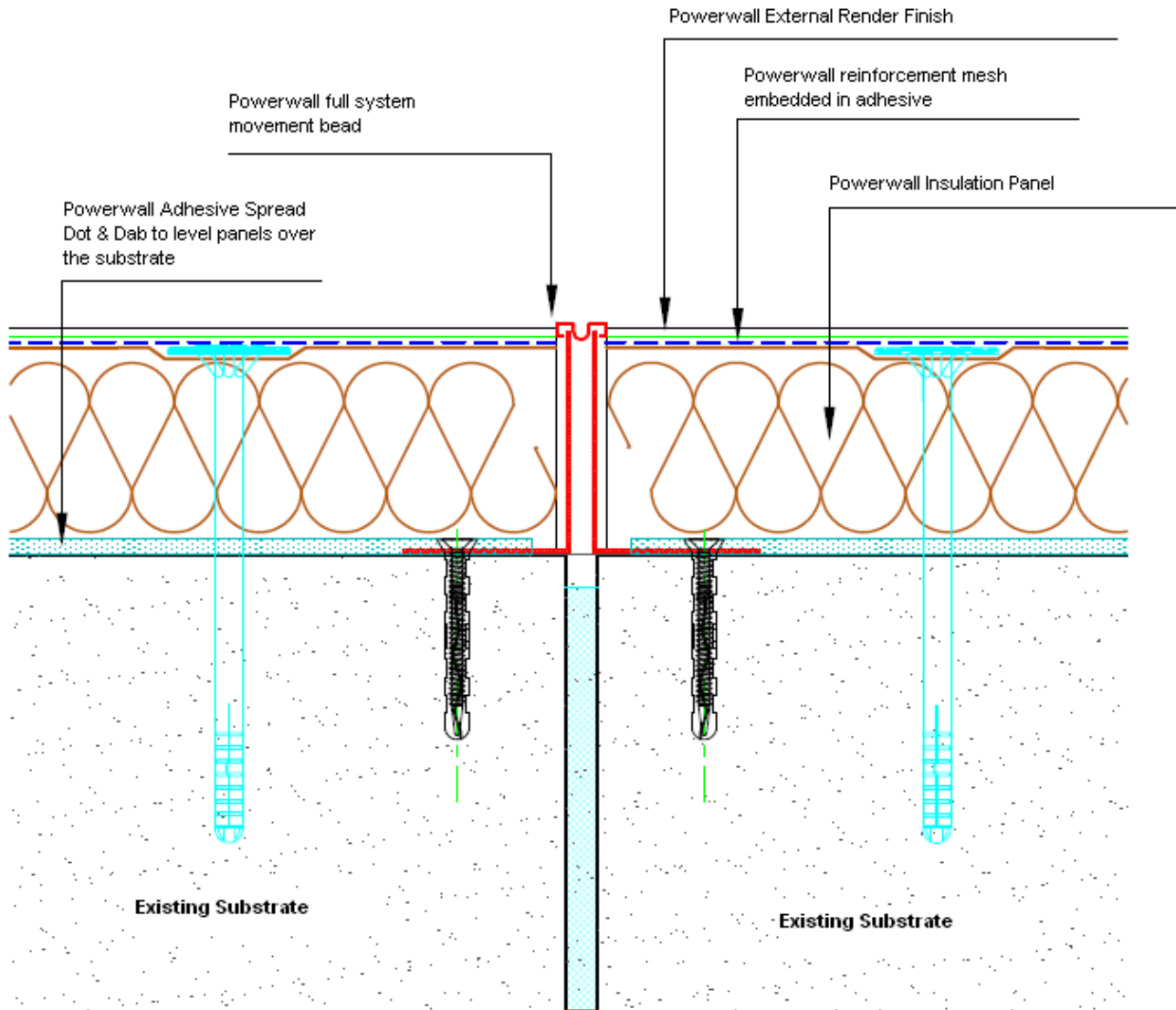


Figure 6: Movement Bead Detail

3. GENERAL

The system is designed by PW Thermal Building Solutions Ltd on a project specific basis. The design will include for:

- a) A site survey shall be carried out and recorded.
- b) Preparation of substrate.
- c) Minimising risk of condensation in accordance with recommendations of BS 5250:2002 *Code of practice for control of condensation in buildings*.
- d) Thermal insulation provision to Part L of the Building Regulations 1997 to 2008.
- 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 three for mechanical fixings and a safety factor of nine for adhesive. In addition, fixings around window and door openings shall be at a maximum of 400mm 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.
- 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.

Windows 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 systems will satisfy the requirements of TGD to Part L of the Building Regulations. The design shall include for the elimination of cold bridging at window and door reveals, eaves and at ground floor level.

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.

4.1 STRENGTH AND STABILITY

The Powerwall External Wall Insulation Systems can be designed to withstand the wind pressures (including suction) and thermal stresses in accordance with the Building Regulations 1997 to 2008.

The systems have adequate resistance to severe mechanical impact and abrasion where walls are exposed and have some protection, e.g. walls of private dwellings and walls of communal dwellings above ground floor level. This does not include an allowance for acts of vandalism. The design should include for preventing impact from motor vehicles or other machinery.

4.2 BEHAVIOUR IN RELATION TO FIRE

The external surfaces of the systems are classified as Class O as per Clause A12 of TGD to Part B of the Building Regulations 1997 to 2008.

The mineral wool board is classed as non-combustible as per Table A8 d) of TGD to Part B of the Building Regulations 1997 to 2008.

The Powerwall External Wall Insulation Systems when tested in accordance with BS 8414-1:2002 *Fire performance of external cladding systems – Test methods for non-loadbearing external cladding systems applied to the face of a building* met the performance criteria set in BRE 135:2003 *Fire performance of external thermal insulation for walls of multi-storey buildings*.

With regard to fire stopping of cavities 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 2008.

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 fire barriers shall be provided at each compartment floor and wall, including the second floor level of a three-storey single occupancy house. Firebreaks should be adhesively bonded to the substrate and mechanically fixed with stainless steel fire fixings at 300 centres. The fire barrier should be of non-combustible material, i.e. mineral fibre, be at least 100mm high, continuous and unbroken for the full perimeter of the building and for the full thickness of the insulation.

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, or 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 2008. 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 2008 can be achieved using the Powerwall External Wall Insulation Systems. The manufacturer's declared thermal conductivity values are 0.038W/mK for the standard white EPS board, 0.031W/mK for the carbon-enhanced EPS board, 0.036W/mK for the mineral wool board, and 0.023W/mK for the PIR board. These have not been assessed by NSAI Agrément.

4.5 CONDENSATION RISK

Areas where there is a significant risk of interstitial condensation due to high levels of humidity should be identified during the initial site survey. Condensation risk analysis will be carried out by PW Thermal Building Solutions 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 MAINTENANCE

Adequate provision should be made for access and maintenance over the life of the system.

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

Repairs should be carried out 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 paint 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.

4.7 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.

4.8 DURABILITY

4.8.1 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 fixings 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 4.6 of this Certificate.

4.8.2 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 dependent 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.

4.9 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.

4.10 TESTS AND ASSESSMENTS WERE CARRIED OUT TO DETERMINE THE FOLLOWING

- Structural strength and stability.
- Behaviour in relation to fire.
- Impact resistance.
- Pull-out resistance of fixings.
- Thermal resistance.
- Condensation risk.
- Site erection controls.
- Durability of components.
- Dimensional stability of insulants.

4.11 OTHER INVESTIGATIONS

- (i) Existing data on product properties in relation for 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 and movement joints) were assessed and approved for use in conjunction with this Certificate.
- (iv) Site visits were conducted to assess the practicability of installation the history of performance in use of the product.

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 2008 and any other regulation or standard applicable to the product/process, its use or installation remains unchanged.
- (c) the product continues to be assessed for the quality of its manufacture and marking by NSAI.
- (d) no new information becomes available which in the opinion of the NSAI, would preclude the granting of the Certificate.
- (e) the product or process continues to be manufactured, installed, used and maintained in accordance with the description, specifications and safety recommendations set out in this certificate.
- (f) the registration and/or surveillance fees due to NSAI Agrément are paid.

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

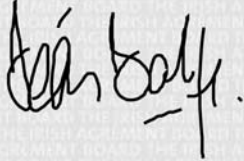
5.7 Where reference is made in this Certificate to any Act of the Oireachtas, Regulation made thereunder, Statutory Instrument, Code of Practice, National Standards, manufacturer's instructions, or similar publication, it shall be construed as reference to such publication in the form in which it is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

NSAI Agrément

This Certificate No. **09/0341** is accordingly granted by the NSAI to **PW Thermal Building Solutions Ltd.** on behalf of NSAI Agrément.

Date of Issue: **October 2009**

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

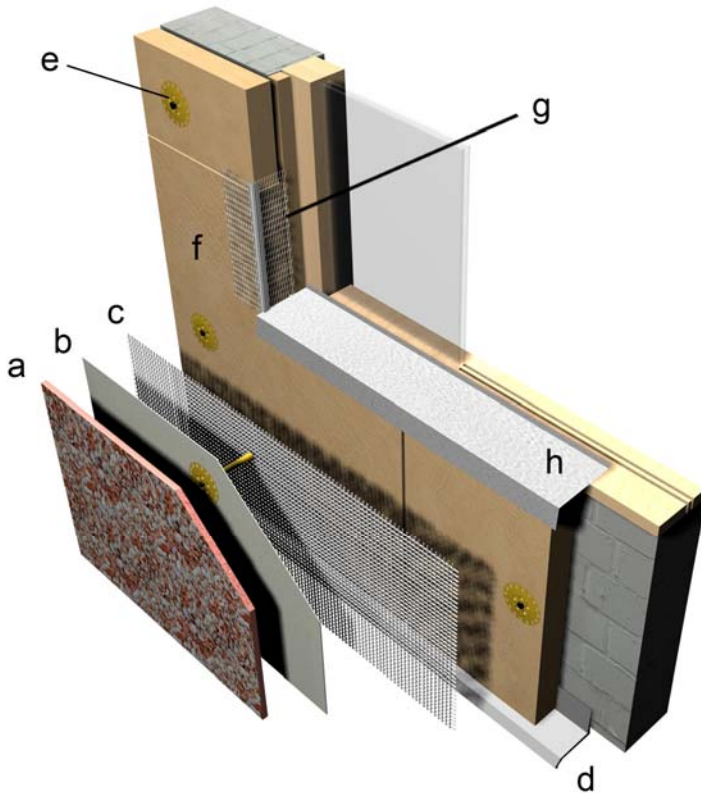


NSAI

Agrément

CERTIFICATE NO. 09/0341
DETAIL SHEET 1

Powerwall External Wall Insulation System 1



a	External Render Finish
b	Adhesive Coat
c	Glass Mesh
d	Bellcast Bead
e	Mechanical Fixing
f	Insulation
g	Corner Bead
h	Oversill

PRODUCT DESCRIPTION

This Detail Sheet relates to Powerwall External Wall Insulation System 1, as defined in NSAI Agrément Certificate 09/0341.

USE:

The system is for use as external insulation for refurbishment/retrofit of new/existing masonry or concrete buildings, up to a maximum of six storeys (18 metres) in height in purpose groups 1(a), 1(b), 1(c), 2(a), 2(b), 3, 4(a) and 4 as defined in TGD to Part B of the Building Regulations 1997 to 2008.

1.1 ASSESSMENT

In the opinion of NSAI Agrément, Powerwall External Wall Insulation System 1, if used in accordance with this Detail Sheet, meets the requirements of the Building Regulations 1997 - 2008 as indicated in Section 1.2 of Certificate 09/0341.

1.2 BUILDING REGULATIONS 1997 to 2008

This matter is dealt with in NSAI Agrément Certificate 09/0341.

2.1 PRODUCT DESCRIPTION

The Powerwall External Wall Insulation System 1 comprises:

- EPS (expanded polystyrene) insulation boards, both standard white or carbon-enhanced - 1000mm by 600mm in a range of thicknesses between 20 and 150mm (other thicknesses are available on request), with a nominal density of 15kg/m³ and a minimum compressive strength of 70kN/m². Boards must be type FRA (flame retardant additive) material. Boards are manufactured to comply with the requirements of IS EN 13163:2008 *Thermal insulation products for buildings – Factory made products of expanded polystyrene (EPS) - Specification*.
- PIR (polyisocyanurate) insulation boards – 1200mm by 600mm in a range of thicknesses between 25 and 150mm, with a minimum compressive strength of 172kN/m². Boards of 15mm thickness are available for use in window and door reveals. Boards are manufactured to comply with the requirements of IS EN 13165:2008 *Thermal insulation products for buildings – Factory made rigid polyurethane foam (PUR) products - Specification*.
- Mineral wool insulation – 1200mm by 600mm in a range of thicknesses between 30mm and 200mm, with a density of 100, 128 or 140kg/m³ and typical compression resistance (at 20% compression) of 35, 50 or 65kPa. Boards are manufactured to comply with the requirements of IS EN 13162:2008 *Thermal insulation products for buildings – Factory made mineral wool (MW) products – Specification*.
- Powerwall mechanical fixings.
- Powerwall Adhesive Coat – a polymer modified, cement based adhesive supplied as a powder to which water is added, and available in grey and white.
- Powerwall reinforcing mesh – a 1m wide mesh of multi-stranded alkali-resistant glass fibres, having a polymer coating and a nominal weight of 157g/m².
- Powerwall Exposed Aggregate Render – a polymer modified, cement based mortar supplied as a powder to which water is added, and available in a range of colours.
- Powerwall Smooth Bond Render – a polymer modified, cement based mortar supplied as a powder to which water is added, and available in a range of colours.
- Powerwall Spar-Dash Aggregate, available in a range of colours to suit the Powerwall Exposed Aggregate Render.

- Ancillary materials – Powerwall Base Coat, profiles, profile fixings, sealant, precompressed sealing strip and Powerwall Fungicidal Wash.

Insulation boards are initially fixed to the external surfaces of walls using the Powerwall Adhesive Coat. When the boards have adhered to the wall, the adhesive coat is trowel-applied to the insulation in a minimum thickness of 3mm, and the reinforcing mesh is embedded. Mechanical fixings are then installed at the frequency of 6 fixings per square metre depending on individual specifications. The system is finished with an 8 to 10mm layer of Powerwall Exposed Aggregate Render and dry-dashed with Powerwall Aggregate. If required, the window and door reveals can be finished with an 8 to 10mm layer of Powerwall Smooth Band Render.

2.2 INSTALLATION PROCEDURE

- Application is carried out in accordance with PW Thermal Building Solutions Ltd's current installation instructions, and the illustrations contained in Section 2.4 of Certificate 09/0341.
- Weather conditions should be monitored to ensure correct application and curing conditions. Application of coating materials should not be carried out below 5°C or above 30°C, nor if exposure to frost is likely. The coating must be protected from rapid drying.
- All rendering should follow best practice guidelines detailed in IS EN 13914-1:2005 *Design, preparation and application of external rendering and internal plastering – External rendering* and BS 8000-10:1995 *Workmanship on building sites – Code of practice for plastering and rendering*.
- Powerwall renders and adhesive must be mixed for at least 5 minutes.
- One coat of Powerwall Fungicidal Wash is applied by brush, roller or knapsack spray to the entire surface of the wall.
- The Powerwall base profile is secured to the external wall above the dpc and on top of the XPS plinth board using the approved profile fixings at approximately 400mm centres.
- Powerwall Adhesive Coat is prepared for use by mixing the powder with water, using an electric paddle mixer. 1 litre of water is used with every 4.5kg of powder. The adhesive is applied in dabs and should cover at least 30% of the board. 6 dabs are applied around the perimeter of the board and 2 dabs along the centre line of the board.

- The first run of insulation boards is positioned on the base profile, and pressed firmly against the wall. Subsequent rows of boards are positioned so that the vertical board joints are staggered and overlapped at the building corners. If required, the boards may be arranged with the longer edge positioned vertically. Where necessary, a primary fixing may be used at the centre of each board to ensure adhesion during the installation process.
- Care must be taken to ensure that all board edges are butted tightly together, and alignment should be checked as work proceeds. For the EPS, any high spots or irregularities should be removed by lightly planing with a rasp. The window and door reveals should be insulated where possible. Where clearance is limited, the special 15 or 25mm boards are used.
- To fit around details such as doors and windows, insulation boards may be cut with a sharp knife or fine-tooth saw. Purpose-made window sills are fitted, which are designed to prevent water ingress and incorporate drips to shed water clear of the system.
- Installation continues until the whole wall is completely covered including, where appropriate, the building soffits.
- Movement joints in the substrate must be continued through the system.
- Powerwall Adhesive Coat is prepared as described above and a bed coat is trowel-applied to the surface of dry insulation boards to a minimum thickness of 3mm.
- An alkali-resisting glass-fibre mesh is bedded into the adhesive with 100mm laps at joints. Extra mesh is used around openings.
- After the adhesive has been left to dry for at least 24 hours, holes are drilled typically at 400mm horizontal centres and 300mm vertical centres, or 300mm horizontal centres and 400mm vertical centres. Mechanical fixings are inserted through the mesh and tapped firmly home.
- Mechanical fixings are positioned 300mm apart around window details and 200mm vertical centres at building corners.
- Building corners, door and window heads and jambs are formed using Powerwall Base Coat or angle beads in accordance with the manufacturer's instructions. The base coat is prepared for use by mixing the powder with water, using an electrically driven paddle mixer or concrete mixer. 1 litre of water is used with every 6.4kg of powder.
- Expansion beads are fixed vertically in agreed positions. These beads are positioned at approximately 7m centres along a building, the centres depending on the individual requirements of each job.
- Stop beads are positioned vertically, e.g. at party wall positions where the adjoining house does not require treatment.
- Prior to the render coat, a bead of silicone rubber sealant is gun-applied at window and door frames, overhanging eaves, gas and electric meter boxes, wall vents, or where the render abuts any other building material or surface.
- The drying period of any render will depend on weather conditions; however the base coat must be left to harden for at least 1 day before application of the topcoat. Powerwall Exposed Aggregate Render is prepared for use by mixing the powder with water, using an electric paddle mixer or concrete mixer. 1 litre of water is used with every 4.5kg of powder.
- One coat of the render is trowel-applied to a minimum thickness of 8 to 10mm. While the render is still soft, selected clean spar aggregate is thrown or sprayed onto the surface. On completion, the surface must be checked to ensure an even coverage of spar-dash has been achieved. Where necessary, the aggregate should be lightly tamped to ensure that a good bond is achieved.
- Powerwall Smooth Bond Render is applied to the insulated reveals. The product is prepared as for the Powerwall Exposed Aggregate Render and is trowel-applied to a minimum thickness of 8 to 10mm.
- At the tops of the walls the system must be protected by an overhang or by an adequately sealed purpose-made flashing.
- Care must be taken in the detailing of the system around openings and projections.
- To prevent the finish from drying too rapidly it should not be applied in direct sunlight. Continuous surfaces must be completed without a break.
- On completion of the installation, external fittings, e.g. rainwater goods, are re-fixed through the system into the substrate.

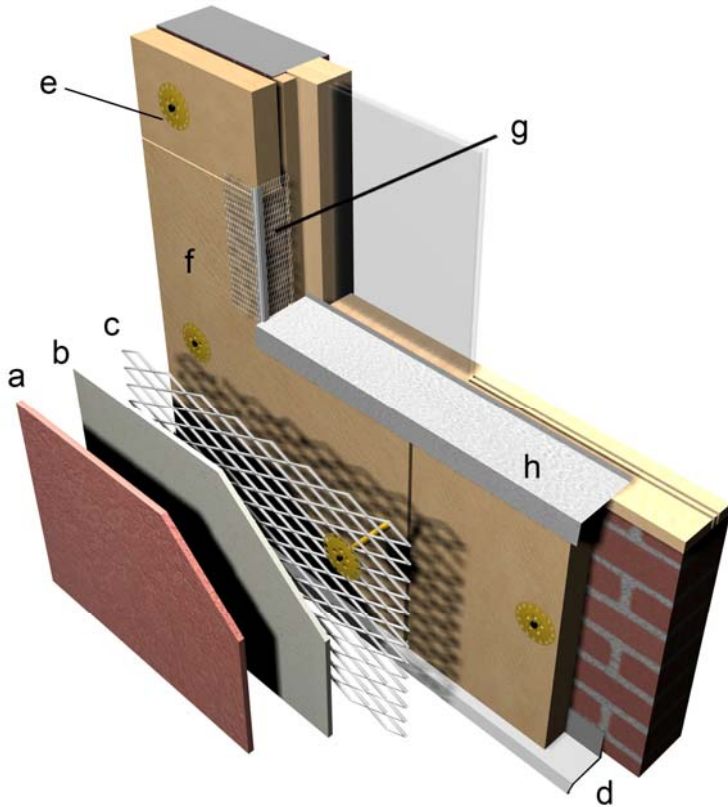


NSAI

Agrément

CERTIFICATE NO. 09/0341
DETAIL SHEET 2

Powerwall External Wall Insulation System 2



a	External Render Finish
b	Base Coat
c	SS Reinforcement Lath
d	Bellcast Bead
e	Mechanical Fixing
f	Insulation
g	Corner Bead
h	Oversill

PRODUCT DESCRIPTION

This Detail Sheet relates to Powerwall External Wall Insulation System 2, as defined in NSAI Agrément Certificate 09/0341.

USE:

The system is for use as external insulation for refurbishment/retrofit of new/existing masonry or concrete buildings, up to a maximum of six storeys (18 metres) in height in purpose groups 1(a), 1(b), 1(c), 2(a), 2(b), 3, 4(a) and 4 as defined in TGD to Part B of the Building Regulations 1997 to 2008.

1.1 ASSESSMENT

In the opinion of NSAI Agrément, Powerwall External Wall Insulation System 2, if used in accordance with this Detail Sheet, meets the requirements of the Building Regulations 1997 - 2008 as indicated in Section 1.2 of Certificate 09/0341.

1.2 BUILDING REGULATIONS 1997 to 2008

This matter is dealt with in NSAI Agrément Certificate 09/0341.

2.1 PRODUCT DESCRIPTION

The Powerwall External Wall Insulation System 2 comprises:

- EPS (expanded polystyrene) insulation boards, both standard white or carbon-enhanced - 1000mm by 600mm in a range of thicknesses between 20 and 150mm (other thicknesses are available on request), with a nominal density of 15kg/m³ and a minimum compressive strength of 70kN/m². Boards must be type FRA (flame retardant additive) material. Boards are manufactured to comply with the requirements of IS EN 13163:2008 *Thermal insulation products for buildings – Factory made products of expanded polystyrene (EPS) - Specification*.
- PIR (polyisocyanurate) insulation boards – 1200mm by 600mm in a range of thicknesses between 25 and 150mm, with a minimum compressive strength of 172kN/m². Boards of 15mm thickness are available for use in window and door reveals. Boards are manufactured to comply with the requirements of IS EN 13165:2008 *Thermal insulation products for buildings – Factory made rigid polyurethane foam (PUR) products - Specification*.
- Mineral wool insulation – 1200mm by 600mm in a range of thicknesses between 30mm and 200mm, with a density of 100, 128 or 140kg/m³ and typical compression resistance (at 20% compression) of 35, 50 or 65kPa. Boards are manufactured to comply with the requirements of IS EN 13162:2008 *Thermal insulation products for buildings – Factory made mineral wool (MW) products – Specification*.
- Powerwall mechanical fixings.
- Powerwall Adhesive Coat – a polymer modified, cement based adhesive supplied as a powder to which water is added, and available in grey and white.
- Powerwall metal lathing – expanded metal manufactured to form a diamond mesh pattern. The metal lathing is available in austenitic stainless steel grade 304S nominal weight 0.7g/m².
- Powerwall Base Coat – a polymer modified cement based mortar, supplied as a powder to which water is added.
- Powerwall Exposed Aggregate Render – a polymer modified, cement based mortar supplied as a powder to which water is added, and available in a range of colours.
- Powerwall Smooth Band Render – a polymer modified, cement based mortar supplied as a powder to which water is added, and available in a range of colours.

- Powerwall Spar-Dash Aggregate, available in a range of colours to suit the Powerwall Polymer Exposed Aggregate Render/Wet-Dash.
- Ancillary materials – Powerwall profiles (a range of standard profiles for wall base, end stop, corner mesh, expansion joint etc. – profiles are available in organic polyester powder-coated galvanised steel or stainless steel and are provided to the specifier's requirements), profile fixings, sealant, and Powerwall Fungicidal Wash.

Insulation boards are initially fixed to the external surfaces of walls using the Powerwall Adhesive Coat. The metal lathing is placed against the boards and secured in position with mechanical fixings at the average frequency of 9 fixings per square metre depending on individual specifications. Powerwall Base Coat is trowel-applied to a thickness of 8 to 10mm and allowed to dry. The system is finished with a 6 to 8mm trowel-applied layer of Polymer Exposed Aggregate Render/Wet-Dash and dry-dashed with Powerwall Aggregate. If required, the window and door reveals can be finished with an 8 to 10mm layer of Smooth Bands Render.

2.2 INSTALLATION PROCEDURE

- Application is carried out in accordance with PW Thermal Building Solutions Ltd's current installation instructions, and the illustrations contained in Section 2.4 of Certificate 09/0341.
- Weather conditions should be monitored to ensure correct application and curing conditions. Application of coating materials should not be carried out below 5°C or above 30°C, nor if exposure to frost is likely. The coating must be protected from rapid drying.
- All rendering should follow best practice guidelines detailed in IS EN 13914-1:2005 *Design, preparation and application of external rendering and internal plastering – External rendering* and BS 8000-10:1995 *Workmanship on building sites – Code of practice for plastering and rendering*.
- Powerwall renders and adhesive must be mixed for at least 5 minutes.
- One coat of Powerwall Fungicidal Wash is applied by brush, roller or knapsack spray to the entire surface of the wall.
- The Powerwall base profile is secured to the external wall above the dpc and on top of the XPS plinth board using the approved profile fixings at approximately 400mm centres.
- Powerwall Adhesive Coat is prepared for use by mixing the powder with water, using an

electric paddle mixer. 1 litre of water is used with every 4.5kg of powder. The adhesive is applied in dabs and should cover at least 30% of the board. 6 dabs are applied around the perimeter of the board and 2 dabs along the centre line of the board.

- The first run of insulation boards is positioned on the base profile, and pressed firmly against the wall. Subsequent rows of boards are positioned so that the vertical board joints are staggered and overlapped at the building corners. If required, the boards may be arranged with the longer edge positioned vertically. Where necessary, a primary fixing may be used at the centre of each board to ensure adhesion during the installation process.
- Care must be taken to ensure that all board edges are butted tightly together, and alignment should be checked as work proceeds. For the EPS, any high spots or irregularities should be removed by lightly planing with a rasp. The window and door reveals should be insulated where possible. Where clearance is limited, the special 15 or 25mm boards are used.
- To fit around details such as doors and windows, insulation boards may be cut with a sharp knife or fine-tooth saw. Purpose-made window sills are fitted, which are designed to prevent water ingress and incorporate drips to shed water clear of the system.
- Installation continues until the whole wall is completely covered including, where appropriate, the building soffits.
- Movement joints in the substrate must be continued through the system.
- The stainless steel reinforcing lath is fixed against the insulation, using the mechanical fixings at the specified average rate of 9 per square metre. The fixings are positioned typically at 300mm centres both vertically and horizontally.
- Mechanical fixings are positioned 300mm apart around window details and 300mm vertical centres are building corners.
- The lath joint should overlap by no less than 70mm in either a horizontal or vertical direction and should be tied together at 200mm intervals by using stainless steel wire or snipping a strand of lath and bending it over the lapping mesh.
- Prior to the render coat, a bead of clear silicone rubber sealant is gun-applied at window and door frames, overhanging eaves, gas and electric meter boxes, wall vents or where the render abuts any other building material or surface.
- Building corners, door and window heads and jambs are formed using Powerwall Base Coat or angle beads in accordance with the manufacturer's instructions.
- Stop beads are positioned vertically, e.g. at party wall positions where the adjoining house does not require treatment.
- Powerwall Base Coat is prepared for use by mixing the powder with water, using an electrically driven paddle mixer or concrete mixer. 1 litre of water is used with every 6.4kg of powder.
- The base coat is trowelled upwards onto the surface of the dry insulation boards so that it is forced behind the lath. It is applied in a thickness of 8 to 10mm, taking care to achieve complete coverage of the lath and to butt the base coat under details such as window sills.
- Powerwall Exposed Aggregate Render is prepared for use by mixing the powder with water, using an electric paddle mixer or concrete mixer. 1 litre of water is used with every 4.5kg of powder.
- The drying period of any render will depend on weather conditions; however the base coat must be left to harden for at least 1 day before one coat of Powerwall Exposed Aggregate Render is trowel-applied to a minimum thickness of 6 to 8mm. While the render is still soft, selected clean spar aggregate is thrown or sprayed onto the surface. On completion, the surface must be checked to ensure an even coverage of spar-dash has been achieved. Where necessary, the aggregate should be lightly tamped to ensure that a good bond is achieved.
- Powerwall Smooth Band Render is applied to the insulated reveals. The product is prepared as for the Powerwall Polymer Exposed Aggregate Render/Wet-Dash and is trowel-applied to a minimum thickness of 8 to 10mm.
- At the tops of the walls the system must be protected by an overhang or by an adequately sealed purpose-made flashing.
- Care must be taken in the detailing of the system around openings and projections.
- To prevent the finish from drying too rapidly it should not be applied in direct sunlight. Continuous surfaces must be completed without a break.
- On completion of the installation, external fittings, e.g. rainwater goods, are re-fixed through the system into the substrate.

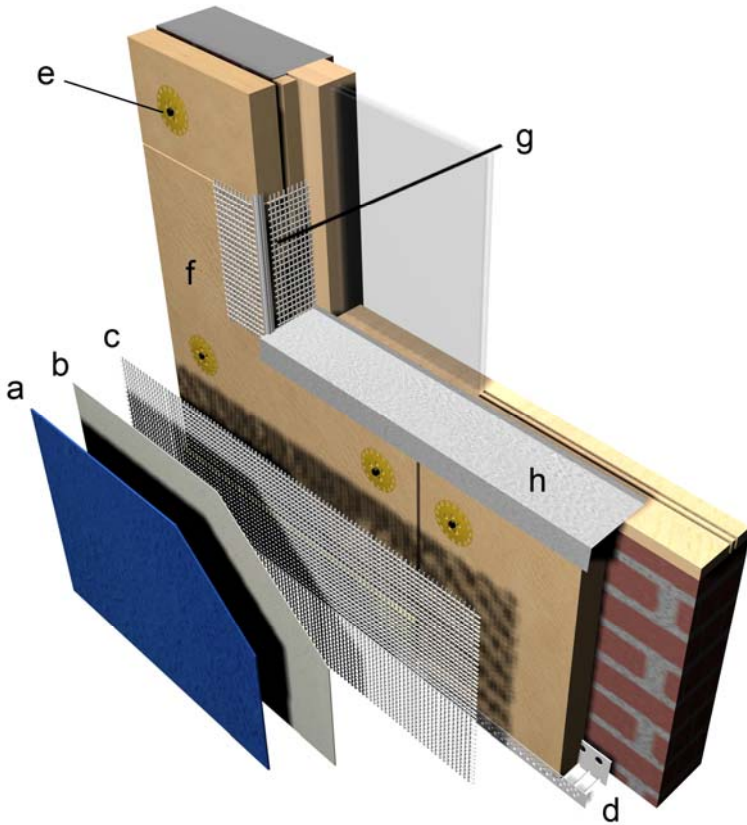


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CERTIFICATE NO. 09/0341
DETAIL SHEET 3

Powerwall External Wall Insulation System 3



a – External Render Finish

b – Adhesive Coat

c – Glass-fibre Mesh

d – Starter Track

e – Mechanical Fixing

f – Insulation

g – Mesh Angle Bead

h – Oversill

PRODUCT DESCRIPTION

This Detail Sheet relates to Powerwall External Wall Insulation System 3, as defined in NSAI Agrément Certificate 09/0341.

USE:

The system is for use as external insulation for refurbishment/retrofit of new/existing masonry or concrete buildings, up to a maximum of six storeys (18 metres) in height in purpose groups 1(a), 1(b), 1(c), 2(a), 2(b), 3, 4(a) and 4 as defined in TGD to Part B of the Building Regulations 1997 to 2008.

1.1 ASSESSMENT

In the opinion of NSAI Agrément, Powerwall External Wall Insulation System 3, if used in accordance with this Detail Sheet, meets the requirements of the Building Regulations 1997 - 2008 as indicated in Section 1.2 of Certificate 09/0341.

1.2 BUILDING REGULATIONS 1997 to 2008

This matter is dealt with in NSAI Agrément Certificate 09/0341.

2.1 PRODUCT DESCRIPTION

The Powerwall External Wall Insulation System 3 comprises:

- EPS (expanded polystyrene) insulation boards, both standard white or carbon-enhanced - 1000mm by 600mm in a range of thicknesses between 20 and 150mm (other thicknesses are available on request), with a nominal density of 15kg/m³ and a minimum compressive strength of 70kN/m². Boards must be type FRA (flame retardant additive) material. Boards are manufactured to comply with the requirements of IS EN 13163:2008 *Thermal insulation products for buildings – Factory made products of expanded polystyrene (EPS) - Specification*.
- PIR (polyisocyanurate) insulation boards – 1200mm by 600mm in a range of thicknesses between 25 and 150mm, with a minimum compressive strength of 172kN/m². Boards of 15mm thickness are available for use in window and door reveals. Boards are manufactured to comply with the requirements of IS EN 13165:2008 *Thermal insulation products for buildings – Factory made rigid polyurethane foam (PUR) products - Specification*.
- Powerwall mechanical fixings.
- Powerwall Adhesive Coat – a polymer modified, cement based adhesive supplied as a powder to which water is added, and available in grey and white.
- Powerwall reinforcing mesh – a 1m wide mesh of multi-stranded alkali-resistant glass fibres, having a polymer coating and a nominal weight of 157g/m².
- Powerwall Sand/Swirl Finish – a ready to use acrylic based decorative coating containing aggregates, coalescing and thickening agents. The finish is available in aggregate sizes of 1, 1.5 and 2mm and a range of colours.
- Ancillary materials – Powerwall profiles (a range of standard profiles for wall base, end stop, corner mesh, expansion joint etc. – profiles are available in organic polyester powder-coated galvanised steel or stainless steel and are provided to the specifier's requirements), profile fixings, sealant, precompressed sealing strip and Powerwall Fungicidal Wash.

Insulation boards are initially fixed to the external surfaces of walls using the Powerwall Adhesive Coat with supplementary fixings where required (mechanical fixings are always required for no-fines substrates). When the boards have adhered to the wall, the adhesive coat is trowel-

applied to the insulation in a minimum thickness of 3mm, and the reinforcing mesh and left to dry. The system is finished with a layer of Powerwall Sand/Swirl Finish.

2.2 INSTALLATION PROCEDURE

- Application is carried out in accordance with PW Thermal Building Solutions Ltd's current installation instructions, and the illustrations contained in Section 2.4 of Certificate 09/0341.
- Weather conditions should be monitored to ensure correct application and curing conditions. Application of coating materials should not be carried out below 5°C or above 30°C, nor if exposure to frost is likely. The coating must be protected from rapid drying.
- All rendering should follow best practice guidelines detailed in IS EN 13914-1:2005 *Design, preparation and application of external rendering and internal plastering – External rendering* and BS 8000-10:1995 *Workmanship on building sites – Code of practice for plastering and rendering*.
- Powerwall renders and adhesive must be mixed for at least 5 minutes.
- One coat of Powerwall Fungicidal Wash is applied by brush, roller or knapsack spray to the entire surface of the wall.
- The Powerwall base profile is secured to the external wall above the dpc and on top of the XPS plinth board using the approved profile fixings at approximately 400mm centres.
- Powerwall Adhesive Coat is prepared for use by mixing the powder with water, using an electric paddle mixer. 1 litre of water is used with every 4.5kg of powder. The adhesive is applied to the complete surface of the board using a notched trowel.
- The first run of insulation boards is positioned on the base profile. Subsequent rows of boards are positioned so that the vertical board joints are staggered and overlapped at the building corners. If required, the boards may be arranged with the longer edge positioned vertically. Insulation boards are mechanically fixed to the wall at a rate of 5 fixings per square metre.
- Care must be taken to ensure that all board edges are butted tightly together, and alignment should be checked as work proceeds. For the EPS, any high spots or irregularities should be removed by lightly planing with a rasp. The window and door reveals should be insulated where possible. Where clearance is limited, the special 15 or 25mm boards are used.

- To fit around details such as doors and windows, insulation boards may be cut with a sharp knife or fine-tooth saw. Purpose-made window sills are fitted, which are designed to prevent water ingress and incorporate drips to shed water clear of the system.
- Installation continues until the whole wall is completely covered including, where appropriate, the building soffits.
- Movement joints in the substrate must be continued through the system.
- Powerwall Adhesive Coat is prepared as described above and a bed coat is trowel-applied to the surface of dry insulation boards to a minimum thickness of 3mm.
- An alkali-resisting glass-fibre mesh is bedded into the adhesive with 100mm laps at joints. Extra mesh is used around openings.
- Building corners, door and window heads and jambs are formed using angle beads in accordance with the manufacturer's instructions.
- Only follow structural expansion through to the surface with full system expansion bead.
- Stop beads are positioned vertically, e.g. at party wall positions where the adjoining house does not require treatment.
- Prior to the render coat, a bead of silicone rubber sealant is gun-applied at window and door frames, overhanging eaves, gas and electric meter boxes, wall vents, or where the render abuts any other building material or surface.
- The drying period of any render will depend on weather conditions; however the base coat must be left to harden for at least 1 day before application of the topcoat. Powerwall Sand/Swirl Finish should be thoroughly mixed before application. The coating is trowel-applied to the thickness of the chosen aggregate size.
- At the tops of the walls the system must be protected by an overhang or by an adequately sealed purpose-made flashing.
- Care must be taken in the detailing of the system around openings and projections.
- To prevent the finish from drying too rapidly it should not be applied in direct sunlight. Continuous surfaces must be completed without a break.
- On completion of the installation, external fittings, e.g. rainwater goods, are re-fixed through the system into the substrate.