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Agrément Certificate
13/5065
Product Sheet 1

ENVIROWALL EXTERNAL WALL INSULATION SYSTEM

ENVIROWALL SYSTEM 2 EXTERNAL WALL INSULATION SYSTEM

This Agrément Certificate Product Sheet⁽¹⁾ relates to the Envirowall System 2 External Wall Insulation System, comprising mechanically-fixed enhanced expanded polystyrene (EPS) insulation boards, with or without supplementary adhesive, a glassfibre-mesh-reinforced basecoat and render or brick-slip finishes, for use on the outside of external walls in new or existing domestic and non-domestic buildings.

(1) Hereinafter referred to as 'Certificate'.

CERTIFICATION INCLUDES:

- factors relating to compliance with Building Regulations where applicable
- factors relating to additional non-regulatory information where applicable
- independently verified technical specification
- assessment criteria and technical investigations
- design considerations
- installation guidance
- regular surveillance of production
- formal three-yearly review.

KEY FACTORS ASSESSED

Thermal performance — the system can be used to improve the thermal performance of external walls and can contribute to meeting the requirements of the national Building Regulations (see section 6).

Strength and stability — the system can adequately resist wind loads and has sufficient resistance to impact damage (see section 7).

Behaviour in relation to fire — the system has a B-s1,d0 reaction to fire classification and can meet the requirements of the national Building Regulations (see section 8).

Risk of condensation — the system can contribute to limiting the risk of interstitial and surface condensation (see section 11).

Durability — when installed and maintained in accordance with the Certificate holder's recommendations and the terms of this Certificate, the system will remain effective for at least 30 years. The durability can be extended to 60-years by using different fixings and by following a planned inspection and an effective maintenance schedule as described in sections 12 and 13.



The BBA has awarded this Certificate to the company named above for the system described herein. This system has been assessed by the BBA as being fit for its intended use provided it is installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

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Certificate amended on 20 February 2017 to modify section 4.3.

Certificate amended on 17 December 2018 to update front page picture.

John Albon — Head of Approvals
Construction Products

Claire Curtis-Thomas
Chief Executive

The BBA is a UKAS accredited certification body — Number 1113. The schedule of the current scope of accreditation for product certification is available in pdf format via the UKAS link on the BBA website at www.bbacerts.co.uk

Readers are advised to check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA direct.

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Regulations

In the opinion of the BBA, the Envirowall Wall System 2 External Wall Insulation System, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements of the following Building Regulations (the presence of a UK map indicates that the subject is related to the Building Regulations in the region or regions of the UK depicted):



The Building Regulations 2010 (England and Wales) (as amended)

Requirement: A1	Loading
Comment:	The system can sustain and transmit wind loads to the substrate wall. See sections 7.1 to 7.5 of this Certificate.
Requirement: B4(1)	External fire spread
Comment:	The system can satisfy this Requirement. See sections 8.1 to 8.6 of this Certificate.
Requirement: C2(b)	Resistance to moisture
Comment:	The system can provide a degree of protection against rain ingress. See sections 4.4 and 10.1 of this Certificate.
Requirement: C2(c)	Resistance to moisture
Comment:	The system can contribute to minimising the risk of interstitial and surface condensation. See sections 11.1, 11.2 and 11.4 of this Certificate.
Requirement: L1 (a)(i)	Conservation of fuel and power
Comment:	The system can contribute to satisfying this Requirement. See sections 6.2 and 6.3 of this Certificate.
Regulation: 7	Materials and workmanship
Comment:	The system is acceptable. See sections 13.1 and 13.2 and the <i>Installation</i> part of this Certificate.
Regulation: 26	CO₂ emission rates for new buildings
Regulation: 26A	Fabric energy efficiency rates for new dwellings (applicable to England only)
Regulation: 26A	Primary energy consumption rates for new buildings (applicable to Wales only)
Regulation: 26B	Fabric performance values for new dwellings (applicable to Wales only)
Comment:	The system can contribute to satisfying these Regulations See sections 6.2 and 6.3 of this Certificate.



The Building (Scotland) Regulations 2004 (as amended)

Regulation: 8(1)(2)	Durability, workmanship and fitness of materials
Comment:	The system can contribute to a construction satisfying this Regulation. See sections 12, 13.1 and 13.2 and the <i>Installation</i> part of this Certificate.
Regulation: 9	Building standards applicable to construction
Standard: 1.1	Structure
Comment:	The system can sustain and transmit wind loads to the substrate wall. See sections 7.1 to 7.5 of this Certificate.
Standard: 2.6	Spread to neighbouring buildings
Comment:	The system can satisfy this Standard, with reference to clauses 2.6.4 ⁽¹⁾⁽²⁾ , 2.6.5 ⁽¹⁾ and 2.6.6 ⁽²⁾ . See sections 8.1 to 8.8 of this Certificate.
Standard: 2.7	Spread on external walls
Comment:	The system can satisfy this Standard, and is acceptable for use more than one metre from a boundary, with reference to clauses 2.7.1 ⁽¹⁾⁽²⁾ , 2.7.2 ⁽²⁾ and Annex 2A ⁽¹⁾ . See sections 8.1 to 8.8 of this Certificate.
Standard: 3.10	Precipitation
Comment:	The system will contribute to a construction satisfying this Standard, with reference to clauses 3.10.1 ⁽¹⁾⁽²⁾ and 3.10.2 ⁽¹⁾⁽²⁾ . See sections 4.4 and 10.1 of this Certificate.
Standard: 3.15	Condensation
Comment:	The system can contribute to satisfying this Standard, with reference to clauses 3.15.1 ⁽¹⁾⁽²⁾ , 3.15.4 ⁽¹⁾⁽²⁾ and 3.15.5 ⁽¹⁾⁽²⁾ . See sections 11.3 and 11.4 of this Certificate.
Standard: 6.1(b)	Carbon dioxide emissions
Standard: 6.2	Building insulation envelope
Comment:	The system can contribute to satisfying these Standards, with reference to clauses (or parts of) 6.1.1 ⁽¹⁾ , 6.1.2 ⁽¹⁾⁽²⁾ , 6.1.3 ⁽¹⁾⁽²⁾ , 6.1.6 ⁽¹⁾ , 6.1.10 ⁽²⁾ , 6.2.1 ⁽¹⁾⁽²⁾ , 6.2.3 ⁽¹⁾ , 6.2.4 ⁽²⁾ , 6.2.5 ⁽²⁾ , 6.2.6 ⁽¹⁾ , 6.2.7 ⁽¹⁾ , 6.2.8 ⁽²⁾ , 6.2.9 ⁽¹⁾⁽²⁾ , 6.2.10 ⁽¹⁾ , 6.2.11 ⁽¹⁾ , 6.2.12 ⁽²⁾ and 6.2.13 ⁽¹⁾⁽²⁾ . See sections 6.2 and 6.3 of this Certificate.
Standard: 7.1(a)(b)	Statement of sustainability
Comment:	The system can contribute to satisfying the relevant requirements of Regulation 9, Standards 1 to 6, and therefore will contribute to a construction meeting the bronze level of sustainability as defined in this Standard. In addition, the system can contribute to a construction meeting a higher level of sustainability as defined in this Standard with reference to clauses 7.1.4 ⁽¹⁾⁽²⁾ [Aspect 1 ⁽¹⁾⁽²⁾ and 2 ⁽¹⁾], 7.1.6 ⁽¹⁾⁽²⁾ [Aspect 1 ⁽¹⁾⁽²⁾ and 2 ⁽¹⁾] and 7.1.7 ⁽¹⁾⁽²⁾ [Aspect 1 ⁽¹⁾⁽²⁾]. See sections 6.2 and 6.3 of this Certificate.
Regulation: 12	Building standards applicable to conversions
Comment:	All comments given for the system under Regulation 9, Standards 1 to 6, also apply to this Regulation, with reference to clause 0.12.1 ⁽¹⁾⁽²⁾ and Schedule 6 ⁽¹⁾⁽²⁾ . (1) Technical Handbook (Domestic). (2) Technical Handbook (Non-Domestic).



The Building Regulations (Northern Ireland) 2012 (as amended)

Regulation:	23	Fitness of materials and workmanship
Comment:		The system is acceptable. See sections 13.1 and 13.2 and the <i>Installation</i> part of this Certificate.
Regulation:	28(b)	Resistance to moisture and weather
Comment:		Walls insulated with the system will satisfy this Regulation. See sections 4.4 and 10.1 of this Certificate.
Regulation:	29	Condensation
Comment:		Walls insulated with the system will satisfy the requirements of this Regulation. See section 11.4 of this Certificate.
Regulation:	30	Stability
Comment:		The system can sustain and transmit wind loads to the substrate wall. See sections 7.1 to 7.5 of this Certificate.
Regulation:	36(a)	External fire spread
Comment:		The system has a low risk surface and can satisfy this Regulation. See sections 8.1 to 8.6 of this Certificate.
Regulation:	39(a)(i)	Conservation measures
Regulation:	40	Target carbon dioxide emission rate
Comment:		The system can contribute to satisfying these Regulations. See sections 6.2 and 6.3 of this Certificate.

Construction (Design and Management) Regulations 2015

Construction (Design and Management) Regulations (Northern Ireland) 2016

Information in this Certificate may assist the client, designer (including Principal Designer) and contractor (including Principal Contractor) to address their obligations under these Regulations.

See section: 3 *Delivery and site handling* (3.1 and 3.3) of this Certificate.

Additional Information

NHBC Standards 2016

NHBC accepts the use of the Envirowall System 2 External Wall Insulation System, provided it is installed, used and maintained in accordance with this Certificate, in relation to *NHBC Standards, Part 6 Superstructure (excluding roof)* and Chapter 6.9 *Curtain Walling and Cladding*.

Technical Specification

1 Description

1.1 The Envirowall System 2 External Wall Insulation System consists of enhanced expanded polystyrene insulation boards mechanically fixed to the substrate wall, reinforcing glassfibre mesh embedded in the basecoat, various render finishes and a brick-slip system. The system can be designed to achieve either a 30- or 60-year durability (see Figure 1 and section 16).

1.2 The system is mechanically fixed through the insulation (for a 30-year durability) or through the mesh (for a 60-year durability), into the external surface of the substrate wall. For the 60-year application, fixings are applied through the mesh while the basecoat is still wet, before mesh patches are placed over the fixing heads. Further basecoat is applied, if required, in order to achieve a flat surface and the required thickness. For both applications, when the basecoat has dried, the primer is used where required, followed by a decorative finish.

1.3 For the 60-year durability system, the supplementary adhesive must be used, and the guidelines relating to mechanical fixings (section 4.11) and maintenance followed.

1.4 The system comprises the following components:

Adhesive (Supplementary)

- EnviroBed Adhesive — cement-based polymer-modified adhesive, supplied in powder form to which water is added (one litre per 5 kg powder).

Insulation⁽¹⁾⁽²⁾

- EPS 70 Grey enhanced expanded polystyrene (EPS) boards — 1200 mm by 600 mm, in a range of thicknesses between 90 mm and 200 mm in increments of 10 mm, with a nominal density of 15 kg·m⁻³, a minimum compressive strength of 70 kN·m⁻² and a minimum tensile strength perpendicular to the faces of 100 kN·m⁻². Boards are manufactured to comply with BS EN 13163 : 2012 and are classified as Class E in accordance with BS EN 13501 : 2007.

(1) For declared thermal conductivity values (λ_D), see Table 3.

(2) Insulation thicknesses below 90 mm would generally be used on reveals.

Mechanical fixings

- mechanical fixings⁽¹⁾⁽²⁾ — proprietary external wall insulation fixings of adequate length to suit the substrate and insulation thickness and supplied by the Certificate holder:

- Koelner KI-10⁽³⁾: polypropylene anchor sleeve with a carbon steel, galvanized steel or glassfibre-reinforced polypropylene (PA6 GF30) pin
- Koelner T Fix 8M⁽³⁾: polypropylene anchor sleeve with a steel, electro-galvanized steel or glassfibre-reinforced polyamide pin
- Ejotherm NT U⁽⁴⁾: high density polyethylene anchor sleeve, with either an electro-galvanized steel or stainless steel pin
- Ejotherm STR U⁽⁴⁾: high density polyethylene anchor sleeve, with either an electro-galvanized steel or stainless steel pin.

- (1) Other fixings may be used provided they can be demonstrated to have equal or higher pull-out, plate diameter and plate stiffness characteristics.
- (2) High density polyethylene or polyamide anchor sleeve with a stainless steel pin to achieve 60-years durability performance.
- (3) These fixings can only be specified for 30-year durability applications.
- (4) These fixings are acceptable for 60-years durability only when used with a pin or screw made from stainless steel.

Basecoats

- RetroBase — polymer-modified, cement-based powder of limestone aggregate and specially selected fillers. Applied to a thickness of 5 mm.

Reinforcement

- EnviroMesh — an alkali-resistant glassfibre mesh, with a 4 mm by 4 mm grid size and a nominal weight of 165 g·m⁻².

Adhesives

- SpeedySlip adhesive mortar — organically-bound, water-based, cement-free ready to use mortar, with a density of 170 g·cm⁻³. Supplied in a range of colours and applied to an approximate thickness of 1.5 mm to 2 mm.

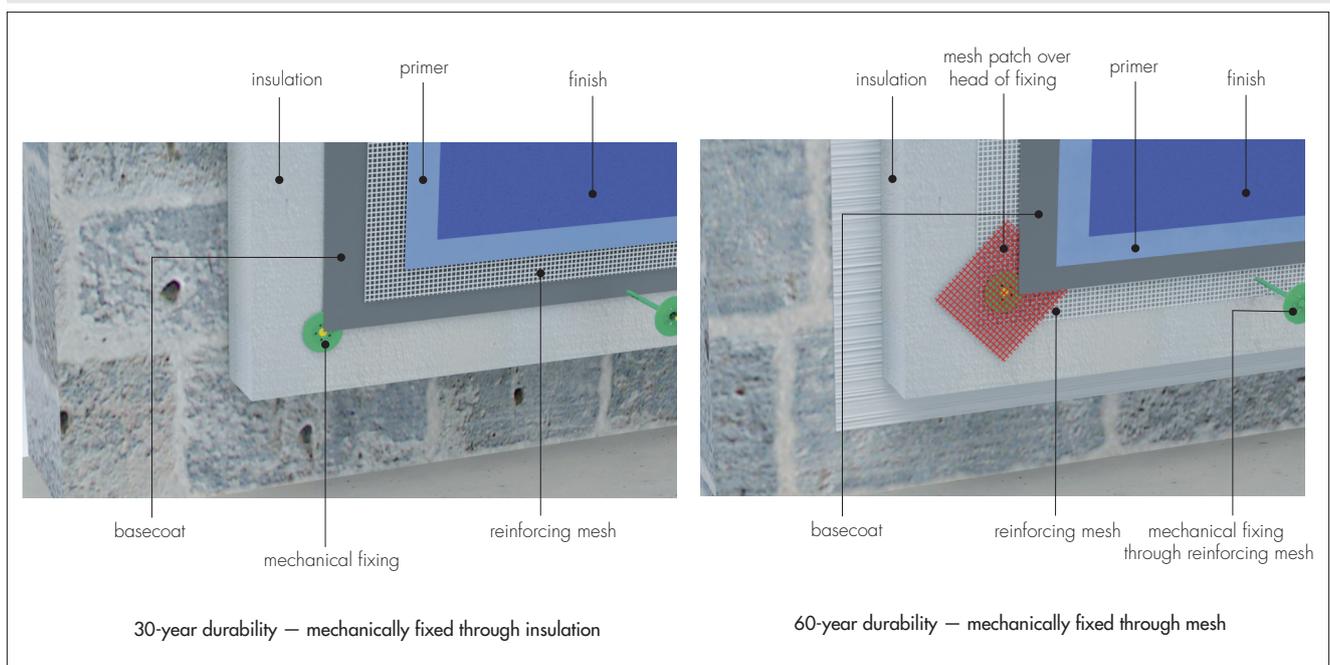
Primers

- Silicone Acrylate primer — to be used with the Silicone Acrylate render.

Finishes

- EnviroDash — polymer-modified, cement-binder-based system, for use as a wet receiver coat for a graded aggregate dash finish. Supplied in powder form to which clean water is added
- Dry dash — aggregates up to 8 mm and available in a range of colours (in accordance with BS EN 13139 : 2002)
- EnviroBrick render — polymer-modified, two-coat render system available in a range of colours and designed to simulate conventional brickwork. Supplied in powder form to which clean water is added
- SpeedySlips — 65 mm by 215 mm by 4 mm to 6 mm thick simulated brick-slips comprising inorganic fillers and aggregates with an organic binder. Also available in corner profiles, 65 mm by 215 mm by 115 mm
- Silicone Acrylate render — supplied pre-mixed in a range of colours. With particle sizes 1.5 mm to 3 mm. Thickness dictated by particle size.

Figure 1 *Envirowall System 2 External Wall Insulation System*



1.5 Ancillary materials used with the system:

- range of aluminium, PVC-U or stainless steel profiles⁽¹⁾, comprising:
 - base profile
 - edge profile
 - corner profile with optional PVC-U nosing
 - render stop profile.

1.6 Ancillary materials also used with the system but outside the scope of this Certificate:

- range of aluminium, PVC-U or stainless steel profiles, comprising:
 - movement joint
 - expansion joint
- profile connectors and fixings
- fungicidal wash
- sealants — silicone in accordance with BS EN ISO 11600 : 2003
- expansion foam — polyurethane foam used for filling gaps between insulation boards.

(1) For 60-year durability system these profiles must be made of stainless steel (see section 13.2).

2 Manufacture

2.1 Components are either manufactured by the Certificate holder or bought-in from suppliers, to an agreed specification.

2.2 As part of the assessment and ongoing surveillance of product quality, the BBA has:

- agreed with the manufacturer the quality control procedures and product testing to be undertaken
- assessed and agreed the quality control operated over batches of incoming materials
- monitored the production process and verified that it is in accordance with the documented process
- evaluated the process for management of nonconformities
- checked that equipment has been properly tested and calibrated
- undertaken to carry out the above measures on a regular basis through a surveillance process, to verify that the specifications and quality control operated by the manufacturer are being maintained.

2.3 The management system of SPS Envirowall Limited has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2008 and BS EN ISO 14001 : 2004 by CQS (Certified Quality Systems) Limited (Certificate SP240369 and SP240368 respectively).

3 Delivery and site handling

3.1 Each package carries the product identification, manufacturer's batch number and the BBA logo incorporating the number of this Certificate. The components are delivered to site in the packaging and quantities listed in Table 1.

Table 1 Component supply details

Component	Quantity/packaging
Insulation	sealed packs
EnviroBed (adhesive)	25 kg bag
RetroBase (basecoat)	25 kg bag
EnviroMesh	50 m roll, 1 m wide
Silicone Acrylate primer	20 kg bucket
Speedy Slips adhesive mortar	20 kg bucket
SpeedySlips	174 per box
EnviroBrick render	25 kg bag
Silicone Acrylate render	25 kg bucket
EnviroDash receiver	25 kg bag
Dry dash	25 kg bag
Mechanical fixings	boxed by the manufacturer
Aluminium, powder-coated galvanized steel, PVC-U or stainless steel base profiles, and edge, corner, render stop ends	lengths of 2500 mm

3.2 The insulation must be stored on a firm, clean, level base, off the ground and under cover until required for use. Care must be taken when handling to avoid damage.

3.3 The insulation must be protected from prolonged exposure to sunlight, either by storing opened packs under cover or re-covering with opaque polythene sheeting. Care must be taken to avoid contact with solvents or materials containing volatile organic components. The boards must not be exposed to open flame or other ignition sources. Boards that become damaged, soiled or wet should be discarded.

3.4 The adhesive, basecoat and topcoats and all cementitious materials must be stored in dry conditions within 5°C and 30°C, off the ground and protected from moisture. Contaminated material must be discarded.

3.5 The rails must be protected from humidity and stored indoors.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on the Envirowall System 2 External Wall Insulation System.

Design Considerations

4 General

4.1 Envirowall System 2 External Wall Insulation System, when installed in accordance with this Certificate, is effective in reducing the thermal transmittance (U value) of external masonry walls of new and existing buildings. It is essential that the detailing techniques specified in this Certificate are carried out to a high standard if the ingress of water into the insulation is to be avoided and the full thermal benefit obtained from treatment with the system.

4.2 For improved thermal/carbon-emissions performance, the designer should consider additional/alternative fabric and/or services measures.

4.3 The system is for application to the outside of external walls of masonry, or dense or no-fines concrete construction on new or existing domestic and non-domestic buildings (with or without existing render) up to 18 metres in height. Prior to installation of the system, the wall should comply with section 14 of this Certificate.

 4.4 New walls subject to national Building Regulations should be constructed in accordance with the relevant recommendations of:

- BS EN 1996-2 : 2006, in that the designer should select a construction appropriate to the local wind-driven rain index, paying due regard to the design detailing, workmanship and materials to be used
- BS 8000-3 : 2001.

4.5 New walls not subject to regulatory requirements should also be built in accordance with the Standards identified in section 4.4 of this Certificate.

4.6 The system will improve the weather resistance of a wall and provide a decorative finish. However, it should only be installed where there is no sign of dampness on the inner surface of the wall, other than that caused solely by condensation.

4.7 The effect of the system on the acoustic performance of a construction is outside the scope of this Certificate.

4.8 The fixing of sanitary pipework, plumbing, rainwater goods, satellite dishes, clothes lines, hanging baskets and similar items to the system is outside the scope of this Certificate.

4.9 External pipework and ducts should be removed before installation and alterations made to underground drainage, to accommodate repositioning of the pipework to the finished face of the system.

4.10 All detailing, such as window sills, should be designed and installed so as to discharge water away from the building.

4.11 For 60-year durability, the following components must be constructed from stainless steel grade 1.4301 to BS EN 10088-2 : 2005:

- starter track and render stop end including the fixings
- corner profile (dash application only)
- pin or screw for mechanical fixings.

4.12 It is essential that this system is installed and maintained in accordance with the conditions set out in this Certificate.

5 Practicability of installation

The system must only be installed by specialised contractors who have successfully undergone training and registration by the Certificate holder (see section 1.5).

Note: The BBA operates a UKAS-accredited Approved Installer Scheme for external wall insulation (non-mandatory); details of approved installer companies are included on the BBA website (www.bbacerts.co.uk).

6 Thermal performance

6.1 Calculations of thermal transmittance (U value) should be carried out in accordance with BS EN ISO 6946 : 2007 and BRE Report BR 443 : 2006, using the insulation manufacturer's declared thermal conductivity (λ_p value) of $0.032 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$.



6.2 The U value of a completed wall will depend on the selected insulation thickness and fixing method, the insulation value of the substrate masonry and its internal finish. Figures for typical design U values, calculated in accordance with section 6.1, are given in Tables 2 and 3.

Table 2 Insulation thickness required to achieve U value⁽¹⁾⁽²⁾⁽³⁾ using galvanized steel fixings (30-year durability)

U value (W·m ⁻² ·K ⁻¹)	Thickness of insulation ⁽³⁾ (mm)	
	215 mm brickwork, $\lambda = 0.56 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$	200 mm dense blockwork, $\lambda = 1.75 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$
	EPS 70 Grey	EPS 70 Grey
0.18	190	200
0.19	180	190
0.25	130	140
0.26	120	130
0.28	110	120
0.30	100	110
0.35	90	90

- (1) Wall construction inclusive of 13 mm plaster ($\lambda = 0.57 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$) and 5 mm render ($\lambda = 1.0 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$), brickwork (protected) with 17.1 % mortar ($\lambda = 0.88 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$). Declared thermal conductivity (λ_D) of insulation is as shown in 6.1.
- (2) Calculation based on a system that included 7 galvanized steel fixings per square metre, with 8 mm diameter sleeve and a point thermal transmittance (X_p) of 0.004 W·K⁻¹ per m². Use of other types of fixings should be calculated in accordance with BS EN ISO 6946 : 2007.
- (3) Based upon incremental insulation thickness of 10 mm.

Table 3 Insulation thickness required to achieve U value⁽¹⁾⁽²⁾⁽³⁾⁽⁴⁾ using stainless steel fixings (60-year durability)

U value ⁽⁵⁾ (W·m ⁻² ·K ⁻¹)	Thickness of insulation ⁽³⁾ (mm)	
	215 mm brickwork, $\lambda = 0.56 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$	200 mm dense blockwork, $\lambda = 1.75 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$
	EPS 70 Grey	EPS 70 Grey
0.18	170	180
0.19	160	170
0.25	120	130
0.26	110	120
0.28	110	110
0.30	100	100
0.35	90	90

- (1) Wall construction inclusive of 13 mm plaster ($\lambda = 0.57 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$) and 14 mm render ($\lambda = 1.0 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$), brickwork (protected) with 17.1 % mortar or dense blockwork with 6.7% mortar ($\lambda = 0.88 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$). Declared thermal conductivity (λ_D) of insulation is as shown in 6.1.
- (2) Calculation based on a system that included 7 stainless steel fixings per square metre, with 8 mm diameter sleeve and a point thermal transmittance (X_p) of 0.002 W·K⁻¹ per m². Use of other types of fixings should be calculated in accordance with BS EN ISO 6946 : 2007.
- (3) Based on calculations in accordance with BS EN ISO 6946 : 2007.
- (4) Based upon incremental insulation thickness of 10 mm.
- (5) When applying the maximum available insulation thickness, these walls can achieve a U value of 0.16 W·m⁻²·K⁻¹.

6.3 Care must be taken in the overall design and construction of junctions with other elements and openings to minimise thermal bridges and air infiltration. Detailed guidance can be found in the documents supporting the National Building Regulations.

7 Strength and stability

General



7.1 When installed on suitable walls, the system can adequately transfer to the wall the self-weight and negative (suction) and positive (pressure) wind loads normally experienced in the United Kingdom.

7.2 Positive wind load is transferred to the substrate wall directly via compression of the render and insulation system.

7.3 Negative wind load is resisted by the bond between the insulation and render and system anchors. A render bond strength of 80 kN·m⁻² should be assumed and a safety factor of 9 applied.

7.4 The wind loads on the wall should be calculated in accordance with BS EN 1991-1-4 : 2005 and its National Annex. Special consideration should be given to locations with high wind-load pressure coefficients, as additional fixings may be necessary. In accordance with BS EN 1990 : 2002, it is recommended that a load factor of 1.5 is used to determine the ultimate wind load to be resisted by the system.

7.5 Assessment of structural performance for individual installations should be carried out by a suitably qualified and experienced individual to confirm that:

- the substrate wall has adequate strength to resist the additional loads that may be applied as a result of installing the system, ignoring any positive contribution that may occur from the system itself
- the proposed system and associated fixing and profiles layout (see Figure 4) provides adequate resistance to negative wind loads, based on test and site investigation results (see section 7.7)
- an appropriate number of site-specific pull-out tests are conducted on the substrate of the building to determine the minimum resistance to failure of the fixings used for the rail. The characteristic pull-out resistance should be determined in accordance with the guidance given in ETAG 014 : 2011, Annex D (minimum test characteristic = 0.6 x mean of 5 lowest tests results).

7.6 The number and centre of fixings should be determined by the system designer; the number of fixings must not be less than the minimum specified for the system. Provided the substrate wall is suitable and an appropriate fixing selected, the fixings will adequately support and transfer the weight of the render insulation system to the substrate wall.

7.7 Typical characteristic pull-out strengths for the fixings taken from the corresponding European Technical Assessment (ETA) are given in Table 4; however, these values are dependent on the substrate, and the fixing must be selected to suit the loads and substrate concerned.

Fixing type	ETA number	Substrates	Drill diameter (mm)	Effective anchorage depth (mm)	Typical pull out strength (kN) ⁽¹⁾	Partial safety factor
Koelner KI-10	07/0291	Concrete C12/15/clay bricks	10	25	0.5	2
Koelner TFIX-8M	07/0336	Concrete C12/15/clay bricks	8	25	1.2	2
Ejotherm NT U	05/0009	Concrete C12/15/clay bricks	8	25	1.2 1.5	2
Ejotherm STR U	04/0023	Concrete C12/15/clay bricks	8	25	1.5	2

(1) Values are determined in accordance with ETAG 014: 2011 and are dependent on the substrate. The Use Categories are defined in the corresponding ETA.

7.8 The insulation system is mechanically fixed to the substrate wall with a minimum of 7 fixings per m² (as per the fixing pattern shown in Figure 5) and with a minimum of 40% supplementary adhesive (required for the 60-year system).

7.9 The design pull-through resistance data given in Table 4 is the result of calculations based upon pull-through resistances determined by the BBA from tests on anchors with 60 mm diameters and with a 140 mm diameter anchor extension washer.

Table 5 Design pull-through resistances

Factor (unit)	Expanded polystyrene insulation
Insulation thickness (mm)	90
Plate diameter of anchor (mm)	60
Characteristic pull-through resistance ⁽¹⁾ (per anchor) (N)	1279
Factor of safety ⁽²⁾	2.5
Design pull-through resistance (N)	512

(1) Characteristic pull-through resistance of insulation over the head of the fixing, in accordance with BS EN 1990 : 2002, Annex D7.2.

(2) The safety factor of 2.5 is applied and based on the assumption that all insulation boards are quality controlled and tested to establish tensile strength perpendicular to the face of the boards.

Impact resistance

7.10 Hard body impact tests were carried out in accordance with ETAG 004 : 2000 (amended 2013). The system is suitable for use in the Categories listed in Table 6.

Rendering system	Impact resistance
RetroBase + Silicone Acrylate + Silicone Acrylate (topcoat)	Category III ⁽¹⁾
RetroBase + EnviroBrick (finish)	Category III ⁽¹⁾
RetroBase + EnviroDash — white	Category III ⁽¹⁾
RetroBase + SpeedySlip adhesive + SpeedySlips	Category I ⁽¹⁾

(1) 'Use Categories' are defined in ETAG 004 : 2000 (amended 2013) as:

- Category I — a zone readily accessible at ground level to the public and vulnerable to hard body impacts but not subjected 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.

8 Behaviour in relation to fire



8.1 The reaction to fire classification is B-s1, d0 in accordance with BS EN 13501-1 : 2007.

8.2 The fire classification applies to the full range of insulation thicknesses covered by this Certificate (see section 1.4).

8.3 The classification applies to the full range of colours and finishes (including render) covered by this Certificate.

8.4 The EPS insulation material in isolation is not classified as non-combustible.

8.5 The system is restricted for use in buildings up to 18 m in height.

8.6 For houses in Scotland, and for all buildings in England and Wales and Northern Ireland, the system is suitable for use on, or at any distance from, the boundary.

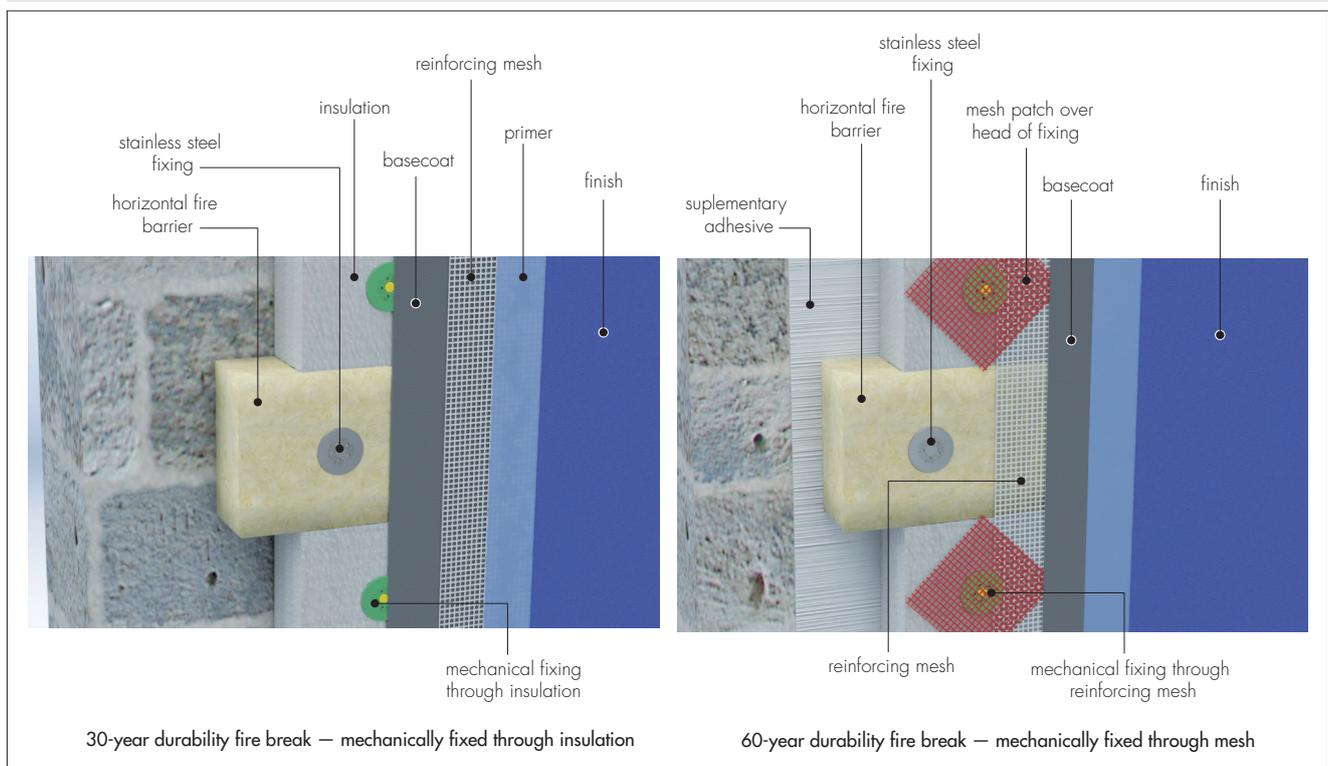


8.7 For flats and maisonettes and non-domestic buildings in Scotland, the system is only suitable for use more than one metre from the boundary.

8.8 The system is not classified as non-combustible; therefore, calculations for unprotected areas may apply dependent on the fire resistance characteristics of the wall.

8.9 For application to second storey walls and above, it is recommended that the designer considers at least one stainless steel fixing per square metre, and fire barriers in line with compartment walls and floors as advised in BRE Report BR 135 : 2013 (see Figure 2 of this Certificate).

Figure 2 Fire barrier



9 Proximity of flues and appliances

When the system is installed in close proximity to certain flue pipes, the relevant provisions of the national Building Regulations should be met:

England and Wales – Approved Document J

Scotland – Mandatory Standard 3.19, clause 3.19.4⁽¹⁾⁽²⁾

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

Northern Ireland – Technical Booklet L.

10 Water resistance



10.1 The system will provide a degree of protection against water ingress. However, care should be taken to ensure that walls are adequately watertight prior to application of the system. The system must only be installed where there is no sign of dampness on the inner surface of the substrate other than that caused solely by condensation.

10.2 Designers and installers should take particular care in detailing around openings, penetrations and movement joints to minimise the risk of water ingress.

10.3 The guidance given in BRE Report BR 262 : 2002 should be followed in connection with the watertightness of solid wall constructions. The designer should select a construction appropriate to the local wind-driven rain index, paying due regard to the design detailing, workmanship and materials to be used.

10.4 At the top of walls, the system should be protected by a coping, adequate overhang or other detail designed for use with this type of system (see section 16).

11 Risk of condensation



11.1 Designers must ensure that an appropriate condensation risk analysis has been carried out for all parts of the construction, including openings and penetrations at junctions between the insulation system, to minimise the risk of condensation. The recommendations of BS 5250 : 2011 should be followed.

Surface condensation



11.2 Walls will adequately limit the risk of surface condensation when the thermal transmittance (U value) does not exceed $0.7 \text{ W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}$ at any point and the junctions with other elements and openings comply with section 6.3 of this Certificate.



11.3 Walls will adequately limit the risk of surface condensation when the thermal transmittance (U value) does not exceed $1.2 \text{ W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}$ at any point. Guidance may be obtained from BS 5250 : 2011, section 8 and Annex D, and BRE Report BR 262 : 2002.

Interstitial condensation



11.4 Walls incorporating the system will adequately limit the risk of interstitial condensation when they are designed and constructed in accordance with BS 5250 : 2011, Section 4 and Annexes D and G.

11.5 The water vapour resistance factors (μ) and equivalent air layer thicknesses (S_d) are shown in Table 7.

Table 7 Water vapour resistance factors and equivalent air layer thicknesses

Render system	Equivalent air layer thickness, S_d (m)	Water vapour resistance (μ)
Enhanced expanded polystyrene	–	20-40
RetroBase + Silicone Acrylate (primer and finish)	0.20	–
RetroBase + EnviroBrick (render)	0.10	–
RetroBase + EnviroDash – white	0.13	–
SpeedySlip adhesive	0.49	245
RetroBase (basecoat)	0.08	16
SpeedySlips	0.58	116

(1) Taken from BS EN ISO 10456 : 2007, Table 4.

(2) Taken from BS EN 12524 : 2000, Table 2.

12 Maintenance and repair



12.1 An initial inspection should be made within 12 months and regularly checked thereafter to include:

- visual inspection of the render for signs of damage. Cracks in the render exceeding 0.2 mm must be repaired
- examination of the sealant around openings and service entry points
- visual inspection of architectural details designed to shed water to confirm that they are performing properly
- visual inspection to ensure that water is not leaking from external downpipes or gutters; such leakage could penetrate the rendering
- necessary repairs effected immediately and the sealant joints at window and door frames replaced at regular intervals
- maintenance schedules, which should include the replacement and resealing of joints, for example between the insulation systems and window and door frame.

12.2 For a 60-year durability, a detailed maintenance plan must be prepared and provided to the building manager/owner on completion. As a minimum, this should include an inspection for evidence of defects twelve months after the application and subsequently every five years.

12.3 Damaged areas must be repaired using the appropriate components and procedures detailed in the Certificate holder's installation instructions and in accordance with BS EN 13914-1 : 2016.

13 Durability



13.1 The system will remain effective for at least 30-years, provided any damage to the surface finish is repaired immediately and regular maintenance is undertaken, as described in section 12 of this Certificate.

13.2 The system's service life can be extended to 60-years provided a planned inspection and maintenance programme is introduced in accordance with section 12 of this Certificate. An extended 60-years' service life requires the use of stainless steel base and corner profiles, stainless steel fixings or centre pin Grade 1.4301 and plastic anchor sleeve material such as polyamide (PA6 and PA6.6), polyethylene (PE) or polypropylene (PP) and the following of an appropriate repair and maintenance schedule as covered by the Certificate holder's Repair and Maintenance Manual. In order to achieve this, and depending on the building's location, degree of exposure and detailing, it may be necessary to repair or replace isolated areas. Any damage to the surface finish must be repaired within a time period agreed in the Certificate holder's maintenance manual. Additionally, for 60-year durability systems, the supplementary adhesive must be used.

13.3 The render may become discoloured with time, the rate depending on the initial colour, the degree of exposure and atmospheric pollution, as well as the design and detailing of the wall. In common with traditional renders, discoloration by algae and lichens may occur in wet areas. The appearance may be restored by a suitable power wash or, if required, by over coating.

13.4 The renders incorporate Portland cement and may be subject to lime bloom. The occurrence of this may be reduced by avoiding application in winter or in adverse weather conditions. The effect is transient and is less noticeable on lighter colours.

13.5 To maintain a high quality aesthetic appearance, it may be necessary to periodically overcoat the building using system-compatible coatings recommended by the Certificate holder and in accordance with BS EN 1062-1 : 2004. Care should be taken not to adversely affect the water vapour transmission or fire characteristics of the system. The advice of the Certificate holder should be sought as to the suitability of a particular product.

Installation

14 Site survey and preliminary work

14.1 A pre-installation survey of the property must be carried out to determine suitability for installation and the need for any necessary repairs to the building structure before application of the system. A specification must be prepared for each elevation of the building indicating:

- the position of beads
- detailing around windows, doors and at eaves
- damp-proof course (dpc) level
- exact position of expansion joints, if required
- where required, additional corner mesh and reinforcement
- areas where flexible sealants must be used
- any alterations to external plumbing
- the position of fire barriers.

14.2 The survey should include tests conducted on the walls of the building by the Certificate holder or their approved installers to determine the pull-out resistance of the proposed mechanical fixings. An assessment and recommendation is made on the type and number of fixings required to withstand the building's expected wind loading based on calculations using the test data and pull-out resistance (see section 7). The advice of the Certificate holder should be sought to ensure the proposed bonding pattern (supplementary adhesive) is sufficient.

14.3 All modifications, such as provision for fire barriers (see section 8) and necessary repairs to the building structure, must be completed before installation of the system commences.

14.4 Surfaces should be sound, clean and free from loose material. The flatness of surfaces must be checked; this may be achieved using a straight-edge tool spanning the storey height. Any excessive irregularities, ie greater than 10 mm in one metre, must be made good prior to installation, to ensure that the insulation boards are installed with a smooth, in-plane finished surface.

14.5 Where surfaces are covered with an existing rendering, it is essential that the bond between the background and the render is adequate. All loose areas should be hacked off and reinstated.

14.6 On existing buildings, purpose-made window sills must be fitted to extend beyond the finished face of the system. New buildings should incorporate suitably deep sills.

14.7 In new buildings, internal wet work (eg screed or plastering) should be completed and allowed to dry prior to the application of the system.

15 Approved Installers

Application of the system, within the context of this Certificate, must be carried out by approved installers recommended or recognised by the Certificate holder. Such an installer is a company:

- employing operatives who have been trained and approved by the Certificate holder to install the system
- which has undertaken to comply with the Certificate holder's application procedure, containing the requirement for each application team to include at least one member operative trained by the Certificate holder
- subject to at least one inspection per annum by the Certificate holder to ensure suitable site practices are being employed. This may include unannounced site inspections.

16 Procedure

General

16.1 Installation of the system must be carried out in accordance with the Certificate holder's installation instructions.

16.2 Weather conditions should be monitored to ensure correct application and curing conditions. Application of coating materials must not be carried out at temperatures below 5°C or above 30°C, nor if exposure to frost is likely, and the coating must be protected from rapid drying. Installation should not take place during rainfall or if rain is anticipated. In addition, cementitious-based renders must not be applied if the temperature will fall below 0°C within 72 hours of completion.

16.3 The planarity of the substrate must be checked, and any protrusions exceeding 10 mm removed.

16.4 The primer should be used (see section 1.4).

16.5 All rendering should be in accordance with the relevant recommendations of BS EN 13914-1 : 2016.

16.6 At the tops of walls, the system must be protected by an adequate overhang or by an adequately sealed, purpose-made flashing.

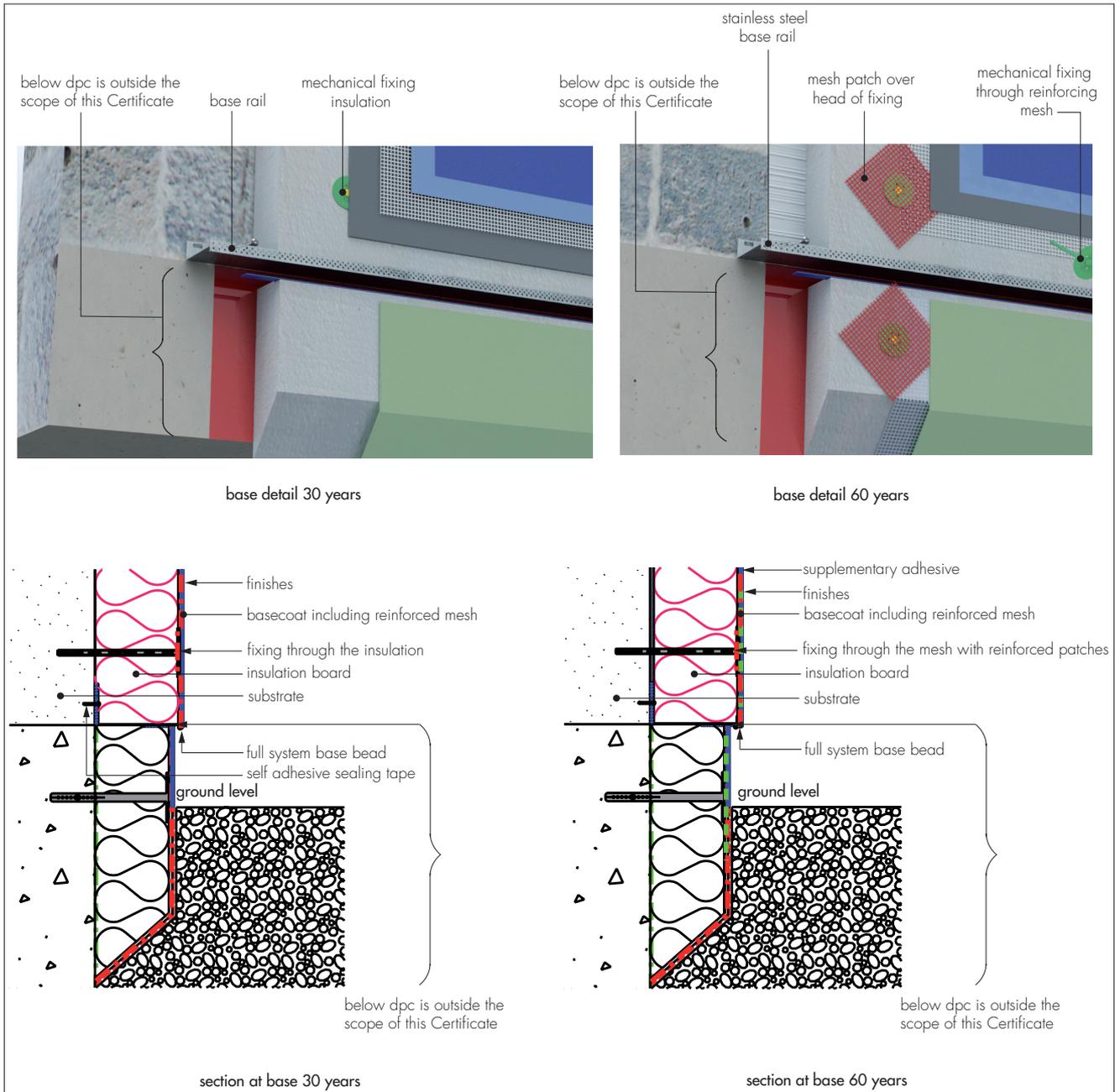
16.7 Care must be taken in the detailing of the system around openings and projections (see Figures 9, 10 and 11). To achieve a 60-year service life, the system is finished against a stainless steel stop bead at reveals, to allow for replacement of windows.

16.8 The difference between 30- and 60-year durability systems is described in section 1 of this Certificate. The initial installation procedure is common to both systems and is described in sections 16.9 to 16.17 of this Certificate.

Positioning and securing insulation boards

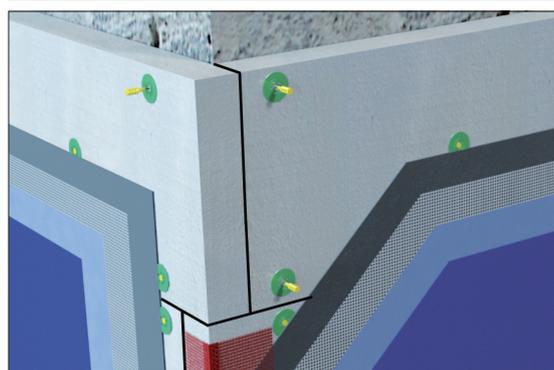
16.9 The base profile is secured to the external wall above the dpc using the approved profile fixings at approximately 300 mm centres. Base profile connectors are inserted at all rail joints. Extension profiles are fixed to the front lip of the base profile or stop end channel where appropriate. Beads and expansion joints are incorporated as specified. For a 60-year durability application, the base profile must be made of stainless steel.

Figure 3 Typical section of base profile



16.10 The first run of insulation boards is positioned on the base profile, pressed firmly against the wall and butted tightly together with the vertical joints staggered by at least 200 mm. Subsequent rows of boards are positioned so that the vertical joints are staggered and overlapped at the building corners (see Figure 4), and so that board joints do not occur within 200 mm of the corners of openings. Joints between boards greater than 2 mm should be filled with slivers of insulation or PU foam. Gaps greater than 10 mm should be closed by repositioning or, where appropriate, by cutting boards to fit. Alignment should be checked as work proceeds.

Figure 4 Typical arrangement of insulation boards at external corners



16.11 One mechanical fixing is applied through each insulation board to secure boards initially.

16.12 Periodic checks should be carried out during the installation. Where existing render is on the wall or dubbing out render has been used, care should be taken when aligning the boards as the effective embedment will be reduced.

16.13 To fit around details such as doors and windows, the boards may be cut with a sharp knife or a fine-tooth saw. Purpose-made powder-coated aluminium window sills (complete with sill end caps) are installed in accordance with the Certificate holder's instructions. They are designed to prevent water ingress and incorporate drips to shed water clear of the system, but their performance is outside the scope of this Certificate.

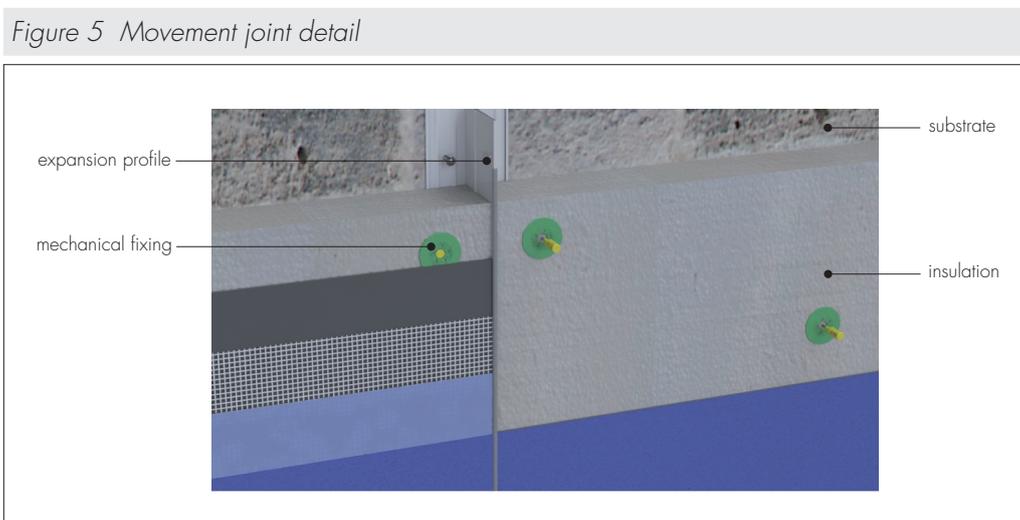
16.14 Any high spots should be removed by lightly planing with a rasp. The surface of the boards should be smooth. At all locations where there is a risk of insulant exposure (eg window reveals or eaves), the system must be protected (eg by an adequate overhang or by purpose made sub-sills, seals or flashing).

16.15 Building corners, door and window heads and jambs are formed using corner mesh profiles in accordance with the Certificate holder's instructions. Corner profiles are fixed to all building corners. For a 60-year durability system, any portion of the corner profile that remains exposed after the application of the finish coat must be constructed from stainless steel material in order to protect the profile from atmospheric exposure.

16.16 Installation continues until the whole wall is completely covered including, where appropriate, the building soffits.

Movement joints

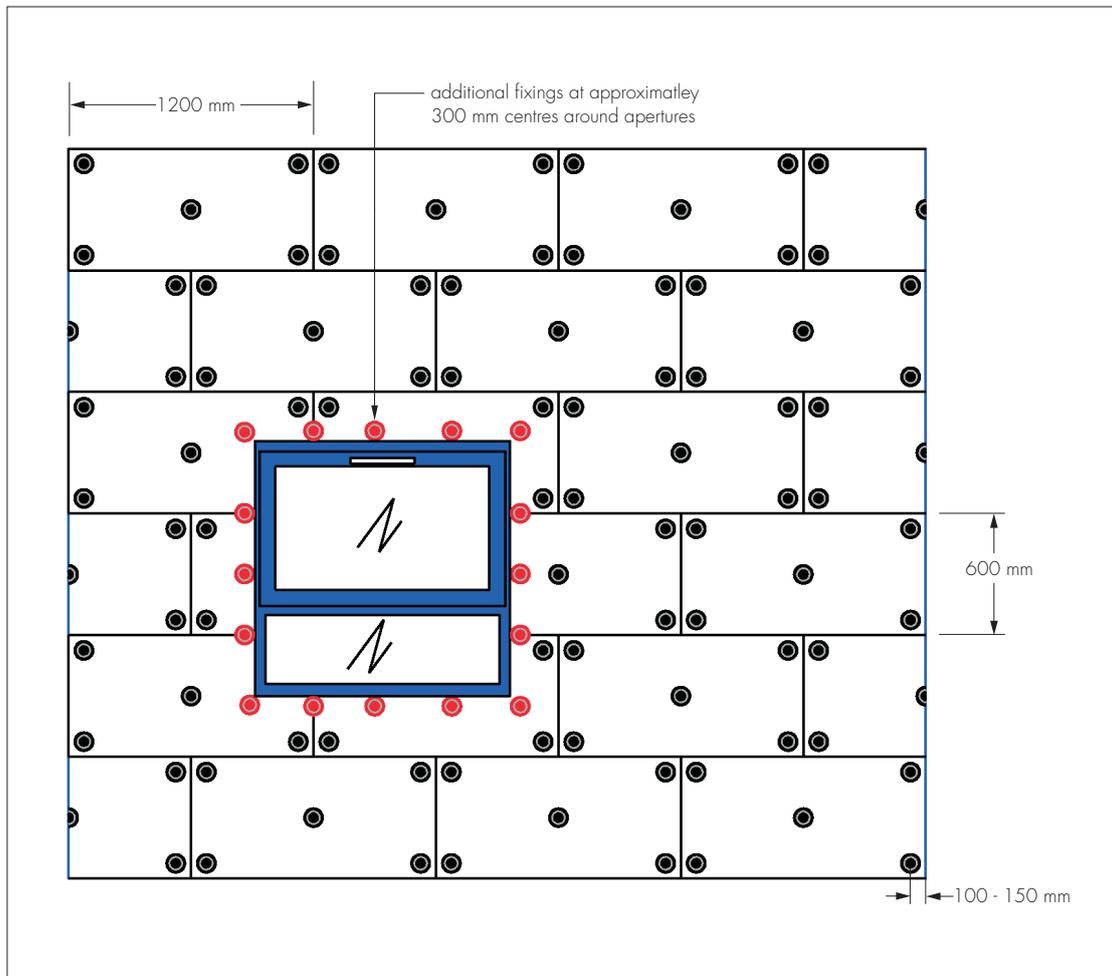
16.17 Generally, movement joints are not required in the system but, if an expansion joint is already incorporated in the substrate, a movement joint must be included with the system (see Figure 5).



Application of 30-year durability systems — mechanical fixings through the insulation boards

16.18 Holes are drilled through the insulation boards into the substrate wall to the required depth, at the specified frequency and pattern but not less than seven fixings per square metre (see Figure 6). Around openings, additional fixings should be used at 300 mm centres. Mechanical fixings are inserted and tapped or screwed firmly into place, securing the insulation boards to the substrate.

Figure 6 Insulation board fixing pattern — 30-year durability



16.19 The basecoat is prepared by mixing each bag with the required amount of clean water in a suitable container using a paddle drill mixer to create a paste-like mortar in accordance with Certificate holder instructions.

16.20 The basecoat is applied progressively over the insulation boards, using a notched trowel and floated with a Darby float to an approximate minimum thickness of 4 mm.

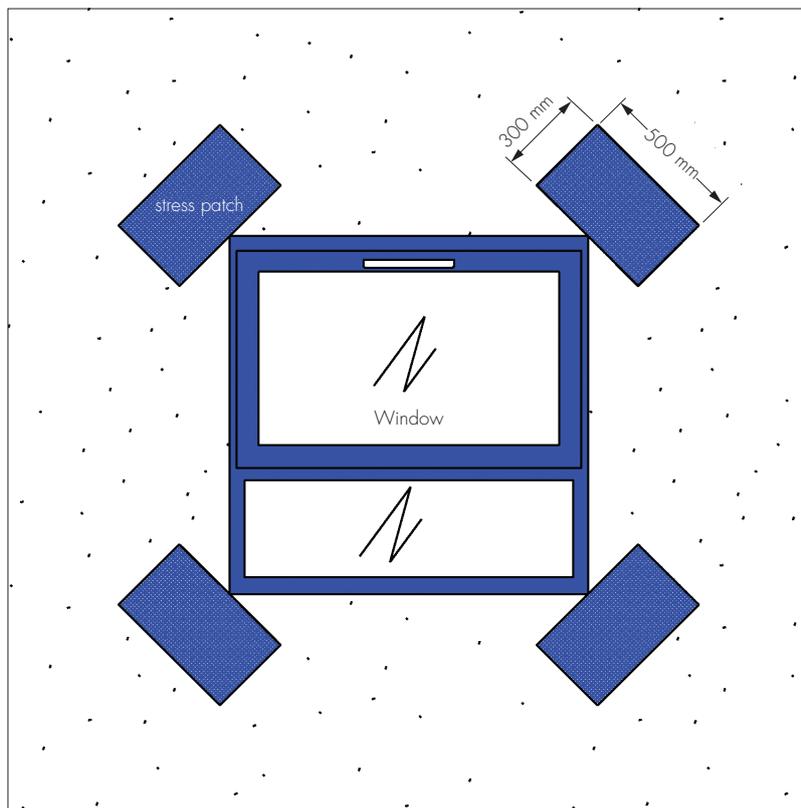
16.21 Reinforcement mesh is immediately applied and embedded into the basecoat using the trowel, and overlapped at all mesh joints by not less than 100 mm; a further layer of basecoat is applied and smoothed-off to remove trowel lines. The overall thickness should be a minimum of 5 mm.

16.22 It is important to ensure that the mesh is free of wrinkles, completely covered and the required minimum thickness of basecoat is achieved.

16.23 Additional pieces of reinforcing mesh, 300 mm by 500 mm, are used diagonally at the corners of openings, as shown in Figure 7.

16.24 Building corners, door and window heads and jambs are formed using mesh corner profiles, bonded to the insulation in accordance with the Certificate holder's instructions.

Figure 7 Additional reinforcement at openings



16.25 The system is then ready for the application of a decorative coat.

Application of 60-year durability system — mechanical fixings through the reinforcement mesh

16.26 The adhesive is prepared by mixing each bag with the required amount of clean water in accordance with the packaging, and applied in a continuous line around the perimeter of the board, with six additional dabs of adhesive distributed uniformly over the remaining surface. At least 40% of the board should be covered. Alternatively, the adhesive can be applied over the entire face of the insulation board using a notched trowel.

16.27 After the insulation adhesive has set, the system is ready for the application of basecoat (mixed as described in section 16.19).

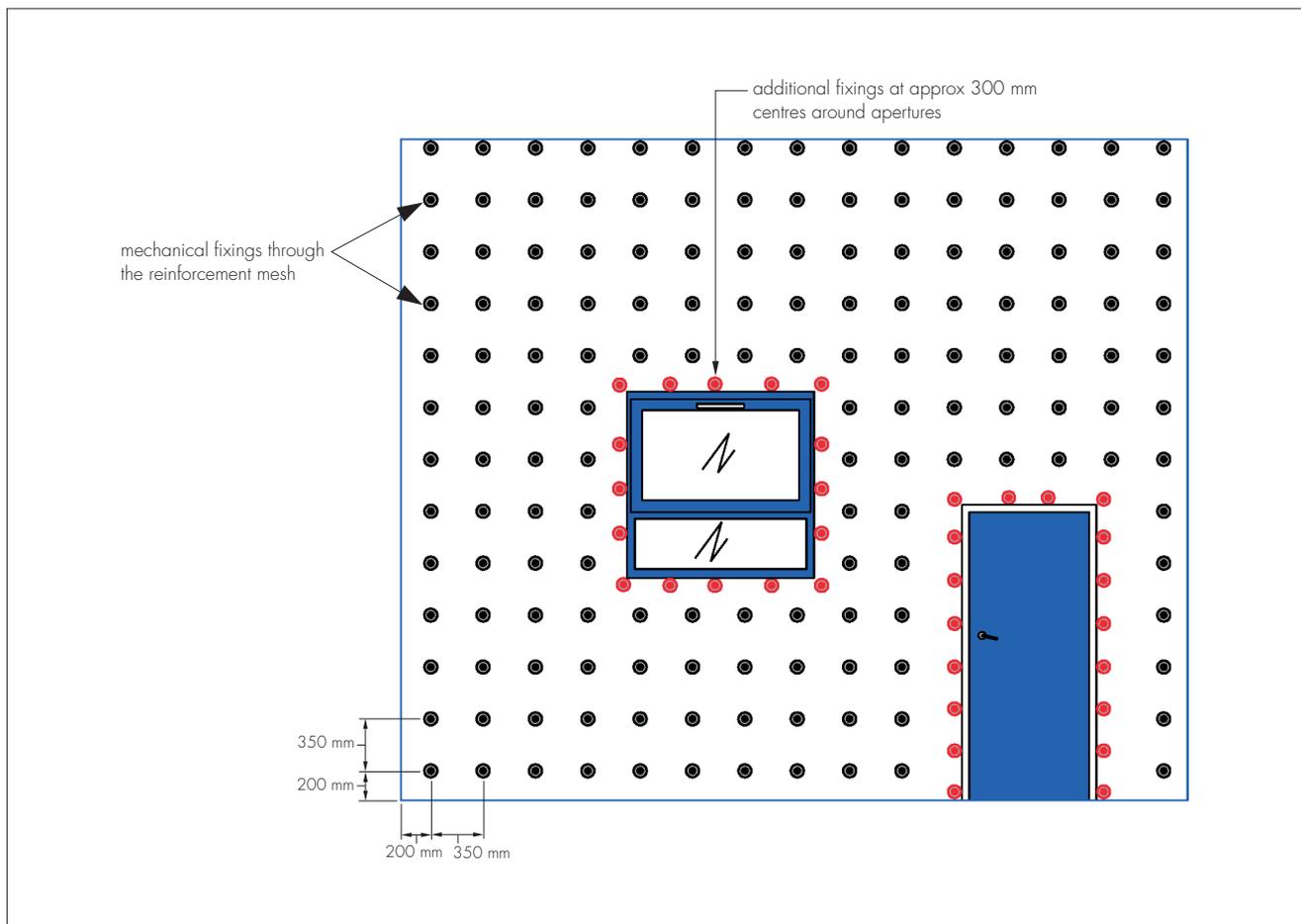
16.28 The basecoat is applied progressively to an approximate thickness of 5 mm over the insulation boards, working in 1 m sections in vertical and horizontal directions, using a stainless steel trowel.

16.29 The reinforcement mesh (with its concave surface to the wall) is applied and immediately embedded into the basecoat by trowelling from the centre to the edge; an additional light coat of basecoat is applied (whilst the first coat is still wet) to ensure the mesh is free of wrinkles. Corner details are reinforced using mesh angle profiles.

16.30 The reinforcement mesh should be overlapped at joints by at least 100 mm. Further basecoat is then applied as required, to ensure the mesh is completely covered and the required minimum thickness of basecoat is achieved (6 mm in total).

16.31 Mechanical fixings (7 per m²) are applied through the mesh and the insulation boards while the basecoat is still wet using the fixing pattern provided by the Certificate holder (see Figure 8). Holes are drilled through (into the substrate wall) and mechanical fixings are inserted and tapped or screwed firmly into place. The fixing head is deliberately over-driven into the insulation to reduce the protrusion of the fixing head on the surface of insulation board.

Figure 8 Insulation board fixing pattern — 60-year durability



16.32 While the basecoat is still wet, 300 mm by 300 mm stress patches of reinforcing mesh are applied over the mechanical fixing heads and fully embedded within the basecoat. Further basecoat is used (if required), in order to achieve a 4 mm thickness (approximately), when measured from the top of the fixings.

Decorative finishes (30- and 60-year systems)

16.33 The appropriate primer for the basecoat and finish used (and of an appropriate colour to match the finish coat) should be thoroughly mixed and applied by roller to the entire area.

Dash finish

16.34 The dash receiver is prepared and trowel-applied to a thickness of approximately 6 mm to 8 mm. While the render is still soft, 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.

16.35 Continuous surfaces must be completed without a break.

SpeedySlips

16.36 SpeedySlip adhesive mortar is trowelled onto the surface of the base coat and the surface is roughened with a notched trowel or comb. The direction of the notched lines of the adhesive mortar must be perpendicular to the brick-slip length.

16.37 The Speedy Slips are laid by pressing onto the surface of the adhesive, ensuring a firm bond is achieved. Pointing between the brick-slip is carried out using a wet soft brush.

Render finish

16.38 The Silicone Acrylate render finish coat is applied over the primer and dried basecoat to a thickness dictated by the grain size. A straight-edge can be used to help ensure a flat surface, and specialised tools, supplied by the Certificate holder can be used to create the desired finish.

16.39 The finish coats are applied using a stainless steel trowel and float and finished with a plastic float to create the required finish texture.

16.40 Render applications must have a continuous surfaces completed without a break.

Brick render finish

16.41 For EnviroBrick render applications, the first layer of EnviroBrick is applied over the completed basecoat to a uniform thickness using a stainless steel trowel, and floated off. At the precise level of cure, the second layer is applied to the whole surface and a selected brickwork bonding pattern is formed by careful cutting out of the surface layer to expose the visual 'mortar' layer beneath. The total applied thickness is 11 mm.

16.42 EnviroBrick render applications must have continuous surfaces completed without a break.

Figure 9 Roof eaves detail

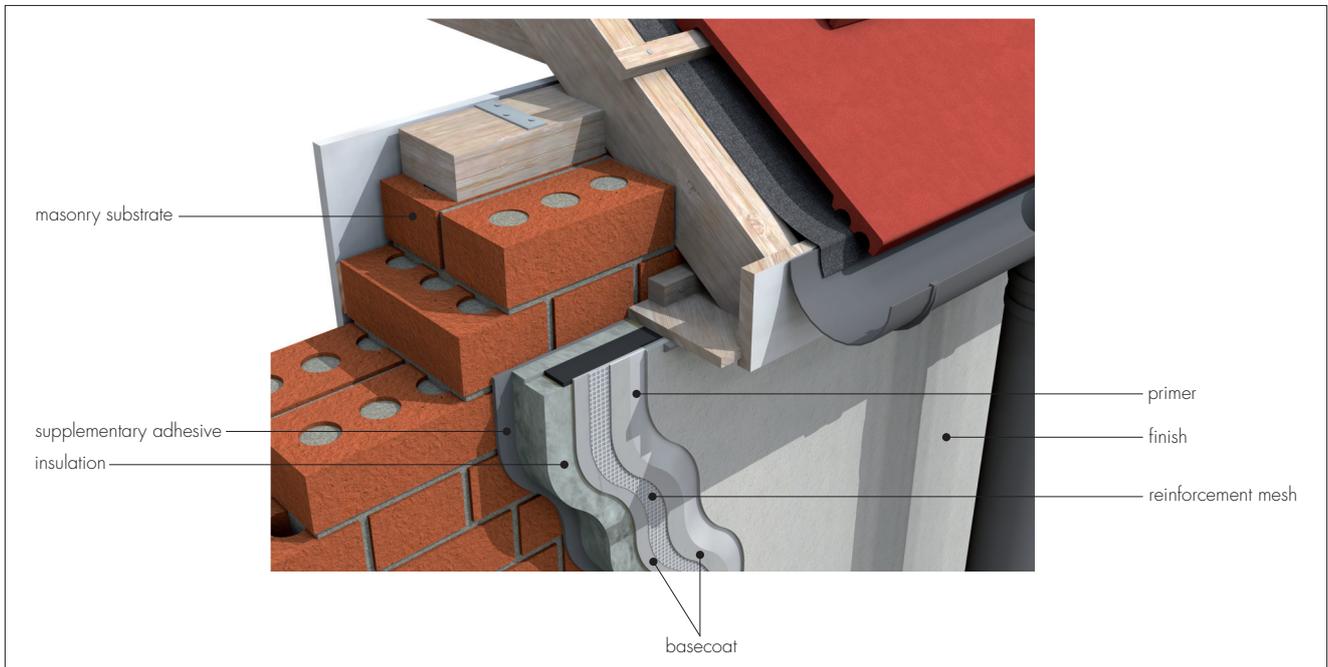


Figure 10 Typical window reveal detail

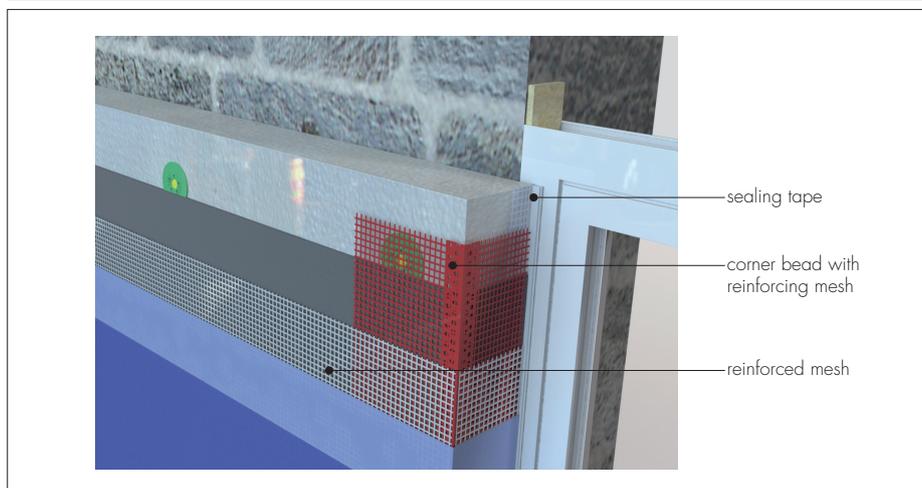
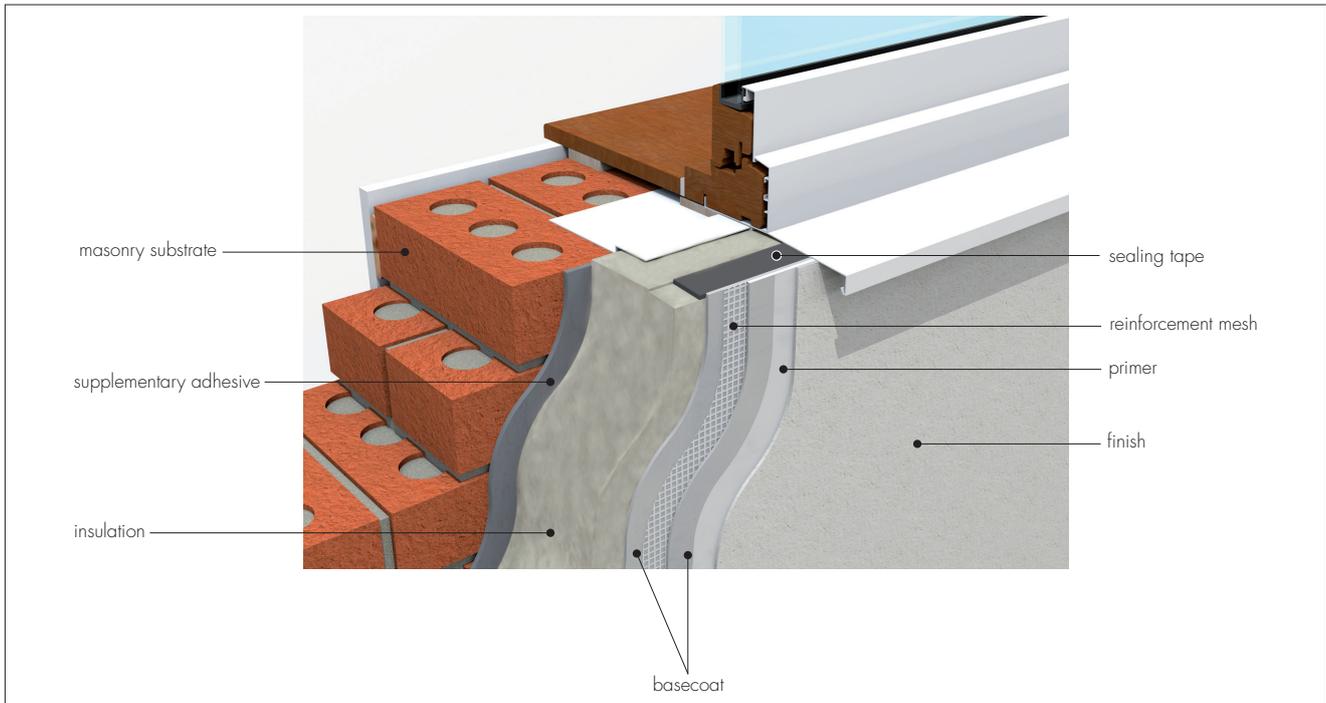


Figure 11 Typical window reveal detail



16.43 On completion of the installation, external fittings, eg rainwater goods, are re-fixed through the system into the substrate in accordance with the Certificate holder's instructions.

Technical Investigations

17 Investigations

17.1 The system was examined and assessed to determine:

- fire performance
- bond strength
- hygrothermal performance
- resistance to frost
- resistance to hard body impact
- water absorption of render
- water vapour permeability
- durability.

17.2 An examination was made of data relating to:

- reaction to fire
- thermal conductivity
- the risk of interstitial condensation.

17.3 The practicability of installation and the effectiveness of detailing techniques were examined.

17.4 The manufacturing process was evaluated, including the methods adopted for quality control, and details were obtained of the quality and composition of materials used.

Bibliography

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- BS 8000-3 : 2001 *Workmanship on building sites — Code of practice for masonry*
- BS EN 1062-1 : 2004 *Paints and varnishes — Coating materials and coating systems for exterior masonry and concrete — Classification*
- BS EN 1990 : 2002 *Eurocode — Basis of structural design*
- BS EN 1991-1-4 : 2005 *Eurocode 1 — Actions on structures — General actions — Wind actions*
- NA to BS EN 1991-1-4 : 2005 *UK National Annex to Eurocode 1 — Actions on structures — General actions — Wind actions*
- BS EN 1996-2 : 2006 *Eurocode 6 — Design of masonry structures — Design considerations, selection of materials and execution of masonry*
- BS EN 10088-2 : 2005 *Stainless steels — Technical delivery conditions for sheet/plate and strip of corrosion resisting steels for general purposes*
- BS EN 12524 : 2000 *Building materials and products — Hygrothermal properties — Tabulated design values*
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- BS EN 13914-1 : 2016 *Design, preparation and application of external rendering and internal plastering — External rendering*
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- BRE Report (BR 262 : 2002) *Thermal insulation: avoiding risks*
- BRE Report (BR 443 : 2006) *Conventions for U-value calculations*
- ETAG 004 : 2013 *Guideline for European Technical Approval of External Thermal Insulation Composite Systems (ETICS) with Rendering*
- ETAG 014 : 2011 *Guideline for European Technical Approval of Plastic Anchors for fixing of External Thermal Insulation Composite Systems with Rendering*

18 Conditions

18.1 This Certificate:

- relates only to the product/system that is named and described on the front page
- is issued only to the company, firm, organisation or person named on the front page — no other company, firm, organisation or person may hold or claim that this Certificate has been issued to them
- is valid only within the UK
- has to be read, considered and used as a whole document — it may be misleading and will be incomplete to be selective
- is copyright of the BBA
- is subject to English Law.

18.2 Publications, documents, specifications, legislation, regulations, standards and the like referenced in this Certificate are those that were current and/or deemed relevant by the BBA at the date of issue or reissue of this Certificate.

18.3 This Certificate will remain valid for an unlimited period provided that the product/system and its manufacture and/or fabrication, including all related and relevant parts and processes thereof:

- are maintained at or above the levels which have been assessed and found to be satisfactory by the BBA
- continue to be checked as and when deemed appropriate by the BBA under arrangements that it will determine
- are reviewed by the BBA as and when it considers appropriate.

18.4 The BBA has used due skill, care and diligence in preparing this Certificate, but no warranty is provided.

18.5 In issuing this Certificate, the BBA is not responsible and is excluded from any liability to any company, firm, organisation or person, for any matters arising directly or indirectly from:

- the presence or absence of any patent, intellectual property or similar rights subsisting in the product/system or any other product/system
- the right of the Certificate holder to manufacture, supply, install, maintain or market the product/system
- actual installations of the product/system, including their nature, design, methods, performance, workmanship and maintenance
- any works and constructions in which the product/system is installed, including their nature, design, methods, performance, workmanship and maintenance
- any loss or damage, including personal injury, howsoever caused by the product/system, including its manufacture, supply, installation, use, maintenance and removal
- any claims by the manufacturer relating to CE marking.

18.6 Any information relating to the manufacture, supply, installation, use, maintenance and removal of this product/system which is contained or referred to in this Certificate is the minimum required to be met when the product/system is manufactured, supplied, installed, used, maintained and removed. It does not purport in any way to restate the requirements of the Health and Safety at Work etc. Act 1974, or of any other statutory, common law or other duty which may exist at the date of issue or reissue of this Certificate; nor is conformity with such information to be taken as satisfying the requirements of the 1974 Act or of any statutory, common law or other duty of care.