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BBA APPROVAL INSPECTION TESTING CERTIFICATION
TECHNICAL APPROVALS FOR CONSTRUCTION

Agrément Certificate
05/4206
Product Sheet 1

SPS ENVIROWALL EXTERNAL WALL INSULATION SYSTEM

SPS ENVIROWALL MINERAL WOOL EXTERNAL WALL INSULATION SYSTEM

This Agrément Certificate Product Sheet(1) relates to the SPS Envirowall Mineral Wool External Wall Insulation System, comprising mechanically-fixed mineral wool insulation slabs, with or without supplementary adhesive, with a reinforced basecoat and render finishes. It is suitable for use on the outside of external walls in new and 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 satisfying the requirements of the national Building Regulations (see section 6).

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

Behaviour in relation to fire — the system has an A2-s1, d0 reaction to fire classification in accordance with BS 476-6 : 1989 and BS 476-7 : 1997 (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 of this Certificate.

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

Date of First issue: 14 October 2016

Originally certificated on 10 May 2005

John Albon — Head of Approvals
Construction Products

Claire Curtis-Thomas
Chief Executive

The BBA is a UKAS accredited certification body — Number 113. 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.

Regulations

In the opinion of the BBA, the SPS Envirowall Mineral Wool 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 8.4 of this Certificate.
Requirement:	C2(b)	Resistance to moisture
Comment:		The system provides 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 *Installation* part of this Certificate.
Regulation:	26	CO_2 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; however, appropriate compensatory fabric/services measures may need to be taken. 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 *Installation* 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 has a 'low risk' surface spread of flame classification, with reference to clauses 2.6.1[(1)(2)], 2.6.2[(1)(2)], 2.6.4[(1)(2)], 2.6.5[(1)] and 2.6.6[(2)]. See sections 8.1 to 8.4 of this Certificate.
Standard:	2.7	Spread on external walls
Comment:		The external face of the system is classified as 'low risk' with reference to clauses 2.7.1[(1)(2)], 2.7.2[(1)(2)] and 2.6.4[(1)(2)], and Annex 2A[(1)]. See sections 8.1 to 8.4 of this Certificate.
Standard:	3.10	Precipitation
Comment:		The system can 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 section 6.2 of this Certificate.
Regulation:	12	Building standards applicable to conversions
Comment:		All comments given for this 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(a)(b)	Fitness of materials and workmanship
Comment:		The system is acceptable. See sections 13.1 and 13.2 and the *Installation* 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 can satisfy this Regulation. See sections 8.1 to 8.4 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* (3.2) of this Certificate.

Additional Information

NHBC Standards 2016

NHBC accepts the use of SPS Envirowall Mineral Wool 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 roofs)*, Chapter 6.9 *Curtain walling and cladding*.

Technical Specification

1 Description

1.1 The SPS Envirowall Mineral Wool External Wall Insulation System consists of mechanically-fixed mineral wool insulation slabs, with supplementary adhesive if necessary, and a reinforcing glassfibre mesh embedded in basecoat and various render finishes. The system can be designed to achieve either a 30- or 60-year service life (see Figure 1).

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 durability application, mechanical fixings are applied through the mesh while the basecoat is wet, before mesh patches are applied over the fixing heads and fully embedded. Further basecoat is applied, if required, in order to achieve the same thickness as that applied over the insulation slabs for the 30-year durability, when measured from the top of the fixing plate. For both applications, when the basecoat has dried, primer is applied 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 and maintenance must be followed.

1.4 The system comprises the following:

Supplementary adhesive

EnviroBed Polymer Adhesive Mortar — cement-based polymer-modified adhesive, supplied in powder form.

Insulation

- MW High Density 039 — high density mineral wool slabs in sizes up to 1200 mm by 600 mm and 50 mm to 200 mm thicknesses, with a nominal density of 140 kg·m^{-3}, a minimum compressive strength of 10 kPa and a tensile resistance perpendicular to the faces of 15 kPa. Slabs are manufactured to comply with BS EN 13162 : 2012
- MW Dual Density 036 — dual density mineral wool slabs in sizes up to 1200 mm by 600 mm and 50 mm to 200 mm thicknesses, with nominal densities of 160/100 kg·m^{-3} (outer/inner layer), a minimum compressive strength of 10 kPa and a tensile resistance perpendicular to the faces of 10 kPa. Slabs are manufactured to comply with BS EN 13162 : 2012
- MW Slab 036 — high strength, rock mineral wool slabs with a water-repellent additive, in sizes up to 1200 mm by 600 mm and 60 mm to 200 mm thicknesses, with a nominal density of 105 kg·m^{-3}, a minimum compressive strength of 30 kPa and a tensile resistance perpendicular to the faces of 10 kPa. Slabs are manufactured to comply with BS EN 13162 : 2012

- MW Slab Plus 038 — high strength, rock mineral wool slabs with a water-repellent additive, in sizes up to 1200 mm by 600 mm and 60 mm to 200 mm thicknesses, with a nominal density of 140 kg·m^{-3}, a minimum compressive strength of 40 kPa and a tensile resistance perpendicular to the faces of 15 kPa. Slabs are manufactured to comply with BS EN 13162 : 2012.

Mechanical fixings

- mechanical fixings[1][2] — anchors with adequate length to suit the substrate and insulation thickness, approved and supplied by the Certificate holder, and selected from:
  - Koelner Kl-10[3] — polypropylene anchor sleeve with a carbon steel pin, galvanized steel pin or glassfibre-reinforced polypropylene (PA6 GF30) pin
  - Koelner TFix-8M[3] — polypropylene anchor sleeve with a carbon steel pin, galvanized steel pin or glassfibre-reinforced, polyamide pin
  - Ejotherm NT U[4] — polyethylene, PE-HD anchor sleeve with a stainless steel or electro-galvanized steel pin
  - Ejotherm STR U[4] — polyethylene, PE-HD anchor sleeve with stainless steel or electro-galvanized screw with polystyrene insulation cover or anchor cup.

(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.

Basecoat

- EnviroRend Basecoat Render— a factory-batched, polymer-modified, basecoat mortar, supplied as a powder to which clean water is added. Applied to a thickness from 3 mm to 5 mm.

Reinforcement

- EnviroMesh — multi-stranded, alkali-resistant glassfibre with a polymer coating, 4 mm by 4 mm grid size and a nominal weight of 165 g·m^{-2}.

Primers

- EnviroSil Primer — a silicone resin-based emulsion primer.

Finishing coats

- 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
- 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
- Granol Silicone Render KR — silicone resin-based, textured coating with particle size up to 3 mm, applied to a thickness of 1.5 mm to 3 mm. Available in a range of colours.

1.5 Ancillary materials used with the system:

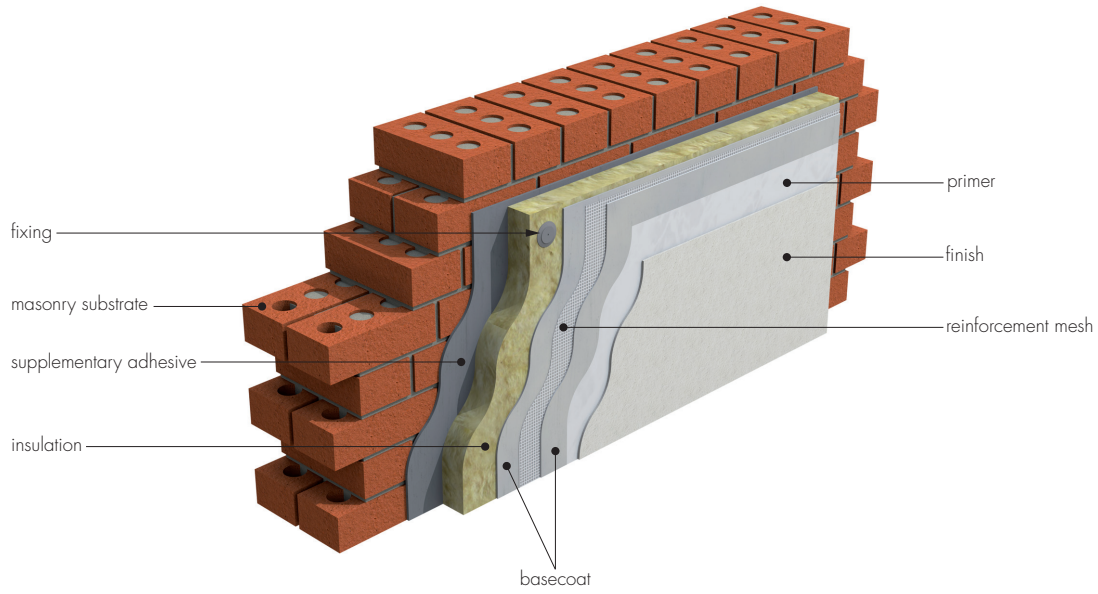
- range of aluminium, PVC-U or stainless steel profiles[1], comprising:
  - base profile
  - edge profile
  - corner profile with optional PVC-U nosing
  - render stop profile.

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

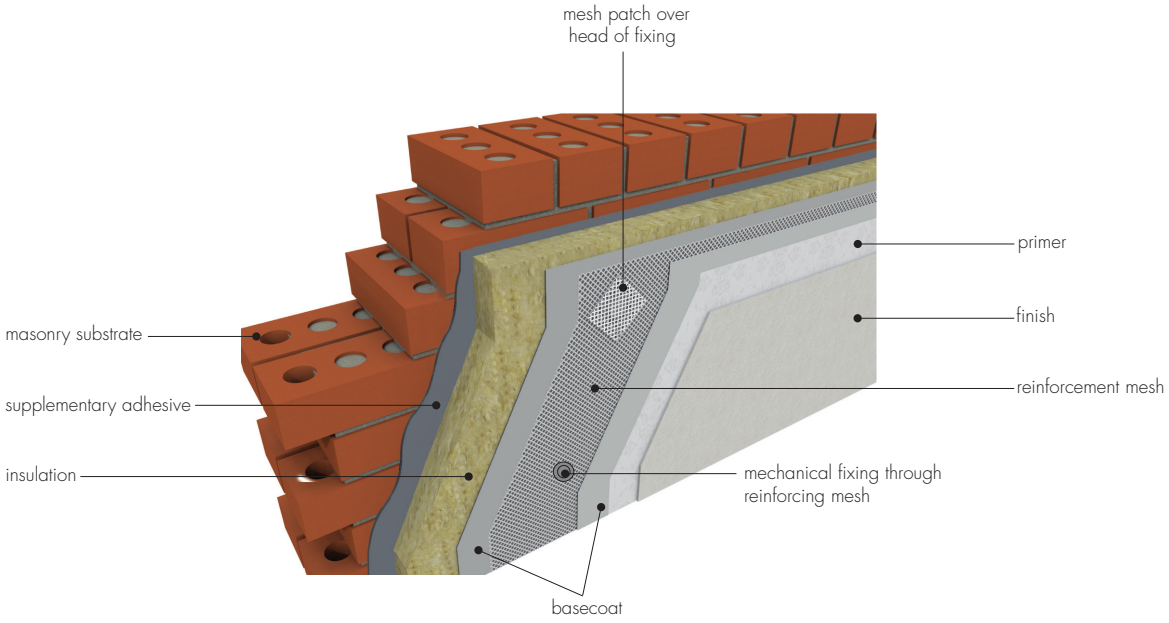
1.6 Ancillary materials also used with the system but outside the scope of the Certificate:

- range of aluminium, PVC-U or stainless steel profiles[1], 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 slabs.

Figure 1 Envirowall 30- and 60-years durability



30-year durability — mechanically fixed through insulation



60-year durability — mechanically fixed through mesh

2 Manufacture

2.1 Components are 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 being 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 The insulation slabs are delivered to site wrapped in plastic film, with the product identification and manufacturer's batch numbers.

3.2 The other components are delivered in the quantities and packaging listed in Table 1. Each package carries the product identification and manufacturer's batch number.

Table 1 Component supply details

Component	Packaging/quantity/size
Insulation	sealed packs
EnviroMesh	1 m wide roll
EnviroSil Primer	25 kg bucket
EnviroRend Basecoat/EnviroDash/EnviroBrick/EnviroBed adhesive	25 kg bag
Granol Silicone Render KR	25 kg bucket
Mechanical fixings	boxed by manufacturer

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

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 primer and synthetic textured finishes should be stored in a safe area, under cover, and protected from excessive heat and frost at all times.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on the SPS Envirowall Mineral Wool External Insulation System.

Design Considerations

4 General

4.1 The SPS Envirowall Mineral Wool External Wall Insulation System, when installed in accordance with this Certificate, is effective in reducing the thermal transmittance (U value) of external walls in new and existing buildings (see section 4.3). It is essential that 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. Only details specified by the Certificate holder should be used.

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). Prior to the installation of the system, wall surfaces should comply with section 14 of this Certificate.

4.4 New walls subject to the 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 any of the previous requirements should also be built in accordance with section 4.4 of this Certificate.

4.6 The system will provide a degree of protection against rain ingress and give a decorative finish. However, care should be taken to ensure that walls are adequately weathertight prior to its application. It may only be installed where there are no signs of dampness on the inner surface of the wall other than those 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, cloths 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 a 60-year durability, the following components must be constructed from stainless steel grade 1.4301 to BS EN 10088-2 : 2005:

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

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

5 Practicability of installation

The system should be installed only by specialised contractors who have successfully undergone training and registrations by the Certificate holder (see section 15).

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 thermal conductivity values (λ_D) of the insulations given in Table 2.

Table 2 Declared thermal conductivity values (λ_D) and available thicknesses

Insulation types	Thickness (mm)	Thermal conductivity ($W \cdot m^{-1} \cdot K^{-1}$)(1)
MW High Density Slab (039)	50–200	0.039
MW Dual Density Slab (036)	50–200	0.036
MW Slab (036)	60–200	0.036
MW Slab Plus (038)	60–200	0.038

(1) U value calculations (in Tables 3 and 4 of this Certificate) have been determined for these thermal conductivities as the corresponding insulation thicknesses fall within the typical thicknesses that would be applied to the external wall.

6.2 The U value of a completed wall will depend on the selected insulation type and thickness, the type and number of fixings, and the insulating value of the substrate masonry and its internal finish. Calculated U values for sample construction in accordance with the national Building Regulations are given in Tables 3 and 4, and are based on the thermal conductivities given in Table 2.

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

U value ($W \cdot m^{-2} \cdot K^{-1}$)	Thickness of insulation(3) (mm)					
	215 mm brickwork λ = 0.56 $W \cdot m^{-1} \cdot K^{-1}$			215 mm blockwork λ = 1.75 $W \cdot m^{-1} \cdot K^{-1}$		
	MW 036	MW 038	MW 039	MW 036	MW 038	MW 039
0.18	—(4)	—(4)	—(4)	—(4)	—(4)	—(4)
0.19	200	—(4)	—(4)	—(4)	—(4)	—(4)
0.25	140	150	160	150	160	160
0.26	140	140	150	150	150	160
0.28	130	130	140	130	140	140
0.30	120	120	120	120	130	130
0.35	100	100	100	100	110	110

(1) Wall construction inclusive of 13 mm plaster (λ = 0.57 $W \cdot m^{-1} \cdot K^{-1}$), brickwork (protected) with 17.1% mortar or dense blockwork with 6.7% mortar (λ = 0.88 $W \cdot m^{-1} \cdot K^{-1}$) and an external render thickness of 5 mm with λ = 1 $W \cdot m^{-1} \cdot K^{-1}$. Declared thermal conductivity of insulation values (λ_D) is as shown in Table 2.

(2) Calculations based on a system that included 7 galvanized steel fixings per square metre with a point thermal transmittance (χ_p) of 0.004 $W \cdot K^{-1}$ per pin. 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.

(4) See section 4.2 of this Certificate.

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

U value ($W \cdot m^{-2} \cdot K^{-1}$)[4]	Thickness of insulation[3] (mm)					
	215 mm brickwork λ = 0.56 $W \cdot m^{-1} \cdot K^{-1}$			215 mm blockwork λ = 1.75$W \cdot m^{-1} \cdot K^{-1}$		
	MW 036	MW 038	MW 039	MW 036	MW 038	MW 039
0.18	200	—[5]	—[5]	200	—[5]	—[5]
0.19	180	190	200	190	200	210
0.25	130	140	150	140	150	150
0.26	130	140	140	140	140	150
0.28	120	120	130	130	130	140
0.30	110	110	120	120	120	130
0.35	90	100	100	100	100	110

(1) Wall construction inclusive of 13 mm plaster (λ = 0.57 $W \cdot m^{-1} \cdot K^{-1}$), brickwork (protected) with 17.1% mortar or dense blockwork with 6.7% mortar (λ = 0.88 $W \cdot m^{-1} \cdot K^{-1}$. and an external render thickness of 5 mm with λ = 1 $W \cdot m^{-1} \cdot K^{-1}$. Declared thermal conductivity of insulation values (λ_D) is as shown in Table 2. An adhesive layer of 5 mm thick with λ = 1 $W \cdot m^{-1} \cdot K^{-1}$ covering 100% of the area is also included.

(2) Calculations based on a system that included 7 stainless steel fixings per square metre with a point thermal transmittance (χ_p) of 0.002 $W \cdot K^{-1}$ per pin. 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.

(4) When applying the maximum available insulation thickness, these walls can achieve U values from 0.15 to 0.16 $W \cdot m^{-2} \cdot K^{-1}$.

(5) See section 4.2 of this Certificate.

6.3 The system can maintain, or contribute to maintaining, continuity of thermal insulation at junctions between external walls and other elements. Details shown in section 16 will allow use of the default ψ-values (Psi) for Accredited Construction Details in Emission Rate calculations to SAP 2009 or the Simplified Building Energy Model (SBEM). Detailed guidance can be found in the documents supporting the national Building Regulations.

7 Strength and stability

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

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

7.3 Negative wind load pressure is resisted by the bond between each component. The insulation slabs are retained by the external wall insulation system anchors. For 60-year durability applications, the mechanical fixings must always be fixed through the reinforcement mesh.

7.4 The wind loads on the walls should be calculated in accordance with BS EN 1991-1-4 : 2005. 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 person to confirm that:

- the substrate wall has adequate strength to resist additional loads that may be applied as a result of installing the system, ignoring any positive contribution from the insulation system
- the proposed system and associated fixing layout provides adequate resistance to negative wind loads, based on the results of site investigation and test results (given in 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. The characteristic pull-out resistance should be determined in accordance with the guidance given in ETAG 014 : 2011, Annex D.

7.6 The number and centre of fixings should be determined by the system designer. Provided the substrate wall is suitable and the appropriate fixings are selected, the fixings will adequately support and transfer the weight of the render insulation system to the substrate wall at the minimum spacings given in this Certificate.

7.7 Typical characteristic pull-out strengths for the fixings taken from the ETA (European Technical Approval/ Assessment) are given in Table 5; however, these values are dependent on the substrate and the fixing must be selected to suit the loads and substrate concerned.

Table 5 Fixings — typical characteristic pull-out strength (for 60 mm diameter fixings plate)

Fixing type	ETA number	Substrate	Drill diameter (mm)	Effective anchorage depth (mm)	Typical pull-out strength (kN)[1]	Partial safety factor[2]
Koelner KI-10	07/0291	Concrete C12/15 Clay brickwork	10	25	0.5	2
Koelner TFix-8M	07/0336	Concrete C12/15 Clay brickwork	8	25	1.2	2
Ejotherm NT U	05/0009	Concrete C12/15 Clay brickwork	8	25	1.2 1.5	2
Ejotherm STR U	04/0023	Concrete C12/15 Clay brickwork	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.
(2) Values quoted for concrete and clay brickwork.

7.8 The design pull-through resistance data given in Table 6 are the result of calculations based upon pull-through resistances determined by the BBA from tests on anchors with 60 mm diameters.

Table 6 Design pull-through resistances

Factor (unit)	MW insulation
Fixings — plate diameter (mm)	60
Fixings — type	See Table 5
Insulation thickness (mm)	>60
Characteristic pull-through resistance[1] per fixing (N)	360
Factor of safety[2]	2.5
Design pull-through resistance per fixing (N)	144

(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 based on the assumption that all insulation slabs are quality controlled, and tested to establish tensile strength perpendicular to the face of the slab and failure mode.

Impact resistance

7.9 Hard body impact tests were carried out in accordance with ETAG 004 : 2013. The systems as listed in Table 7 are suitable for Use Categories I and II.

Table 7 Envirowall Mineral Wool External Wall Insulation System impact resistance

Rendering system: insulation + render with different finishes	Impact resistance Use Category
EnviroRend Basecoat Render + EnviroDash — white	Category II[1]
EnviroRend Basecoat Render + EnviroBrick render (mortar coloured + EnviroBrick effect)	Category I[1]
EnviroRend Basecoat Render + Granol Silicone Render KR	Category II[1]

(1) The Use Categories are defined in ETAG 004 : 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 A2-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.

8.3 The mineral wool insulation material is classified as non-combustible.

8.4 The systems are considered suitable for use on or at any distance from the boundary and there is no height restriction on their use.

8.5 For application to second storey walls and above, it is recommended that the designer considers at least one stainless fixing per square metre as advised in BRE Report BR 135 : 2013.

9 Proximity of flues and appliances

With this system, there are no provisions to be met.

10 Water resistance

10.1 The system will provide a degree of protection against rain ingress. Care should be taken to ensure that walls are adequately watertight prior to the application of the system. The system must only be installed where there are no signs of dampness on the inner surface of the substrate other than those 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 water tightness 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 tops of walls, the system should be protected by an adequate coping, 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 junctions, to minimise the risk of condensation. The recommendations of BS 5250 : 2011 should be followed.

Surface condensation

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

11.3 Walls will limit the risk of surface condensation adequately when the thermal transmittance (U value) does not exceed 1.2 $W \cdot m^{-2} \cdot K^{-1}$ at any point and detailing is in accordance with BS 5250 : 2011. Additional guidance may be obtained from BRE Report 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) (for the render systems) are shown in Table 8.

Table 8 Water vapour resistance factor and equivalent air layer thickness (S_d)

Basecoat with finishing coat (without decorative coat or key coat)	Thickness (mm)	S_d (m)	μ
Mineral wool insulation	50-200	—	1
EnviroRend Basecoat	8	0.08	—
EnviroDash	10	0.08	—
EnviroBrick Render	10	0.19	—
Granol Silicone Render KR	3	0.16	—

12 Maintenance

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 : 2005.

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.

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 of 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, 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 Manual. Additionally, for a 60-year durability, the supplementary adhesive must be used.

13.3 The render incorporates Portland cement and may be subject to lime bloom. The occurrence of this may be reduced by avoiding application in adverse weather conditions. The effect is transient and less noticeable on lighter colours.

13.4 The render may become discoloured with time, the rate depending on the initial colour, 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 repainting, provided this does not 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.

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 and necessary repairs to the building structure must be completed before installation 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 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 slabs are installed with a smooth, in-plane finished surface.

14.5 Where surfaces are covered with an existing render, 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

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, or 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. All rendering should be in accordance with the relevant recommendations of BS EN 13914-1 : 2005.

16.4 Before installation takes place, the building designer must confirm where items such as rainwater goods, satellite dishes, clothes lines and hanging baskets will be placed. The fixings points for these items must be specifically designated and built into the system as the insulation is installed. This is outside the scope of this Certificate.

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

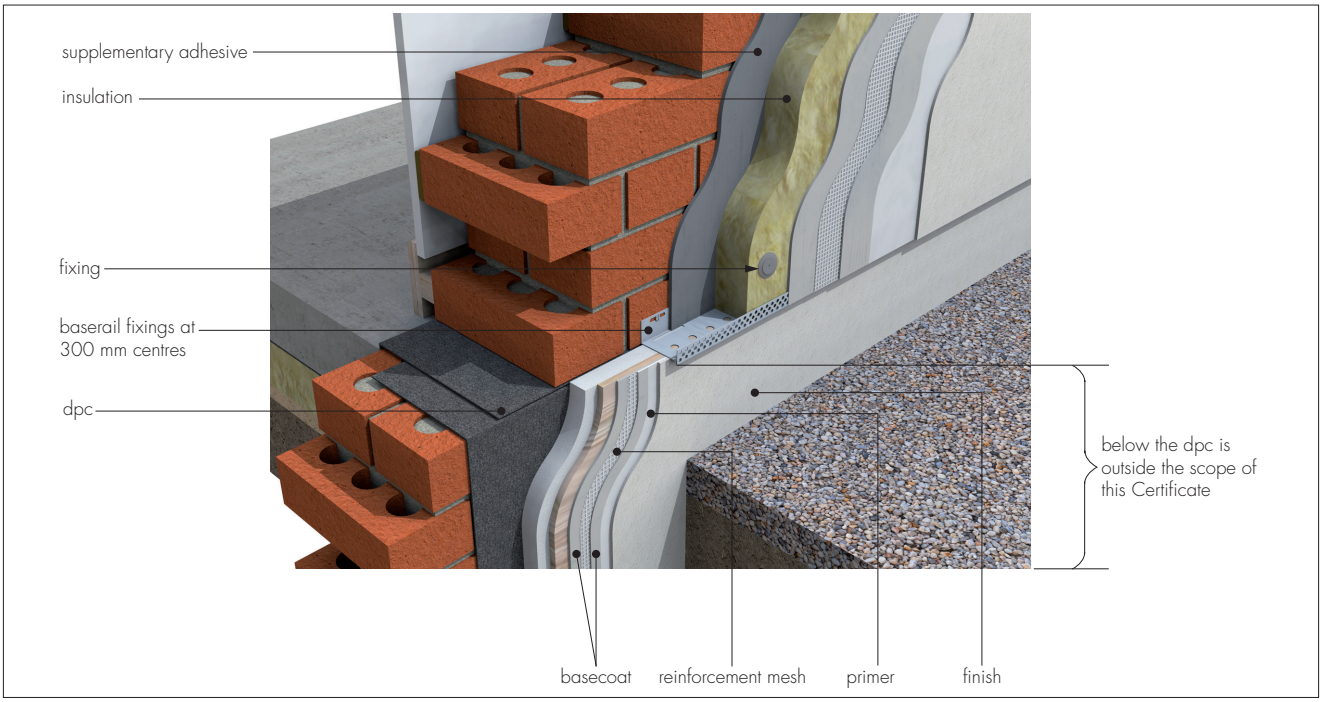
16.6 Care must be taken in the detailing of the system around openings and projections (see Figures 9, 10 and 11). To achieve a 60-year service life, the system is finished against a stainless steel stop bead at reveals, to allow for replacement of windows.

16.7 The initial installation of the system is described in sections 16.8 to 16.14.

Positioning and securing of insulation slabs

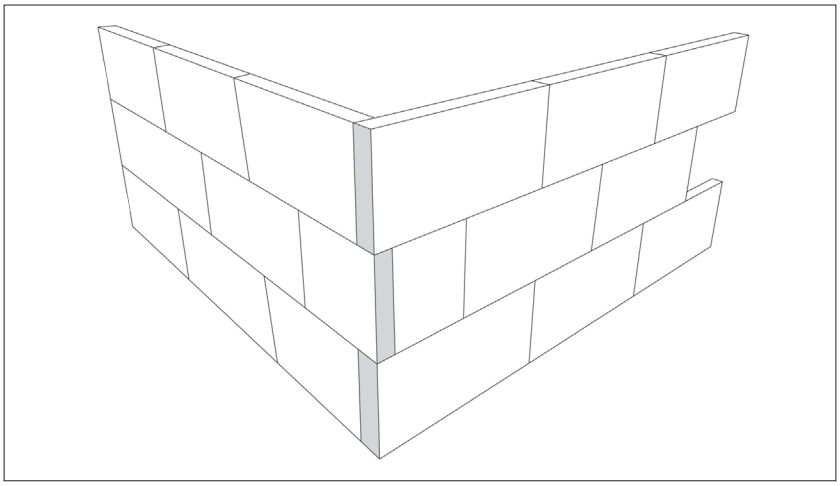
16.8 The base profile is secured to the external wall above the dpc using the approved profile fixings at approximately 300 mm centres (see Figure 2). Base rail connectors are inserted at all profile joints. Extension profiles are fixed to the front lip of the base rail or stop end channel where appropriate. Note: For 60-year durability applications, the base profile needs to be constructed from stainless steel.

Figure 2 Typical section of base profile



16.9 The first run of insulation slabs is positioned on the perforated base profile with or without the adhesive applied. The slabs must be pressed firmly against the wall and butted tightly together. Subsequent rows of slabs are positioned so that the vertical slab joints are staggered by at least 200 mm (see Figure 3). Joints between slabs greater than 2 mm should be filled with slivers of insulation slab or PU foam. Gaps greater than 10 mm should be closed by repositioning or, where appropriate, by cutting slabs to fit. Alignment should be checked as work proceeds.

Figure 3 Typical arrangement of insulation slabs



16.10 Mechanical fixings are applied to secure the insulation slabs during installation of the system.

16.11 To fit around details such as doors and windows, the slabs may be cut with a sharp knife or a fine-tooth saw. If required, purpose-made window sills designed to prevent water ingress and incorporating drips to shed water clear of the system, are fitted but their performance is outside the scope of this Certificate.

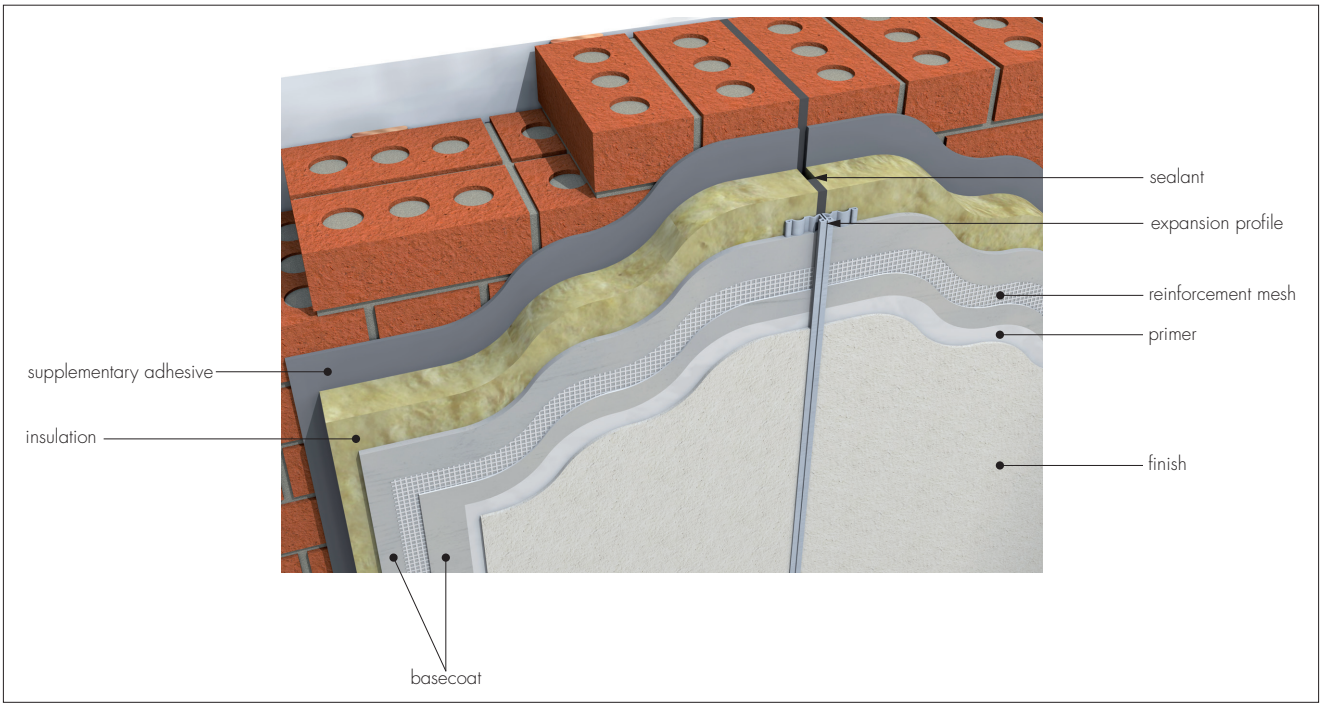
16.12 Installation continues until the whole wall is completely covered including, where appropriate, the building soffits. Building corners, and door and window heads and jambs are formed using mesh angle profiles bonded to the insulation. Where appropriate, application-specific profiles in accordance with the manufacturer's instructions are installed, to allow the rainwater to drain away.

16.13 Periodic checks should be carried out as work proceeds. Allowance should be made where either existing render is on the wall or dubbing out render has been used to align the slabs, as the effective embedment will be reduced. Window and door reveals should be insulated to minimise the effects of cold bridging.

Movement joints

16.14 Generally, movement joints are not required in the system but, if an expansion joint is incorporated in the substrate, then movement joints must be carried through the insulation system by cutting through the insulation slabs to coincide with the building's movement joint. The expansion profile is fixed to the insulation slab surface with adhesive, prior to the application of the reinforced undercoat (see Figure 4).

Figure 4 Movement joint detail



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

16.15 Holes are drilled through the insulation slabs 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 slabs to the substrate.

16.16 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.

16.17 The basecoat is applied progressively over the insulation slabs, using a notched trowel and floated with a Darby float to an approximate minimum thickness of 3 mm.

16.18 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.

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

16.20 Additional pieces of reinforcing mesh, 300 mm by 500 mm, are used diagonally at the corners of openings, as shown in Figure 5.

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

Figure 5 Additional reinforcement at openings

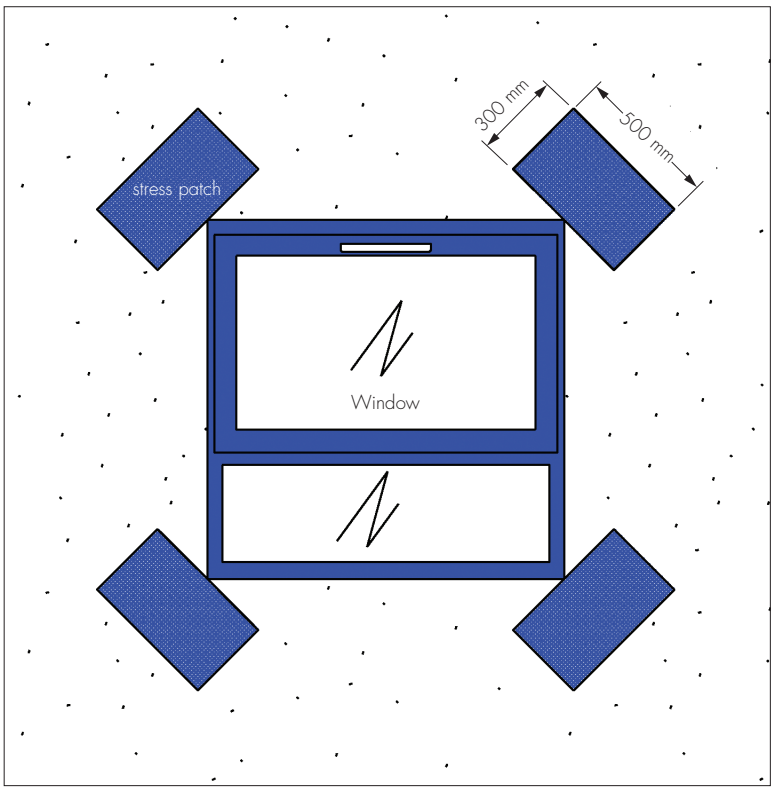
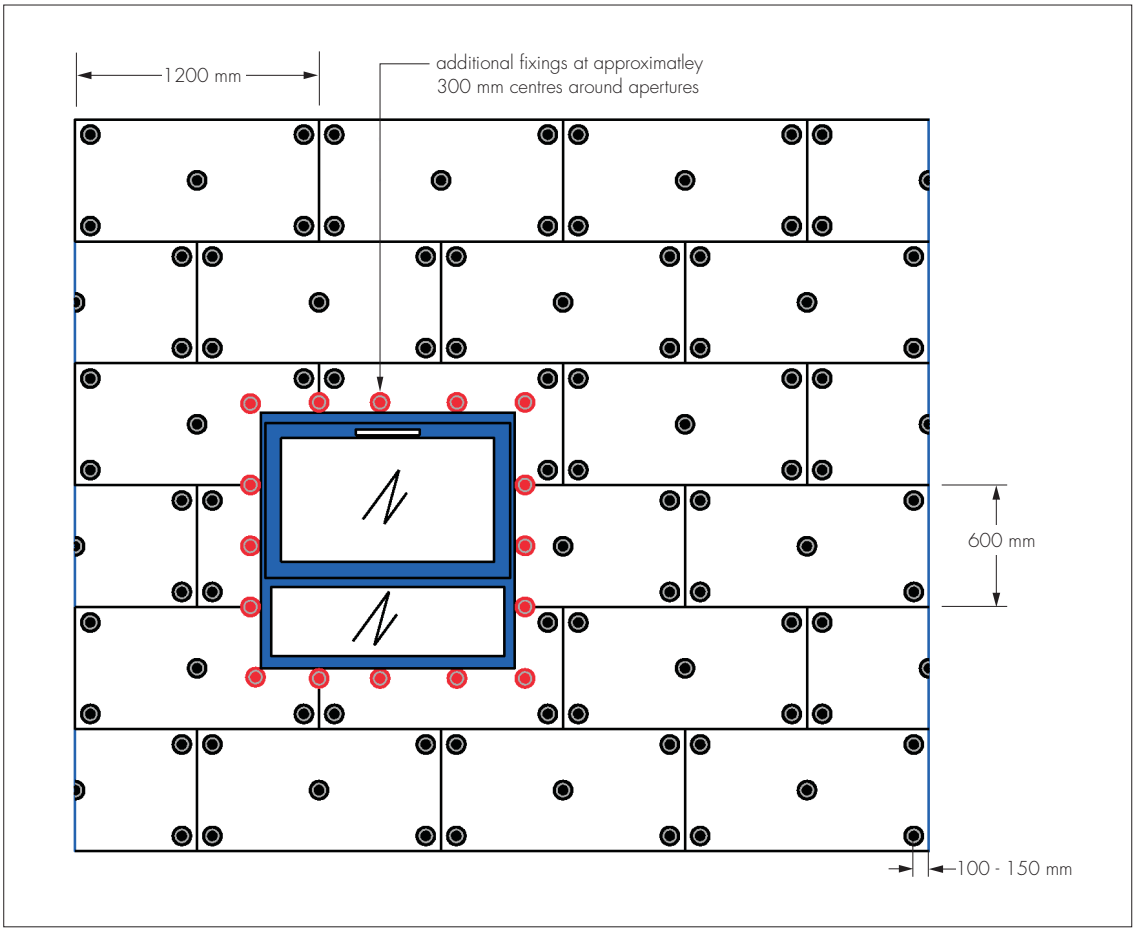


Figure 6 Typical fixing patterns



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

16.22 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 slab, with six additional dabs of adhesive distributed uniformly over the remaining surface. At least 40% of the slab should be covered. Alternatively, the adhesive can be applied over the entire face of the insulation slab using a notched trowel.

16.23 After the insulation adhesive has set, the system is ready for the application of basecoat (mixed as described in section 16.16).

16.24 The basecoat is applied progressively to an approximate thickness of 4 mm over the insulation slabs, working in 1 m sections in vertical and horizontal directions, using a stainless steel trowel.

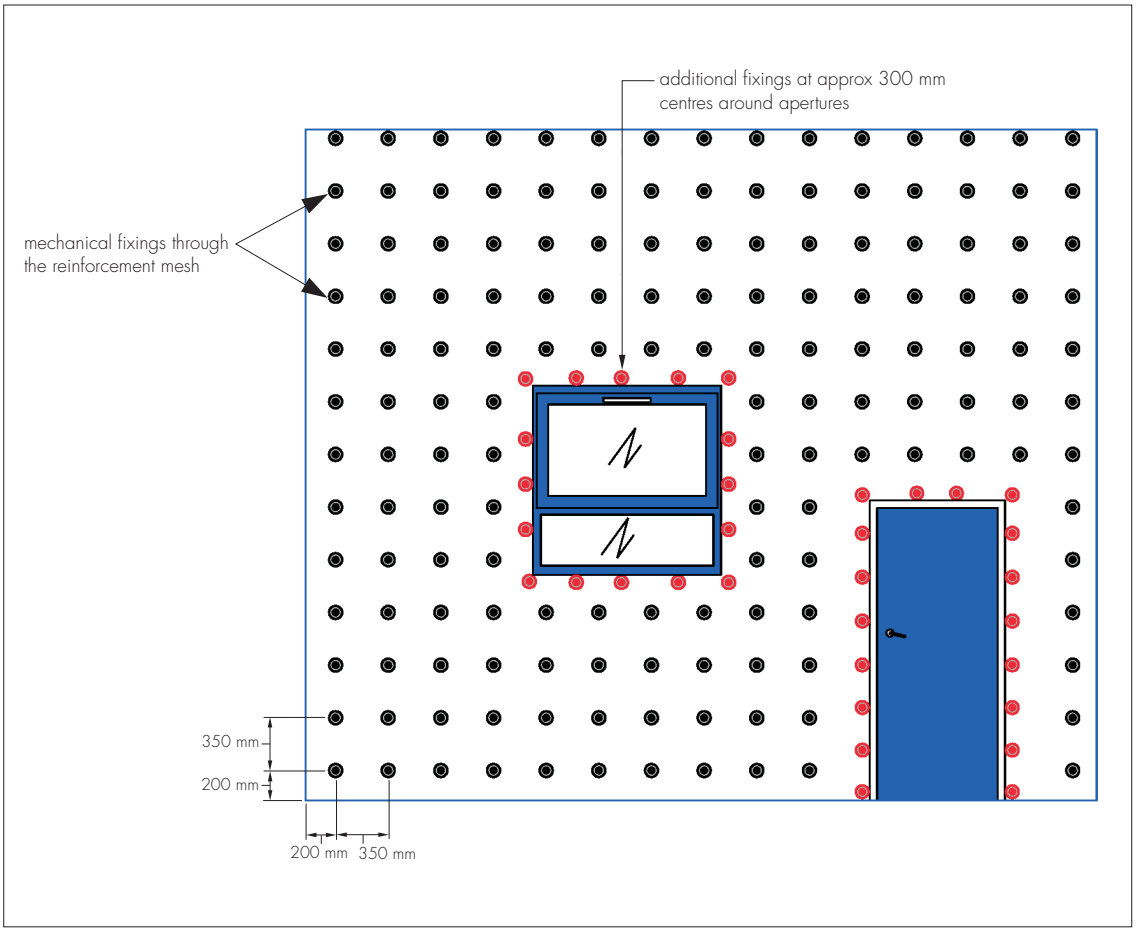
16.25 The reinforcement mesh (with its concave surface to the wall) is applied and immediately embedded into the basecoat by trowelling from the centre to the edge; an additional light coat of basecoat is applied (whilst the first coat is still wet) to ensure the mesh is free of wrinkles. Corner details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

16.26 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).

16.27 Mechanical fixings (7 per m^2) are applied through the mesh and the insulation slabs while the basecoat is still wet using the fixing pattern provided by the Certificate holder (see Figure 7). 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 slab.

16.28 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 3 mm thickness (approximately), when measured from the top of the fixings.

Figure 7 Fixing patterns — 60 year durability



Decorative finish

EnviroDash

16.29 The receiver is mixed until the correct workability is achieved and trowelled onto the basecoat to a thickness of between 6 mm and 10 mm. While still soft, washed aggregate is thrown or sprayed onto the receiver, ensuring a uniform covering. Where necessary, the aggregate can be lightly tampered with a wooden float to ensure a good bond is achieved.

EnviroBrick

16.30 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 in 11 mm. EnviroBrick render applications must have a continuous surfaces completed without a break.

Granol Silicone KR

16.31 The render is applied to a thickness of 1.5 mm to 3 mm. A straight edge can be used to help ensure a flat surface, and wet sponges, wooden mortar slabs or similar tools can be used to create the desired finish.

Figure 8 Roof eaves detail

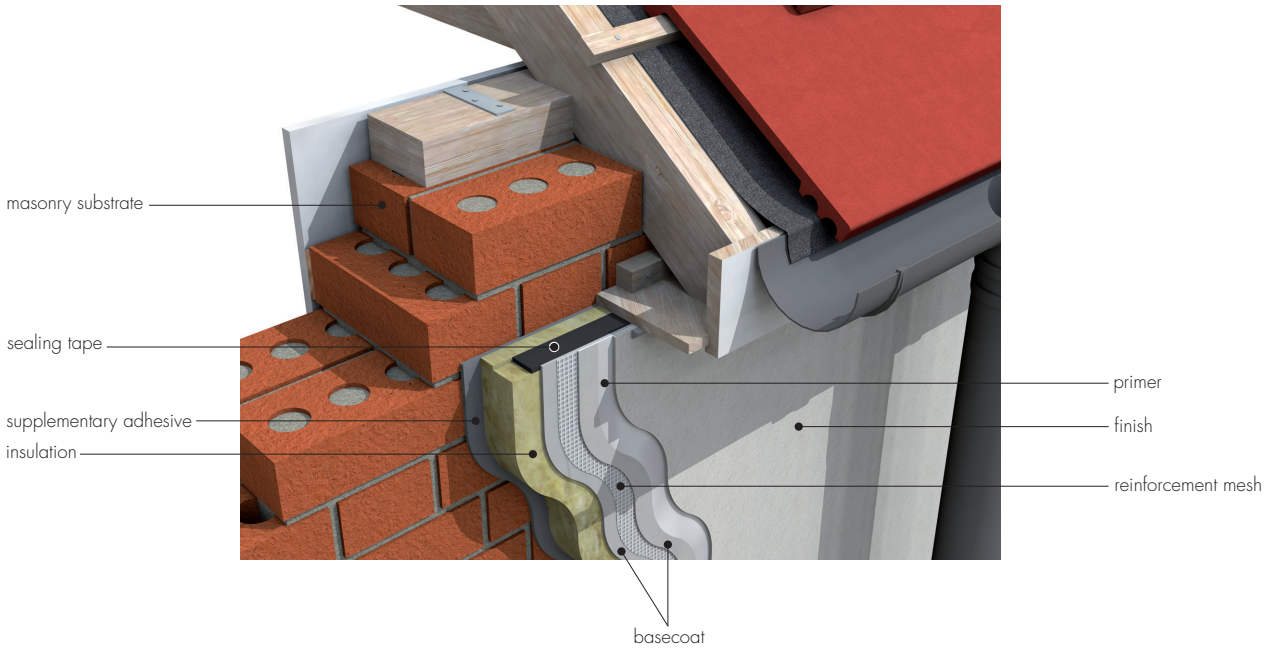


Figure 9 Typical window reveal detail

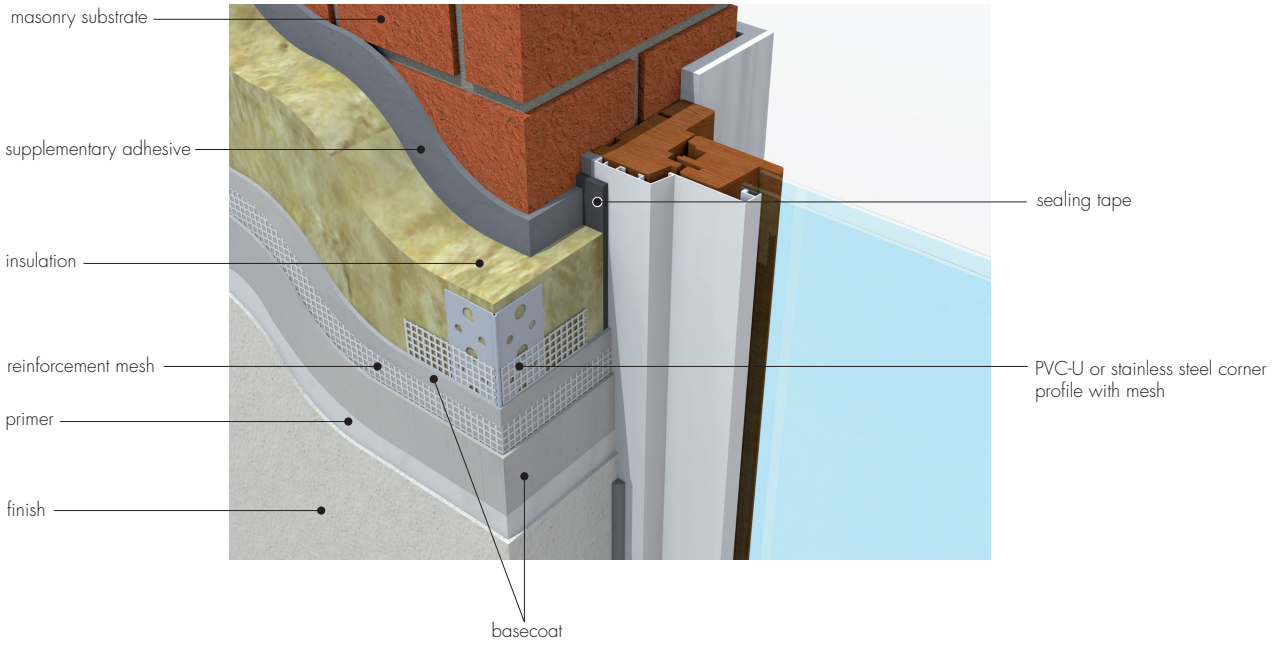


Figure 10 Typical window head detail

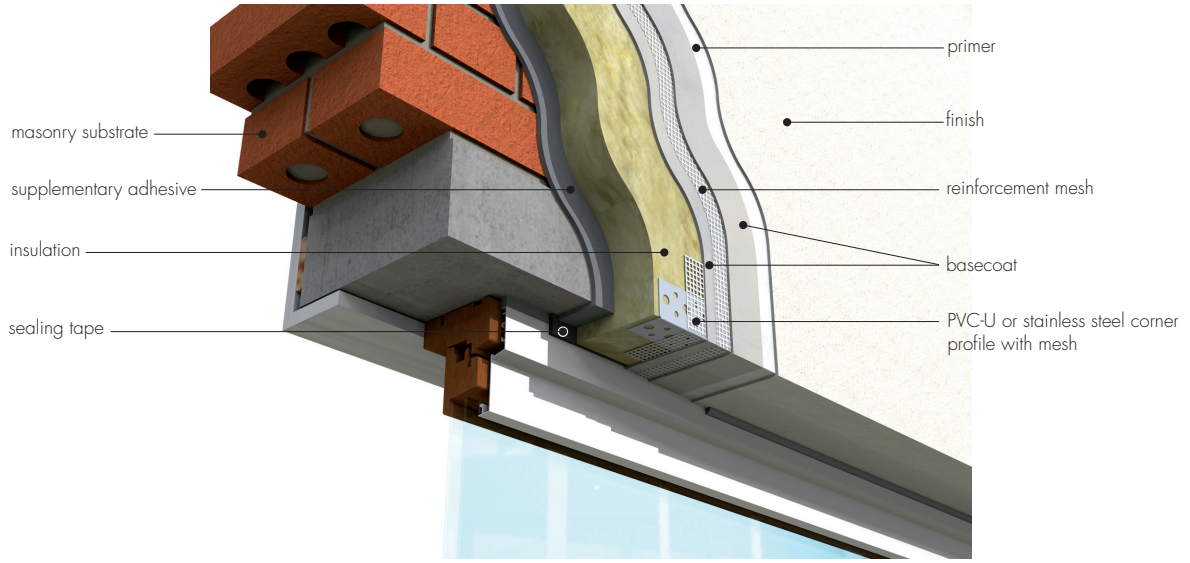
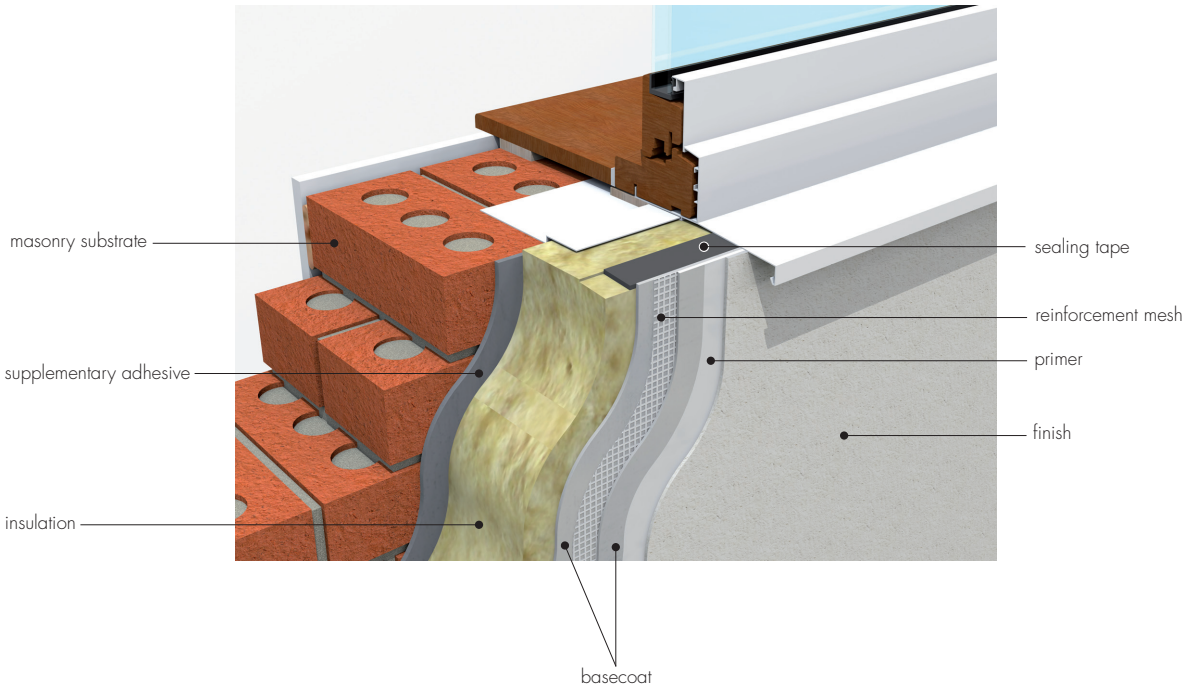


Figure 11 Window sill detail



16.32 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.

17 Investigations

17.1 Results of tests were assessed to determine:

- pull-through
- fire performance
- bond strength
- hygrothermal performance
- resistance to frost
- resistance to impact
- water vapour permeability
- water absorption (capillarity test)
- thermal conductivity
- 60-years durability assessment.

17.2 The practicability of the installation and the effectiveness of detailing were examined.

17.3 An assessment of the risk of interstitial condensation was undertaken.

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 EN 1990 : 2002 *Eurocode — Basis of structural design*

BS EN 1991-1-4 : 2005 *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 13162 : 2012 *Thermal insulation products for buildings — Factory made mineral wool (MW) products — Specification*

BS EN 13501-1 : 2007 *Fire classification of construction products and building elements — Classification using test data from reaction to fire tests*

BS EN 13914-1 : 2005 *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.

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