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Agrément Certificate

14/5120

Product Sheet 2

LICATA EXTERNAL WALL INSULATION SYSTEMS

LICATATHERM EPS EXTERNAL WALL INSULATION SYSTEM 2

This Agrément Certificate Product Sheet⁽¹⁾ relates to Licatatherm EPS External Wall Insulation System 2, comprising mechanically fixed white or grey expanded polystyrene (EPS) insulation boards, with supplementary adhesive, reinforced basecoat and render finishes. The system is suitable for use, with height restriction, on the outside of external masonry 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 masonry 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 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 in accordance with BS EN 13501-1 : 2007 and its use is restricted (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 (see section 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

Date of Second issue: 23 April 2019

John Albon
Chief Scientific Officer

Originally certificated on 6 May 2014

Claire Curtis-Thomas
Chief Executive

Certificate amended on 13 January 2020 to include new regulatory guidance for fire in Scotland and Wales.

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 MUST check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA directly.*

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Regulations

In the opinion of the BBA, Licatatherm EPS External Wall Insulation System 2, 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 7.12 of this Certificate.
Requirement:	B4(1)	External fire spread
Comment:		The system is restricted by 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 section 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(1)	Materials and workmanship
Comment:		The system is acceptable. See section 13.1 and the <i>Installation</i> part of this Certificate.
Regulation:	7(2)	Materials and workmanship
Comment:		The system is restricted by this Regulation. See sections 8.1 to 8.3 of this Certificate.
Regulation:	26	CO₂ emission rate for new buildings
Regulation:	26A	Fabric energy efficiency rates for new dwellings (applicable to England only)
Regulation:	26A	Primary energy consumption rates for 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, compensating 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 and 13.1 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 7.12 of this Certificate.
Standard:	2.6	Spread to neighbouring buildings
Comment:		The system is restricted by 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 8.3, 8.5 and 8.6 of this Certificate.

Standard:	2.7	Spread on external walls
Comment:		The external surface of the system is restricted by this Standard, with reference to clauses 2.7.1 ⁽¹⁾⁽²⁾ and 2.7.2 ⁽²⁾ and Annex 2A ⁽¹⁾ . See sections 8.1 to 8.3, 8.5 and 8.6 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 section 10.1 of this Certificate.
Standard:	3.15	Condensation
Comment:		The system can satisfy the requirements of 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	Buildings 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 the system under Regulation 9, Standards 1 to 6, also apply to this Regulation, with reference to 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 section 13.1 and the <i>Installation</i> part of this Certificate.
Regulation:	28(b)	Resistance to moisture and weather
Comment:		The system provides a degree of protection against rain ingress. See section 10.1 of this Certificate.
Regulation:	29	Condensation
Comment:		The system can contribute to minimising the risk of interstitial condensation. 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 7.12 of this Certificate.
Regulation:	36(a)	External fire spread
Comment:		The system is restricted by 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* (3.1 and 3.3) of this Certificate.

Additional Information

NHBC Standards 2019

In the opinion of the BBA, Licatatherm EPS External Wall Insulation System 2, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements in relation to *NHBC Standards 2019, Part 6 Superstructure (excluding roofs), Chapter 6.9 Curtain Walling and Cladding*.

(1) There is a general requirement in *NHBC Standards 2019, Chapter 6.9*, for fire-retardant-treated insulation to be used with the system in accordance with BS EN 13163 : 2012.

Technical Specification

1 Description

1.1 Licatatherm EPS External Wall Insulation System 2 comprises EPS insulation boards, mechanically fixed to the substrate wall with supplementary adhesive (ensuring a minimum 40% coverage), glass-fibre-reinforced basecoat, primer and render finishes (see Table 1 and Figure 1). After the insulation boards have been secured to the wall with insulation adhesive and the required number of mechanical fixings, the basecoat is trowel-applied over the boards to a uniform thickness, followed by the reinforcing mesh, which is fully embedded within the basecoat. A further layer of basecoat render is applied over the embedded reinforcing mesh to achieve the required overall thickness. After the basecoat has fully cured, the primer and finishes are applied in accordance with the Certificate holder's installation instructions and this Certificate.

1.2 The system comprises:

Adhesive (supplementary)

- Raso Top 800 Grigio — cement-based powder requiring the addition of 5.25 litres of clean water per 25 kg bag. Applied to a minimum thickness of 5 mm, at a coverage of 3.5 to 4.0 kg·m⁻²
- Raso Top 800 Bianco — cement-based elastic-fibre-reinforced powder requiring the addition of 6 litres of clean water per 25 kg bag. Applied to a minimum thickness of 5 mm, at a coverage of 3.5 to 4.0 kg·m⁻²

Insulation⁽¹⁾

- Licatatherm White EPS (EPS 70) Insulation Boards — 1200 by 600 mm in a range of thicknesses from 60⁽²⁾ to 200 mm, with a nominal density of 15 kg·m⁻³, compressive strength of 70 kN·m⁻² and minimum tensile strength of 150 kPa. Boards comply with the requirements of BS EN 13163 : 2012, and are classified as Euroclass E in accordance with BS EN 13501-1 : 2007
- Licatatherm White EPS (EPS 100) Insulation Boards — 1200 by 600 mm in a range of thicknesses from 60⁽²⁾ to 200 mm, with a nominal density of 20 kg·m⁻³, compressive strength of 100 kN·m⁻² and minimum tensile strength of 150 kPa. Boards comply with the requirements of BS EN 13163 : 2012, and are classified as Euroclass E in accordance with BS EN 13501-1 : 2007
- Licatatherm Grey EPS (EPS 70) Insulation Boards — 1200 by 600 mm in a range of thicknesses from 60⁽²⁾ to 200 mm, with a nominal density of 17 kg·m⁻³, compressive strength of 70 kN·m⁻² and minimum tensile strength of 150 kPa. Boards comply with the requirements of BS EN 13163 : 2012, and are classified as Euroclass E in accordance with BS EN 13501-1 : 2007
- Licatatherm Grey EPS (EPS 100) Insulation Boards — 1200 by 600 mm in a range of thicknesses from 60⁽²⁾ to 200 mm, with a nominal density of 20 kg·m⁻³, compressive strength of 100 kN·m⁻² and minimum tensile strength of

150 kPa. Boards comply with the requirements of BS EN 13163 : 2012, and are classified as Euroclass E in accordance with BS EN 13501-1 : 2007

(1) For declared thermal conductivity (λ_D) values see Table 2.

(2) Insulation thicknesses of 20, 30, 40 and 50 mm are also available, which are generally to be used in reveals.

Mechanical fixings

- Mechanical fixings⁽¹⁾ — fixing anchors with various lengths to suit the substrate and insulation thickness, approved and supplied by the Certificate holder, and selected from:
 - Fischer Termoz 8 U — polyamide anchor sleeve, with stainless steel or galvanized steel screw
 - Fischer Termoz 8 UZ — polypropylene anchor sleeve, with polyamide screw
 - Fischer Termoz 8 NZ — polypropylene anchor sleeve, with galvanized steel pin
 - EjoTherm SDM-T — polyamide anchor sleeve, with stainless steel or galvanized steel screw
 - EjoTherm NT U — polyethylene anchor sleeve, with stainless steel or galvanized steel pins
 - EjoTherm STR U — polyethylene anchor sleeve, with stainless steel or galvanized steel pins.

(1) Other fixings may be used provided it can be demonstrated they have equal or higher pull-out resistance, plate diameter and plate stiffness characteristics.

Basecoats

- Raso Top 800 Grigio — cement-based powder requiring the addition of 5.25 litres of clean water per 25 kg bag, applied to a thickness of 3 to 5 mm in two layers, at a coverage of 6.0 to 6.5 kg·m⁻²
- Raso Top 800 Bianco — cement-based elastic-fibre-reinforced powder requiring the addition of 6 litres of clean water per 25 kg bag, applied to a thickness of 3 to 5 mm in two layers, at a coverage of 6.0 to 6.5 kg·m⁻²

Reinforcement

- Licatatherm Rete (ES-L 112) — 1 m wide mesh (4 by 5 mm grid size) of multi-strength glass fibre with a polymer coating, and nominal weight of 150 g·m⁻²
- Licatatherm Rete (RET01-1160) — 1 m wide mesh (3.5 by 4.5 mm grid size) of multi-strength glass fibre with a polymer coating, and nominal weight of 145 g·m⁻²

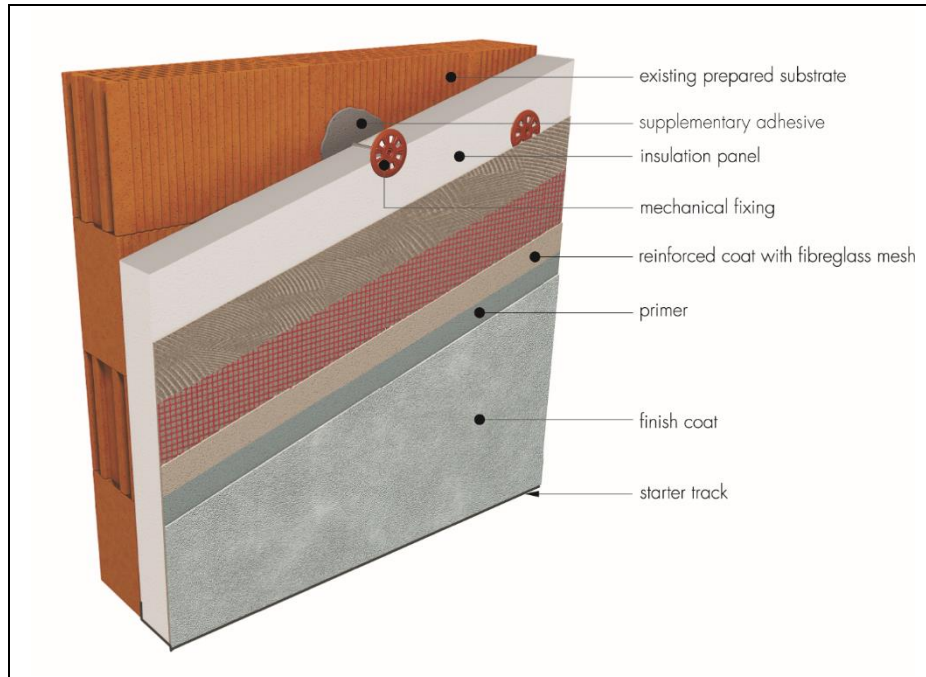
Primers

- Isolante LG — ready-to-use pigmented universal primer, based on acrylic copolymers, and applied at a coverage of 0.2 kg·m⁻²
- Acril Primer — primer, based on acrylic copolymers. Diluted with water in a 1:1 to 1:3 ratio (primer : water), and applied at a coverage of 0.2 kg·m⁻²

Finishing coats

- Siloxan Color — ready-to-use silicone-based paste. Available in 1.5 and 2.0 mm particle grain sizes, with thickness regulated by particle size and applied at a coverage of 2.7 to 3.3 kg·m²
- Lerici — ready-to-use acrylic-based paste. Available in 1.5 and 2.0 mm particle sizes, with thickness regulated by particle size and applied at a coverage of 2.7 to 3.3 kg·m²
- LicataSil — ready-to-use silicate-based paste. Available in 1.5 and 2.0 mm particle sizes, with thickness regulated by particle size and applied at a coverage of 2.7 to 3.3 kg·m².

Figure 1 Licatatherm EPS External Wall Insulation System 2



1.3 Ancillary materials used with the system are:

- a range of aluminium, PVC-U or stainless steel profiles, comprising:
 - base profile
 - edge profile
 - corner profile with optional PVC-U nosing
 - render stop profile
 - movement joint
 - expansion joint
- profile connectors and fixings.

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

- fungicidal wash
- silicone sealant in accordance with BS EN ISO 11600 : 2003
- expansion foam
- fire barriers.

2 Manufacture

2.1 The system 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 operated by the manufacturer are being maintained.

2.3 The management system of the manufacturer has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2008 by Kiwa Cermet Italia S.p.A (Certificate 15400-A) and BS EN ISO 14001 : 2004 by Rina Services S.p.A. (Certificate EMS-5678/S).

3 Delivery and site handling

3.1 The system components are delivered to site in the packaging and quantities listed in Table 1. Each package carries the product identification and batch number.

Table 1 Component supply details

Components	Quantity and packaging
Licatatherm EPS (white and grey) insulation	Shrink-wrapped in polyethylene (on pallets)
Raso Top 800 Grigio (supplementary adhesive and basecoat)	25 kg bags
Raso Top 800 Bianco (supplementary adhesive and basecoat)	25 kg bags
Fixings	Boxed by manufacturer
Licatatherm Rete (ES-L 112)	50 m rolls
Licatatherm Rete (RET01-1160)	50 m rolls
Isolante LG primer	20 kg pails
Acril Primer	5 and 10 litre tubs
Siloxan Color finishing coat	25 kg pails
Lerici finishing coat	25 kg pails
LicataSil finishing coat	25 kg pails

3.2 The insulation boards 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. Boards that become damaged, soiled or wet should be discarded.

3.3 The insulation boards should be protected from prolonged exposure to sunlight, and contact with solvents and bitumen. The boards must not be exposed to open flame or other ignition sources.

3.4 The powder and paste components must be stored in dry conditions within 5 and 30°C, off the ground and protected from moisture. Contaminated materials should be discarded.

3.5 The primers and render finishes should be stored 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 Licatatherm EPS External Wall Insulation System 2.

Design Considerations

4 General

4.1 Licatatherm EPS External Wall Insulation System 2, when installed in accordance with this Certificate, is satisfactory for use in reducing the thermal transmittance (U value) of external masonry or concrete 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 (eg the insulation must be protected by an overhang, and window sills should be designed and installed so as to direct water away from the building).

4.2 For improved thermal/carbon-emissions performance of the structure, 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, normal weight concrete, lightweight concrete, autoclaved concrete and no-fines concrete construction, on new or existing domestic and non-domestic buildings (with or without existing render) with no storey above 18 metres (11 metres in Scotland). Prior to the installation of the system, wall surfaces should comply with section 14.

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

- BS EN 1992-1-1 : 2004 and its UK National Annex
- BS EN 1996-1-1 : 2005 and its UK National Annex
- BS EN 1996-2 : 2006 and its UK National Annex
- BS 8000-0 : 2014
- BS 8000-2.2 : 1990
- 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.

4.6 Movement joints should be incorporated into the system in line with existing expansion joints in the building structure in accordance with the Certificate holder's recommendations for the specific installation.

4.7 The system will improve the weather resistance of a wall and provide a decorative finish. However, for existing buildings, it should only be installed where there are no signs of dampness on the inner surface of the wall other than those caused solely by condensation.

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

4.9 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. See section 4.10.

4.10 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. The Certificate holder may advise on suitable fixing methods, but these are outside the scope of this Certificate.

4.11 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.

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 only be installed by specialist contractors who have successfully undergone training and registration 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's 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 : 2017 and BRE Report BR 443 : 2006, using the declared thermal conductivity (λ_D) values of the insulations given in Table 2.

Table 2 Declared conductivity (λ_D) values and available thicknesses

Insulation types	Insulation board thickness range (mm)	Thermal conductivity ($W \cdot m^{-1} \cdot K^{-1}$)
White EPS 70		0.038
White EPS 100	40 to 200	0.036
Grey EPS 70 and 100		0.030



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

Table 3 Insulation thickness required to achieve design U values⁽¹⁾⁽²⁾⁽³⁾ given in the national Building Regulations

U value ⁽⁴⁾ (W·m ⁻² ·K ⁻¹)	Thickness of Insulation (mm)					
	215 mm brickwork, λ = 0.56 W·m ⁻¹ ·K ⁻¹			200 mm dense blockwork, λ = 1.75 W·m ⁻¹ ·K ⁻¹		
	White EPS 70	White EPS 100	Grey EPS 70 and 100	White EPS 70	White EPS 100	Grey EPS 70 and 100
0.18	200	190	170	— ⁽⁵⁾	200	180
0.19	190	180	160	200	190	170
0.25	140	130	120	150	140	130
0.26	130	130	110	140	140	120
0.28	120	120	100	130	120	110
0.30	110	110	100	120	120	100
0.35	90	90	80	100	100	90

(1) Wall construction inclusive of 13 mm plaster (λ = 0.57 W·m⁻¹·K⁻¹), brickwork (protected) with 17.1% mortar or dense blockwork with 6.7% mortar (λ = 0.88 W·m⁻¹·K⁻¹). Declared thermal conductivity (λ_b) values of insulation are as shown in Table 2. A render thickness of 5 mm (with λ = 1.0 W·m⁻¹·K⁻¹) is also included.

(2) Calculations based on a mechanical system that included 7 steel fixings per m² with a point thermal transmittance (x_p) of 0.002 W·K⁻¹ per pin. Use of other types of fixings should be calculated in accordance with BS EN ISO 6946 : 2017.

(3) Based upon incremental insulation thickness of 10 mm.

(4) When applying the maximum available insulation thickness, these walls can achieve U values from 0.16 to 0.19 W·m⁻²·K⁻¹ depending on insulation and wall type.

(5) See section 4.2.

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 The Certificate holder is ultimately responsible for the design of the system and it is the responsibility of the company installing the system to accurately follow the installation instructions (see also section 5). The Certificate holder must also verify that a suitably experienced and qualified individual (with adequate professional indemnity) establishes that:

- the wind loads on the different zones of the building's elevation for the specific geographical location have been calculated correctly (see section 7.3)
- the system can adequately resist and safely transfer the calculated loads, accounting for all possible failure modes, to the substrate wall and supporting structure (see sections 7.3 to 7.6).

7.2 The substrate and supporting structure must be capable of transferring all additional loading due to the installation of the system to the ground in a satisfactory manner. The adequacy of the substrate and supporting structure must be verified by the person or party responsible for the global stability of the building to which the system is applied. Any defects should be made good prior to the system being installed.

7.3 The wind loads on the walls should be calculated, taking into account all relevant factors such as location and topography, in accordance with BS EN 1991-1-4 : 2005 and its UK National Annex. All of the factors affecting wind load on each elevation and specific zones of the building must be considered. In accordance with BS EN 1990 : 2002 and its UK National Annex, a partial factor of 1.5 must be applied to the calculated characteristic wind pressure values to establish the design wind load to be resisted by the system.

7.4 Installations correctly designed in accordance with this Certificate will safely accommodate the applied loads due to the self-weight of the system, wind and impact.

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

7.6 Negative wind load is transferred to the substrate wall via⁽¹⁾⁽²⁾:

- the bond between the insulation and render system (see section 7.7)
- the pull-out resistance of the fixing from the substrate wall (see section 7.8)
- the pull-through resistance of the fixing (see section 7.9).

(1) For mechanically fixed systems with supplementary adhesive, the contribution of the adhesive is not considered when calculating resistance to wind load.

(2) Further guidance is available from BBA Guidance Note 1, available on the BBA website (www.bbacerts.co.uk).

7.7 The characteristic bond resistance between the insulation and render interface derived from test results was $80 \text{ kN}\cdot\text{m}^{-2}$. The design resistance of the bond between the insulation and render (N_{RD1}) should be taken as the characteristic bond resistance divided by a partial factor of 9.

7.8 Typical characteristic pull-out resistances for the fixings taken from the corresponding European Technical Assessment (ETA) are given in Table 4; the values are dependent on the fixing type and must be selected to suit the specific loads and substrate concerned. In situations where suitable data does not exist⁽¹⁾, the characteristic pull-out resistance must be established from site-specific pull-out tests conducted on the substrate of the building to ascertain the minimum resistance to pull-out failure of the fixings, and determined in accordance with the guidance given in EOTA TR051 : 2016 (minimum test characteristic value = $0.6 \times$ mean of 5 lowest test results). To obtain the design pull-out resistance of the fixings (N_{RD2}), this characteristic pull-out resistance should then be divided by the partial factor given in Table 4.

(1) To qualify as suitable data, the age and condition of the substrate must be equivalent to that used to establish the values in the ETA.

Table 4 Fixings — typical characteristic pull-out resistances

Fixing type ⁽¹⁾	ETA number	Substrate	Drill diameter (mm)	Effective anchorage depth (mm)	Characteristic pull-out resistance ⁽²⁾ (kN)	Partial factor
Fischer Termoz 8U	02/0019	Concrete(C12/15) Brick (solid/clay)	8	70	1.5	2
Fischer Termoz 8UZ	02/0019	Concrete (C12/15) Brickwork (solid/clay)	8	30	1.2 1.5	2
Fischer Termoz 8 NZ	03/0019	Concrete (C12/15) Brickwork (solid/clay)	8	35	1.5	2
Ejot SDM-T	04/0064	Concrete (C12/15) Brickwork (solid/clay)	8	50	1.5	2
Ejot NT U	05/0009	Concrete (C12/15) Brickwork (solid/clay)	8	25	1.2 1.5	2
Ejot STR U	04/0023	Concrete (C12/15) Brickwork (solid/clay)	8	65	1.5	2

(1) The minimum value for plate stiffness of fixings is $0.5 \text{ kN}\cdot\text{m}^{-2}$ and the load resistance is 1.3 kN.

(2) Values are determined in accordance with EAD 330196-00-0604 : 2016 and are dependent on the substrate. The Use Categories are defined in the corresponding ETA.

7.9 The characteristic pull-through resistance of the fixings was determined from tests using a 60 mm diameter fixing plate, minimum insulation thickness 60 mm. The design resistance per fixing (N_{RD3}) is obtained by applying an appropriate partial factor as shown in Table 5.

Table 5 Design pull-through resistances

Factor (unit)	Insulation							
	Pull through white/grey EPS 70		Static foam block white/grey EPS 70		Pull through white/grey EPS 100		Static foam block white/grey EPS 100	
Tensile resistance of insulation (kN.m ⁻²)	≥100		≥100		≥100			
Fixing types ⁽¹⁾	Fischer Termoz 8 U Fischer Termoz 8 UZ Fischer Termoz 8 NZ		Fischer Termoz 8 U Fischer Termoz 8 UZ Fischer Termoz 8 NZ		EjoTherm SDM-T EjoTherm NT U EjoTherm STR U		EjoTherm SDM-T EjoTherm NT U EjoTherm STR U	
Fixings plate diameter (mm)	60		60		60		60	
Insulation thickness (mm)	≥60		≥60		≥60		≥60	
Characteristic pull-through resistance ⁽²⁾ per fixing (kN)	Panel joints	0.48	-		Panel joints	0.40	-	
	At panel	-	0.52		At panel	-	0.56	
Partial factor ⁽³⁾	2.5			2.5				
Design pull-through resistance per fixing (N _{RD3}) (kN)	Panel joints	0.19	-		Panel joints	0.16	-	
	At panel	-	0.21		At panel	-	0.22	
Design pull-through resistance per board (kN) (based on the minimum number of fixings ⁽⁴⁾)	1.01			0.98				
Design pull-through resistance per board (kN) (based on the maximum number of fixings ⁽⁴⁾)	1.64			1.64				

(1) See Table 4 for typical characteristic pull-out resistance of the fixings.

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

(3) The partial factor is based on the assumption that all insulation boards are quality controlled and tested to establish tensile strength perpendicular to the face of the board.

(4) The minimum design pull-through resistance per board is based on a minimum of 5 fixings per board (1200 x 600 mm), which equates to approximately 7 fixings per m². The design resistance for the minimum number of fixings is based on the fixing pattern provided in Figure 5 and minimum insulation thickness specified in Table 5. The fixing pattern and interaction of the fixings should be considered when calculating the design resistance per board.

(5) The maximum design pull-through resistance per board is based on a maximum of 8 fixings per board (1200 x 600 mm), which equates to approximately 11 fixings per m². The design resistance for the maximum number of fixings is only applicable for the minimum insulation thickness tested and as specified in Table 5. The fixing pattern, insulation thickness and interaction of the fixings should be considered when calculating the design resistance per board.

7.10 The number and spacing of the fixings should be determined by the Certificate holder. The number of fixings must not be less than the minimum specified for the system and the fixings should be symmetrically positioned and evenly distributed both vertically and horizontally, except at openings and building corners.

7.11 The data obtained from sections 7.7 to 7.9 must be assessed against the design wind load and the following expression must be satisfied:

For safe design:

$$R_d \geq W_e$$

$$R_{d,b,ins/render} = A_r * N_{RD1}$$

$$R_{d,pull-out} = n * N_{RD2}$$

$$R_{d,pull-through} = (N_{RD3panel} * n_{panel}) + (N_{RD3joint} * n_{joint}) / A_{board}$$

Where:

R_d is the design ultimate resistance (kN.m⁻²) taken as the minimum of $R_{d,b,ins/render}$, $R_{d,pull-out}$ and $R_{d,pull-through}$

W_e is the maximum design wind load (kN.m⁻²)

$R_{d,b,ins/render}$ is the design bond resistance between the insulation and render (kN.m⁻²)

$R_{d,pull-out}$ is the design pull-out resistance of the insulation fixings per metre square (kN.m⁻²)

$R_{d,pull-through}$ is the design pull-through resistance of the insulation fixings per metre square (kN.m⁻²)

A_r is the reinforced basecoat bond area (based on % area covered)

N_{RD1} is the design adhesive bond resistance between the insulation and render, based on test (kN.m⁻²)

n is the number of anchor fixings per m²

N _{RD2}	is the design pull-out resistance per fixing based on test (kN)
N _{RD3panel}	is the design pull-through resistance per anchor not placed at the panel joint, based on test (kN)
N _{RD3joint}	is the design pull-through resistance per anchor placed at the panel joint, based on test (kN)
n _{panel}	is the number of internal anchors in a panel
n _{joint}	is the number of joint anchors in a panel
A _{board}	is the area of the board (m ²).

7.12 The insulation system is mechanically fixed to the substrate wall with a minimum of 5 fixings per board or approximately 7 fixings per square metre, as per the fixing pattern shown in Figure 5, and in conjunction with a minimum 40% coverage of supplementary adhesive (see section 16). Additional fixings may be required, depending on the results of the calculations detailed above for the specific site.

Impact resistance

7.13 Hard body impact tests were carried out in accordance with ETAG 004 : 2013. The system is suitable for use in the Use Categories up to and including Use 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⁽¹⁾ of the system is B-s1, d0 in accordance with BS EN 13501-1 : 2007 where the maximum organic content of basecoat and finishing coat is less than 0.6%, and 5.8%, respectively. For specific colours included within these ranges, the advice of the Certificate holder must be sought.

(1) ETA-09/0022, issued by ZAG. Details are available from the Certificate holder.

8.2 The fire classification applies to the full range of thicknesses covered by this Certificate (see sections 1.2 and 8.1).

8.3 The insulation component in isolation is not classified as 'non-combustible' or of 'limited combustibility'.



8.4 For all buildings in England, Wales and Northern Ireland, the system is considered suitable for use on, or at any distance from, the boundary, and the system is restricted for use in buildings up to 18 metres in height.

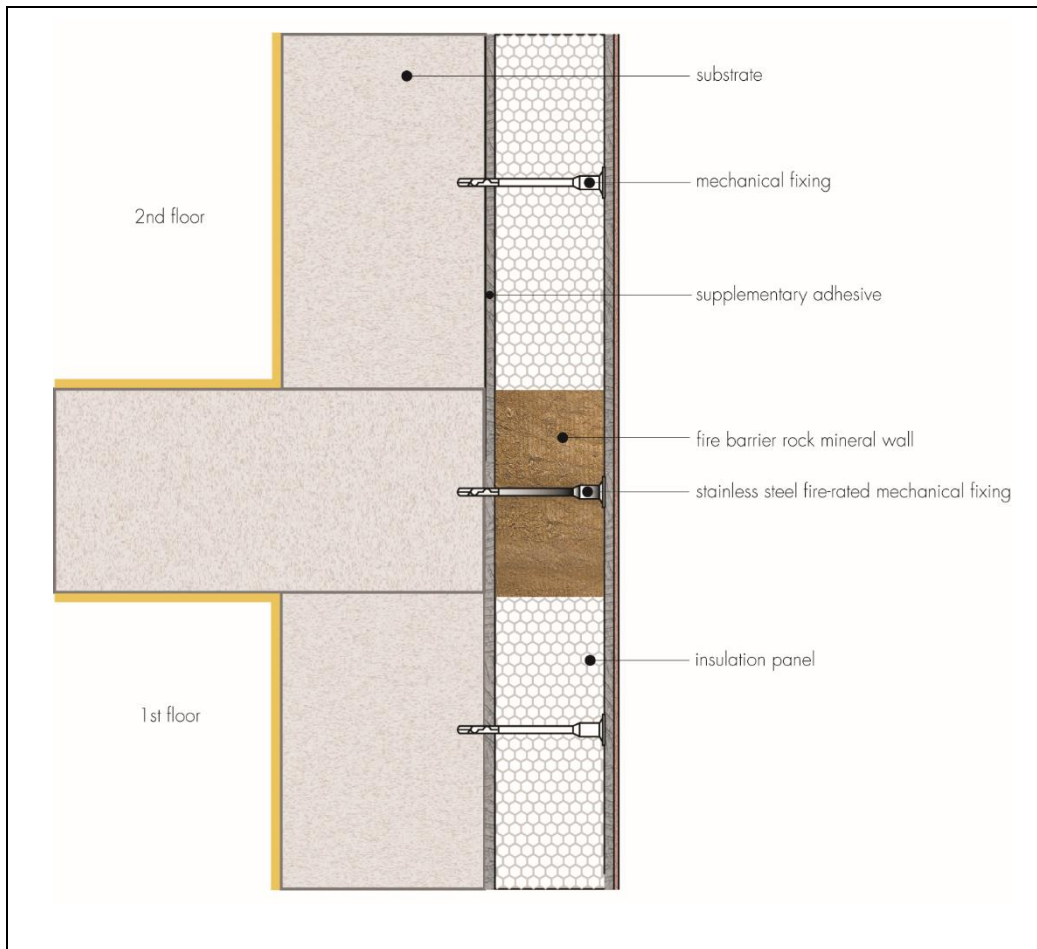


8.5 In Scotland, the system is not classified as non-combustible and may be used on buildings more than 1 m from a boundary and, on houses, 1 m or less from a boundary. With minor exceptions, the system should be included in calculations of unprotected area, except on houses where the external wall behind has the appropriate fire resistance.

8.6 In Scotland, the system should not be used on any building with a storey more than 11 m above the ground, or on any entertainment or assembly building with a total storey area more than 500 m², or on any hospital or residential care building with a total storey area more than 200 m².

8.7 For application to second storey walls and above, it is recommended that the designer includes 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 details



9 Proximity of flues and appliances

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

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 substrate walls are adequately watertight prior to 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 rain ingress.

10.3 The guidance given in BRE Report 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 and windows, 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.



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 4 and Annex G, and 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 (μ) factor (for the insulation boards) and equivalent air layer thickness (s_d) (for the render systems) are shown in Table 6.

Table 6 Water vapour resistance factor and equivalent air layer thickness

Layer	Thickness (mm)	μ	s_d (m)
EPS 70 boards (white and grey)	40 to 200	20-40 ⁽²⁾	—
EPS 100 boards (white and grey)	40 to 200	30-70 ⁽²⁾	—
Rendering system: reinforced basecoat + finish coat (specific particle size) as indicated below			
Raso Top 800 Grigio ⁽¹⁾ basecoat + Lerici finish coat	4.5 to 6.5	—	0.42 ⁽³⁾
Raso Top 800 Grigio ⁽¹⁾ basecoat + Siloxan Color finish coat	4.5 to 6.5	—	0.42 ⁽³⁾
Raso Top 800 Grigio ⁽¹⁾ basecoat + LicataSill finish coat	4.5 to 6.5	—	0.31 ⁽³⁾

(1) Equivalent air layer thickness (s_d) value also applies to Raso Top 800 Bianco basecoat, which is of a similar composition to Raso Top 800 Grigio which was tested as part of the rendering system.

(2) It is recommended that the lower figure is used when assessing the interstitial condensation risk.

(3) The s_d is only representative of 1.5 mm particle size; for other particle sizes, the Certificate holder should be contacted.

12 Maintenance and repair



12.1 An initial inspection should be made within 12 months and regularly 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 system and window and door frame).

12.2 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.

13.2 Any render containing Portland cement 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.

13.3 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 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 treatment and the need for any necessary repairs to the building structure before application of the system. A specification is prepared for each elevation of the building indicating:

- the position of beads
- detailing around windows and doors and at eaves
- damp-proof course (dpc) level
- exact position of expansion joints, if required
- 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 (see section 15) 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).

14.3 All modifications, such as alterations to external plumbing 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 1 m, 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 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 sills must be fitted to extend beyond the finished face of the system. New buildings should incorporate suitably deep sills (see Figure 12).

14.7 In new buildings, internal wet work (eg screeding 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 installers approved, 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 should be carried out in accordance with the Certificate holder's current installation instructions and this Certificate.

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 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.

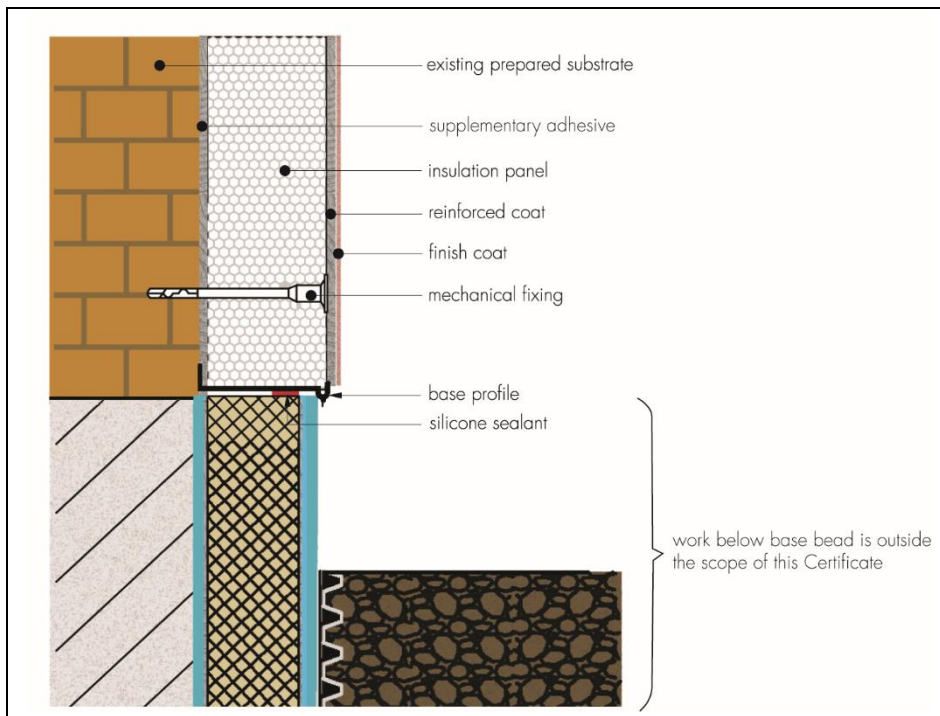
16.3 Where required, a fungicidal wash is applied to the entire surface of the external wall by brush, roller or spray.

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

Positioning and securing insulation boards

16.5 A base profile should be fixed to the external wall above the dpc to coincide with the lower edge of the insulation using the approved profile fixings at approximately 500 mm centres (see Figure 3). Base rail connectors are inserted at all rail joints. Extension profiles are fixed to the front lip of the base rail or stop end channel where appropriate. Stop profiles are positioned vertically, eg at party wall positions where the adjoining property does not require treatment.

Figure 3 Typical section at base profile

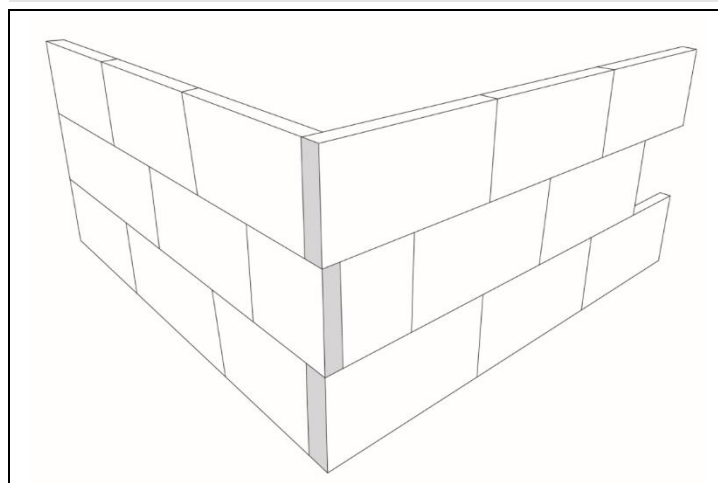


16.6 Insulation boards should be installed with staggered joints, including at the building corners, from the base-profile upward (see Figure 4). The boards should be bonded to the wall using the adhesive (as described in section 1.2). The adhesive is prepared with the required amount of water, and mixed with a paddle mixer until the desired consistency is achieved. After allowing the adhesive to rest for 5 minutes, it is stirred again. The adhesive is applied in a continuous line around the perimeter of the board with three additional dabs of adhesive distributed uniformly over the remaining surface to a minimum thickness of 5 mm (with at least 40% of the board covered). Alternatively, it can be applied over the entire surface of the board using a notched trowel.

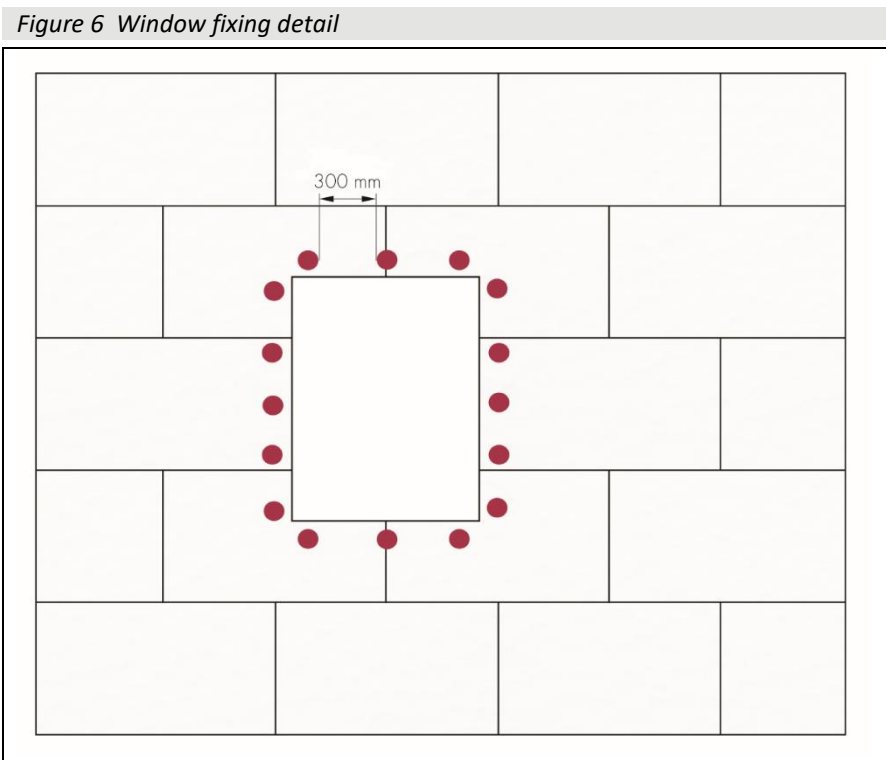
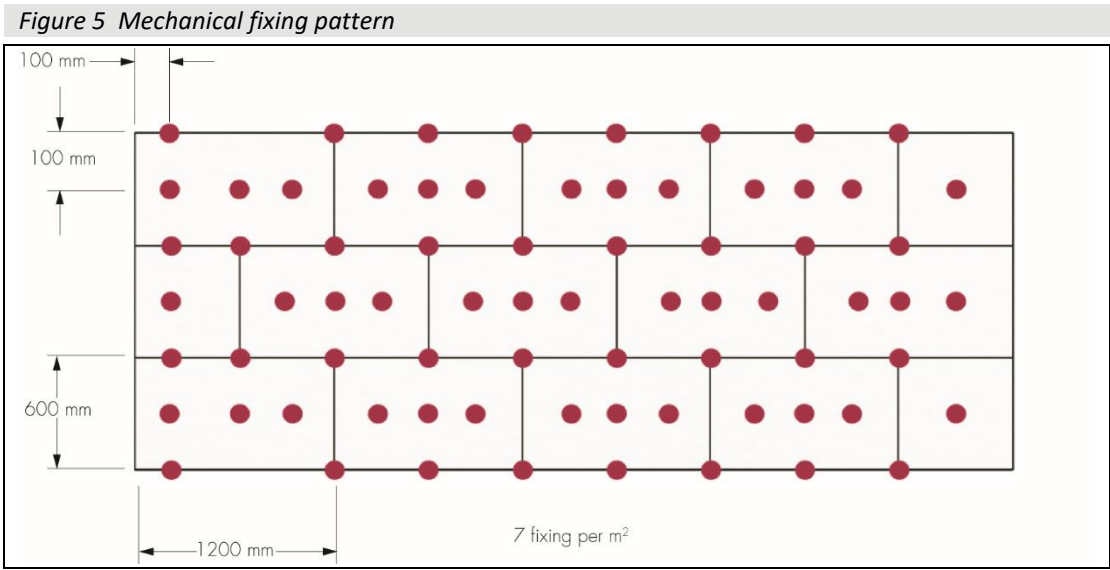
16.7 The first run of insulation boards, with adhesive applied, is positioned on the base profile and pressed firmly against the wall, and butted tightly together and aligned to achieve a level finish.

16.8 Vertical joints must be staggered by at least 200 mm (see Figure 4) and joints must not occur within 200 mm of the corners of openings. Joints between boards greater than 2 mm should be filled with slivers of insulation board or expansion foam. Gaps greater than 10 mm should be closed by repositioning or, where appropriate, by cutting boards to fit. Any gaps, high spots or irregularities are removed by lightly planing with a rasp over the whole surface. Alignment should be checked as work proceeds.

Figure 4 Board layout on the wall and at corners of a building



16.9 Holes are drilled into the substrate wall to the required depth through the insulation at the corner joints of each board and at positions which would result in a minimum of five fixings per board or seven fixings per square metre. The fixing pattern is shown in Figure 5 for a board size of 1200 x 600 mm. Around openings, additional fixings should be used at 300 mm centres (see Figure 6). The mechanical fixings are inserted and tapped or screwed firmly into place, securing the insulation to the substrate.

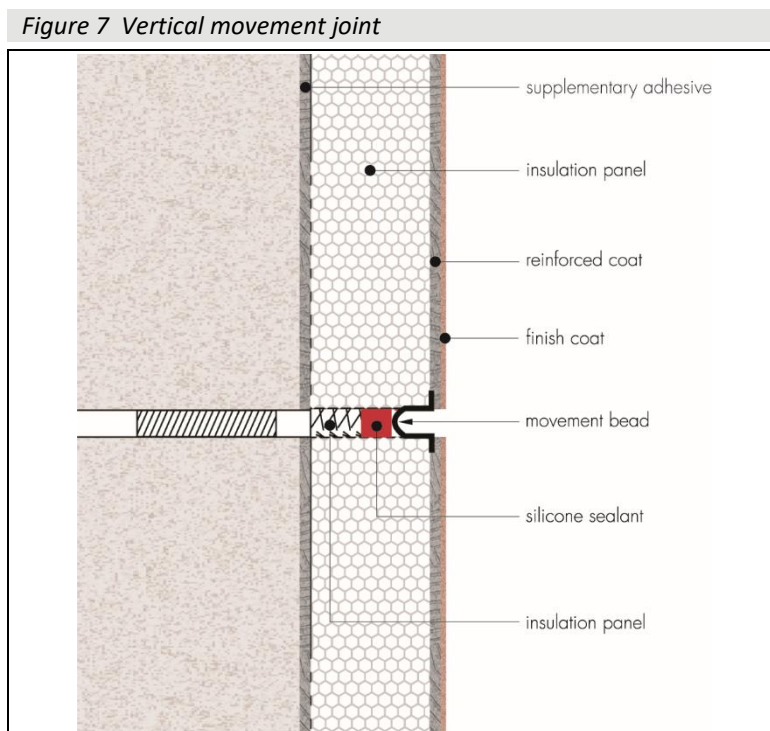


16.10 To fit around details such as doors and windows, insulation boards may be cut with a sharp knife or a fine-tooth saw. If required, purpose-made window sills, designed to prevent water ingress and incorporating drips to shed water clear of the system, are fitted.

16.11 Window and door reveals should be insulated to minimise the effects of cold bridging. Where clearance is limited, strips of approved insulation should be installed to suit available margins and details. Installation continues until the whole wall is completely covered including, where appropriate, the building soffits and eaves.

Movement joints

16.12 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 provided in the insulation system (see Figure 7).



16.13 At all locations where there is a risk of insulant exposure, eg window reveals or eaves, the system must be protected by such features as an adequate overhang or by purpose-made sub-sills, seals or flashing. All corners are fixed with mesh angles installed with adhesive mortar to building corners, door and window heads and jambs before applying basecoat to form the corners in accordance with the Certificate holder's instructions. Where appropriate, the PVC angle with drip mesh is installed, to allow the rainwater to drain away.

16.14 Prior to the application of the render system, the relevant seals are positioned and installed at all openings (or a bead of joint sealant is gun-applied at window and door frames), overhanging eaves, gas and electric meter boxes, and wall vents, or where the render abuts any other building material or surface. This helps to reduce the risk of water ingress into the structure.

Application of basecoat and reinforcing mesh

16.15 The basecoat is prepared with the required amount of water (see section 1.2), and mixed with a paddle mixer until the desired consistency is achieved. After allowing the basecoat to rest for 5 minutes, it is stirred again before it is ready to use. The basecoat is applied over the insulation boards using a stainless steel trowel, and floated with a Darby float to an approximate thickness of 3 to 5 mm, applied in two layers.

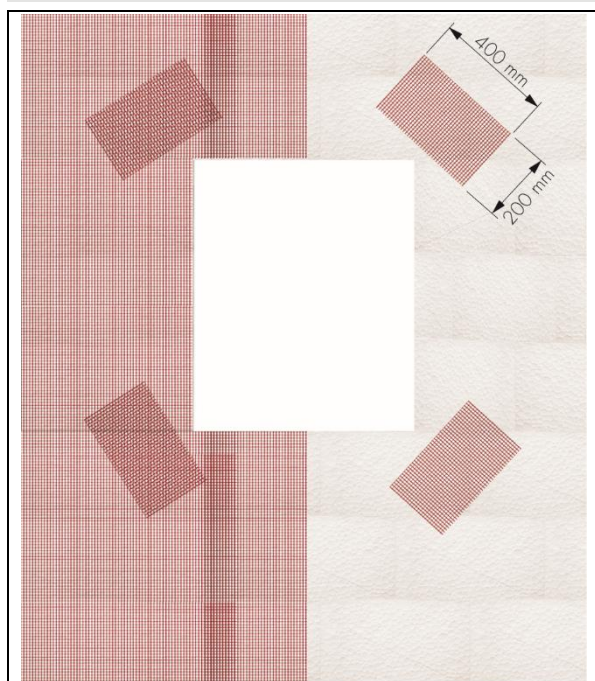
16.16 A layer of alkali-resisting glass-fibre reinforcing mesh is applied and immediately embedded (with its concave surface facing the wall). A light coat of basecoat is applied (whilst the first is still wet), ensuring that the reinforcement is in the top one third of the basecoat.

16.17 The mesh should be free of wrinkles and fully embedded in the basecoat (for areas requiring extra resistance to impact, two mesh layers should be used).

16.18 The basecoat is applied progressively, working in one metre sections vertically or horizontally. Overlapping at all mesh joints should not be less than 100 mm.

16.19 Additional pieces of reinforcing mesh (approximately 200 by 400 mm strips) are applied diagonally at a 45° angle to the corners of openings (prior to the application of the basecoat or, if applying a double layer of basecoat, prior to the application of the second coat) to provide the necessary reinforcement in the corners of window/door openings in accordance with the Certificate holder's instructions (see Figure 8).

Figure 8 Additional reinforcement of openings



16.20 The reinforced basecoat is left to dry for at least two days before applying a second coat, where required. The drying time will depend upon the conditions, but an additional 24 hours should elapse before the primer and finishing coats are applied. The overall thickness of the reinforced basecoat must be greater than 3 mm.

Primer

16.21 The primer is roller-applied after the basecoat has dried, first making sure it is free from any irregularities (trowel-marks, exposed mesh, etc). Isolante LG is applied as delivered whereas Acril Primer is diluted with clean water in a ratio 1:1 up to 1:3 (see section 1).

Finishing coats

16.22 The finishing coat is applied to the required thicknesses of 1.5 to 2 mm (depending on particle size), using a stainless steel trowel and finished with a plastic trowel to create a textured finish. The drying time is dependent on conditions, but will typically be 24 hours in accordance with the Certificate holder's instructions.

16.23 Continuous surfaces must be completed without a break, eg working to a wet edge. Care should be taken to prevent the basecoats and finishing coats from either drying too rapidly or freezing.

16.24 Care should be taken in the detailing of the system around openings and projections and at eaves (see Figures 9 to 12) to ensure adequate protection against water ingress and to limit the risk of water penetrating the system.

16.25 It is imperative that weather conditions are suitable for the application and curing of the finishing coats. In wet weather, the finished walls should be protected to prevent wash-off. It is also advisable that protective covers remain in place until required.

16.26 At the top of walls, the system should be protected by an adequate overhang (see Figure 9) or other detail designed for use with this type of system.

Figure 9 Typical detail – Eaves

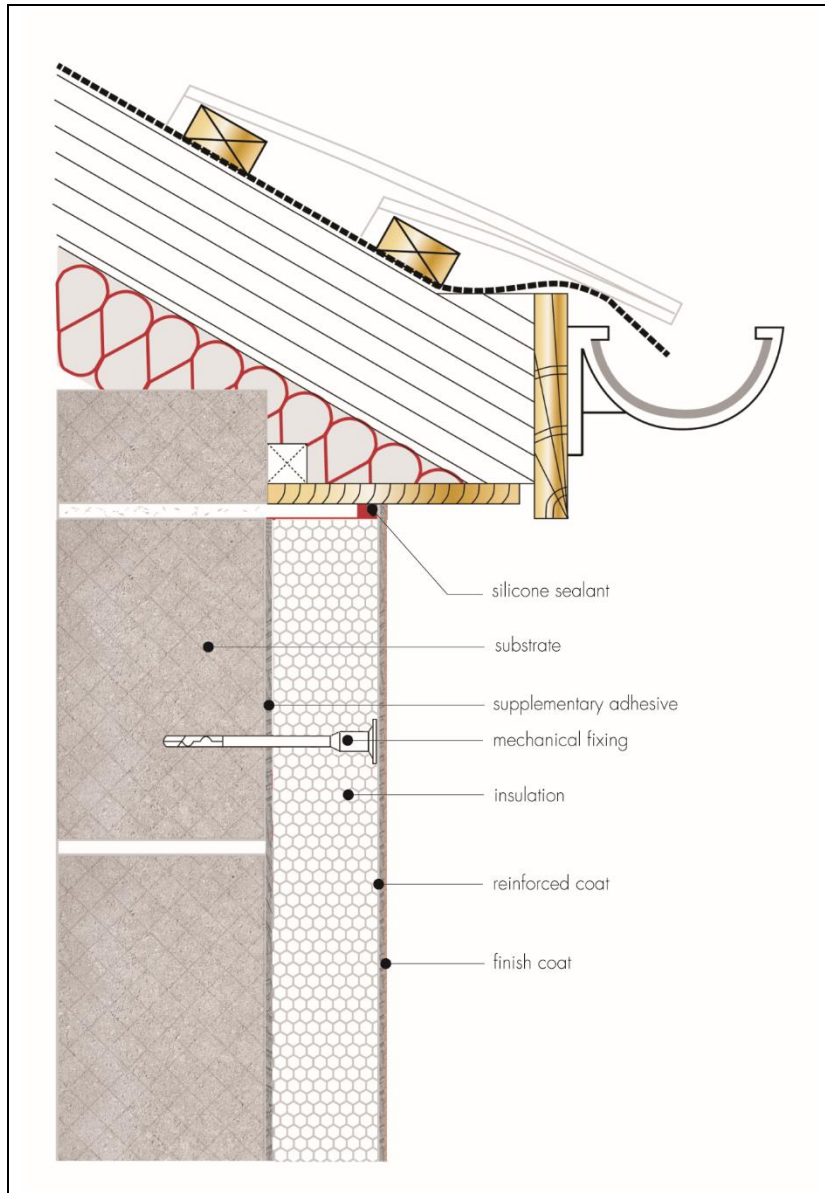


Figure 10 Building corner details

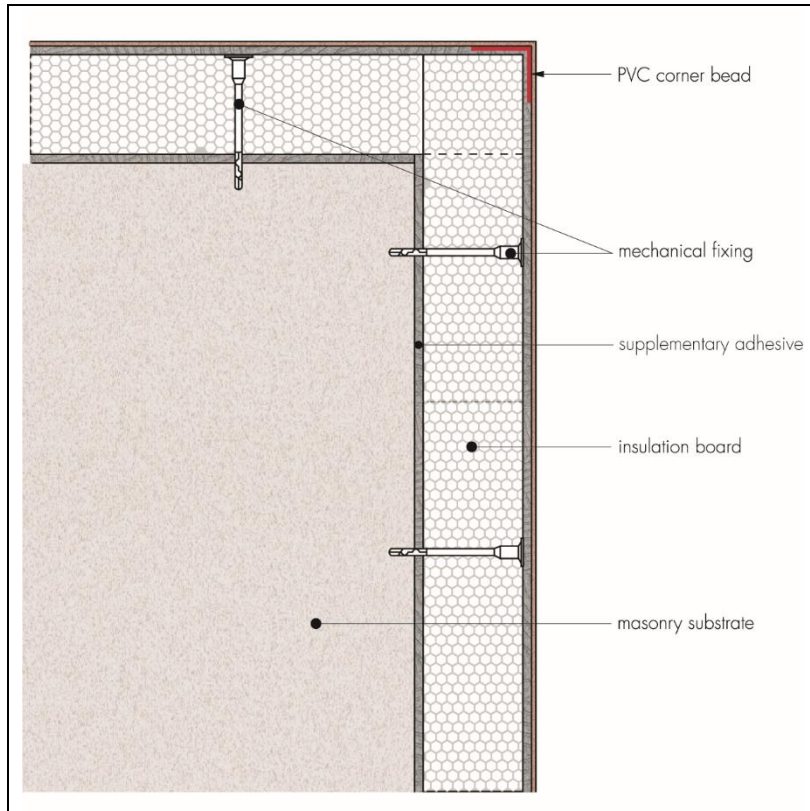


Figure 11 Insulated window reveal details

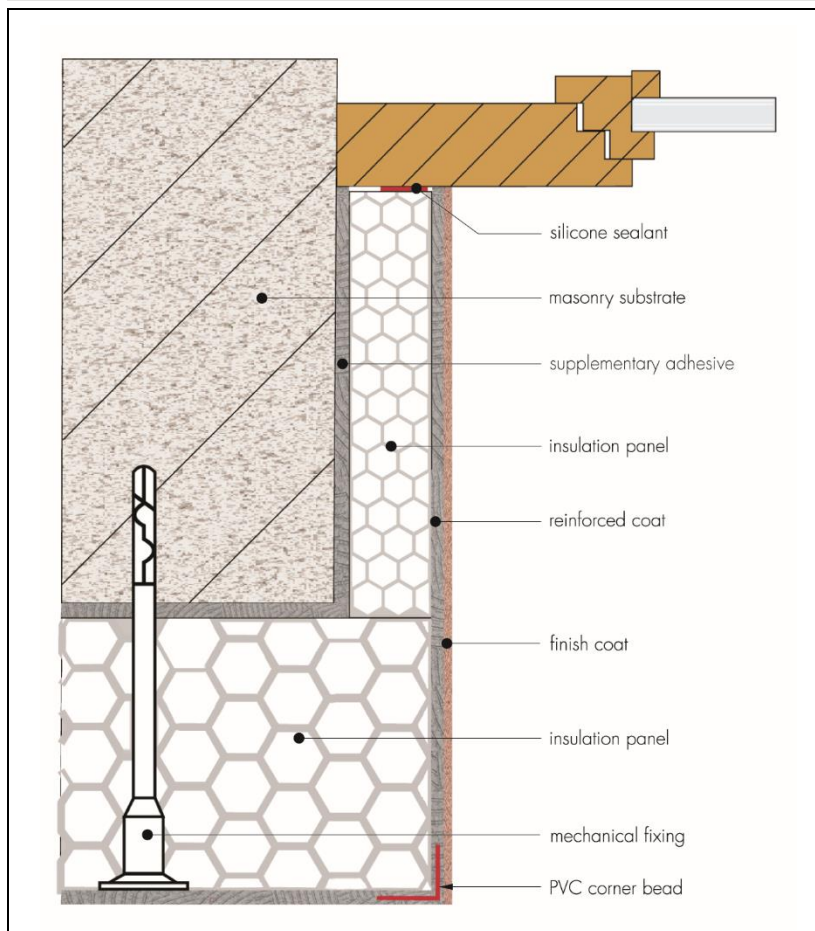
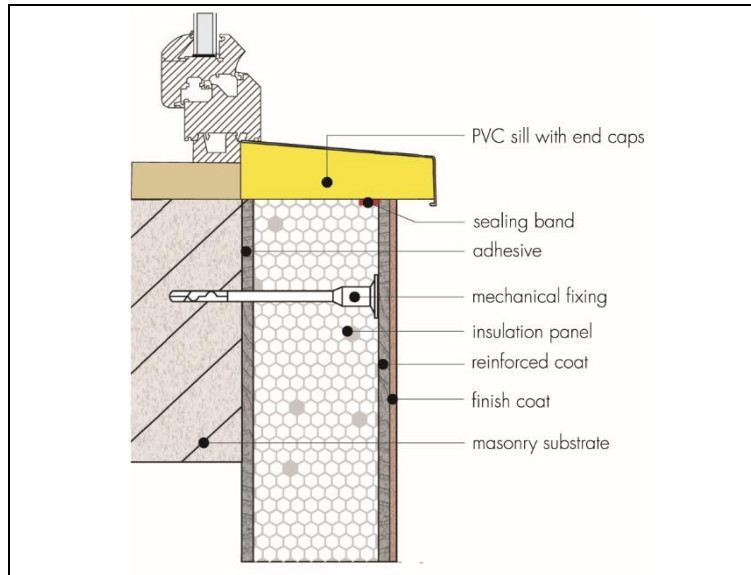


Figure 12 Window sill details



Technical Investigations

17 Tests

Results of tests were assessed to determine:

- reaction to fire classification in accordance with BS EN 13501-1 : 2007
- hygrothermal performance (heat/spray cycling)
- render/insulation bond strength
- resistance to hard body impact
- water vapour permeability
- water absorption
- pull-through resistance of fixings.

18 Investigations

18.1 An examination was made of data relating to:

- durability
- adequacy of the fixing system
- the risk of interstitial condensation
- thermal conductivity and example U values
- system wind load resistance.

18.2 The practicability of installation and the effectiveness of detailing techniques were assessed.

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

Bibliography

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- BRE Report BR 262 : 2002 *Thermal insulation : avoiding risk*
- BRE Report BR 443 : 2006 *Conventions for U-value calculations*
- BS 5250 : 2011 + A1 : 2016 *Code of practice for control of condensation in buildings*
- BS 8000-0 : 2014 *Workmanship on construction sites — Introduction and general principles*
- BS 8000-2.2 : 1990 *Workmanship on building sites — Code of practice for concrete work — Sitework with in situ and precast concrete*
- 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 + A1 : 2005 *Eurocode — Basis of structural design*
- BS EN 1991-1-4 : 2005 + A1 : 2010 *Eurocode 1 — Actions on structures — General actions — Wind actions*
- NA to BS EN 1991-1-4 : 2005 + A1 : 2010 *UK National Annex to Eurocode 1 — Actions on structures — General actions — Wind actions*
- BS EN 1992-1-1 : 2004 + A1 : 2014 *Eurocode 2 — Design of concrete structures — General rules and rules for buildings*
- NA to BS EN 1992-1-1 : 2004 + A1 : 2014 *UK National Annex to Eurocode 2 — Design of concrete structures — General rules and rules for buildings*
- BS EN 1996-1-1 : 2005 + A1 : 2012 *Eurocode 6 — Design of masonry structures — General rules for reinforced and unreinforced masonry structures*
- NA to BS EN 1996-1-1 : 2005 + A1 : 2012 *UK National Annex to Eurocode 6 — Design of masonry structures — General rules for reinforced and unreinforced masonry structures*
- BS EN 1996-2 : 2006 *Eurocode 6 — Design of masonry structures — Design considerations, selection of materials and execution of masonry*
- NA to BS EN 1996-2 : 2006 *UK National Annex to Eurocode 6 — Design of masonry structures — Design considerations, selection of materials and execution of masonry*
- BS EN 13163 : 2012 + A2 : 2016 *Thermal insulation products for buildings — Factory made products of expanded polystyrene (EPS) — Specification*
- BS EN 13501-1 : 2007 + A1 : 2009 *Fire classification of construction products and building elements — Classification using test data from reaction to fire tests*
- BS EN 13914-1 : 2016 *Design, preparation and application of external rendering and internal plastering — External rendering*
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- BS EN ISO 14001 : 2004 *Environmental management systems — Requirements*
- EAD 330196-00-0604 : 2016 *Plastic anchors made of virgin or non-virgin material for fixing of external thermal insulation composite systems with rendering*
- EOTA TR051 : 2016 *Recommendations for job-site tests of plastic anchors and screws*
- ETAG 004 : 2013 *Guideline for European Technical Approval of Plastic Anchors for fixing of External Thermal Composite Systems (ETICS) with Rendering*

19 Conditions

19.1 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.

19.2 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.

19.3 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.

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

19.5 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.

19.6 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.