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Agrément Certificate
13/5056
Product Sheet 1

STRIKOLITH EXTERNAL WALL INSULATION SYSTEMS

STRIKOTHERM EPS EXTERNAL WALL INSULATION SYSTEM

This Agrément Certificate Product Sheet⁽¹⁾ relates to Strikotherm EPS External Wall Insulation System, comprising mechanically-fixed expanded polystyrene (EPS) or enhanced expanded polystyrene (EEPS) insulation boards with a reinforced basecoat and render finishes, and suitable for use on 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 contribute to meeting the requirements of the Building Regulations (see section 6).

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

Behaviour in relation to fire — the system has a B-s1,d0 or C-s2,d0 surface spread of flame classification, depending on the version chosen, and can meet this requirement in accordance with the national Building Regulations (see section 8).

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

Durability — with appropriate care, 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 First issue: 22 October 2013

John Albon — Head of Approvals
Energy and Ventilation

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.

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Regulations

In the opinion of the BBA, StrikoTherm EPS External Wall Insulation System, if installed, used and maintained in accordance with this Certificate, will meet or contribute to meeting 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 section 7.4 of this Certificate.
Requirement:	B4(1)	External fire spread
Comment:		The system can meet or contribute to meeting this Requirement. See sections 8.1 to 8.5 and 8.8 of this Certificate.
Requirement:	C2(b)	Resistance to moisture
Comment:		The system can provide a degree of protection against rain ingress. See sections 4.5 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 meeting this Requirement. See sections 6.2 and 6.3 of this Certificate.
Regulation:	7	Materials and workmanship
Comment:		The system is acceptable. See section 13.1 and the <i>Installation</i> part of this Certificate.
Regulation:	26	CO₂ emission rate for new buildings
Comment:		The system can contribute to meeting this Regulation. See section 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 meeting 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 section 7.4 of this Certificate.
Standard:	2.6	Spread to neighbouring buildings
Comment:		The system can meet 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 8.4, and 8.6 to 8.8 of this Certificate.
Standard:	2.7	Spread on external walls
Comment:		The system can meet this Standard and is acceptable for use more than one metre from a boundary, with reference to clauses 2.7.1 ⁽¹⁾⁽²⁾ , 2.7.2 ⁽²⁾ and Annex 2A ⁽¹⁾ . See sections 8.1 to 8.4 and 8.6 to 8.8 of this Certificate.
Standard:	3.10	Precipitation
Comment:		The system will contribute to a construction satisfying this Standard, with reference to clauses 3.10.1 ⁽¹⁾⁽²⁾ and 3.10.2 ⁽¹⁾⁽²⁾ . See sections 4.5 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 meeting 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 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

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:		Walls insulated with the system will satisfy this Regulation. See sections 4.5 and 10.1 of this Certificate.
Regulation:	29	Condensation
Comment:		Walls insulated with the system will satisfy the requirements of this Regulation. See sections 11.2 and 11.4 of this Certificate.
Regulation:	30	Stability
Comment:		The system can sustain and transmit wind loads to the substrate wall. See section 7.4 of this Certificate.
Regulation:	36(a)	External fire spread
Comment:		The system has a low risk surface and can satisfy this Regulation. See sections 8.1 to 8.5 and 8.8 of this Certificate.
Regulation:	39(a)(i) 40	Conservation measures Target carbon dioxide emission rate
Comment:		The system will contribute to a building satisfying its target emission rate. See sections 6.2 and 6.3 of this Certificate.

Construction (Design and Management) Regulations 2007

Construction (Design and Management) Regulations (Northern Ireland) 2007

Information in this Certificate may assist the client, CDM co-ordinator, designer and contractors 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 2013

NHBC accepts the use of the Strikotherm EPS 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 Strikotherm EPS External Wall Insulation System consists of insulation boards mechanically fixed directly to the substrate wall through the insulation, with supplementary adhesive and embedded reinforced render basecoat and render finishes (see Figure 1). They are made up of the following components:

Adhesives

- Strikotherm EPS Adhesive and Basecoat Mortar GG and GW — a cement-based powder plaster requiring the addition of about 26% of its weight in water, with a nominal application thickness of 4 mm

Insulation

- expanded polystyrene (EPS70) insulation boards — 500 mm by 1000 mm in a range of thicknesses between 40 mm and 250 mm, with a nominal density of 14 to 17 Kg·m⁻³, a minimum compressive strength of 70 kPa and a minimum nominal tensile strength perpendicular to the face of 100 kPa. Boards are manufactured to comply with the requirements of factory manufactured expanded polystyrene material to BS EN 13163 : 2001
- expanded polystyrene (EPS70E) insulation boards — 500 mm by 1000 mm in a range of thicknesses between 40 mm and 250 mm, with a nominal density of 14 to 17 Kg·m⁻³, a minimum compressive strength of 70 kPa and a minimum nominal tensile strength perpendicular to the face of 100 kPa. Boards are manufactured to comply with the requirements of factory manufactured expanded polystyrene material to BS EN 13163 : 2001, and are fire retardant in accordance with BS EN ISO 11925-2 : 2010
- enhanced expanded polystyrene (EEPS70E) insulation boards — 500 mm by 1000 mm in a range of thicknesses between 40 mm and 250 mm, with a nominal density of 15 to 17 Kg·m⁻³, a minimum compressive strength of 70 kPa and a minimum nominal tensile strength perpendicular to the face of 100 kPa. Boards are manufactured to comply with the requirements of factory manufactured expanded polystyrene material to BS EN 13163 : 2001, and are fire retardant in accordance with BS EN ISO 11925-2 : 2010

Fixings

- mechanical fixings⁽¹⁾ — anchors with adequate length to suit the substrate and insulation thickness, approved and supplied by the Certificate holder, and selected from :
Ejot STU — polyethylene, PE-HD with steel or electro-galvanised nails
Ejot STR U — polyethylene, PE-HD with steel or electro-galvanised nails

Ejot NTU — polyethylene, PE-HD with steel or electro-galvanised nails

Ejot NTK U — polyethylene, PE-HD with polyamide, PA GF 50 nails

(1) Other fixings may be used provided they can be demonstrated to have equal or higher pull out and plate stiffness characteristics.

Basecoats

- Strikotherm Adhesive and Basecoat Mortar GW FLEX — a ready-to-use paste base or resin binder (non cementitious), with a nominal application thickness of 4 mm
- Strikotherm Adhesive and Basecoat Mortar GG — a cement-based powder plaster requiring the addition of about 26% of its weight in water, with a nominal application thickness of 4 mm
- Strikotherm Adhesive and Basecoat Mortar GW — a cement-based powder plaster requiring the addition of about 26% of its weight in water, with a nominal application thickness of 4 mm
- Strikotherm Adhesive and Basecoat Mortar GW PLUS — a cement-based powder plaster requiring the addition of about 26% of its weight in water, with a nominal application thickness of 4 to 7 mm

Reinforcement

- Strikotherm Reinforcing Mesh — a 1 metre wide, woven glass fibre reinforcing mesh (embedded in the basecoat) with alkali and slide-resistant polymer coating, with a nominal weight of about $165 \text{ g}\cdot\text{m}^{-2}$, mesh size 4 mm by 4 mm and thickness less than 1 mm (see Figure 6)

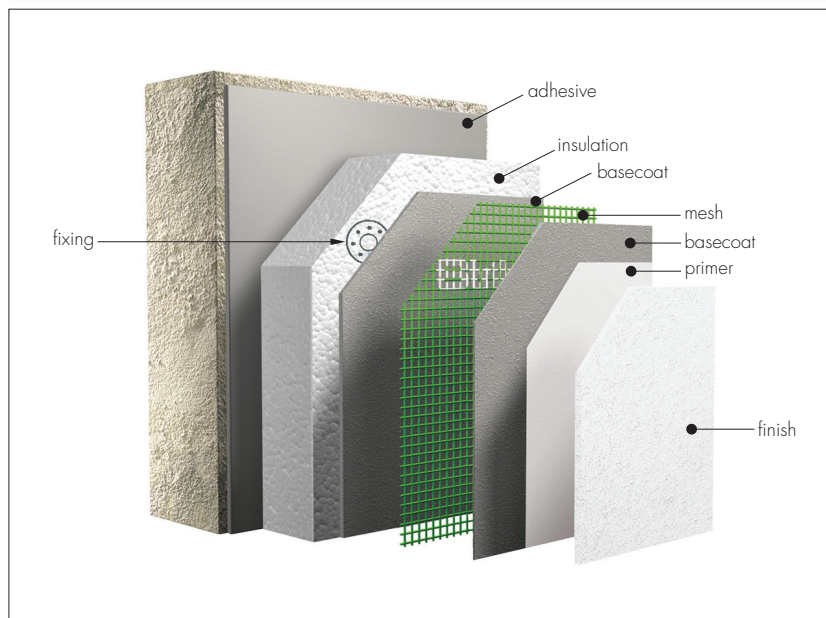
Primers

- Strikotherm BGI, Silicone or Silicate Primers — key coat resin-based binder, through coloured, vapour permeable, liquid primers used directly, or diluted with the addition of clean water, and applied to the finished basecoats by brush, roller or spray

Finishes

- Strikotherm BGI Plaster — a finishing coat of ready-to-use paste based on vinyl/acrylic binder, with particle sizes 1.5, 2.0 or 3.0 mm and a thickness equal to particle size
- Strikotherm Silicate Plaster — a finishing coat of ready-to-use paste based on silicate binder, with particle sizes 1.5, 2.0 or 3.0 mm and a thickness equal to particle size
- Strikotherm Silicone Plaster — a finishing coat of ready to use paste based on styrol acryl-silicone resin binder, with particle sizes 1.5, 2.0 or 3.0 mm and a thickness equal to particle size
- Strikotherm Variostar — a finishing coat of cement based powder plaster requiring the addition of about 30% of its weight in water, with particle sizes 1.0, 2.0 or 3.0 mm and a thickness equal to particle size.

Figure 1 Strikotherm EPS External Wall Insulation system components



1.2 Ancillary items supplied with the system but outside the scope of this Certificate:

- profiles — a range of standard profiles such as starter track, angle and mesh angle beads, and stop ends
- expansion joint beads
- bitumen emulsion
- seal tape
- profile fixings — driven pins with plastic expansion sleeves
- sealant — silicone sealant

1.3 The insulation boards are mechanically fixed to the external surface of the substrate through the insulation boards with supplementary adhesive. Basecoat render is trowel-applied to the board face to an approximate thickness of 4 mm, the reinforcing mesh embedding immediately, and then a further layer of basecoat render is applied to a total thickness of approximately 6 mm. When dry, the surface is primed for the application of the selected render finishing coat followed by the decorative coat.

2 Manufacture

2.1 As part of the assessment and on-going 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.

2.2 The management system of Strikolith UK has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2008 (Certificate GB11301) and BS EN ISO 14001 : 2004 (Certificate GB17295) by QMS International plc.

3 Delivery and site handling

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

<i>Table 1 Component supply details</i>	
Component	Quantity and package
Insulation boards	Shrink-wrapped in polythene
Strikotherm Adhesives GG and GW	25 kg bag
Strikotherm Basecoat GW FLEX	25 kg bucket
Strikotherm Basecoat GG and GW	25 kg bag
Strikotherm Basecoat GW Plus	20 kg bag
Strikotherm mechanical fixings	boxed by manufacturer, 100 per box
Strikotherm reinforcement mesh	1 m x 50 m rolls
Strikotherm Silicone, Silicate and BGI Primers	16 and 22 kg plastic bucket (liquid)
Strikotherm BGI Plaster Finish	17 kg plastic bucket (paste)
Strikotherm Silicone, Silicate Plaster Finish	17 kg plastic bucket (paste)
Strikotherm Variostar Finish	25 kg bag (powder)

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

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

3.4 The basecoat, adhesive and topcoats 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 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 Strikotherm EPS External Wall Insulation System.

Design Considerations

4 General

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

4.2 The system is applied to the outside of external walls of masonry and dense or no-fines concrete construction and is suitable for use on new or existing domestic or non-domestic buildings up to 18 m in height. Application and maintenance must be carried out strictly in accordance with this Certificate and the Certificate holder's instructions, by installers trained and approved by the Certificate holder.

4.3 The system will improve the weather resistance of a wall and provide a decorative finish. However, it should only be installed where there is no sign of dampness on the inner surface of the wall other than that caused solely by condensation (see section 10.1)

4.4 New or existing buildings should have wall surfaces in accordance with section 14 of this Certificate.

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

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

4.6 Other new buildings not subject to regulatory requirements should also be built in accordance with the standards identified in section 4.5.

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

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

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

5 Practicability of installation

The system should be installed only by specialised contractors who have successfully undergone training and registration by the Certificate Holder.

Note: The BBA operates a UKAS Accredited Approved Installer Scheme for external wall insulation; 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 : 2007 and BRE Report BR 443 : 2006, using the declared thermal conductivity (λ_D value) of the insulations given in Table 2.

Table 2 Thermal conductivity values

Insulation	Board thickness range (mm)	Lambda value ($\text{W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$)
EPS70	40 to 250	0.038
EPS70E		0.037
EEPS70E		0.030

 6.2 The U value of a completed wall will depend on the selected insulation thickness and fixing method, the insulating value of the substrate masonry and its internal finish. Calculated U values, in accordance with BS EN ISO 6946, for sample constructions in accordance to the Building Regulations are given in Table 3 using the declared thermal conductivities given in Table 2.

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

U-value ($\text{W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}$)	Insulation thickness requirement (mm) ⁽³⁾					
	215 mm Brickwork, $\lambda = 0.56 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$			200 mm Dense blockwork, $\lambda = 1.75 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$		
	EPS70	EPS70E	EEPS70E	EPS	EPS70E	EEPS70E
0.19	200	200	160	210	200	170
0.25	150	140	120	150	150	120
0.26	140	140	110	150	140	120
0.28	130	120	100	140	130	110
0.30	120	110	90	130	120	100
0.35	100	90	80	110	100	80

(1) Wall construction inclusive of 13 mm plaster ($\lambda = 0.57 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$), 6 mm render ($\lambda = 1 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$), brickwork (17.1% mortar) or blockwork (6.3% mortar) ($\lambda = 0.88 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$) and insulation (see 2).

(2) Calculation based on a mechanically fixed system that included ten stainless steel fixings ($X_p = 0.002 \text{ W}\cdot\text{K}^{-1}$) per m^2 . 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.

6.3 The system can contribute to maintaining continuity of thermal insulation at junctions between elements and openings. For Accredited Construction Details the corresponding psi values in BRE Information Paper IP 1/06, Table 3, may be used in carbon emission calculations in Scotland and Northern Ireland. Detailed guidance for other junctions and on limiting heat loss by air infiltration can be found in:

England and Wales — Approved Documents to Part L and for new thermal elements to existing buildings, Accredited Construction Details (version 1.0). See also SAP 2009 Appendix K and the *iSBEM User Manual* for new-build

Scotland — Accredited Construction Details (Scotland)

Northern Ireland — Accredited Construction Details (version 1.0).

7 Strength and stability

7.1 When installed on suitable walls, the system can adequately transfer to the wall the self-weight and negative (suction and pressure) 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.

7.3 Negative wind pressure (suction) is resisted by the bond between each component. The insulation boards are retained by the external wall insulation system anchors.

 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 individual 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 contribution from the insulation system
- the proposed system and associated fixing layout (see Figure 4) provides adequate resistance to negative wind loads (based on the results of site investigation and test results given in Table 5)
- 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 mechanical fixings will adequately support and transfer the weight of the render insulation system to the substrate wall at the minimum spacing given in this certificate. Typical characteristic pull-out strengths for the fixings taken from the European Technical Approval (ETA) are given in Table 4. However, these values are dependent on the substrate and the fixing must be selected to suit the loads and substrate concerned.

Table 4 Fixings — typical characteristic pull-out strengths

Fixing Type	ETA number	Substrate	Drill diameter (mm)	Embedment Depth (mm)	Typical Pull out strength (kN)
Ejot STU	02/0018	Concrete/brickwork	8 mm	25 mm	1.2/1.2
Ejot STR U	04/0023	Concrete/brickwork	8 mm	25 mm	1.5/1.5
Ejot NT U	05/0009	Concrete/brickwork	8 mm	25 mm	1.2/1.5
Ejot NTK U	07/0026	Concrete/brickwork	8 mm	40 mm	0.9/0.9

7.7 The pull-through resistance determined by BBA from tests on anchors are given in Table 5.

Table 5 Typical calculation to establish the pull through resistances

Factor (unit)	Insulation ⁽¹⁾
	EPS
Fixings plate diameter (mm)	60
Fixings types	See Table 4
Insulation thickness (mm)	>60
Characteristic pull-through resistance ⁽²⁾ per fixing (N) at joints	388
Factor of safety ⁽³⁾	2.5
Design pull-through resistance per fixing (N)	155

(1) Calculation based upon insulation slab 1000 mm by 500 mm (total area 0.5 m²) attached by five fixings.

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

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

Impact resistance

7.8 Hard body impact tests were carried out in accordance with ETAG 004 : 2011. The system is suitable for use in Use Categories I to III⁽¹⁾, depending on the finish. See Table 6.

(1) Categories are as follows:

- Category I — a zone readily accessible at ground level to the public and vulnerable to hard body impacts but not subject to abnormally rough use
- Category II — a zone liable to impacts from thrown or kicked objects, but in public locations where the height of the systems 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.

Table 6 Strikolith External Wall Insulation System resistance to impacts

Rendering systems	Impact Category
Strikotherm GW FLEX basecoat + BGI finish Strikotherm GW FLEX basecoat + Silicone finish	Category I
Strikotherm GG basecoat + BGI finish Strikotherm GG basecoat + Silicate finish Strikotherm GG basecoat + Silicone finish Strikotherm GG basecoat + Variostar finish	Category II
Strikotherm GW Plus basecoat + BGI Plaster finish Strikotherm GW Plus basecoat + Silicate finish Strikotherm GW Plus basecoat + Variostar finish Strikotherm GW Plus basecoat + Silicone finish	Category II
Strikotherm GW basecoat + BGI Plaster finish	Category II
Strikotherm GW basecoat + Silicate finish	Category III ⁽¹⁾
Strikotherm GW basecoat + Variostar finish	Category II
Strikotherm GW basecoat + Silicone finish	Category III ⁽¹⁾

(1) Assessment based upon small scale test results carried out by the ETA issuing organisation.

8 Behaviour in relation to fire



8.1 The system classification is described in Table 7.

Table 7 Reaction to fire classification in accordance with EN 13501-1 : 2007

System	Classification
Strikotherm 100-200 GG EPS Strikotherm 100-200 GW EPS Strikotherm 100-200 GW Plus EPS	B-s1,d0
Strikotherm 100 GW FLEX EPS	C-s2,d0

8.2 The classification applies to the full range of thicknesses and finishes covered by this Certificate.

8.3 The insulation materials are not classified as non-combustible.

8.4 Application to second storey walls and above should include at least one stainless steel mechanical fixing per square metre, and consideration should be given to including fire barriers in line with compartment walls and floors as recommended in BRE Report BR 135 : 2013 (see Figure 2).

System with a B-s2, d0 fire rating



8.5 The system is considered suitable for use on or at any distance from the boundary and restricted for use in buildings up to 18 m in height.



8.6 The system is classified as 'low risk' combustible materials and must not be used within 1 m of the boundary and are restricted for use in buildings up to 18 m in height.

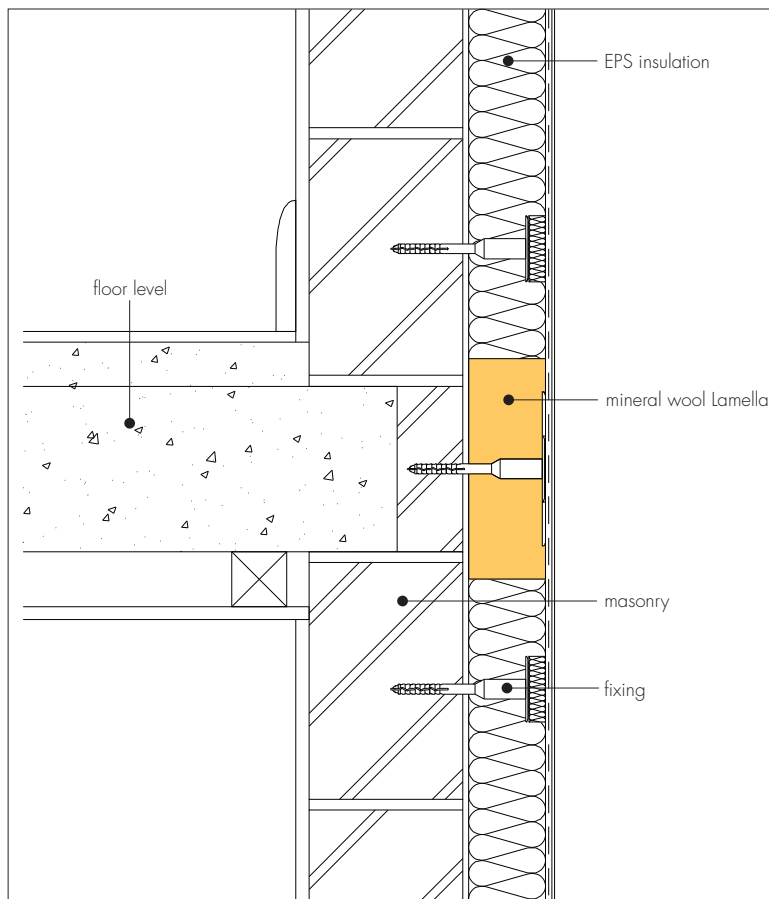
8.7 The system is not classified as 'non-combustible'; therefore, calculations for unprotected areas apply, with some minor exceptions.

System with a C-s1, d0 fire rating



8.8 The system is considered suitable for use on or more than 1 m of the boundary depending on the calculated unprotected area and is restricted for use in buildings up to 18 m in height.

Figure 2 Fire barrier



9 Proximity of flues

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

England and Wales — *Approved Document J*

Scotland — *Mandatory Standard 3.19, clause 3.19.4⁽¹⁾⁽²⁾*

(1) Technical Handbook (Domestic)

(2) Technical Handbook (Non-Domestic).

Northern Ireland — *Technical Booklet L*

10 Water resistance



10.1 The system will provide a degree of protection against rain ingress. However, care should be taken to ensure that walls are adequately weathertight prior to its application. The insulation 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 BR 262 : 2002 should be followed in connection with the weathertightness of solid wall constructions. The designer should select a construction appropriate to the local wind-driven 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 overhang or other detail designed for use with these types of system (see section 16.24).

11 Risk of Condensation



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

Surface condensation



11.2 Walls will limit the risk of surface condensation adequately 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 BR 262 : 2002.

Interstitial condensation



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

11.5 The render has an equivalent air layer thickness (S_a) of approximately 0.03 m. This corresponds to a water vapour resistance factor (μ) of approximately 20 for a render thickness of 6 mm.

11.6 The water vapour resistance (μ) factor for the insulation boards, as taken from BS EN ISO 10456 : 2007, Table 3 and 4, is:

- expanded polystyrene 60
- enhanced polystyrene 60
- render 20.

12 Maintenance and repair



12.1 Regular checks should be made on the installed system, including:

- 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 : 2005.

13 Durability



13.1 The system will have a service life of not less than 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 is 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 a suitable masonry coating (ie one covered by a valid BBA Certificate for this purpose). 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 any repairs necessary to the building structure undertaken before application of a system. A specification is prepared for each elevation of the building indicating:

- the position of beads and starter track
- detailing around windows, 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 where required
- where required, the position of fire barriers.

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

14.3 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 1 m, must be made good prior to installation to ensure that the insulation boards are installed with a smooth, in-plane finished surface.

14.4 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.

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

14.6 Internal wet work, eg screeding or plastering, should be completed and allowed to dry prior to the application of a system.

14.7 All modifications, such as provision for fire barriers (see section 8) and necessary repairs to the building structure, are completed before installation commences.

15 Approved Installers

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

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

16 Procedure

General

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

16.2 Weather conditions should be monitored to ensure correct application and curing conditions. Application of coating materials must not be carried out at temperatures below 5°C or above 30°C, nor if exposure to frost is likely, and the coating must be protected from rapid drying.

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

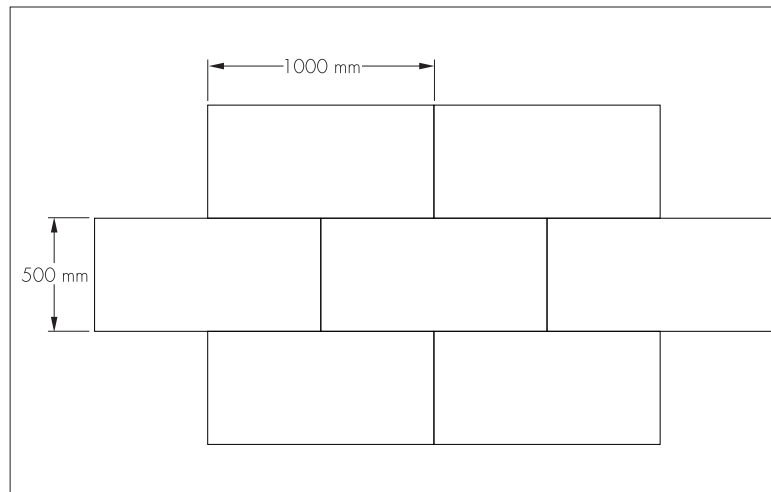
Positioning and securing insulation boards

16.4 The base profile is secured to the external wall above the dpc using the approved profile fixings at approximately 300 mm centres. If a temporary timber batten is to be used, a strip of mesh is partially adhered to the wall so that 300 mm of mesh is hanging from the starting line of the installation. Base rail connectors are inserted at all rail joints. Extension profiles are fixed to the front of the base rail or stop end channel where appropriate.

16.5 The adhesive is prepared by mixing 6 to 7 litres of clean water with every 25kg bag and applied over the entire rear face of the insulation board, using a notched trowel.

16.6 The first run of insulation boards are positioned on the base profile, and must be pressed firmly against the wall and butted tightly together. Joints in the system greater than approximately 2 mm should be filled with slivers of insulation board or PU foam, and any irregularity removed. Subsequent rows of boards are positioned so that the vertical joints are staggered and overlap at the building corners, and so that the board joints do not occur within 150 mm of the corners of openings (see Figure 3). Care must be taken to ensure that all insulation boards are butted tightly together, and alignment should be checked as work proceeds.

Figure 3 Positioning of the boards



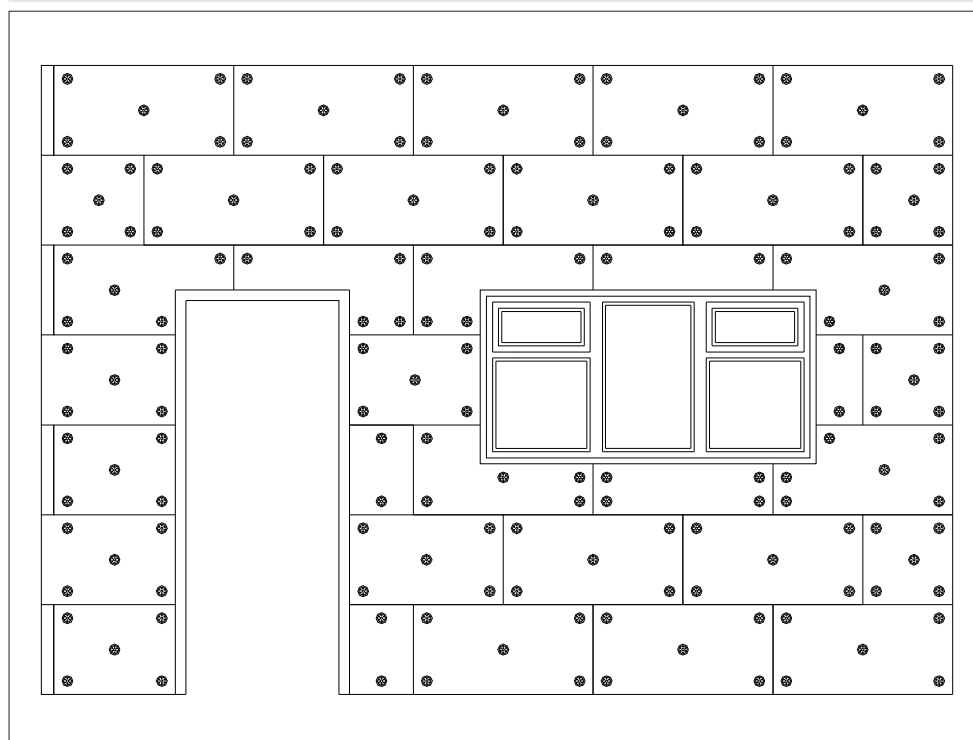
16.7 To fit around details such as doors and windows, insulation boards may be cut with a sharp knife or a fine-tooth saw. If required, purpose-made window sills are fitted. They are designed to prevent water ingress and incorporate drips to shed water clear of the system.

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

16.9 Allowance should be made where either existing render is on the wall or dubbing-out render has been used to align the boards, as the effective embedment will be reduced.

16.10 The mechanical fixings are installed through the insulation by holes drilled into the substrate to the required depth at the corners of each board and at positions which will allow for a nominal seven to eight fixings per square metre (see Figure 4). The mechanical fixings are inserted and tapped or screwed firmly into place, securing the insulation to the substrate.

Figure 4 Typical fixing pattern

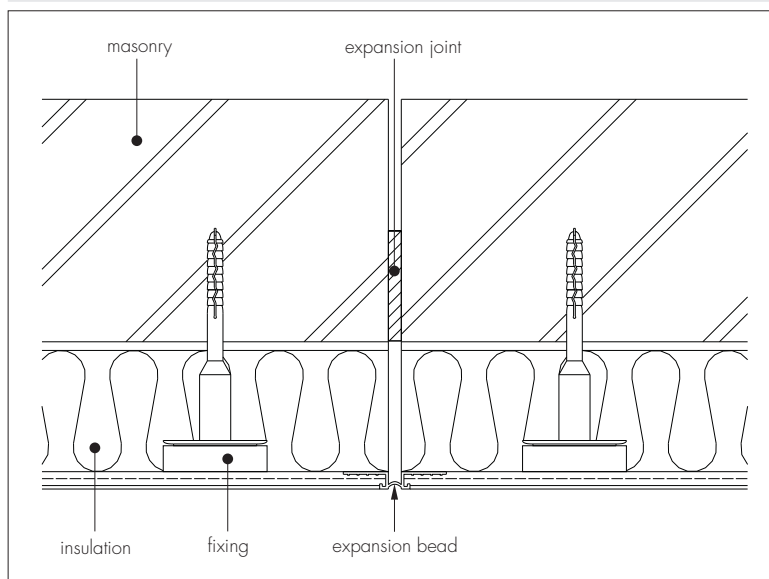


Movement joints

16.11 Expansion beads are fixed vertically in agreed positions. These beads are positioned at approximately seven metre centres along a building, the centres depending on the individual design and requirements of each job. The Certificate holder should be consulted for further information regarding provision for expansion in the system.

16.12 Vertical or horizontal movement joints in the substrate must be continued through the system or render when applied. Additional expansion or movement joints are determined by the Certificate holder at the time of the initial survey on case by case basis. The joint detail using purpose-made trims is illustrated in Figure 5.

Figure 5 Vertical movement joint



Reinforcing

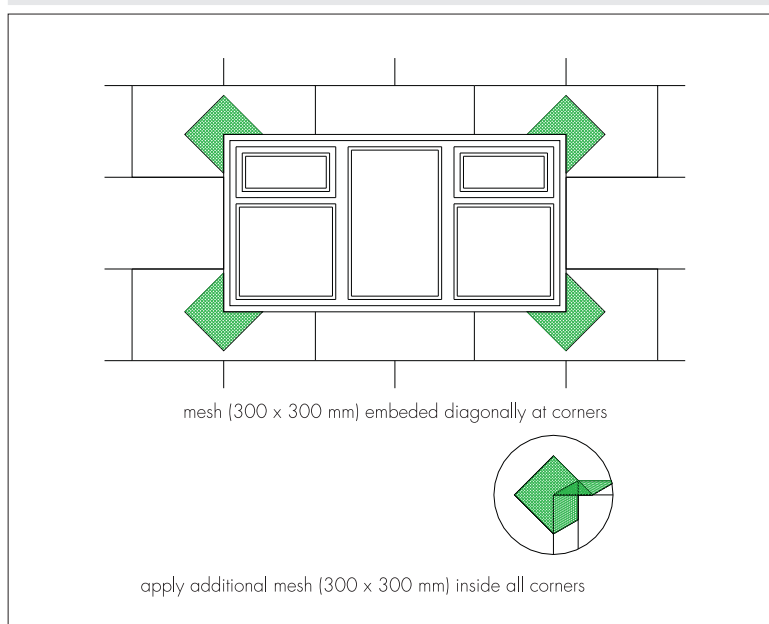
16.13 The basecoat render is prepared by mixing the contents of each 25 kg or 20 kg bag with approximately four to seven litres of cold, clean water using a suitable drill with a whisk attachment, for at least five minutes after the addition of the last bag of render, to allow an even dispersion of the resins. This is then allowed to stand for at least three minutes then re-mixed.

16.14 The basecoat render is spray or trowel-applied to the surface of the dry insulation boards initially to an approximate thickness of 4 mm. It is applied progressively working in 1 m sections in vertical or horizontal directions.

16.15 The reinforcement glassfibre mesh is immediately embedded into the basecoat, with 100 mm overlap at joints, then a further coat of basecoat is applied. The overall basecoat thickness is approximately 5 mm to 7 mm. Additional pieces of mesh, 300 mm by 300 mm, are used diagonally at the corners of openings, as shown in Figure 6. Corner details are reinforced using PVC mesh angle beads.

16.16 The mesh should be free of wrinkles and fully embedded in the base coat with no visible mesh pattern on the finish surfaces.

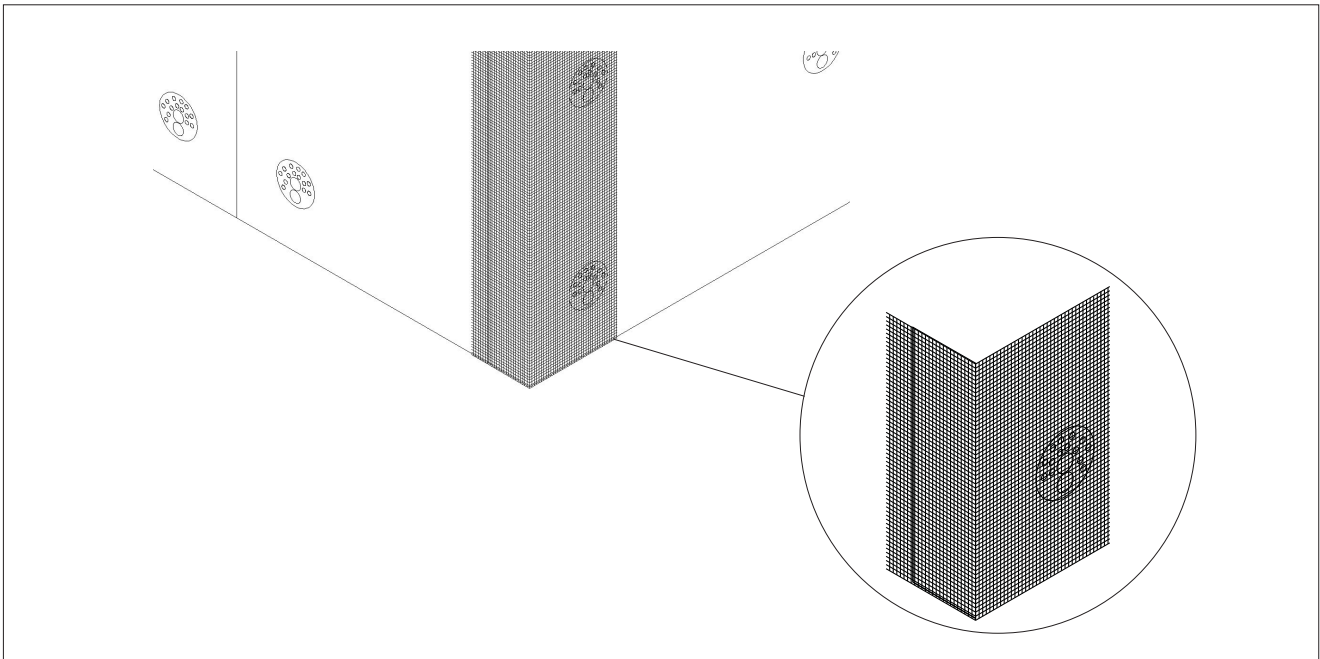
Figure 6 Additional reinforcement at openings



16.17 Prior to the render coat, a bead of silicone rubber mastic is gun-applied at window and door frames, overhanging eaves, gas and electric meter boxes, wall vents or where the render abuts any other building material or surface.

16.18 Corner beads are fixed to all building corners and to door and window heads and jambs (see Figure 7).

Figure 7 External corner detail



16.19 Stop beads are positioned vertically, eg at party wall positions where the adjoining property does not require treatment.

Rendering and finishing

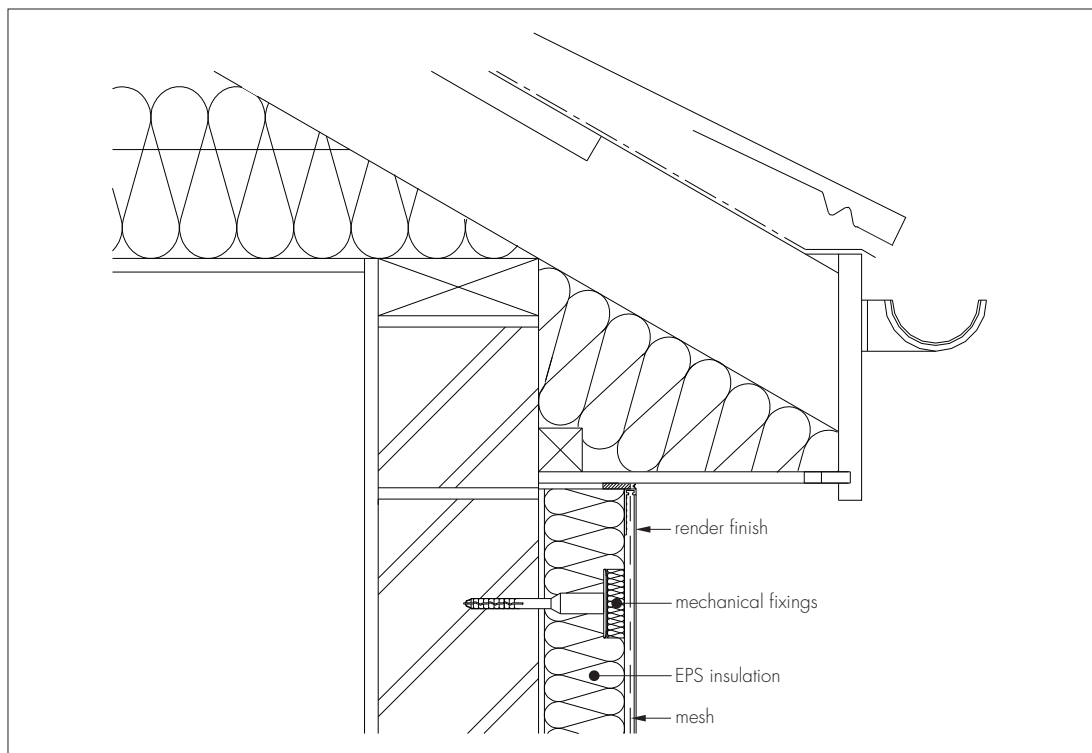
16.20 The drying period of any render will depend on the applied thickness and weather conditions; however, the basecoat must be left to harden between 24 hours and 48 hours depending on the prevailing temperature and weather conditions before application of the decorative finish, and any contaminants such as grease and chalking removed. In the case of resin-based finishing coat, the dried base coat requires a pre-treatment with a primer according to the manufacturer's guidelines

16.21 Strikotherm silicone/acrylic textured finishes should be mixed gently with a mixer before application over the dried primed basecoat. Finishes are spread out evenly over the surface using a stainless steel trowel (from 1.5 mm to 3 mm thicknesses).

16.22 Strikotherm finishing coats should be allowed to dry thoroughly before paints are applied to any features. Continuous surfaces must be completed without a break, so the coating must always be applied to a wet edge.

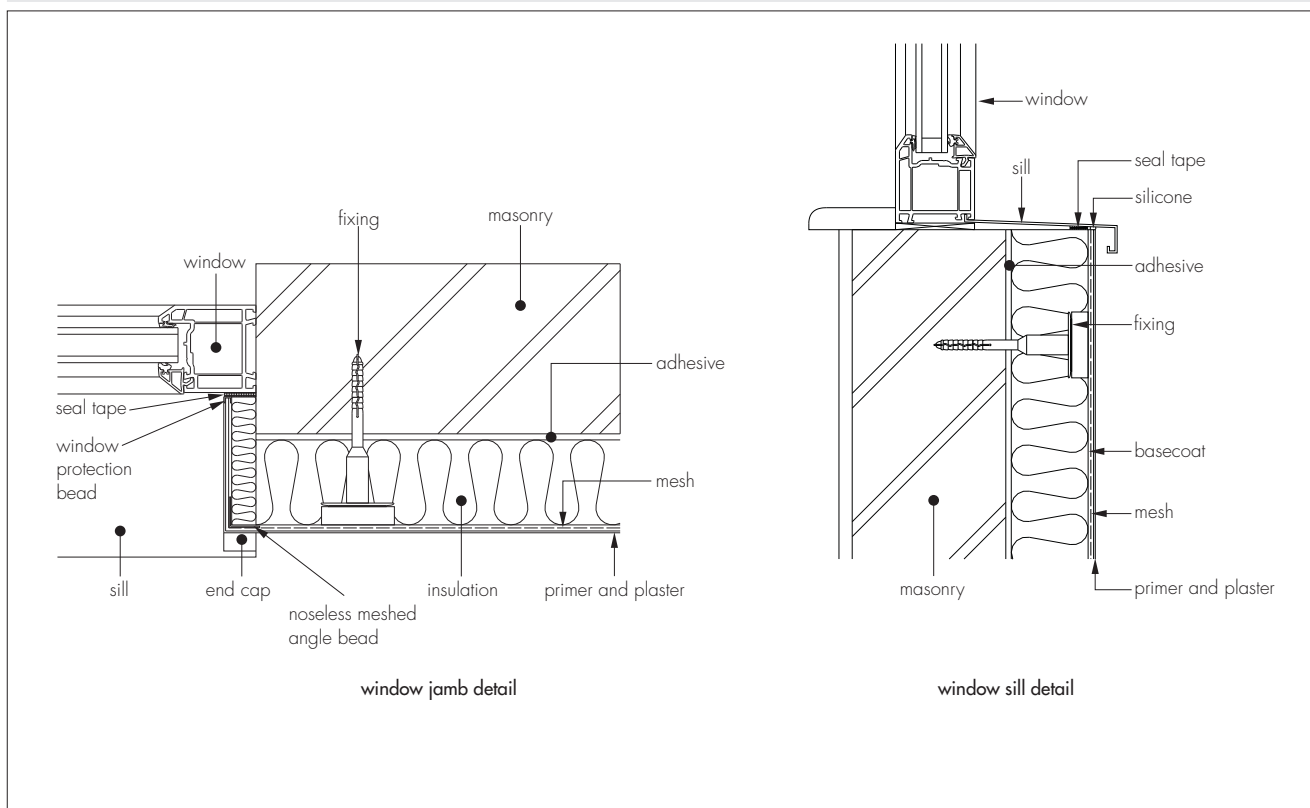
16.23 At the tops of walls the system should be protected by an adequate overhang or by an adequately sealed purpose-made flashing or coping (see Figure 8)

Figure 8 Roof eaves details



16.24 Care should be taken in the detailing of the system around openings and projections (see Figure 9).

Figure 9 Window details



16.25 On completion of the installation, external fittings, eg rainwater goods, are re-fixed through the system (outside the scope of this Certificate — consult the Certificate holder for Installation details).

17 Tests

17.1 Tests were carried out on the system to determine:

- fire performance
- bond strength
- hygrothermal performance
- resistance to frost
- resistance to impact
- water vapour permeability.

17.2 An examination was made of data relating to:

- pull through strength
- surface spread of flame tests
- thermal conductivity
- durability of finish.

18 Investigations

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

18.2 A condensation risk analysis was undertaken.

18.3 A series of U value calculations were carried out.

18.4 An assessment was made of the practicability of installation and the effectiveness of detailing techniques.

Bibliography

- BS 3837 : 2004 *Expanded polystyrene boards — Specification for boards manufactured from expandable beads*
- BS 5250 : 2011 *Code of practice for control of condensation in buildings*
- BS 8000-3 : 2001 *Workmanship on building sites — Codes of practice for masonry*
- BS EN 1607 : 1997 *Thermal insulating products for building applications — Determination of tensile strength perpendicular to faces*
- BS EN 1990 : 2002 *Eurocode — Basis of structural design*
- BS EN 1991-1-4 : 2005 *Eurocode — 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 13914-1 : 2005 *Design, preparation and application of external rendering and internal plastering — External rendering*
- BS EN ISO 6946 : 2007 *Building components and building elements — thermal resistance and thermal transmittance — calculation method*
- BS EN ISO 9001 : 2008 *Quality management system — Requirements*
- BS EN ISO 14001 : 2004 *Environmental management system — Requirements with guidance for use*
- BS EN ISO 10456 : 2007 *Building materials and products — Hygrothermal properties — Tabulated design values and procedures for determining declared and design thermal values*
- BRE Information Paper IP 1/06 *Assessing the effects of thermal bridging at junctions and around opening*
- BRE Report (BR 135 : 2013) *Fire Performance of External Thermal Insulation for Walls of Multistorey Buildings*
- BRE Report (BR 262 : 2002) *Thermal Insulation : avoiding risks*
- BRE Report (BR 443 : 2006) *Conventions for U-value calculations*

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.