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Agrément Certificate
09/4625
Product Sheet 2

WETHERBY EXTERNAL WALL INSULATION SYSTEMS

EPSIWALL EXTERNAL WALL INSULATION SYSTEM

PRODUCT SCOPE AND SUMMARY OF CERTIFICATE

This Certificate relates to the Epsiwall External Wall Insulation System, for use on walls of solid masonry construction. The system incorporates specific reinforced renders and phenolic insulation, and can be used on domestic and non-domestic buildings to enable, or contribute to enabling, a wall construction to meet the thermal performance requirements of the appropriate building regulations.

AGRÉMENT 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

Practicability of installation — the system must be installed by trained operatives (see section 4).

Thermal performance — use of the system can enable a construction to meet, or contribute to meeting, the building regulations (see section 5).

Mechanical resistance and stability — a correctly designed system will have adequate resistance to wind loads (see section 6).

Properties in relation to fire — the system has a Class 0 surface spread of flame classification (see section 7).



The BBA has awarded this Agrément 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

Handwritten signature of Brian Chamberlain in black ink.

Brian Chamberlain
Head of Approvals — Engineering

Handwritten signature of Greg Cooper in black ink.

Greg Cooper
Chief Executive

Date of First issue: 19 February 2010

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, the Epsiwall External Wall Insulation System, if used in accordance with the provisions of this Certificate, will meet or contribute to meeting the relevant requirements of the following Building Regulations:



The Building Regulations 2000 (as amended) (England and Wales)

Requirement: A1	Loading
Comment:	The system can sustain and transmit wind loads to the substrate wall. See sections 6.4 and 6.8 of this Certificate.
Requirement: B4(1)	External fire spread
Comment:	The system is classified Class 0 and can, therefore, meet this Requirement. See sections 7.1 to 7.4, and 7.6 of this Certificate.
Requirement: C2(b)(c)	Resistance to moisture
Comment:	Walls incorporating the system can meet this Requirement. See section 9.3 of this Certificate.
Requirement: L1(a)(i)	Conservation of fuel and power
Comment:	The system can enable or contribute to enabling a construction to meet the Target Emission Rate. See sections 5.3 and 5.4 of this Certificate.
Requirement: Regulation 7	Materials and workmanship
Comment:	The system is acceptable. See section 12.1 and the <i>Installation</i> part of this Certificate.



The Building (Scotland) Regulations 2004 (as amended)

Regulation: 8(1)(2)	Fitness and durability of materials and workmanship
Comment:	The use of the system satisfies the requirements of this Regulation. See sections 11.1 and 12.1 and the <i>Installation</i> part of this Certificate.
Regulation: 9	Building standards – construction
Standard: 1.1	Structure
Comment:	The system can sustain and transmit wind loads to the substrate wall. See sections 6.4 and 6.8 of this Certificate.
Standard: 2.6	Spread to neighbouring buildings
Comment:	The system has a 'low risk' surface classification. The system incorporates materials which would not be classed as 'non-combustible'. Completed walls, therefore, would be regarded as unprotected areas as defined in this Standard, with reference to clauses 2.6.1 ⁽¹⁾⁽²⁾ , 2.6.2 ⁽¹⁾⁽²⁾ , 2.6.4 ⁽¹⁾⁽²⁾ , 2.6.5 ⁽¹⁾ and 2.6.6 ⁽²⁾ . See sections 7.1 to 7.4, and 7.6 of this Certificate.
Standard: 2.7	Spread on external walls
Comment:	The system incorporates materials which would not be classed as 'non-combustible' as defined in this Standard under clauses 2.7.1 ⁽¹⁾⁽²⁾ and 2.7.2 ⁽²⁾ and should not, therefore, be used on walls one metre or less from a boundary. See sections 7.1 to 7.4, and 7.6 of this Certificate.
Standard: 3.10	Precipitation
Comment:	Walls insulated with the system can satisfy this Standard, with reference to clauses 3.10.1 ⁽¹⁾⁽²⁾ and 3.10.6 ⁽¹⁾⁽²⁾ . See section 9.3 of this Certificate.
Standard: 3.15	Condensation
Comment:	Walls insulated with the system can satisfy the requirements of this Standard, with reference to clauses 3.15.1 ⁽¹⁾ , 3.15.4 ⁽¹⁾ and 3.15.5 ⁽¹⁾ . See sections 10.4 and 10.5 of this Certificate.
Standards: 6.1(b)	Carbon dioxide emissions
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 ⁽²⁾ , 6.1.5 ⁽²⁾ , 6.1.6 ⁽¹⁾ , 6.2.1 ⁽¹⁾ , 6.2.3 ⁽¹⁾ , 6.2.4 ⁽¹⁾ , 6.2.5 ⁽¹⁾⁽²⁾ and 6.2.10 ⁽²⁾ . See sections 5.3 and 5.4 of this Certificate. (1) Technical Handbook (Domestic). (2) Technical Handbook (Non-Domestic).



The Building Regulations (Northern Ireland) 2000 (as amended)

Regulation: B2	Fitness of materials and workmanship
Comment:	The system is acceptable. See section 12.1 and the <i>Installation</i> part of this Certificate.
Regulation: B3(2)	Suitability of certain materials
Comment:	The system is acceptable. See section 11.1 of this Certificate.
Regulation: C4(b)	Resistance to ground moisture and weather
Comment:	Walls insulated with the system can satisfy this Regulation. See section 9.3 of this Certificate.
Regulation: C5	Condensation
Comment:	Walls insulated with the system can satisfy the requirements of this Regulation. See sections 10.4 and 10.5 of this Certificate.
Regulation: D1	Stability
Comment:	The system can sustain and transmit wind loads to the substrate wall. See sections 6.4 and 6.8 of this Certificate.

Regulation:	E5(a)	External fire spread
Comment:	The system has a Class 0 classification surface and can satisfy this Regulation. See sections 7.1 to 7.4, and 7.6 of this Certificate	
Regulations:	F2(a)(i) F3(2)	Conservation measures Target carbon dioxide Emissions Rate
Comment:	The system can enable a construction to meet the requirements of these Regulations. See sections 5.3 and 5.4 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: 2 *Delivery and site handling* (2.1).

Non-regulatory Information

NHBC Standards 2008

NHBC accepts the use of the Epsiwall External Wall Insulation System for masonry walls, when installed and used in accordance with this Certificate, in relation to *NHBC Standards, Chapter 6.9 Curtain walling and cladding*.

General

This Certificate relates to the Epsiwall External Wall Insulation System for use on external walls of masonry construction. The system incorporates specific reinforced renders and phenolic insulation, and can be used on new and existing domestic and non-domestic buildings.

Technical Specification

1 Description

1.1 The insulation system is for use on external walls of masonry construction. It is mechanically fixed using anchors that have been approved by the Certificate holder.

1.2 The insulation systems covered by this Certificate do not have provision for movement at joints. The possible effects of thermal expansion and differential movement between elements of the substrate and any consequent provision for movement at joints should be considered when choosing a suitable insulation system for a particular construction.

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

1.4 The components of the basic wall system (see Figures 1 and 2) from outer to inner comprise:

- Heck Siliconharputz K and Heck Siliconharputz R render topcoats — silicon ready-mixed pastes available with aggregate sizes from 1.5 mm to 3 mm and 1.5 mm to 2 mm respectively
- Heck Universalgrundierung primer — an emulsion used as a bonding agent and precoat
- Heck K+A Basecoat — a cement-based, ready-mixed render conforming to BS EN 13139 : 2002, supplied as a powder to which clean water is added
- reinforcing scrim — a multi-stranded, alkali-resistant, glassfibre, 4 mm by 4 mm mesh, with a polymer coating and a nominal weight of 160 g·m⁻²
- mechanical fixing — an anchor of adequate length to suit the insulation thickness and incorporating a 60 mm diameter plate
- Kingspan Kooltherm K5EWB insulation — phenolic insulation boards faced with a glassfibre tissue, size 1200 mm by 600 mm, in thicknesses ranging from 40 mm to 90 mm, with a density of 50 kg·m⁻³ and a conductivity of between 0.021 and 0.020 W·m⁻¹·K⁻¹.

Figure 1 Epsiwall external wall insulation system for masonry walls — typical section at base level

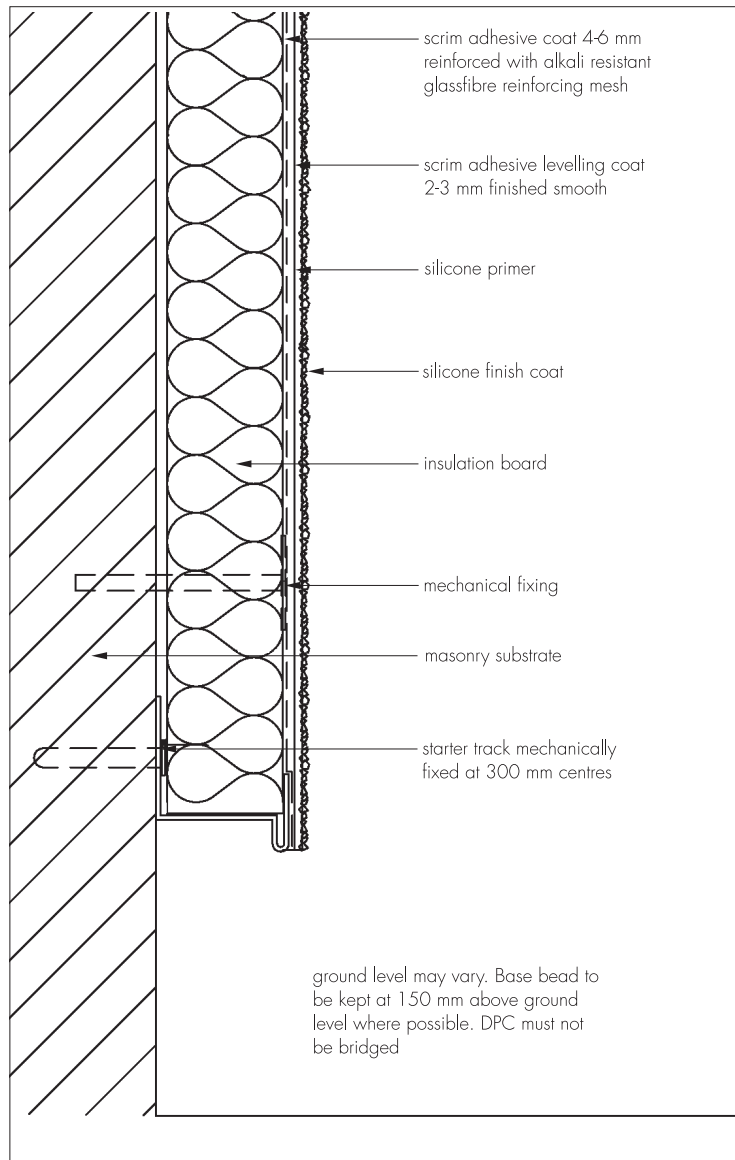
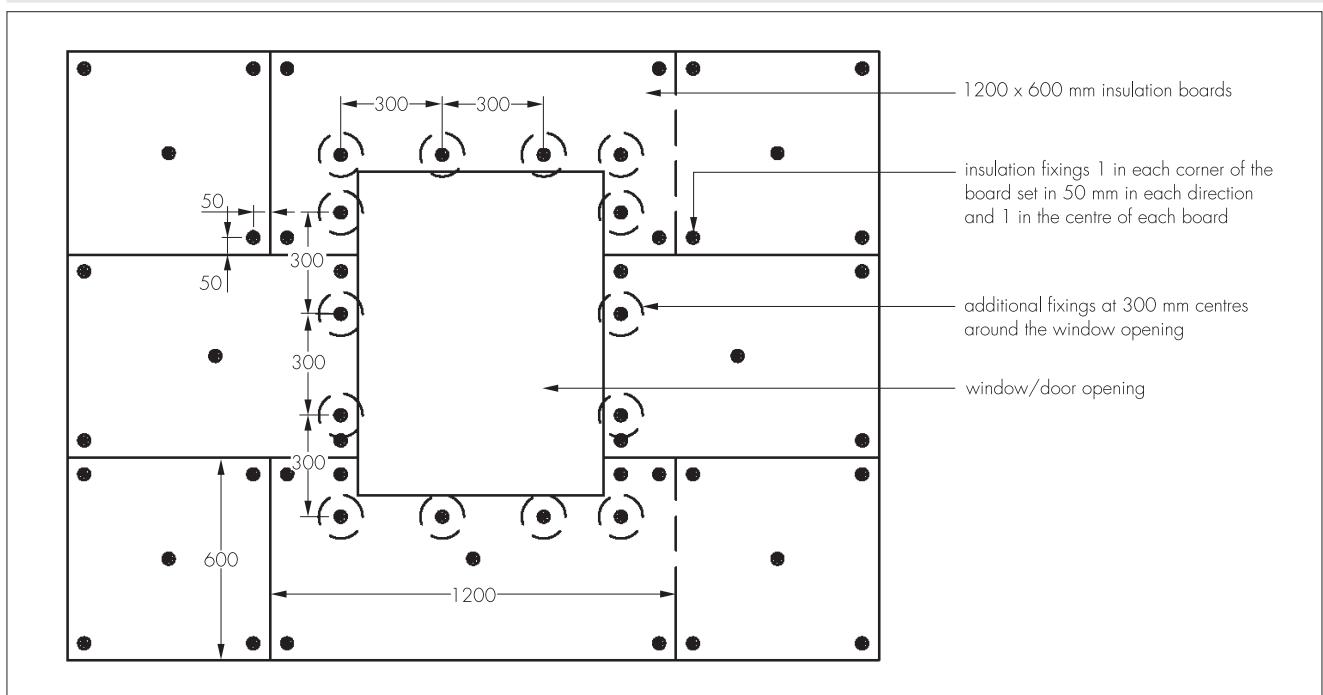


Figure 2 Typical fixing pattern



1.5 Ancillary items supplied by the Certificate holder for use in particular locations/forms of construction include:

- starter tracks (to suit each insulation thickness)
- end stops
- sill extenders
- roof verge extenders.

1.6 Ancillary items which are outside the scope of this Certificate and not supplied by the Certificate holder, but which may be required to ensure the completed construction complies with the building regulations and is fit for purpose, include:

- sealant
- fire stops
- cavity stops (where required, see section 7.6).

2 Delivery and site handling

2.1 Components are delivered in the packaging and quantities listed in Table 1. Each basecoat bag carries the product identification and manufacturer's batch number.

Table 1 Component supply details

Component	Quantity and packaging
Insulation	polythene wrapped
Reinforcing scrim	1 metre wide rolls, 50 metre length
Basecoats	25 kg bag
Primer	15 kg tub
Finish coat	25 kg tub
Mechanical fixings	boxed by manufacturer

2.2 The insulation must be protected from prolonged exposure to sunlight either by storing opened packs under cover or re-covering with opaque sheeting. In addition, the insulation should be stored on a firm, clean, level base, off the ground and under cover until required for use. Care must be taken when handling the insulation boards to avoid both damage and contact with solvents or bitumen products. The boards must not be exposed to open flame or other ignition sources.

2.3 The basecoat must be stored in dry conditions, off the ground, and protected from moisture and frost.

Assessment and Technical Investigations

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

Design Considerations

3 General

3.1 The Epsiwall External Wall Insulation System comprises the system components described in section 1.

3.2 The system is effective in reducing the thermal transmittance (U value) of the walls in 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.

3.3 The system will improve the weather resistance of a wall and provide a decorative finish. However, it may only be installed where other potential sources of moisture penetration have been dealt with separately and where there are no signs of dampness on the inner surface of the wall, other than those caused solely by condensation. The system can be used to overcome condensation occurring on an internal wall surface.

3.4 Existing buildings, subject to national Building Regulations, should have exterior wall surfaces in accordance with section 13 *Site survey and preliminary work* in the *Installation* part of this Certificate.

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

- BS 5628-3 : 2005 (in particular, clause 5.5.2 *Rain penetration* of the Code of Practice, should be followed 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.

3.6 Other walls not subject to regulatory requirements should also be built in accordance with section 3.4.

3.7 When using the system, the recommendations of BS 5250 : 2002 should be followed and consideration given to the overall design to minimise the risk of condensation.

4 Practicability of installation

The system should only be installed by contractors trained and approved by the Certificate holder and in accordance with the Certificate holder's Installation Manual (see section 1.4).

5 Thermal performance

5.1 Calculations of thermal transmittance (U value) should be carried out in accordance with BS EN ISO 6946 : 2007 and BRE report (BR 443 : 2006) *Conventions for U-value calculations*, using the declared thermal conductivity of the insulation ($\lambda_{90/90}$) as given in Table 2.

5.2 The U value of a completed wall will depend on the selected insulation thickness, the fixing method, and the insulating value of the substrate masonry and its internal finish. Calculated U values for example constructions are given in Table 3.



5.3 When considering insulation requirements, designers should refer to the detailed guidance contained in the documents supporting the national Building Regulations. The U values shown in Table 4 indicate that the product can enable a wall to achieve typical design U values referred to in those supporting documents (see Tables 4 and 5).

New buildings



5.4 Walls with U values lower than (or the same as, for dwellings in Scotland) the relevant 'notional' value specified in Tables 4 or 5 will contribute to a building meeting its Target Emission Rate. Walls with higher U values will require additional energy saving measures in the building envelope and/or services.

5.5 The system can maintain, or contribute to maintaining, continuity of thermal insulation around openings and at junctions between external walls and other building elements.

5.6 For existing buildings, extensions and conversions, walls will be acceptable where they do not exceed the relevant U value in Tables 4 or 5 and junctions and openings comply with section 5.5 or BRE report (BR 262 : 2002) *Thermal insulation: avoiding risks*.

Table 2 Thermal conductivity values

Insulation	Thickness (mm)	$\lambda_{90/90}$ value ($\text{W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$)
Phenolic board (40 $\text{kg}\cdot\text{m}^{-3}$ density)	40–45	0.021
	≥ 45	0.020

Table 3 Example wall U value ($\text{W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}$)⁽¹⁾

Insulation thickness (mm)	200 mm of dense concrete ($\lambda = 1.75 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$) 13 mm of dense plaster ($\lambda = 0.57 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$)	220 mm of brickwork ($\lambda = 0.56 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$) 13 mm of dense plaster ($\lambda = 0.57 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$)
50	0.48	0.42
60	0.36	0.33
70	0.30	0.27
80	0.25	0.24
90	0.22	0.21

(1) Including eight steel fixings of 5.5 mm diameter per metre, $\lambda_{\text{steel}} = 50 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$.

Table 4 Typical design values for walls — England, Wales and Northern Ireland

U value ($\text{W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}$)	Construction type
0.30	Mean for new extensions
0.35	'notional' mean in SAP and SBEM and limit mean for new-build
0.35	Limit mean for replacement ⁽¹⁾ , renovation ⁽¹⁾ and retained ⁽¹⁾ walls
0.70	Individual limit for new-build and flexible approaches

(1) Details of alternative/flexible approaches are given in relevant document supporting the national Building Regulations.

Table 5 Typical design U values for walls — Scotland

U value ($\text{W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}$)	Construction type
0.20	'notional' mean for dwellings in SAP and the 'simplified' approach: — solid fuel, package 6 — other fuels, packages 1 to 5
0.25	
0.27	Limit mean for new extensions, conversions ⁽¹⁾ , alterations ⁽¹⁾ and reconstructions ⁽¹⁾
0.30	'notional' mean for non-domestic buildings in SBEM and limit mean for new-build
0.70	Individual limit for new-build, new extensions, conversions, alterations and reconstructions

(1) Details of alternative/flexible approaches are given in relevant document supporting the national Building Regulations.


6 Mechanical resistance and stability

General

6.1 Installations incorporating the insulation system can be designed to provide adequate resistance to design loads applicable to some areas of the UK.

6.2 Positive wind load (pressure) is transferred to the substrate wall directly via bearing and compression of the render, insulation and adhesive.

6.3 Negative wind pressure (suction) is resisted by the bond between each component; the insulation boards are retained by the ETICS anchor and secured to the wall with the appropriate fixing screws.

 6.4 The wind loads on the wall should be calculated in accordance with BS EN 1991-1-4 : 2005 or BS 6399-2 : 1997. 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.

6.5 Assessment of structural performance for individual buildings should be carried out by a suitably qualified engineer or other appropriately qualified person to confirm that:

- the substrate wall has adequate strength to resist additional loads that may be applied as a result of installing the system, ignoring any contribution from the insulation system
- the proposed system and associated fixing layout provides adequate resistance to negative wind loads (based on the results of the site investigation) (see section 6.7).

6.6 Provided the substrate wall is suitable and an appropriate fixing is used, the mechanical fixings and starter track at the base will transfer the weight of the render insulation system to the substrate wall. The number of fixings and the span between fixings should be determined by the system designer. The fixing must be selected to give adequate support to the weight of the system at the minimum spacing given in this Certificate.

6.7 Tests carried out by the BBA indicate that a fixing with a 60 mm diameter anchor plate of adequate stiffness will have an ultimate pull-over resistance of 550 N. An example wind loading calculation relating to the fixing pattern detailed in Figure 2 can be seen in Table 6. Site-specific tests should be conducted on the substrate walls of the building to determine the actual pull-out resistance of the fixings. This should be the required minimum of five tests divided by a factor of safety of 3.

Table 6 Epsiwall example wind loading calculation⁽¹⁾

Factor	Actual resistance force	Required resistance force
Calculated wind load (Pa) ⁽²⁾	750	666
Ultimate wind load (Pa) ⁽³⁾	1125	999
Anchor pull-over resistance (N) ⁽⁴⁾	550	550
Panel design pull-over resistance (N) ⁽⁵⁾	183.33	183.33
Approximate anchor pull out resistance (N) ⁽⁶⁾	1000	1000
Anchor design pull out resistance ⁽⁷⁾	333.3	333.3
Limiting resistance (N) ⁽⁸⁾	183.33	183.33
Resistance force (N) ⁽⁹⁾	916.67	916.67
Resistance force required (N) ⁽¹⁰⁾	810.00	719.28

(1) The calculation is based on an insulation board measuring 1200 mm x 600 mm (total area 0.72 m²) attached by five fixings.

(2) See section 6.4.

(3) Calculated wind load x wind load factor of 1.5.

(4) Pull resistance of the insulation over the head of a fixing (see section 6.7).

(5) Pull-over resistance/EWIS safety factor of 3.

(6) See section 6.7.


(7) Anchor pull-out resistance/EWIS safety factor of 3.

(8) This is the lesser of the panel design pull-over resistance and the anchor design pull-out resistance.

(9) This is based upon the limiting resistance, in this case 183.33 x 5.

(10) This is the ultimate wind load x panel area.

Impact loading

 6.8 Hard body impact tests were carried out generally in accordance with MOAT No 22 : 1988. It is recommended that the use of the system is restricted to category E⁽¹⁾ as defined in BS 8200 : 1985, Table 2.

(1) 1.5 m to 6 m above pedestrian or floor level in location categories A and B defined as follows:

- Category A — readily accessible to the public and others with little incentive to exercise care; prone to vandalism and abnormally rough use, eg external walls of housing and public buildings in vandal prone areas
- Category B — readily accessible to the public and others with little incentive to exercise care; risk of accidents occurring and of misuse, eg walls adjacent to pedestrian thoroughfares or playing fields when not in category A.

7 Properties in relation to fire



7.1 The white external surfaces of the system are classified as Class 0 or 'low risk' as defined in the documents supporting the national Building Regulations. The system, therefore, may be used in accordance with the provisions of:

England and Wales — Approved Document B, Volume 1, paragraph 8.4, and Volume 2, paragraph 12.6 (see also Approved Document B, Volume 2, Diagram 40).

Scotland — Mandatory Standards 2.6 and 2.7, clauses 2.6.1⁽¹⁾⁽²⁾ to 2.6.5⁽¹⁾⁽²⁾, 2.6.6⁽²⁾, 2.6.7⁽²⁾, 2.7.1⁽¹⁾⁽²⁾ and 2.7.2⁽²⁾ respectively, and Annexes 2.C⁽¹⁾ and 2.E⁽²⁾

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

Northern Ireland — Technical Booklet E, paragraph 4.3 (see also Diagram 4.1).

7.2 The classifications stated in section 7.1 were achieved on light-coloured render (further details can be obtained from the Certificate holder). However, the classification of darker colours should be confirmed by:

England and Wales — test or assessment in accordance with Approved Document B, Appendix A, Clause 1

Scotland — test to conform with Regulation 9, Annex 2.C⁽¹⁾, Table, and Annex 2.E⁽²⁾

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

Northern Ireland — test or assessment by a UKAS accredited laboratory or an independent consultant with appropriate experience.

7.3 The documents listed in section 5.1 give full details of permissible heights and boundary conditions of domestic and non-domestic buildings and the relevant guidance with regard to external wall claddings of external wall insulation systems with render surfaces. However, the following information is offered for guidance purposes:

England and Wales

- for buildings one metre or more from a boundary, the systems are acceptable
- for buildings less than one metre from a boundary, the systems can be acceptable provided the wall meets the fire resistance requirements in Tables A1 and A2, from both sides
- the systems can be acceptable, subject to the aforementioned conditions, for use on a building which has a floor up to and over 18 m above the ground level.

Scotland

- domestic and non-domestic use – for buildings more than one metre from a boundary, up to 18 m above ground level, the systems can be acceptable. The systems are not classified as non-combustible, therefore calculations for unprotected areas apply⁽¹⁾.

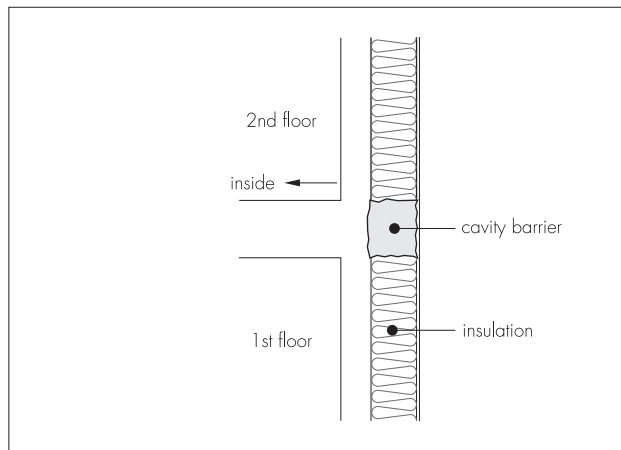
(1) Combustible cladding need not be included in the calculation for unprotected areas where it is attached to the structure of the building and the external wall does not contain openings other than the small openings described in Mandatory Standard 2.6.2, clause 2.6.2b, and the wall behind the cladding has the appropriate fire-resistance duration from the inside. In Mandatory Standard 2.6, clause 2.6.2b, an unprotected area is defined as an area of not more than 0.1 m² which is at least 1.5 m from any other unprotected area in the same wall.

Northern Ireland

- for buildings one metre or more from a boundary, the systems are acceptable
- for buildings less than one metre from a boundary, the systems can be acceptable provided the wall meets the fire resistance requirements given in Tables 3.1 and 3.2, from both sides
- the systems are acceptable, subject to the aforementioned conditions, for use on a building which has a storey the floor of which is up to 18 m above the ground level. For a building which has a storey the floor of which is 18 m or more above the ground level, there is an additional requirement for the insulation component to be of a material of limited combustibility.

7.4 To limit the risk of fire spread between floors cavity barriers should be installed at each floor level above the first floor (ie starting with the second storey) as detailed in BRE report (BR 135 : 2003) *Fire Performance of External Insulation for Walls of Multi-storey Buildings* (see Figure 3). Vertical cavity barriers should also be installed in line with compartment walls.

Figure 3 Cavity barrier



7.5 In buildings not subject to the Building Regulations, it is recommended that designers should consider the use of the guidance given in section 6.2.



7.6 Any cavities present within the system, such as those formed between the external wall insulation system and the substrate, must have an appropriate fire stop or cavity barrier in accordance with the relevant clauses or sections of:

England and Wales — Approved Document B, Volume 1, Section 6, and Volume 2, Section 9

Scotland — Mandatory Standards 2.4, 2.6 and 2.7, clauses 2.1.4⁽¹⁾⁽²⁾, 2.4.2⁽¹⁾⁽²⁾, 2.4.7⁽¹⁾, 2.4.9⁽²⁾, 2.6.1⁽¹⁾⁽²⁾ to 2.6.5⁽¹⁾⁽²⁾, 2.6.6⁽²⁾, 2.6.7⁽²⁾, 2.7.1⁽¹⁾⁽²⁾ and 2.7.2⁽²⁾ respectively, and Annex 2.A⁽¹⁾

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

Northern Ireland — Technical Booklet E, Section 3, paragraphs 3.35 to 3.39, and Section 4.

8 Proximity of flues and appliances

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

England and Wales — Approved Document J

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

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

Northern Ireland — Technical Booklet L.

9 Rain penetration

9.1 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 the application of the system. The system may only be installed where dampness (other than that caused solely by condensation) is not evident on the inner surface of the substrate.

9.2 Designers and installers should take particular care over detailing around openings, penetrations and movement joints, to minimise the risk of rain ingress.



9.3 Guidance in BS 5628-3 : 2005, Table 11, indicates that externally insulated single-leaf masonry walls (minimum 90 mm thick) are acceptable in exposure categories up to 'severe'. Additional guidance can be found in:

England and Wales — Approved Document C, Section 5

Scotland — Mandatory Standard 3.10⁽¹⁾⁽²⁾

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

Northern Ireland — Technical Booklet C, Section 2.

9.4 At the tops of walls, the system should be protected by an adequate overhang or other detail designed for use with this type of system (see section 15.20).

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

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

10 Condensation

10.1 Designers should ensure that an appropriate condensation risk analysis has been carried out for all parts of a construction, including openings and penetrations, to ensure condensation does not occur.

Surface condensation

10.2 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 5.5.

10.3 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 : 2002, Section 8, and BRE report (BR 262 : 2002) *Thermal insulation : avoiding risks*.

Interstitial condensation



10.4 The components of the system have a water vapour resistance such that, under the types of conditions which may occur in dwellings in the United Kingdom, interstitial condensation should not occur within the insulation.

10.5 If a system is to be used on the external walls of rooms expected to have continuous high humidities, care must be taken in the design of the rooms to avoid possible problems from the formation of interstitial condensation in the wall.

10.6 Walls incorporating the systems will adequately limit the risk of interstitial condensation when designed and constructed in accordance with BS 5250 : 2002 (Section 8 and Annex D).

10.7 The render used with the systems has an equivalent air layer thickness (S_d) $\leq 1 \text{ m}$. This corresponds to a water resistance factor (μ value) of ≤ 125 for a render thickness of 8 mm.

10.8 The water resistance factor (μ value) for the insulation boards, as taken from BS EN 12524 : 2000, is 50.

11 Maintenance



11.1 As part of a maintenance programme, regular inspections should be made on the installed system to ensure that ingress of water does not occur. Such programmes should include the replacement and resealing of joints, eg those between the insulation system and window and door frames. The interval between inspections should be considered on a building-by-building basis taking into consideration, for example, such factors as the building location and height. Any necessary repairs should be put into effect immediately.

11.2 The designer should ensure appropriate provision for access is available to enable maintenance inspections to take place safely.

11.3 Damaged areas must be repaired using the appropriate components; the Certificate holder should be contacted for further information.

12 Durability



12.1 The results of accelerated ageing tests in accordance with MOAT No 22 : 1988 indicate that the system is durable. The system should remain effective for at least 30 years, provided any damage to the surface finish is repaired immediately, and regular maintenance is undertaken (see section 11). This includes checks on joints in the systems and on penetrations to enable corrective action to be taken to rectify the defects.

12.2 The finish may become discoloured with time. The rate at which this occurs will depend on the initial colour, the degree of exposure, the level of atmospheric pollution and the design and detailing of the wall. In common with traditional renders, discoloration by algae and lichens may occur in wet areas.

Installation

13 Site survey and preliminary work

13.1 Before application of the Epsiwall External Wall Insulation System, a pre-installation survey of the property is carried out to determine whether repairs are required to the substrate wall. A specification is prepared for each elevation of the building indicating, for example:

- position of starter tracks and render beads
- position and amount of reinforcing scrim and corner mesh
- necessity for additional reinforcing scrim at corners of openings
- detailing around windows, doors and at eaves
- any alterations to external plumbing
- dpc level
- location and type of weather seals to be used
- areas where suitable silicone sealants must be used
- position of fire barriers.

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

13.3 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.

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

13.5 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 must be hacked off and reinstated.

13.6 In buildings of more than two storeys at least one fixing per insulation board should be of a non-combustible type to provide the increased stability that may be required in a fire (see section 15.11).

13.7 Where mechanical fixings are to be used to secure the system, trial tests should be conducted on the wall by the Certificate holder or their approved applicators (see section 14) to determine the pull-out resistance of the proposed mechanical fixings.

13.8 All modifications, such as provision for cavity barriers and fire stopping (see section 7) and necessary repairs to the building must be completed before installation commences.

13.9 It is recommended that external plumbing be removed before installation, and any necessary alterations made to underground drainage to accommodate repositioning of the plumbing on the finished face of the system.

14 Approved installers

Application of the systems, within the context of this Certificate, must be carried out by installers approved by the Certificate holder. A Certificate-holder approved installer is a company which:

- employs operatives who have been trained and approved by the Certificate holder to install the systems and who, upon completion of their training, have been issued with an appropriate identification card by the Certificate holder
- has undertaken to comply with the Certificate holder's installation procedure, including the requirement for each installation team to include at least one member with an identification card
- agrees to be subject to supervision and site inspections by the Certificate holder.

15 Procedure

General

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

15.2 Application of coating materials must not be carried out at temperatures below 5°C or above 30°C, or if exposure to frost is likely, and the coating must be protected from rapid drying. Weather conditions, therefore, should be monitored to ensure correct curing conditions.

15.3 All rendering should be in accordance with the relevant recommendations of BS EN 13914-1 : 2005 and BS EN 13914-2 : 2005.

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

15.5 The base profile is secured to the external wall above the damp proof course using mechanical fixings at a minimum of 300 mm centres.

Positioning and securing insulation boards

15.6 The first insulation board is positioned on the starter track and secured into the substrate wall using a mechanical fixing. Subsequent boards are positioned so that the joints are staggered and overlapped at the building corners (see Figures 4 and 5). Care must be taken to ensure the fixings are not overdriven.

Figure 4 Arrangement of insulation boards and typical fixing pattern

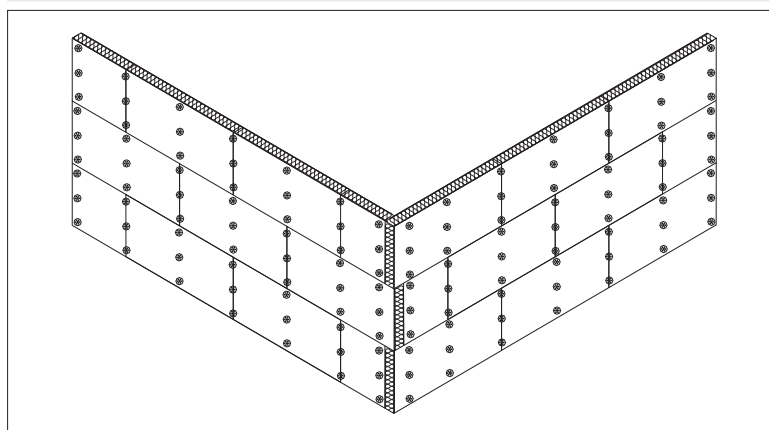
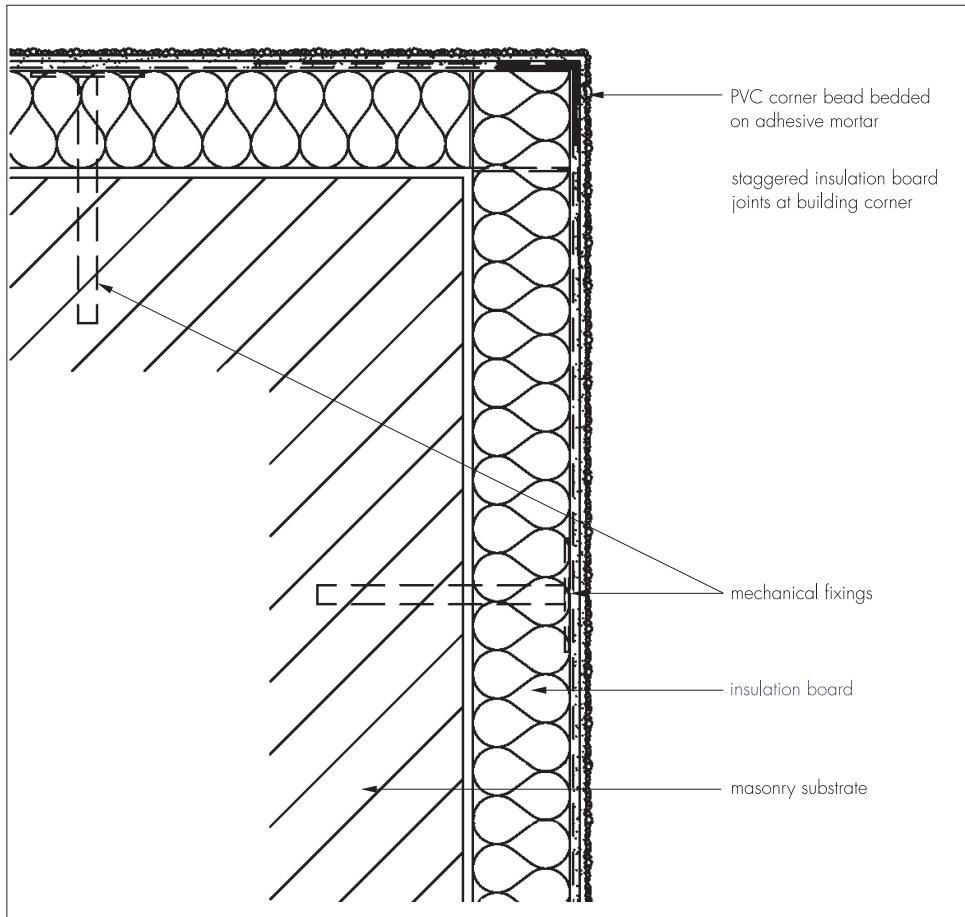


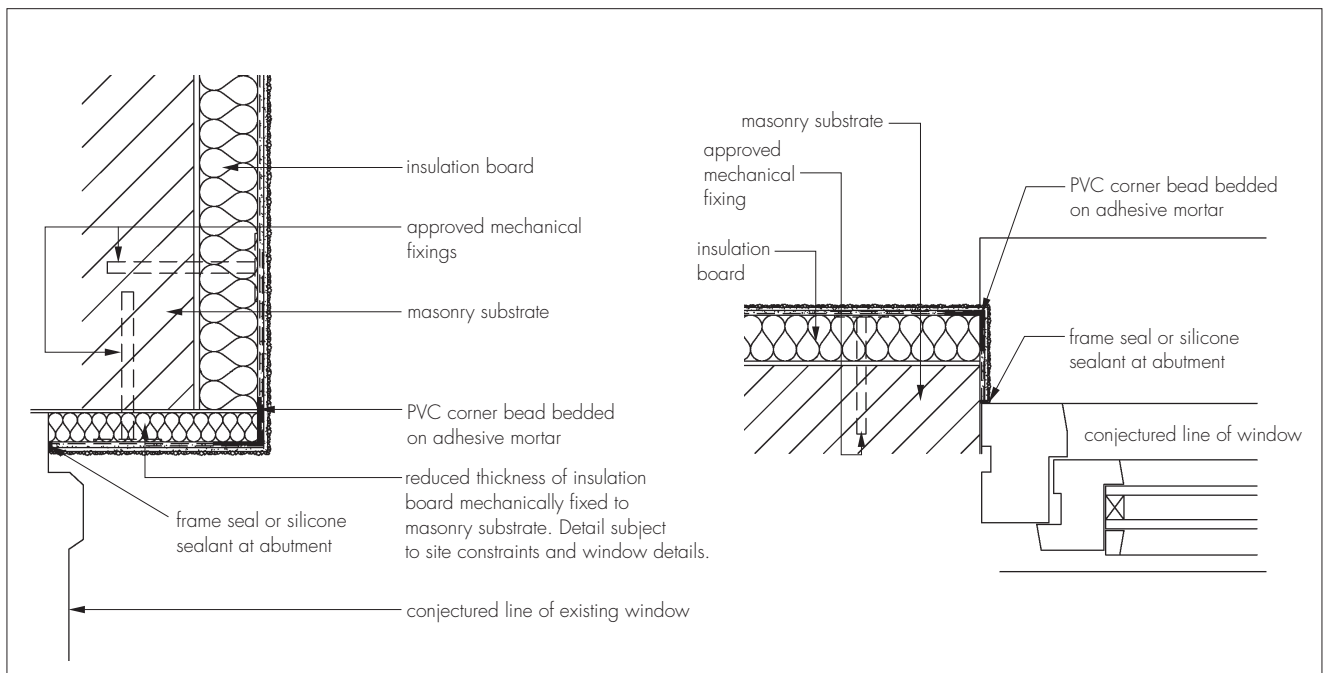
Figure 5 Typical corner detail



15.7 Care must be taken to ensure that all insulation board edges are butted tightly together, and alignment is checked as work proceeds. The surface of the boards should be smooth without high spots or irregularities.

15.8 To fit around details such as doors and windows, insulation boards may be cut with a sharp knife or a fine-tooth saw. Purpose-made window sills, seals and deflection channels, designed to prevent or manage water ingress and allow water to be shed clear of items bridging the cavity, should be fitted (see Figure 6).

Figure 6 Typical opening detail



15.9 Installation continues until the substrate is completely covered including, where appropriate, the building soffits.

Movement joints

15.10 The insulation systems covered by this Certificate do not have provision for movement joints (see section 1.2).

Reinforcing

15.11 In buildings of more than two storeys, holes are drilled at 1 m centres for additional fixings before the basecoat hardens, and stainless steel fixings are inserted through the scrim, insulation and into the substrate wall.

15.12 Fixings are inserted into the centre of each board through the wet scrim adhesive.

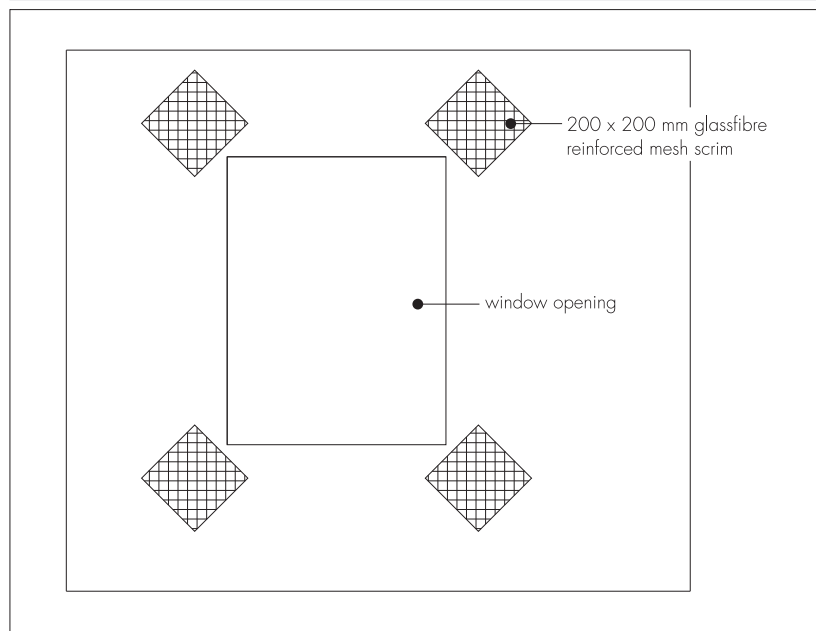
Rendering and finishing

15.13 Prior to the render coat, the relevant seals are positioned and installed at all openings (eg windows and doors), overhanging eaves, gas and electric meter boxes, 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.

15.14 The Heck K+A basecoat render is prepared by mixing the contents of each 25 kg bag with approximately 4 to 5 litres of cold, clean water, using a paddle mixer. Mixing should continue at least five minutes after the addition of the last bag of render to allow an even dispersion of the resins.

15.15 The mixed basecoat render is trowel-applied to the surface of dry insulation boards to a minimum thickness of 4 mm. The scrim is bedded into the render with 100 mm laps at joints. Additional reinforcement should be applied at corners of windows and doors as shown in Figure 7.

Figure 7 Corner reinforcement



15.16 The drying period of any render will depend on weather conditions; however, once applied, the basecoat must be left to harden for at least one day before application of the topcoat. The topcoat is supplied pre-mixed in a tub and is trowel-applied to a thickness of approximately 2 to 4 mm.

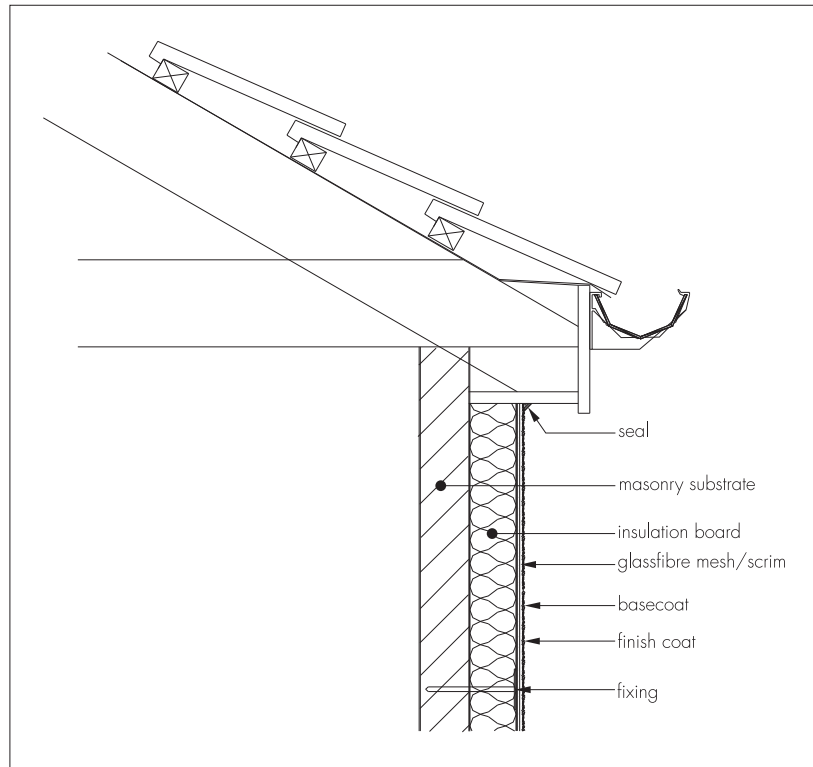
15.17 Surface mounted PVC render beads are fixed with firtree fixings and bedded in scrim adhesive.

15.18 A second coat of Heck K+A Basecoat adhesive is applied to a thickness of between 2 mm and 4 mm and finished smooth to receive the silicone texture coat.

15.19 When the basecoat render is dry a primer coat is applied.

15.20 Care should be taken in the detailing of the system around features such as openings, projections and at eaves (see Figure 8) to ensure adequate protection against water ingress and to limit the risk of water penetrating the system.

Figure 8 Typical roof eaves detail — installation on existing building



15.21 The silicone texture render is lightly mixed and applied in an even thickness to the grain size. Prior to setting, the render is polished with a plastic float to give uniform even texture and remove all trowel lines. Elevations should be completed in one application and finished to natural breaks in render, ie beads or building corners. Texture should be checked to ensure same batches are applied to each elevation. Where necessary drums can be batch mixed to ensure colour consistency.

Technical Investigations

16 Tests

16.1 Tests were carried out in accordance with MOAT No 22 : 1988 to determine:

- heat/spray cycling
- resistance to freeze/thaw
- impact resistance.

16.2 An examination was made of data relating to:

- adequacy of the fixing system
- durability of finish.

16.3 The practicability of installation and the effectiveness of typical details were examined.

17 Investigations

An examination was made of the manufacturing process, the methods adopted for quality control of manufacture and bought-in components, and details of the quality and composition of the materials used

Bibliography

- BS 5250 : 2002 *Code of practice for control of condensation in buildings*
- BS 5628-3 : 2005 *Code of practice for the use of masonry — Materials and components, design and workmanship*
- BS 6399-2 : 1997 *Loading for buildings — Code of practice for wind loads*
- BS 8000-3 : 2001 *Workmanship on building sites — Code of practice for masonry*
- BS 8200 : 1985 *Code of practice for design of non-loadbearing external vertical enclosures of buildings*
- BS EN 1990 : 2002 *Eurocode. Basis of structural design*
- BS EN 1991-1-4 : 2005 *Eurocode 1 : Actions on structures — General actions — Wind actions*
- BS EN 12524 : 2000 *Building materials and products — Hygrothermal properties — Tabulated design values*
- BS EN 13139 : 2002 *Aggregates for mortar*
- BS EN 13914-1 : 2005 *Design, preparation and application of external rendering and internal plastering — External rendering*
- BS EN 13914-2 : 2005 *Design, preparation and application of external rendering and internal plastering — Design considerations and essential principles for internal plastering*
- BS EN ISO 6946 : 2007 *Building components and building elements — Thermal resistance and thermal transmittance — Calculation method*
- MOAT No 22 : 1988 *UEAtc Directives for the Assessment of External Insulation Systems for Walls (Expanded Polystyrene Insulation Faced with a Thin Rendering)*

18 Conditions

18.1 This Certificate:

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

18.2 Publications and documents referred to in this Certificate are those that the BBA deems to be relevant at the date of issue or re-issue of this Certificate and include any: Act of Parliament; Statutory Instrument; Directive; Regulation; British, European or International Standard; Code of Practice; manufacturers' instructions; or any other publication or document similar or related to the aforementioned.

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

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

18.4 In granting this Certificate, the BBA is not responsible for:

- 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
- individual installations of the product/system, including the nature, design, methods and workmanship of or related to the installation
- the actual works in which the product/system is installed, used and maintained, including the nature, design, methods and workmanship of such works.

18.5 Any information relating to the manufacture, supply, installation, use and maintenance 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 and maintained. It does not purport in any way to restate the requirements of the Health & Safety at Work etc Act 1974, or of any other statutory, common law or other duty which may exist at the date 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. In granting this Certificate, the BBA does not accept responsibility to any person or body for any loss or damage, including personal injury, arising as a direct or indirect result of the manufacture, supply, installation, use and maintenance of this product/system.