

Farby KABE Polska Sp. z o.o.

ul. Slaska 88
40 742 Katowice
Poland

Tel: 00 48 32 204 64 60 Fax: 00 48 32 204 64 66
e-mail: info@farbykabe.pl
website: www.farbykabe.pl



Agrément Certificate
13/5015
Product Sheet 1

KABE EXTERNAL WALL INSULATION SYSTEMS

KABE THERM EPS EXTERNAL WALL INSULATION SYSTEM

This Agrément Certificate Product Sheet⁽¹⁾ relates to KABE THERM EPS External Wall Insulation System, comprising bonded and supplementary mechanically-fixed expanded polystyrene (EPS) insulation boards with glassfibre reinforcing mesh and render finishes. The system is for application to the outside of external walls of masonry or dense or no-fines concrete construction in new or existing domestic and non-domestic buildings up to 18 m in height.

(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 or contribute to meeting the Building Regulations (see section 6).

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

Behaviour in relation to fire — the expanded polystyrene is combustible but external surface rating classification is B-s1, d0 (see section 8).

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

Durability — when installed and maintained in accordance with the Certificate holder's recommendations and the terms of this Certificate, the system is expected to have a life in excess of 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: 2 July 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.

British Board of Agrément
Bucknalls Lane
Watford
Herts WD25 9BA

©2013

tel: 01923 665300
fax: 01923 665301
e-mail: mail@bba.star.co.uk
website: www.bbacerts.co.uk

Regulations

In the opinion of the BBA, KABE THERM 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 is classified Class B-s1, d0 and, therefore, can meet this Requirement. See sections 8.1 to 8.4 and 8.7 of this Certificate.
Requirement: C2(b)	Resistance to moisture
Comment:	The system provides a degree of protection against rain ingress. See sections 4.4 and 10.1 of this Certificate.
Requirement: C2(c)	Resistance to moisture
Comment:	The system contributes 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 rates for new buildings
Comment:	The system is acceptable. See sections 6.2 and 6.3 of this Certificate.



The Building (Scotland) Regulations 2004 (as amended)

Regulation: 8(1)(2)	Fitness and durability of materials and workmanship
Comment:	The system can contribute to a construction meeting this Regulation. See sections 12.1 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 external surface of the system has a 'low risk' surface spread of flame classification, with reference to clauses 2.6.1 ⁽¹⁾⁽²⁾ , 2.6.2 ⁽¹⁾⁽²⁾ , 2.6.4 ⁽¹⁾⁽²⁾ , 2.6.5 ⁽¹⁾ and 2.6.6 ⁽²⁾ . See sections 8.1 to 8.3 and 8.5 to 8.7 of this Certificate.
Standard:	2.7 Spread on external walls
Comment:	The system incorporate materials which would not be classed as 'non-combustible' as defined in this Standard, with reference to clauses 2.7.1 ⁽¹⁾⁽²⁾ and 2.7.2 ⁽²⁾ and Annex 2A ⁽¹⁾ . See sections 8.1 to 8.3 and 8.5 to 8.7 of this Certificate.
Standard:	3.10 Precipitation
Comment:	Walls insulated with the system will contribute to a construction satisfying this Standard, with reference to clauses 3.10.1 ⁽¹⁾⁽²⁾ and 3.10.6 ⁽¹⁾⁽²⁾ . See sections 4.4 and 10.1 of this Certificate.
Standard:	3.15 Condensation
Comment:	The system will contribute to a construction 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 part of) 6.1.1 ⁽¹⁾ , 6.1.2 ⁽¹⁾⁽²⁾ , 6.1.3 ⁽¹⁾⁽²⁾ , 6.1.4 ⁽²⁾ , 6.1.6 ⁽¹⁾ , 6.1.8 ⁽²⁾ , 6.1.10 ⁽²⁾ , 6.2.1 ⁽¹⁾⁽²⁾ , 6.2.3 ⁽¹⁾ , 6.2.4 ⁽¹⁾ , 6.2.5 ⁽¹⁾⁽²⁾ , 6.2.6 ⁽²⁾ , 6.2.7 ⁽²⁾ , 6.2.11 ⁽¹⁾ and 6.2.13 ⁽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 clause 7.1.4 ⁽¹⁾⁽²⁾ [Aspect 1 ⁽¹⁾⁽²⁾ and 2 ⁽¹⁾], 7.1.6 ⁽¹⁾⁽²⁾ [Aspect 1 ⁽¹⁾⁽²⁾ and 2 ⁽¹⁾] and 7.1.7 ⁽¹⁾⁽²⁾ [Aspect 1 ⁽¹⁾⁽²⁾]. See sections 6.2 and 6.3 of this Certificate.

(1) Technical Handbook (Domestic).



The Building Regulations (Northern Ireland) 2012

Regulation: 23	Fitness of materials and workmanship
Comment:	The system is acceptable. See section 13.1 the <i>Installation</i> part of this Certificate.

Regulation:	28(b)	Resistance to moisture and weather
Comment:		The system provides a protection against rain ingress. See sections 4.4 and 10.1 of this Certificate.
Regulation:	29	Condensation
Comment:		The system contributes to minimising the risk of interstitial condensation. 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 Class B-s1, d0 and can satisfy this Regulation. See sections 8.1 to 8.4 and 8.7 of this Certificate.
Regulation:	39(a)(i)	Conservation measures
Regulation:	40	Target carbon dioxide emission rate
Comment:		The system can contribute to satisfying these Regulations. See sections 6.2 and 6.3 of this Certificate.

Construction (Design and Management) Regulations 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* (3.2) of this Certificate.

Additional Information

NHBC Standards 2013

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

Technical Specification

1 Description

1.1 KABE THERM EPS External Wall Insulation System consists of bonded and supplementary mechanically-fixed expanded polystyrene (EPS) insulation boards with glassfibre reinforcing mesh and render finishes. They are made up of the following components (see Figure 1):

- Kombi Adhesive Coat — cement-based adhesive supplied as powder to which water is added and applied at a coverage rate of 4.0 kg·m⁻²
- insulation — expanded polystyrene insulation — EPS boards, 1200 mm by 600 mm, in a range of thicknesses from 20 mm to 200 mm and with the nominal characteristics given in Table 1.

Table 1 Nominal characteristics

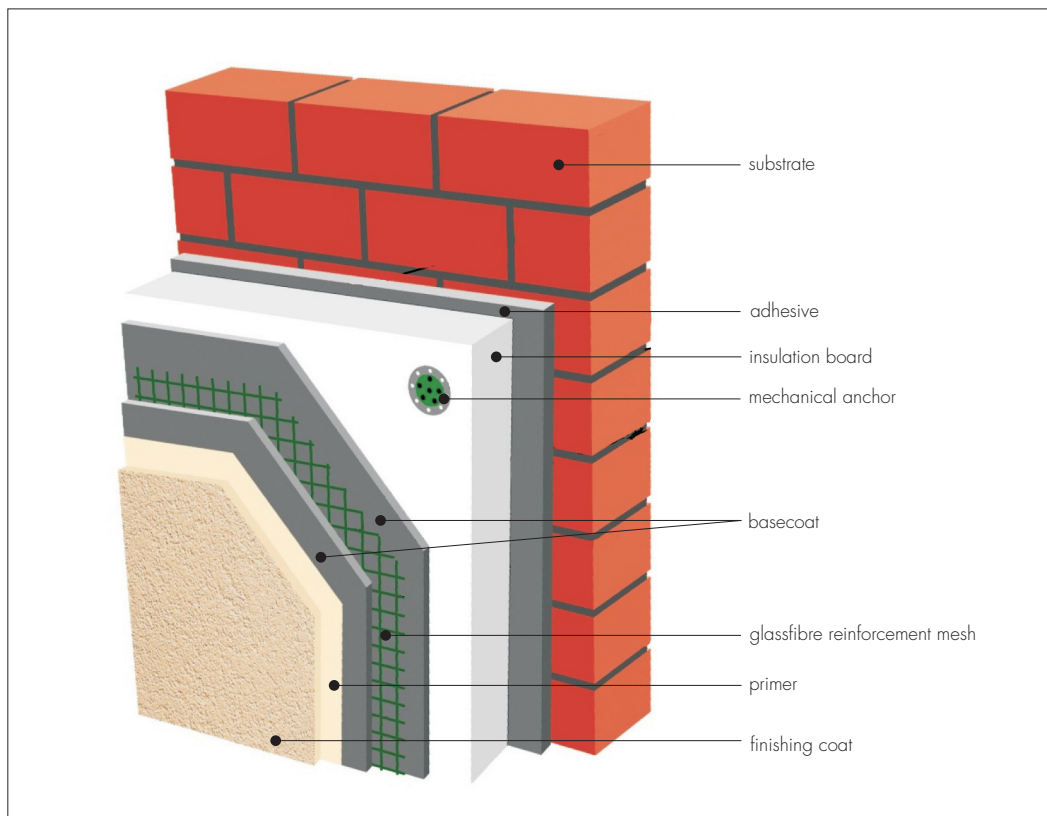
Insulation type	Code
Austrotherm EPS 042 FASSADA	EPS EN 13163 T2-L2-W2-S1-P3-BS75-DS(N)2-DS(70,-)2-TR80
Austrotherm EPS 040 FASSADA	EPS EN 13163 T2-L2-W2-S1-P3-BS100-DS(N)2-DS(70,-)2-TR100
Austrotherm EPS 038 FASSADA SUPER	EPS EN 13163 T2-L2-W2-S1-P3-BS115-CS(10)70-DS(N)2-DS(70,-)2-TR100
Austrotherm EPS FASSADA PREMIUM	EPS EN 13163 T2-L2-W2-S4-P3-BS115-DS(N)2-DS(70,-)2-TR100
Austrotherm EPS 040 KLIMA	EPS EN 13163 T2-L2-W2-S2-P4-BS115-CS(10)70-DS(N)2-DS(70,-)1-TR150-MU10

- supplementary mechanical fixings — anchors of adequate length to suit the substrate and insulation thickness, approved and supplied by the Certificate holder and selected from:
 - EJOT Ejotherm STR U
 - EJOT Ejotherm STRU 2G
 - EJOT Ejotherm VT 2G
 - EJOT Ejotherm NT U
 - EJOT Ejotherm NTK U
 - EJOT Ejotherm H1 eco
 - BRAVOLL PTH – 60/8
 - BRAVOLL PTH – KZ 60/8
 - BRAVOLL PTH – S
 - BRAVOLL PTH – SX
 - DAS SNINA DAS TH 80-190.

All anchors are approved by Certificate holder and covered by ETA's issued against the requirements of ETAG 004

- reinforcement
 - Vertex R117 A101 — anti-alkaline-impregnated glassfibre mesh (4.0 mm by 4.5 mm) with a nominal weight of $145 \text{ g}\cdot\text{m}^{-2}$
 - Vertex R131 A101 — anti-alkaline-impregnated glassfibre mesh (3.5 mm by 3.5 mm) with a nominal weight of $160 \text{ g}\cdot\text{m}^{-2}$
- primer
 - Primer Permuro GT — a dyed primer used with the PERMURO render
 - Primer Armasil GT — a dyed primer used with the ARMASIL T render
 - Primer Novalit GT — a dyed primer used with the NOVALIT T render
- render finish
 - PERMURO — an acrylic render available in a range of colours with full, brushed/mixed textures with grain sizes of 1.5 mm, 2.0 mm, 2.5 mm and 3.0 mm
 - ARMASIL T — a silicone render available in a range of colours with full texture with grain sizes of 1.5 mm, 2.0 mm, 2.5 mm, and 3.0 mm
 - NOVALIT T — a polysilicate (low-alkaline) render supplied in a range of colours with full, brushed/mixed, textured, with grain sizes of 1.5 mm, 2.0 mm, 2.5 mm and 3.0 mm.

Figure 1 KABE THERM EPS External Wall Insulation System



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

- profiles — a range of standard profiles (beading) for wall base, end stop, corner mesh, expansion joint. Profiles are available in organic-polyester-coated galvanized steel, stainless steel grade 304 2B to BS EN 10088-2 : 2005 or aluminium or PVC and are provided to the specifier's requirements and approved by the Certificate holder
- profile fixings — driven pins with plastic expansion sleeves as approved by the Certificate holder
- Algea and fungi wash
- sealant — silicone sealant as approved by the Certificate holder in accordance with BS EN ISO 11600 : 2003.

1.3 The insulation boards are primarily fixed to the external surface of the wall using Kombi adhesive coat and supplementary mechanical anchors (see Figure 1). The adhesive layer should be at least 40% of bonded area of the insulation board. The insulation boards are protected by a basecoat containing glassfibre reinforcement mesh. After allowing the basecoat to dry, a top coat is applied to the required thickness.

2 Manufacture

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

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

2.2 The management system of Farby KABE Polska Sp. z o.o. has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2008 by United Registrar of Systems (URS), (Certificate PL11000196/P).

2.3 The official distributor in the United Kingdom for KABE THERM EPS External Wall Insulation System is MBC Products Ltd, trading as MBC Project, Unit 48 Gateway, 49 Trade Park, Kerfoot Street, Warrington, WA2 8NT, United Kingdom. Telephone: 01925 572 158, (www.mbcproject.co.uk).

3 Delivery and site handling

3.1 The insulation boards are delivered to site wrapped in polythene. Each pack carries the product identification and batch numbers.

3.2 The rest of the components are delivered in the quantities and packages listed in Table 2. Each package carries the manufacturer's and product identification and batch number.

Table 2 Component supply details

Component	Quantity and packaging
Kombi Adhesive Coat	25 kg paper bag
Supplementary mechanical fixings	boxed by manufacturer
Vertex R117 A101/Vertex R131 A101 glassfibre mesh	1 m wide rolls x 50 m length
Primer	10 kg tubs
Render finishes	25 kg tubs

3.3 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 to avoid damage.

3.4 The EPS insulation boards should be protected from prolonged exposure to sunlight, either by storing opened packs under cover or re-covering with opaque polythene sheeting. The boards should not be exposed to open flame or other ignition sources.

3.5 Care must be taken when handling the EPS insulation boards to avoid contact with solvents or materials containing volatile organic components.

3.6 The powder adhesive must be stored in dry conditions, off the ground, and be protected from moisture. Contaminated materials should be discarded.

3.7 The paste basecoat, primers and thin-coat renders must be stored in tightly closed original packaging in a cool dry conditions and protected from excessive heat and frost at times.

Assessment and Technical Investigations

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

Design Considerations

4 General

4.1 KABE THERM EPS External Wall Insulation System, when installed in accordance with this Certificate, is effective in reducing the thermal transmittance (U value) of the walls in new and existing buildings.

4.2 The system will improve the weather resistance of a wall and provide a decorative finish. However, it may be installed only 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.

4.3 New and existing buildings subject to national Building Regulations should be of sound masonry, dense or no-fines concrete construction have wall surfaces in accordance with section 14 of this Certificate.



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

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

4.5 Other new buildings, not subject to any of the previous requirements, should also be built in accordance with BS EN 1996-2 : 2006 and its UK National Annex.

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

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

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

5 Practicability of installation

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

Note: The BBA operates a UKAS Accredited Approved Installer System for external wall insulation; details of installer companies approved 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 insulation manufacturer's declared thermal conductivity ($\lambda_{90/90}$ value) as shown in Table 3.

Table 3 Thermal conductivity values

Insulation	$\lambda_{90/90}$ value ($W \cdot m^{-1} \cdot K^{-1}$)
Austrotherm EPS 042 FASSADA	0.042
Austrotherm EPS 040 FASSADA	0.040
Austrotherm EPS 038 FASSADA SUPER	0.038
Austrotherm EPS FASSADA PREMIUM	0.031
Austrotherm EPS 040 KLIMA	0.040



6.2 The U value of a completed wall will depend on the selected insulation type and thickness and type of fixings and the insulating value of the substrate masonry and its internal finish. Figures for typical design U values, calculated in accordance with section 6.1, are given in Table 4.

Table 4 Insulation thickness required to achieve design U values given in national Building Regulations

U value ⁽¹⁾ (W·m ⁻² ·K ⁻¹)	Insulation type	Insulation thickness requirement (mm) ⁽³⁾	
		Brickwork, $\lambda = 0.56 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$	Dense blockwork, $\lambda = 1.75 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$
0.19	Austrotherm EPS 042 FASSADA	—	—
0.19	Austrotherm EPS 040 FASSADA	—	—
0.19	Austrotherm EPS 038 FASSADA SUPER	200	—
0.19	Austrotherm EPS FASSADA PREMIUM	160	180
0.19	Austrotherm EPS 040 KLIMA	—	—
0.26	Austrotherm EPS 042 FASSADA	150	160
0.26	Austrotherm EPS 040 FASSADA	140	150
0.26	Austrotherm EPS 038 FASSADA SUPER	140	150
0.26	Austrotherm EPS FASSADA PREMIUM	110	120
0.26	Austrotherm EPS 040 KLIMA	140	150
0.28	Austrotherm EPS 042 FASSADA	140	150
0.28	Austrotherm EPS 040 FASSADA	130	140
0.28	Austrotherm EPS 038 FASSADA SUPER	120	130
0.28	Austrotherm EPS FASSADA PREMIUM	100	110
0.28	Austrotherm EPS 040 KLIMA	130	140
0.30	Austrotherm EPS 042 FASSADA	120	140
0.30	Austrotherm EPS 040 FASSADA	120	130
0.30	Austrotherm EPS 038 FASSADA SUPER	110	120
0.30	Austrotherm EPS FASSADA PREMIUM	90	100
0.30	Austrotherm EPS 040 KLIMA	120	130

(1) The following values for other elements of the construction were used:

- external boundary resistance (R_{se}) — $0.04 \text{ m}^2\cdot\text{K}\cdot\text{W}^{-1}$
- render (14 mm sand and cement) — $\lambda = 1.0 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$, $\mu = 6$ (wet)
- 215 mm brickwork (protected) — $\lambda = 0.56 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$ ($\mu = 10$) or 200 mm blockwork, $\lambda = 1.75 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$ ($\mu = 100$) and 6.7% mortar — $\lambda = 0.88 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$
- plaster (13 mm) — $\lambda = 0.57 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$, $\mu = 10$
- internal boundary resistance (R_{si}) — $0.13 \text{ m}^2\cdot\text{K}\cdot\text{W}^{-1}$.

(2) Fixing regime 4 fixings per m² with a point thermal transmittance, = $0.003 \text{ W}\cdot\text{K}^{-1}$.

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

6.3 The system can maintain, or contribute to maintaining, continuity of thermal insulation around openings and at junctions between external walls and other building elements. Details shown in section 16 (Figure 8) will allow use of the default psi values for Accredited Construction details in Emission Rate calculations to SAP 2009 or the Simplified Building Energy Model (SBEM). Guidance on limiting heat loss at junctions 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 positive (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, adhesive 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 adhesive and supplementary anchors.

 7.4 The wind loads on the wall 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 Calculations to determine resistance to negative wind loads should be based on EPS insulation with a bond strength between insulation and adhesive as $\geq 30 \text{ kN}\cdot\text{m}^{-2}$. With a minimum of 40% bonded area and a safety factor of 9, the design resistance to bond failure may be taken as $1.33 \text{ kN}\cdot\text{m}^{-2}$.

7.6 Assessment of structural performance for individual buildings must be carried out by a suitably qualified and experienced person to confirm that:

- the substrate wall has adequate strength to resist the additional loads that may be applied as a result of installing the system, ignoring any positive contribution that may occur from the insulation system
- the proposed system with associated supplementary fixing layout provides adequate resistance to negative wind loads until the adhesive is set and thereafter associated bond strength between adhesive and substrate provides adequate resistance to negative wind loads
- an appropriate number of site-specific pull-off tests should be conducted on the substrate of the building to determine the minimum resistance to failure of the bond strength. The bond strength between the adhesive and the substrate should be determined on site and taken as the lowest of the five results divided by a safety factor of 9 and multiplied by the minimum bond area of 40%⁽¹⁾.

(1) If this value is less than the ultimate wind load, the bonded area should be increased.

7.7 The number of supplementary fixings and the span between fixings should be determined by the system designer. Provided the substrate wall is suitable and an appropriate fixing is used, the mechanical fixings will initially transfer the weight of the system to the substrate wall. The fixing must be selected to give adequate support to the weight of the system at the minimum spacing.

7.8 Typical characteristic pull-out strengths for the supplementary fixings could be taken from the corresponding European Technical Approval (ETA); however, these values are dependent on the substrate and the fixings must be selected to suit the initial loads and substrate concerned.

Impact loading


7.9 Hard body impact tests were carried out in accordance with ETAG 004 : 2011. The KABE THERM EPS External Wall Insulation System is suitable for use in the categories listed in Table 5.

Rendering System: Base coat + finishing coats indicated	Finishing coat	Impact resistance category ⁽¹⁾
EPS + base coat Kombi + finishing coat indicated	ARMASIL T	Category II ⁽¹⁾
EPS + base coat Kombi + finishing coat indicated	PERMURO	Category I ⁽¹⁾

(1) These categories are defined in ETAG 004 : 2011 as:


- Use category I – a zone readily accessible at ground level to the public and vulnerable to hard body impacts but not subjected to abnormally rough use
- Category II – a zone liable to impacts from thrown or kicked objects, but in public locations where the height of the system will limit the size of the impact; or at lower levels where access to the building is primarily to those with some incentive to exercise care
- Category III – a zone not likely to be damaged by normal impacts caused by people or by thrown or kicked objects.


8 Behaviour in relation to fire

 8.1 The surface spread of flame classification for the system in accordance with BS EN 13501-1 : 2007, is B-s1, d0.

8.2 The fire classifications apply to the full range of thicknesses covered by the Certificate.

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

 8.4 The system is considered suitable for use on or at any distance from the boundary. It is restricted for use in buildings less than 18 m in height.

 8.5 The system is classified as low risk combustible materials and must not be used within 1 m of the boundary. It is restricted for use in buildings less than 18 m in height.

8.6 The system is not classified as 'non-combustible'; therefore, calculations for unprotected areas apply with some minor exceptions, in the calculation of unprotected areas.


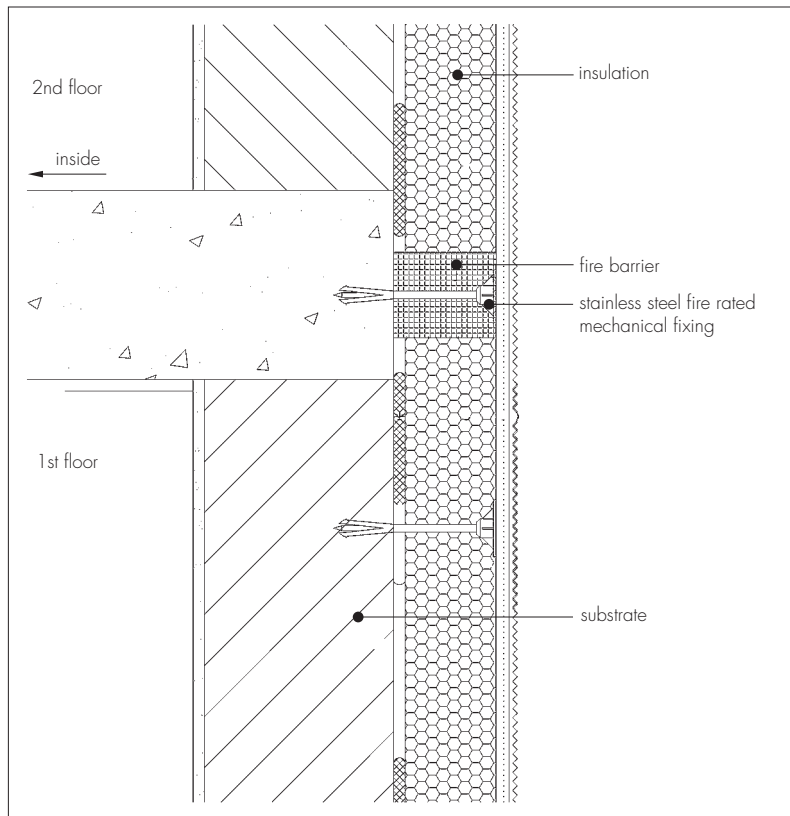
 8.7 Application to second storey walls and above should include at least one stainless steel mechanical fixing per square metre and fire barriers in line with compartment walls and floors (see Figure 2). For installation of fire barriers and steel fixings refer to the guidance given in BRE Report BR 135.

Figure 2 Fire barrier



9 Proximity of flues and appliances

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

England and Wales — Approved Document J

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

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

Northern Ireland — Technical Booklet L.

10 Rain penetration



10.1 The system will provide a degree of protection against rain ingress. However, care should be taken to ensure that walls are adequately weather tight prior to the application of the insulation system. The insulation system may 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 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 rain index, paying due regard to the design detailing, workmanship and materials to be used.

10.4 At the tops of walls, the system should be protected by an adequate overhang or other detail designed for use with this type of system.

11 Risk of condensation



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

Surface condensation



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



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

Interstitial condensation



11.4 Walls incorporating the system will adequately limit the risk of interstitial condensation when they are designed and constructed in accordance with this Certificate.

11.5 The render systems used with the systems have an equivalent air layer of thickness (S_a) of $\leq 2, 0 \text{ m}$. This corresponds to a water vapour resistance factor (μ) which is dependent on the particular basecoat and finish configuration as stated in ETA 09/0042.

11.6 The water vapour resistance factors (μ) for EPS is 60, taken from BS EN ISO 10456 : 2007, Table 4.

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 The designer should ensure suitable access is available to enable maintenance inspections to take place safely.

12.3 Damaged areas must be repaired using the appropriate components and the procedures detailed in the Certificate holder's installation instructions.

13 Durability



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

13.2 The 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 with exterior paint.

Installation

14 Site survey and preliminary work

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

- the position of beads
- detailing around windows, doors and at eaves
- damp-proof course (dpc) level
- exact position of expansion joints
- where required, additional corner mesh and reinforcement
- areas where flexible sealants must be used
- any alterations to external plumbing
- 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 applicators (see section 15) to determine the pull-out resistance of the proposed mechanical fixings for the appropriate substrate. 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 fixing's pull-out resistance test data (see section 7).

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

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

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

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

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

14.8 All modifications, such as provision for cavity barriers and fire stopping (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 is carried out in accordance with the current installation instructions of the Certificate holder.

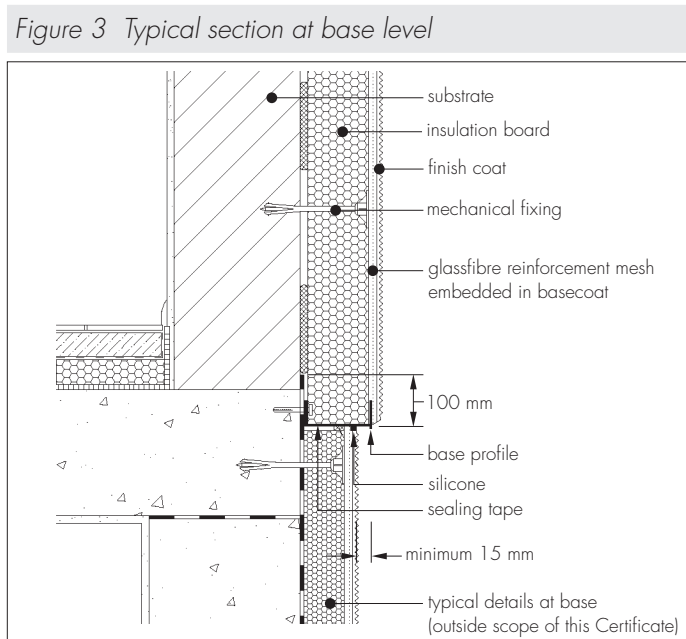
16.2 Weather conditions should be monitored to ensure correct application and curing conditions. The render should not be applied at temperatures below 5°C or above 25°C, if exposure to frost is likely or in damp/wet conditions. The render must be protected from rapid drying and should not be applied on elevations in direct sunlight or where the substrate is hot.

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

16.4 Before installation takes place, the building designer must confirm where items such as rainwater goods, satellite dishes, clothes lines and hanging baskets will be placed. The 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.

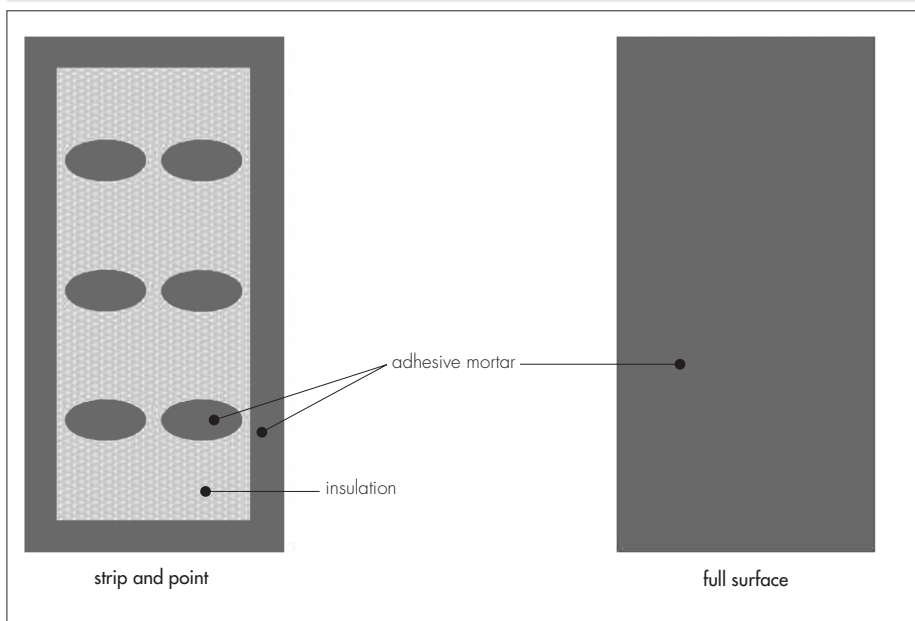
Positioning and securing insulation boards

16.5 The base profile is secured to the external wall above the dpc, using the approved profile fixings at approximately 400 mm centres (see Figure 3). Beads and expansion joints are incorporated as specified.



16.6 The insulation boards are bonded to the wall by applying the specified adhesive to the boards, which is prepared by mixing each bag with 5.5 litres or 6.5 litres of water. The adhesive is applied in 'strip and point' or full surface application. The Kombi Adhesive should cover at least 40% of the insulation board (see Figure 4) and immediately placed on the substrate and pressed into place. The thickness of the adhesive layer when pressed should not exceed 10 mm.

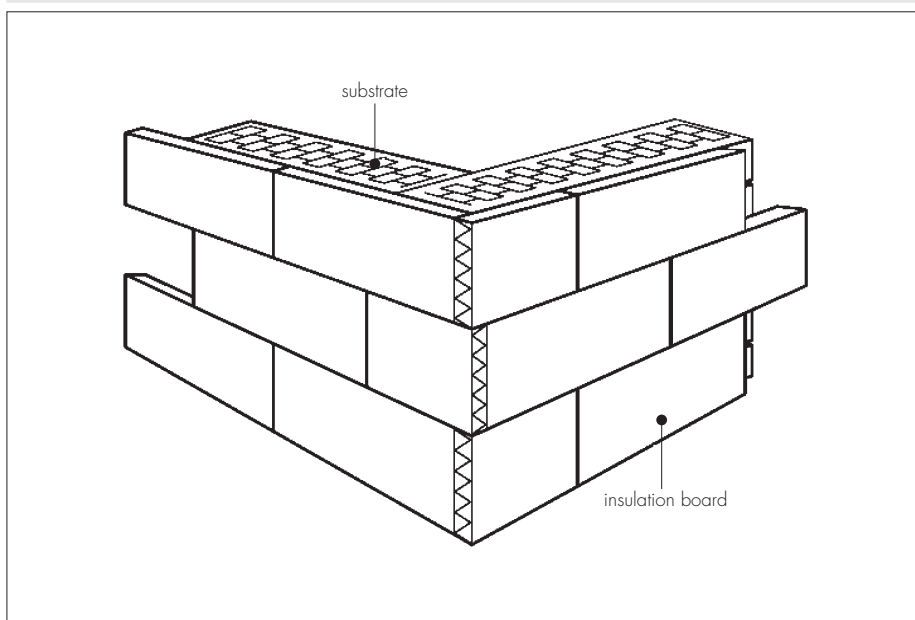
Figure 4 Insulation boards adhesive pattern



16.7 The first run of insulation boards is positioned on the base profile, and pressed firmly against the wall. Subsequent rows of boards are positioned so that the vertical board joints are staggered and overlapped at the building corners (see Figure 5).

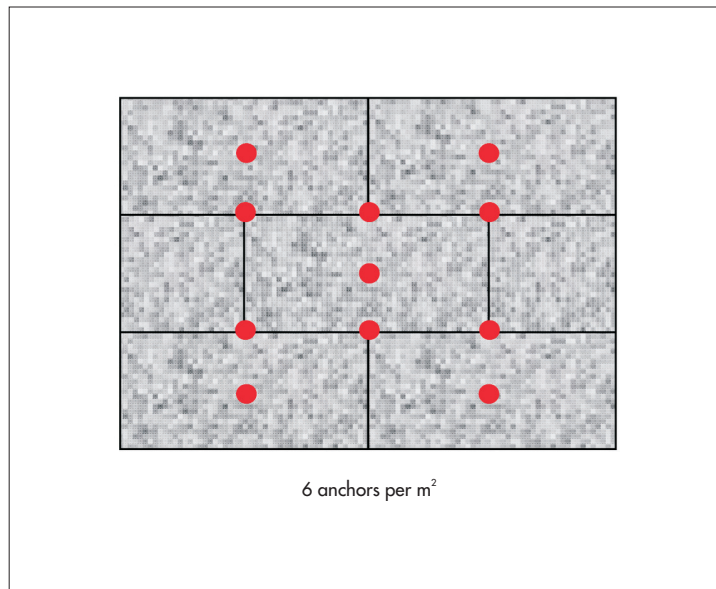
16.8 Subsequent rows of insulation boards are installed above dpc, on top of the starter track and positioned so that the vertical board joints are staggered and overlapped at the building corners (see Figure 5).

Figure 5 Insulation boards corner detail



16.9 A minimum of 4 supplementary mechanical anchors per m² for insulation boards shall be installed unless otherwise specified in the project specific design (see Figure 6). See section 1.1 of this Certificate for the list of approved anchors that can be used.

Figure 6 Typical fixing layout



16.10 Details of supplementary mechanical anchors (including their arrangement in the insulation boards) are specified in the project specific design requirements based on pull-out test results, substrate type and wind loading data. Installation of mechanical fasteners shall commence no earlier than 48 hours after the insulation panels have been adhesively fixed.

16.11 Care must be taken to ensure that all board edges are butted tightly together, and alignment should be checked as work proceeds. For the expanded polystyrene, any high spots or irregularities should be removed by lightly planing with large grain sand paper or special grater for EPS boards. The window and door reveals should always be insulated. However, where clearance is limited, the special 20 mm or 30 mm thick insulation boards should be used.

16.12 Stainless steel mechanical fixings to be provided at least one per square metre starting from second storey (see section 8.7). The fixing design should take account of the extra duty required under fire conditions.

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

16.14 Window and door reveals should be insulated to minimise the effects of a cold bridging in accordance with the recommendations of the Accredited Construction Details. Where clearance is limited, strips of approved insulation should be installed to suit available margins and details.

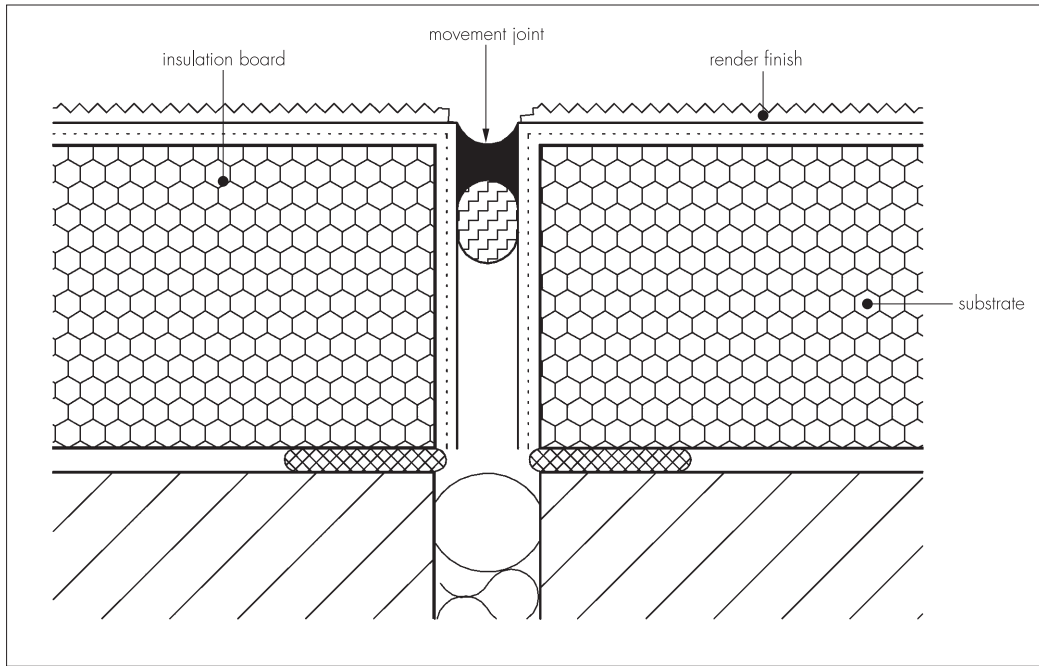
16.15 Building corners, door and window heads and jambs are formed using angle beads bonded to the insulation in accordance with the manufacturer's instructions.

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

Movement joints

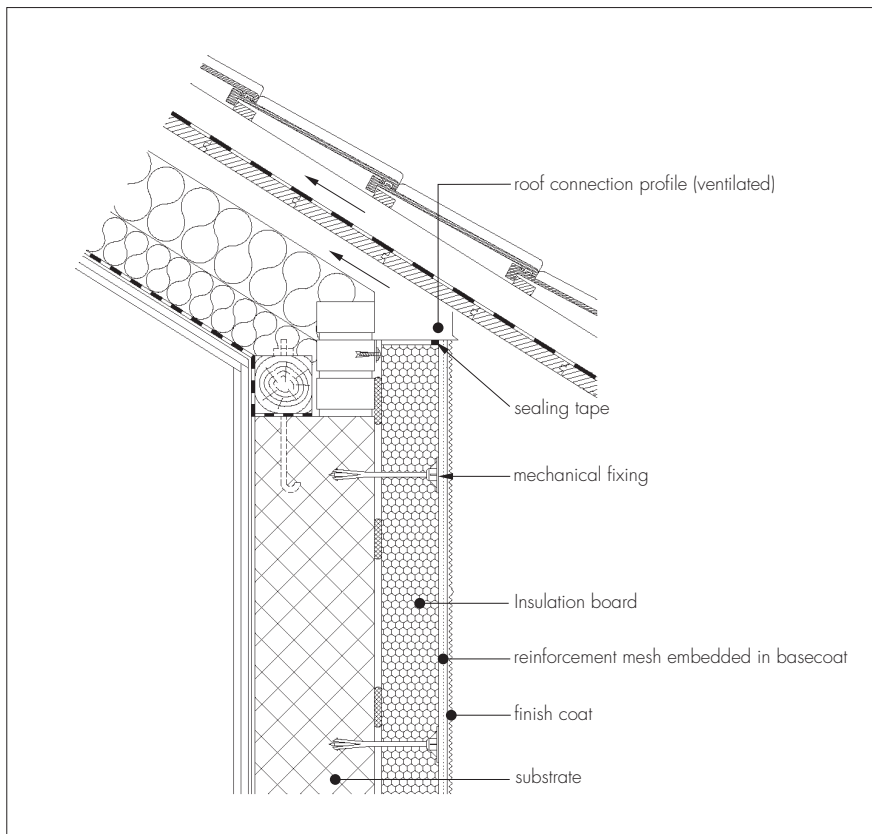
16.17 Movement joints in the substrate must be continued through the system. This may necessitate the use of back-to-back full system stop beads with a sealant and backer strip depending on the width of the joint and the degree of movement anticipated. Additional expansion joints in the insulation system are determined by the Certificate holder at the time of initial survey. Each project is considered on its own merits and the Certificate holder will take into account construction format, building design and fenestration when determining the regularity and positioning of both vertical and horizontal expansion joints in the system (see Figure 7).

Figure 7 Movement joint



16.18 At all locations where there is a risk of insulation exposure, eg window reveals or eaves, the system must be protected by an adequate overhang or by purpose made sub-sills, seals or flashing (see Figure 8).

Figure 8 Eaves detail



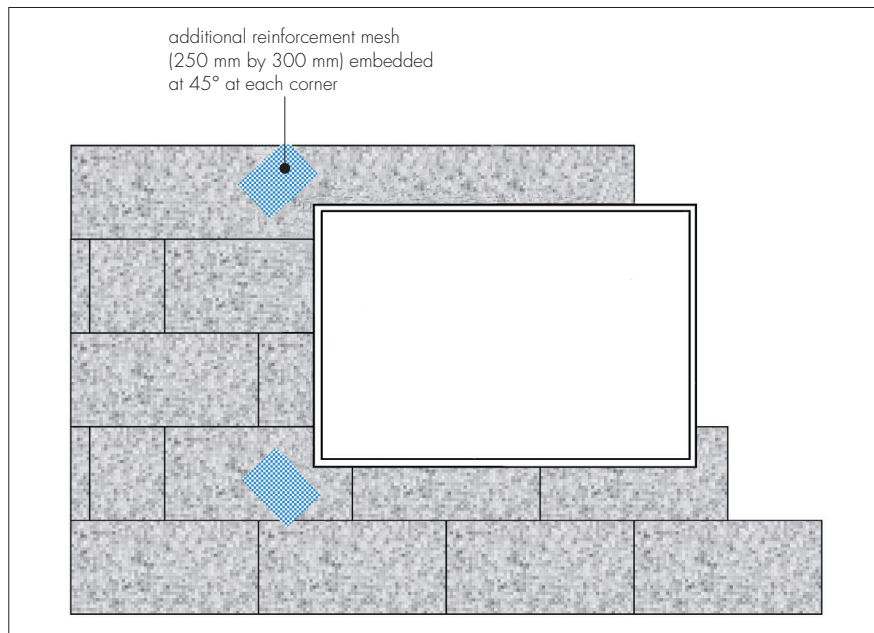
Reinforcing

16.19 The adhesive coat is prepared by mixing with water, using an electrically driven paddle mixer or a concrete mixer (as described in section 16.6). The material is applied over the insulation boards, using a stainless steel trowel and floated to a minimum thickness of 3 mm. The reinforcement mesh is immediately embedded and after immersion of the mesh, the entire surface of the layer should be precisely evened out, with the use of an additional portion of mortar if absolutely necessary while still wet and smoothed off using a stainless steel float.

16.20 The remaining half of thickness of base coat is then applied as required to ensure the mesh is completely covered and the required minimum thickness of base coat is achieved. The first layer of basecoat and mesh is applied, as described in section 16.19 of this Certificate.

16.21 Additional pieces of reinforcing mesh are applied diagonally at the corners of openings to provide the necessary reinforcement in prior to the application of the basecoat. At affected locations, 250 mm by 300 mm mesh strips should be applied at a 45° angle in relation to the lines determined by the reveal embedded into basecoat in accordance with the Certificate holder's instructions (see Figure 9).

Figure 9 Additional reinforcement at openings



16.22 The mesh should be free of wrinkles and fully embedded in the basecoat.

16.23 The drying period of the applied reinforced layer is a minimum of three days (under drying conditions with a temperature of +20°C and relative air humidity of 65%). After this period passes, a primer can be applied using a paintbrush or paint roller.

16.24 The primer should be left to dry thoroughly before application of the finish coat. Depending on conditions, the drying time should be at least 24 hours before applying the finish coats.

Rendering and finishing

16.25 Prior to the application of the render coat, beading should be carried out in window and door frames, overhanging eaves, gas and electric meter boxes, wall vents, or where the render abuts any other building material or surface.

16.26 The render should be applied to the surface in a thin, uniform layer of a thickness (from 1.5 mm to 3 mm) of a grain using a stainless float, then using plastic float, the texture of the plaster should be brought out by floating the applied mass in a circular or longitudinal motion.

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

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

Figure 10 Typical insulated window and door reveal details

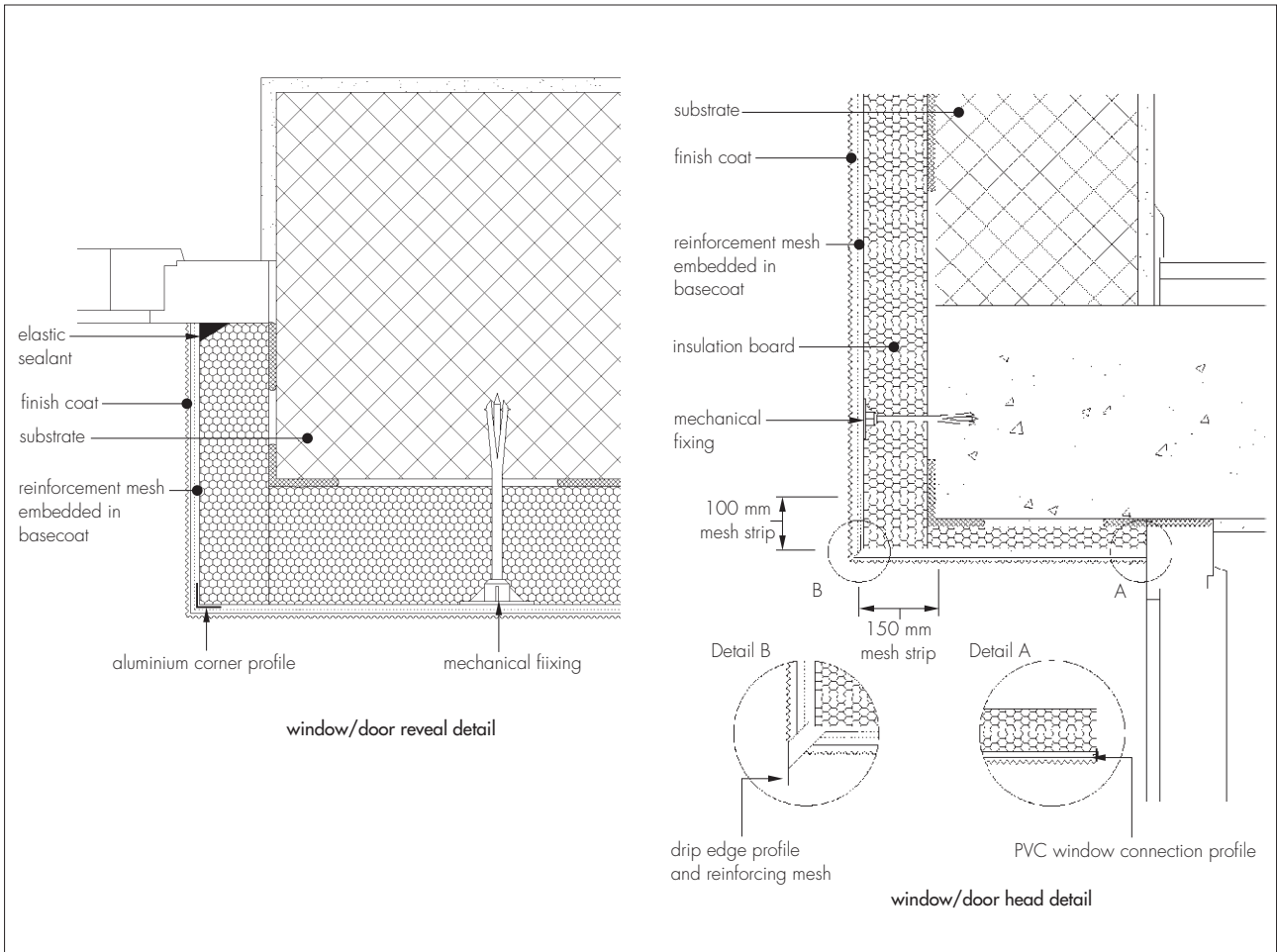
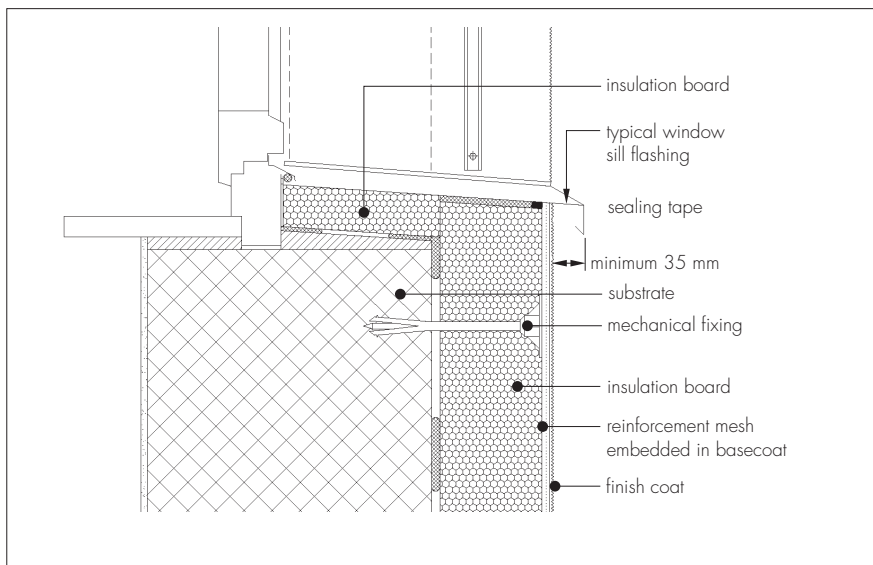


Figure 11 Oversill detail



16.29 To prevent the finish from drying too rapidly, it should not be applied in direct sunlight. Continuous surfaces must be completed without a break.

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

17 Investigations

- 17.1 The system were examined and assessed by an independent laboratory to determine:
 - wind load resistance
 - thermal resistance
 - fire performance
 - bond strength
 - hygrothermal performance
 - resistance to frost
 - resistance to impact
 - water absorption (capillary test)
 - water vapour permeability.

17.2 The manufacturing process, the methods adopted for quality control of manufactured and bought-in components, and details of the quality and composition of the materials used, were examined.

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

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

Bibliography

- BS 5250 : 2011 *Code of practice for control of condensation in buildings*
- BS 8000-3 : 2001 *Workmanship on building sites — Code of practice for masonry*
- BS EN 1990 : 2002 *Eurocode — Basis of structural design*
- BS EN 1991-1-4 : 2005 *Eurocode 1 : Actions on structures — General actions — Wind actions*
- BS EN 1996-2 : 2006 *Eurocode 6 : Design of masonry structures — Design considerations, selection of materials and execution of masonry*
- NA to BS EN 1996-2 : 2006 *UK National Annex to Eurocode 6 : Design of masonry structures — Design considerations, selection of materials and execution of masonry*
- BS EN 10088-2 : 2005 *Stainless steels — Technical delivery conditions for sheet/plate and strip of corrosion resisting steels for general purposes*
- BS EN 13501-1 : 2007 *Fire classification of construction products and building elements — Classification using test data from reaction to fire tests*
- BS EN 13914-1 : 2005 *Design, preparation and application of external rendering and internal plastering — External rendering*
- BS EN ISO 6946 : 2007 *Building components and building elements — Thermal resistance and thermal transmittance — Calculation method*
- BS EN ISO 10456 : 2007 *Building materials and products — Hygrothermal properties — Tabulated design values and procedures for determining declared and design thermal values*
- BS EN ISO 11600 : 2003 *Building construction — Jointing products — Classification and requirements for sealants*
- BS EN ISO 9001 : 2008 *Quality management systems — Requirements*
- BRE Report (BR 135 : 2013) *Fire Performance of External Insulation For Wall of Multistorey Buildings*
- BRE Report (BR 262 : 2002) *Thermal insulation: avoiding risks*
- BRE Report (BR 443 : 2006) *Conventions for U-value calculations*
- ETAG 004 : 2011 *Guideline for European Technical Approval of External Thermal Insulation Composite Systems with Rendering*

18 Conditions

18.1 This Certificate:

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

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

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

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

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

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

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

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