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BBA APPROVAL INSPECTION TESTING CERTIFICATION
TECHNICAL APPROVALS FOR CONSTRUCTION

Agrément Certificate
09/4625
Product Sheet 3

WETHERBY EXTERNAL WALL INSULATION SYSTEMS

EPSITEC EXTERNAL WALL INSULATION SYSTEMS FOR TIMBER-FRAMED BUILDINGS

This Agrément Certificate Product Sheet(1) relates to Epsitec External Wall Insulation Systems for Timber-Framed Buildings, comprising phenolic, expanded polystyrene (EPS) or enhanced EPS insulation boards mechanically fixed to sheathed substrates using top hat rail profiles, with a reinforced basecoat and render finishes. The systems are suitable for use, with height restrictions, on sheathed timber-framed wall substrates of new and existing domestic or non-domestic buildings.

(1) Hereinafter referred to as 'Certificate'.

CERTIFICATION INCLUDES:

- factors relating to compliance with Building Regulations where applicable
- factors relating to additional non-regulatory information where applicable
- independently verified technical specification
- assessment criteria and technical investigations
- design considerations
- installation guidance
- regular surveillance of production
- formal three-yearly review.

KEY FACTORS ASSESSED

Thermal performance — the systems can improve the thermal performance of external walls and can contribute to satisfying the requirements of the national Building Regulations (see section 6).

Strength and stability — the systems can adequately resist wind loads and impact damage. The impact resistance is dependent on the finish chosen (see section 7).

Behaviour in relation to fire — the systems can have a B-s1, d0 reaction to fire classification in accordance with BS EN 13501-1: 2007 and their use is restricted (see section 8).

Risk of condensation — the systems 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 this Certificate, the systems will remain effective for at least 30 years (see section 13).

The BBA has awarded this Certificate to the company named above for the systems described herein. These systems have been assessed by the BBA as being fit for their intended use provided they are installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

Date of First issue: 12 April 2016

John Albon — Head of Approvals
Construction Products

Claire Curtis-Thomas
Chief Executive

Certificate amended on 5 May 2020 regarding the revised fire regulations, classification and associated text.

Regulations

In the opinion of the BBA, Epsitec External Wall Insulation Systems for Timber-Framed Buildings, if installed, used and maintained in accordance with the provisions of this Certificate, can satisfy or contribute to satisfying the relevant requirements of the following Building Regulations (the presence of a UK map indicates that the subject is related to the Building Regulations in the region or regions of the UK depicted):

The Building Regulations 2010 (England and Wales) (as amended)

Requirement:	A1	Loading
Comment:		The systems can sustain and transmit wind loads to the substrate wall. See sections 7.1 to 7.5 of this Certificate.
Requirement:	B3(4)	Internal fire spread
Comment:		The systems are restricted by this Requirement. See sections 8.1 to 8.4 of this Certificate.
Requirement:	B4(1)	External fire spread
Comment:		The systems are restricted by this Requirement. See sections 8.1 to 8.4 of this Certificate.
Requirement:	C2(b)	Resistance to moisture
Comment:		The systems provide 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 systems can contribute to minimising the risk of interstitial and surface condensation. See sections 11.1, 11.2 and 11.4 of this Certificate.
Requirement:	L1(a)(i)	Conservation of fuel and power
Comment:		The systems can contribute to satisfying this Requirement. See sections 6.2 and 6.3 of this Certificate.
Regulation:	7(1)	Materials and workmanship
Comment:		The systems are acceptable. See section 13.1 and the *Installation* part of this Certificate.
Regulation:	7(2)	Materials and workmanship
Comment:		The systems are restricted by this Regulation. See sections 8.1 to 8.4 of this Certificate.
Regulation:	26	CO_2 emission rates for new buildings
Regulation:	26A	Fabric energy efficiency rates for new dwellings (applicable to England only)
Regulation:	26A	Primary energy consumption rates for new buildings (applicable to Wales only)
Regulation:	26B	Fabric energy efficiency rates for new dwellings (applicable to Wales only)
Comment:		The systems can contribute to satisfying these Regulations. See sections 6.2 and 6.3 of this Certificate.

The Building (Scotland) Regulations 2004 (as amended)

Regulation:	8(1)(2)	Durability, workmanship and fitness of materials
Comment:		The systems can contribute to the construction satisfying this Regulation. See sections 12 and 13.1 and the *Installation* part of this Certificate.
Regulation:	9	Building standards applicable to construction
Standard:	1.1	Structure
Comment:		The systems can sustain and transmit wind loads to the substrate wall. See sections 7.1 to 7.5 of this Certificate.
Standard:	2.6	Spread to neighbouring buildings
Comment:		The external face of the systems is restricted, 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, 8.5 and 8.6 of this Certificate.
Standard:	2.7	Spread on external walls
Comment:		The external face of the systems is restricted, with reference to clauses 2.7.1(1)(2) and 2.7.2(1)(2) and Annex 2A(1). See sections 8.1 to 8.3, 8.5 and 8.6 of this Certificate.
Standard:	3.10	Precipitation
Comment:		The systems will contribute to a construction satisfying this Standard, with reference to clauses 3.10.1(1)(2) and 3.10.2(1)(2). See sections 4.4 and 10.1 of this Certificate.
Standard:	3.15	Condensation
Comment:		The systems can satisfy the requirements of this Standard, with reference to clauses 3.15.1(1)(2), 3.15.4(1)(2) and 3.15.5(1)(2). See sections 11.3 and 11.4 of this Certificate.
Standard:	6.1(b)	Carbon dioxide emissions
Standard:	6.2	Buildings insulation envelope
Comment:		The systems can contribute to satisfying these Standards, with reference to clauses 6.1.1(1)(2), 6.1.2(1)(2), 6.1.3(1), 6.1.6(1), 6.1.10(2), 6.2.1(1)(2), 6.2.3(1), 6.2.4(2), 6.2.5(2), 6.2.6(1), 6.2.7(1), 6.2.8(2), 6.2.9(1)(2), 6.2.10(1), 6.2.11(1), 6.2.12(2) and 6.2.13(1)(2). See sections 6.2 and 6.3 of this Certificate.
Standard:	7.1(a)(b)	Statement of sustainability
Comment:		The systems can contribute to satisfying the relevant requirements of Regulation 9, Standards 1 to 6, and therefore will contribute to a construction meeting the bronze level of sustainability as defined in this Standard. In addition, the system can contribute to a construction meeting a higher level of sustainability as defined in this Standard, with reference to clauses 7.1.4(1)(2) [Aspect 1(1)(2) and 2(1)], 7.1.6(1)(2) [Aspect 1(1)(2) and 2(1)] and 7.1.7(1)(2) [Aspect 1(1)(2)]. See section 6.2 of this Certificate.
Regulation:	12	Building standards applicable to conversions
Comment		All comments given for the systems under Regulation 9, Standards 1 to 6, also apply to this Regulation, with reference to 0.12.1(1)(2) and Schedule 6(1)(2).

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

The Building Regulations (Northern Ireland) 2012 (as amended)

Regulation:	23	Fitness of materials and workmanship
Comment:		The systems are acceptable. See section 13.1 and the *Installation* part of this Certificate.
Regulation:	28(b)	Resistance to moisture and weather
Comment:		The systems provide a degree of protection against rain ingress. See sections 4.4 and 10.1 of this Certificate.
Regulation:	29	Condensation
Comment:		The systems contribute to minimising the risk of interstitial and surface condensation. See section 11.4 of this Certificate.
Regulation:	30	Stability
Comment:		The systems can sustain and transmit wind loads to the substrate wall. See sections 7.1 to 7.5 of this Certificate.
Regulation:	36(a)	External fire spread
Comment:		The systems are restricted by this Regulation. See sections 8.1 to 8.4 of this Certificate.
Regulation:	39(a)(i)	Conservation measures
Regulation:	40	Target carbon dioxide emission rate
Comment:		The systems can contribute to satisfying these Regulation. See sections 6.2 and 6.3 of this Certificate.

Construction (Design and Management) Regulations 2015

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

Information in this Certificate may assist the client, Principal Designer/CDM co-ordinator, designer and contractors to address their obligations under these Regulations.

See section: 3 *Delivery and site handling* (3.1 and 3.3) of this Certificate.

Additional Information

NHBC Standards 2016

NHBC accepts the use of Epsitec External Wall Insulation Systems for Timber-Framed Buildings, provided they are installed, used and maintained in accordance with this Certificate, in relation to *NHBC Standards*, Part 6 *Superstructure (excluding roofs)* and Chapter 6.9 *Curtain walling and cladding*.

Technical Specification

1 Description

1.1 Epsitec External Wall Insulation Systems for Timber-Framed Buildings comprise EPS, enhanced EPS or phenolic insulation, mechanically fixed at 600 mm vertical centres to Epsitec Cavity spacer top hat rail profiles attached to the external surface of 10 mm (minimum) cement particle boards(1). The insulation boards are covered with a basecoat, glassfibre reinforcement mesh, primer and a render finish. (See Figure 1).

(1) See section 4.6,Table 2.

1.2 The components of the systems comprise:

Epsitec starter track or base profile

- starter/base profile — aluminium base rail fixed to the cement particle board (CPB), with drainage and vented cavity, ventilation level of < 500 $mm^2 \cdot m^{-1}$ length of wall. See section 4.5
- base profile fixing — self-drilling LS range screws, 5.5 mm diameter, made of case-hardened carbon steel with a Climadur organic coating and used for fastening the starter track/base profile to the sheathing board/timber-frame substrate.

Epsitec cavity spacer rail (see Figure 1)

- Epsitec cavity spacer rail(1) — 0.7 mm gauge thickness, 15 mm high by 45 mm wide, 2500 mm long (approximately) vertical section top hat rail support. Fixed at 600 mm horizontally and 300 mm vertically in both flanges
- base profile fixings — self drilling LS range screws, 5.5 mm diameter, made of case-hardened carbon steel with a Climadur organic coating and used for fastening the starter track/base profile to the sheathing board/timber-frame substrate.

(1) Other top hat rails may be used provided they can be demonstrated to have equal or higher bending strength and mechanical characteristics.

Epsitec insulation fixings

- Mechanical fixings(1) — anchors with a 60 mm diameter plate and of adequate length to suit the substrate, rail profile and insulation thickness. These are approved and supplied by the Certificate holder and include:
  - — Bravoll TIT or SBH-T65/25 — 60 mm diameter polyethylene or high density polyethylene (PE-HD) anchor washer with 4.8 mm diameter self-drilling TKR range screws made of case-hardened carbon steel pin with a Climadur organic coating. Used for fastening the insulation to steel Epsitec rail.

(1) Other fixings may be used provided they can be demonstrated to have equal or higher pull-out, plate diameter and plate stiffness characteristics (see Table 5 of this Certificate).

Insulation

- phenolic insulation boards — 1200 mm by 600 mm, available in a range of thicknesses between 40 mm and 120 mm in 10 mm increments, with a nominal density of 40 kg·m^{-3}, a minimum tensile strength of 50 kN·m^{-2} and a minimum compressive strength of 150 kN·m^{-2}. Boards are manufactured to comply with the requirements of BS EN 13166 : 2012
- expanded polystyrene EPS 70 insulation boards (white) —1200 mm by 600 mm, available in a range of thicknesses between 50 mm and 240 mm in 10 mm increments, with a nominal density of 17 kg·m^{-3}, a minimum compressive strength of 70 kN·m^{-2} and nominal tensile strength of ≥ 100 kN·m^{-2}. The boards are manufactured to comply with the requirements for EPS 70, Class E (flame retardant) material to BS EN 13163 : 2012
- Epsitherm 70E and 90E enhanced expanded polystyrene (EPS) insulation boards — 1200 mm by 600 mm, available in a range of thicknesses between 50 mm and 240 mm in 10 mm increments, with a nominal density of 17 kg·m^{-3}, a minimum compressive strength of 70 kN·m^{-2} and 90 kN·m^{-2} respectively and nominal tensile strengths perpendicular to the face of 100 kN·m^{-2}. Boards are manufactured to comply with the requirements of EPS 70, Class E (flame retardant) material to BS EN 13163 : 2012.

Basecoat

- Heck K+A Basecoat — a cement-based render for use as a reinforcement basecoat and conforming to BS EN 13139 : 2002. Supplied as a powder to which clean water is added and applied in two coats to a total thickness of 6 mm to 9 mm.

Reinforcement mesh

- reinforcing mesh — a multi-stranded, alkali-resistant glassfibre mesh (grid size 4 mm by 4 mm), with a polymer coating and a nominal weight of 160 gm^{-2}.

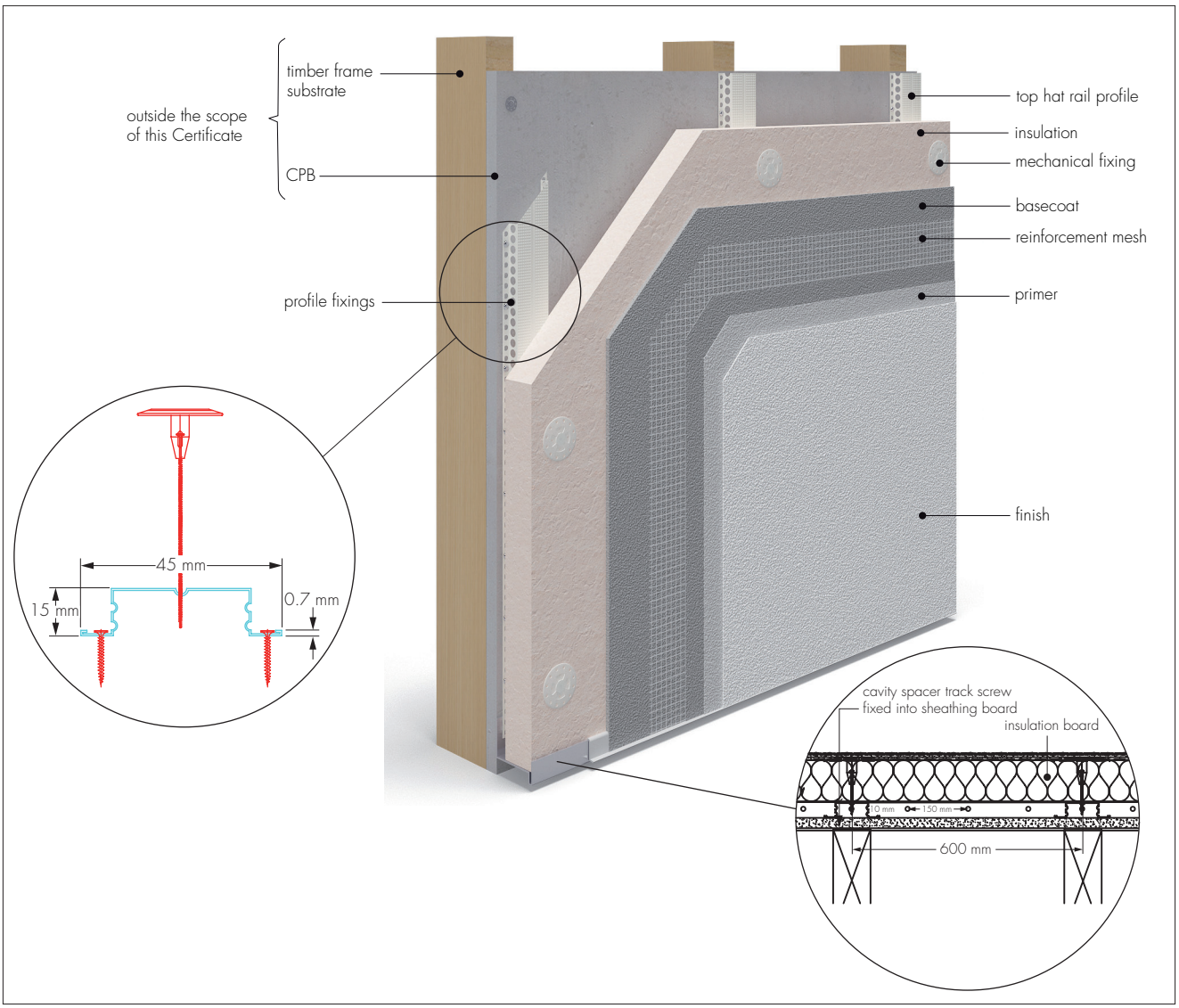
Primer

- Heck Universalgrundierung primer — an emulsion for use as a bonding agent and pre-coat.

Render finishes

- Heck Siliconharputz K and Heck Siliconharputz R render topcoats — ready-made silicone pastes available with aggregate sizes from 1.5 mm to 3 mm and 1.5 mm to 2 mm respectively. Coating thickness is regulated by particle sizes.

Figure 1 Epsitec External Wall Insulation Systems for Timber-Framed Buildings



1.3 Ancillary materials used with the systems include:

- profiles, comprising:
  - aluminium or PVC-U edge, corner and render stop profiles
  - profile connectors and fixings
  - water drainage deflector channels for use above windows.

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

- aluminium or PVC-U movement joint
- aluminium or PVC-U expansion joint
- breather membrane
- insect mesh
- cavity stops
- joint sealant
- polyurethane (PU) foam filler.

2 Manufacture

2.1 System components are either manufactured by the Certificate holder or bought-in from suppliers, to an agreed specification.

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

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

2.3 The management system of Wetherby Building Systems Limited has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2008 and BS EN ISO 14001 : 2004 by Bureau Veritas (Certificate UK 9000006).

3 Delivery and site handling

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

Table 1 Component supply details

Component	Quantity/packaging
Epsitec Starter Track	boxed
Insulation boards	sealed packs
Heck K+A Basecoat	25 kg bag
Reinforcement mesh	1 m wide roll, 50 m length
Heck Universalgrundierung primer	23 kg tub
Epsitec cavity spacer rail	boxed
Mechanical fixings	boxed
Heck Siliconharputz K render topcoat	25 kg tub
Heck Siliconharputz R render topcoat	25 kg tub

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

3.3 The insulation must be protected from prolonged exposure to sunlight, either by storing opened packs under cover or re-covering with opaque polythene sheeting. Care must be taken to avoid contact with solvents or materials containing volatile organic components. The boards must not be exposed to open flame or other ignition sources. Boards that become damaged, soiled or wet should be discarded.

3.4 The adhesive, basecoat and topcoats and all cementitious materials must be stored in dry conditions within 5°C and 30°C, off the ground and protected from moisture. Contaminated material must be discarded.

3.5 The rails must be protected from humidity and stored indoors.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on the Epsitec External Wall Insulation Systems for Timber-Framed Buildings.

4 General

4.1 Epsitec External Wall Insulation Systems for Timber-Framed Buildings, when installed in accordance with this Certificate, are effective in reducing the thermal transmittance (U value) of external walls of new and existing buildings. It is essential that the detailing techniques specified in this Certificate are carried out to a high standard if the ingress of water into the insulation is to be avoided and the full thermal benefit obtained from installing the system. For example, the insulation must be protected by an overhang (see section 16.25) and window sills should be designed and installed so as to direct water away from the building. Only details specified by the Certificate holder should be used.

4.2 For improved thermal/carbon-emission performance, the designer should consider additional/alternative fabric and/or service measures.

4.3 The systems are suitable for use on sheathed timber-framed wall substrates of new and existing domestic or non-domestic buildings with height restrictions (see section 8). Prior. Prior to installation of the system, wall surfaces should comply with section 14 of this Certificate.

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

- BS EN 1995-1-1 : 2004
- BS EN 338-1-1 : 2009
- BS EN 14081-1 : 2005
- BS EN 4978 : 2007.

4.5 The systems must provide a minimum 15 mm wide drained and vented cavity[1][2] between the CPB and the insulation panels. This cavity should be vented to allow some limited (but not necessarily through) movement of air, but not to the extent that it would affect the thermal performance of the systems; therefore openings should be less than 500 mm^2 metre of length (in the horizontal direction – for vertical air layers, see BS EN ISO 6946 : 2007). The openings must be kept clean, free of obstructions and capable of draining freely.

(1) Horizontal rails which obstruct the drained and vented cavity should not be used to support the insulating render system.

(2) Drained and vented cavities must not contain electrical cables other than meter tails.

4.6 The structural frame of the building is the responsibility of the building designer and is outside the scope of this Certificate. However, the timber frame, sheathing and associated fixings must be structurally adequate and designed to have adequate racking resistance due to wind and other forces. It must also be able to withstand the loads applied to it from the insulation systems (see Table 2 for minimum specifications) and have an acceptable fixing pull-out resistance (see section 5). It is essential that appropriate movement joints are incorporated into the systems.

Table 2 Minimum construction specification

Item	Characteristic	Specifications
Timber-frame structure[1]	The timber frame should be not less than 37 mm thick with a minimum width of 72 mm or 0.026 times the panel height in millimetres (mm), whichever is the greater	Exterior grade coating in accordance with BS EN 338 : 2009 and BS EN 14081-1 : 2005, and dry graded and marked in accordance with BS EN 4978 : 2007
Sheathing board[1] (cement particle board)	10 mm thick minimum	1380 kg·m^{-3} apparent density and > 4500 modulus of elasticity in bending (MPa) Class 1 in accordance with BS EN 634-2 : 2007

(1) The board and the structural timber frame must be of an exterior grade and meet the minimum acceptable specification in Table 2. Note that both the timber frame and sheathing board are outside the scope of this Certificate.

4.7 New buildings not subject to regulatory requirements should also be built in accordance with the Standards identified in section 4.4.

4.8 The system will provide a degree of protection against rain ingress and a decorative finish. However, care should be taken to ensure that walls are adequately weathertight prior to its application. It may only be installed where there are no signs of dampness on the inner surface of the wall other than those caused solely by condensation.

4.9 The effect of the systems on the acoustic performance of a construction has not been assessed and is outside the scope of this Certificate.

4.10 Fixing of sanitary pipework, plumbing, rainwater goods, satellite dishes, clothes lines, hanging baskets and similar items are outside the scope of this Certificate.

4.11 External pipework and ducts should be removed before installation and alterations made to underground drainage, where appropriate, to accommodate repositioning of the pipework to the finished face of the systems. If necessary, the Certificate holder should be contacted for further advice.

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

5 Practicability of installation

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

Note: The BBA operates a UKAS-accredited Approved Installer Scheme for external wall insulation (non-mandatory); details of approved installer companies are included on the BBA 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 values (λ_D) given in Table 3 of this Certificate.

Table 3 Declared thermal conductivity of the insulation (λ_D)

Insulation types (mm)	Thickness	Thermal conductivity ($W \cdot m^{-1} \cdot K^{-1}$)
Phenolic	40	0.021
Phenolic	50 to 120	0.020
EPS 70 white	50 to 240	0.038
Epsitherm 70E	50 to 240	0.032
Epsitherm 90E	50 to 240	0.030

6.2 The U value of a completed wall will depend on the selected insulation type and thickness, the degree of ventilation to the cavity, fixing method and type of fixing, and the insulating value of the substrate and its internal finish. Example U values for a timber-frame construction with a drained and vented cavity in accordance with the national Building Regulations are given in Table 4, and are based on the thermal conductivities given in Table 3.

Table 4 Insulation thickness required to achieve typical design U value(1)(2)(3)

U value ($W \cdot m^{-1} \cdot K^{-2}$)	Phenolic insulation thickness (mm)	EPS 70 insulation thickness (mm)	Epsitherm 70E insulation thickness (mm)	Epsitherm 90E insulation thickness (mm)
0.18	120	230	190	180
0.19	110	210	180	170
0.25	80	150	130	120
0.26	80	140	120	110
0.28	70	130	110	100
0.30	60	120	100	90
0.35	50	100	80	80

(1) Wall construction inclusive of 15 mm plasterboard (λ = 0.21 $W \cdot m^{-1} \cdot K^{-1}$), 100 mm air cavity bridged by 15% by timber (λ = 0.13 $W \cdot m^{-1} \cdot K^{-1}$), 10 mm CPB ($\lambda$ = 0.23 $W \cdot m^{-1} \cdot K^{-1}$) (15 mm drained and vented air cavity with 500 mm^2 metre of length ventilation (in the horizontal direction) for vertical air layers of the wall.

(2) Calculations based on using 8.3 galvanized steel fixings per square metre with a point thermal transmittance (χ_p) of 0.004 $W \cdot K^{-1}$ per pin and 8 mm render (λ = 1 $W \cdot m^{-1} \cdot K^{-1}$).

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

6.3 Care must be taken in the overall design and construction of junctions with other elements and openings to minimise thermal bridges and air infiltration. Detailed guidance can be found in the documents supporting the national Building Regulations.

7 Strength and stability

General

7.1 When installed on suitable timber frame walls, the systems 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 is transferred to the substrate wall directly via compression of the render and insulation through the top hat profile and sheathed timber framed structure.

7.3 Negative wind pressure is resisted by the bond of insulation and render (resistance is > 80 $kN \cdot m^2$), and the strength of the connection between insulation, top hat profile and the timber-framed structure.

7.4 The wind loads on the walls should be calculated in accordance with BS EN 1995-1-1 : 2004 and its National Annex. Special consideration should be given to locations with high wind-load pressure coefficients, as additional fixings may be necessary. In accordance with BS EN 1991-1-1 : 2002 and BS EN 1991-1-4 : 2005 and take account of the location, shape and size of the building, it is recommended that a load factor of 1.5 is used to determine the ultimate wind load to be resisted by the systems.

7.5 Assessment of structural performance for individual installations should be carried out by a suitably qualified and experienced individual to confirm that:

- the timber frame and sheathed substrate wall has adequate strength to resist the additional loads that may be applied as a result of installing the systems (ignoring any positive contribution that may occur from the system) and give an acceptable resistance to pull-out of fixings
- the proposed systems and associated fixing and profiles layout provides adequate resistance to negative wind loads, based on test and site investigation results
- an appropriate number of site-specific pull-out tests are conducted on the substrate of the building to determine the minimum resistance to failure of the fixings used for the Epsitec cavity rail and fixings used through the insulation. The characteristic pull-out resistance should be determined in accordance with the guidance given in ETAG 014 : 2011, Annex D (minimum test characteristic = 0.6 x mean of 5 lowest tests results).

7.6 The minimum number of fixings through the insulation and the profile span and centres is determined by test. Provided the sheathed timber frame is suitable and an appropriate fixing is selected, the profiles will adequately support and transfer the weight of the systems and wind loads to the substrate wall at the maximum spacing given in this Certificate (see section 7.7).

7.7 Tests carried out on the system using a lightweight steel-framed wall and:

- phenolic insulation, mechanically fixed at 600 mm horizontal and 300 mm vertical centres to an Epsitec cavity rail profile, in turn fixed to a 10 mm exterior grade CPB providing a 15 mm drained and vented cavity
- indicate that, when installed on a timber-frame structure, the system can resist a design wind load resistance(1) of 0.5 kN·m^2 when using fixings at the rate of 8 per m^2 (see Figure 5).

(1) The design resistance is determined by the ultimate wind failure obtained from a dynamic wind uplift test divided by a material safety factor of 1.5.

7.8 Typical characteristic pull-out strengths for the fixings are given in Table 5. For calculation of the wind load resistances for the systems using Epsitherm EPS 70 white, 70E and 90E, the characteristic pull-through values as stated in Table 6 should be used.

Table 5 Fixing — typical characteristic pull-out strengths

Fixing type	Substrate facing	Characteristic pull-out strength (N)
Epsitec self-drilling LS range screws	Through the Epsitec cavity spacer, CPB	1200
Bravoll TIT or SBH-T65/25	Through the insulation, into the Epsitec cavity spacer rail	1000

Table 6 Characteristic pull-through resistances for EPS insulation(1)

Factor (units)	Insulation type	
	EPS 70 (white)	Epsitherm 70E/90E
Insulation thickness (mm)	≥60	≥60
Fixing plate diameter (mm)	60	60
Characteristic pull-through resistance(2) per anchor (N)	400	833
Factor of safety (material)(3)	2.5	2.5
Design pull-through resistance (N)	160	333

(1) The Certificate holder should be consulted for equivalent data for phenolic insulation.
(2) Characteristic values in accordance with BS EN 1990 : 2002, Annex D7.2.
(3) The safety factor of 2.5 is applied and based on the assumption that all insulation boards are quality controlled and tested to establish tensile strength perpendicular to the faces.

7.9 The permitted deflection of the systems incorporating sheathed timber-framed constructions should be designed in accordance with BS EN 1995-1-1 : 2004, ie span 300 mm. Deflection must be limited to prevent damage to the systems and the Certificate holder's advice sought.

Impact resistance

7.10 Hard body impact tests were carried out in accordance with ETAG 004 : 2013. The systems are suitable for the Use Categories listed in Table 7 of this Certificate.

Table 7 Epsitec External Wall Insulation Systems for Timber-Framed Buildings impact resistance

Rendering system: (basecoat) + finishing coats indicated:	Use Categories(1)
Heck Siliconharputz K render topcoat	Category I, II, III
Heck Siliconharputz R render topcoat	Category I, II, III

(1) The use Categories are defined in ETAG 004 : 2013 as:

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

8 Behaviour in relation to fire

8.1 The rendering systems can have a reaction to fire classification[1] of B-s1, d0 in accordance with BS EN 13501-1 : 2007.

(1) Exova Warringtonfire test report WF 407100.

8.2 The fire classification applies to the full range of thicknesses covered by this Certificate and render colour 'White'. The classification of other colours of the system should be confirmed by reference to the documents supporting the national Building Regulations.

8.3 The insulations in isolation are not classified as non-combustible or of limited combustibility.

8.4 In England and Wales and Northern Ireland, the systems may be used on buildings at any proximity to a boundary. The systems are restricted for use in buildings up to 18 m in height.

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

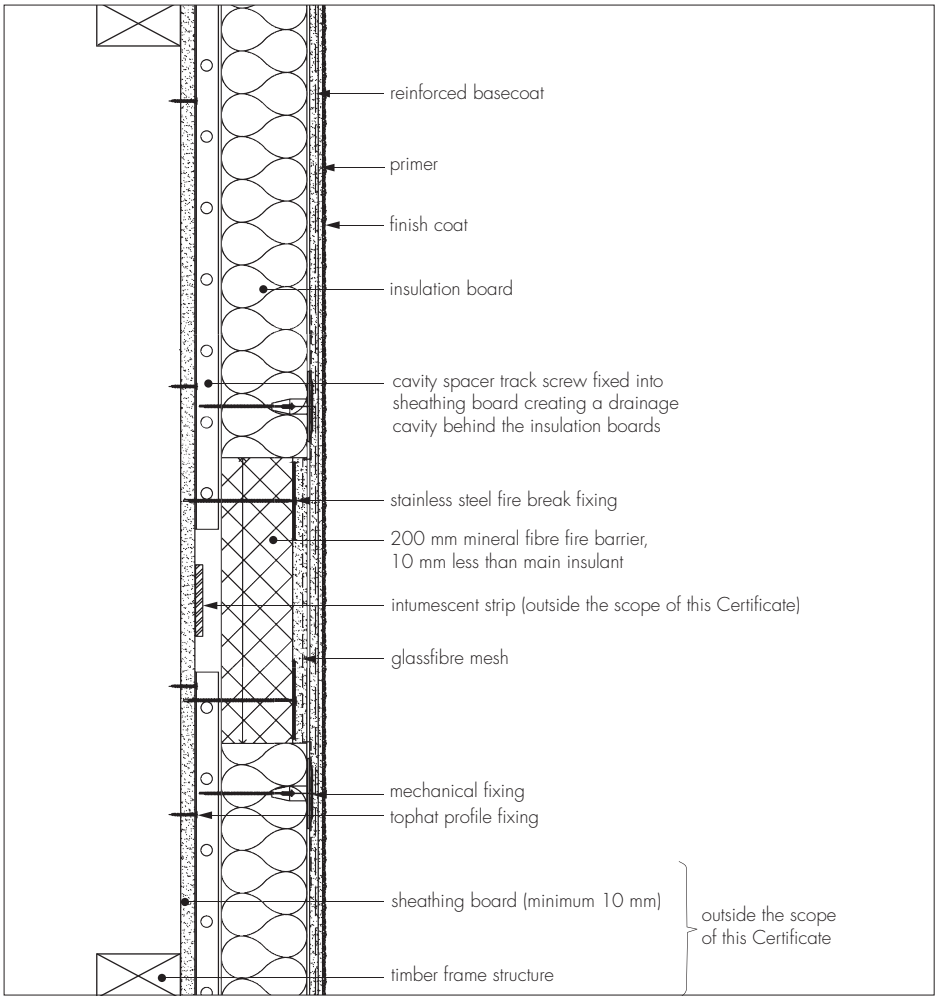
8.6 In Scotland, the systems should not be used on any building with a storey more than 11 m above the ground, or on any entertainment or assembly building with a total storey area more than 500 m^2, or on any hospital or residential care building with a total storey area more than 200 m^2.

8.7 For application to second storey walls and above, it is recommended that the designer considers at least one stainless steel fixing per square metre and that fire barriers are in line with compartment walls and floors as advised in BRE Report BR 135 : 2013 (see Figure 2 of this Certificate).

8.8 NHBC Standards require in all cases that a minimum of one non-combustible fixing through the reinforcement mesh, per square metre or per insulation board, whichever provides the greater number, should be provided, in addition to the other fixings.

8.9 Designers should refer to the relevant national Building Regulations and guidance for detailed conditions of use, particularly in respect of requirements for substrate fire performance, cavity barriers, service penetrations and combustibility limitations for other materials and components used in the overall wall construction.

Figure 2 Horizontal fire barriers detail



9 Proximity of flues and appliances

Where the systems are installed in close proximity to certain flue pipes, the relevant provisions of the national Building Regulations should be met:

England and Wales — Approved Document J

Scotland — Mandatory Standard 3.19, clause 3.19.4[1][2]

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

Northern Ireland — Technical Booklet L.

10 Water resistance

10.1 The systems will provide a degree of protection against rain ingress. However, care should be taken to ensure that walls are adequately watertight prior to application of the systems. The insulation systems must only be installed where there are no signs of dampness on the inner surface of the substrate other than those caused solely by condensation.

10.2 Designers and installers must take particular care in detailing around openings, penetrations and movement joints to minimise the risk of water ingress.

10.3 The guidance given in BRE Report BR 262 : 2002 should be followed in connection with the watertightness. The designer should select a construction appropriate to the local wind-driven index, paying due regard to the design detailing, workmanship and materials to be used.

10.4 At the top of walls, the systems must be protected by an adequate coping, overhang or other detail designed for use with these types of systems (see section 16). On flat roofs parapet walls, waterproofing and drainage must be adequate and in good condition.

11 Risk of condensation

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

Surface condensation

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

11.3 Walls will adequately limit the risk of surface condensation when the thermal transmittance (U value) does not exceed 1.2 $W \cdot m^{-2} \cdot K^{-1}$ at any point. Guidance may be obtained from BS 5250 : 2011, Section 4, and BRE Report BR 262 : 2002.

Interstitial condensation

11.4 Walls incorporating the systems will adequately limit the risk of interstitial condensation when they are designed and constructed in accordance with BS 5250 : 2011 (Section 4 and Annexes D and G) and section 11.5 of this Certificate.

11.5 The water vapour resistance factor (μ) for the insulation and the equivalent air layer thickness (s_d) of the reinforced basecoat applied with a finish coat are shown in Table 8 of this Certificate.

Table 8 Water vapour resistance factors and equivalent air layer thickness

	Thickness (mm)	s_d (m)	(μ)
EPS 70E Epsitherm and EPS 70 white insulation	50 to 240	—	20 – 40[1]
EPS 90E Epsitherm insulation	50 to 240	—	30 – 70[1]
Phenolic insulation	40 to 120	—	50
Heck K+A Basecoat + Heck Siliconharputz K render topcoat	8	1.0	—
Heck K+A Basecoat + Heck Siliconharputz R render topcoat	8	1.0	—

(1) Values obtained from BS EN ISO 10456 : 2007, Table 4. It is recommended that the lower figure is used when assessing the interstitial condensation analysis.

12 Maintenance and repair

12.1 An initial inspection should be made within 12 months and regularly thereafter to include:

- visual inspection of the render for signs of damage. Cracks in the render exceeding 0.2 mm must be repaired
- examination of the sealant around openings and service entry points

- visual inspection of architectural details designed to shed water to confirm that they are performing properly
- visual inspection to ensure that water is not leaking from external downpipes or gutters; such leakage could penetrate the rendering
- necessary repairs effected immediately and the sealant joints at window and door frames replaced at regular intervals
- maintenance schedules, which should include the replacement and resealing of joints, for example between the insulation systems and window and door frame.

12.2 Damaged areas must be repaired using the appropriate components and procedures detailed in the Certificate holder's installation instructions and in accordance with BS EN 13914-1 : 2005.

13 Durability

13.1 The systems will have a service life of not less than 30 years, provided any damage to the surface finish is repaired immediately and regular maintenance is undertaken, as described in section 12 of this Certificate.

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

13.3 The renders may become discoloured with time, the rate depending on the initial colour, the degree of exposure and atmospheric pollution, as well as the design and detailing of the wall. In common with traditional renders, discoloration by algae and lichens may occur in wet areas. The appearance may be restored by a suitable power wash or, if required, by over coating.

13.4 To maintain a high quality aesthetic appearance, it may be necessary to periodically overcoat the building using system-compatible coatings as recommended by the Certificate holder and in accordance with BS EN 1062-1 : 2004. Care should be taken not to adversely affect the water vapour transmission or fire characteristics of the systems. The advice of the Certificate holder should be sought as to the suitability of a particular product.

Installation

14 Site survey and preliminary work

14.1 A pre-installation survey of the property must be carried out to determine suitability for installation, treatment of damp and any repairs necessary to the building structure before application of a 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, if required
- areas where flexible sealants must be used
- any alterations to external plumbing, where required.

14.2 The survey should include tests conducted on the sheathed structural timber-framed walls of the building by the Certificate holder or their approved installers (see section 15) to determine the pull-out resistance of the specified mechanical fixings to withstand the building's expected wind loading, based on calculations using the fixing's pull-out resistance test data. In addition, the type and minimum number of fixings are selected (as per section 7). The advice of the Certificate holder should be sought to ensure the proposed fixing pattern is sufficient.

14.3 Before the system is installed, timber should be dried as near as is practicable to the moisture content appropriate to its climatic condition in the completed structure. If the effects of any shrinkage are not considered important, or if parts that are unacceptably damaged are replaced, higher moisture contents may be accepted during construction provided that it is ensured that the timber can dry to the desired moisture content.

14.4 The flatness of surfaces must be checked; this may be achieved using a straight edge spanning the storey height. Any irregularities, must be made good prior to installation to ensure that the insulation boards are installed with a smooth, in-plane finished surface.

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

14.6 For new buildings, internal wet work, eg screed or plastering, should be completed and allowed to dry prior to the installation of the systems.

14.7 All modifications and necessary repairs to the building structure must be completed before installation commences.

15 Approved installers

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

- employing operatives who have been trained and approved by the Certificate holder to install the systems
- 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 Certificate holder's current installation instructions.

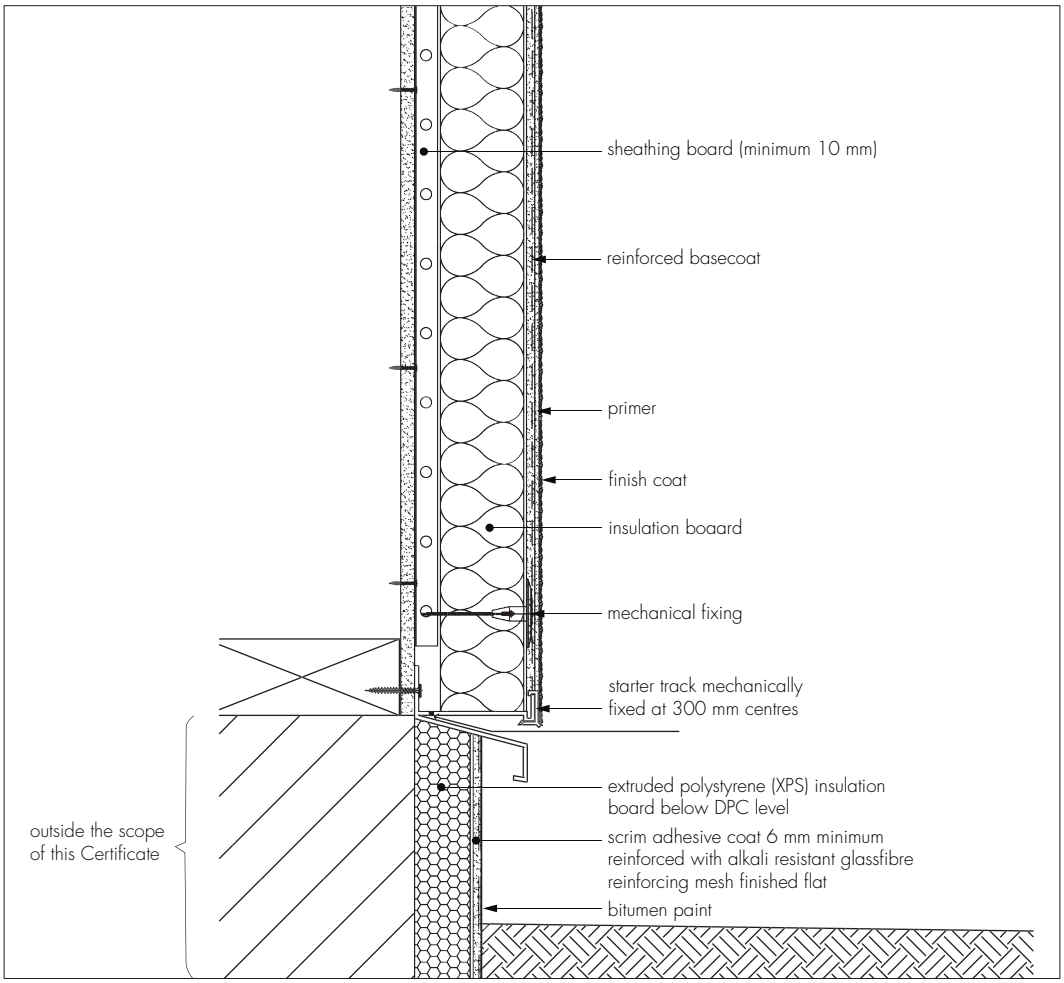
16.2 Weather conditions should be monitored to ensure correct application and curing conditions. Application of coating materials must not be carried out at temperatures below 5°C or above 30°C, nor if exposure to frost is likely, and the coating must be protected from rapid drying.

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

Positioning and securing insulation boards

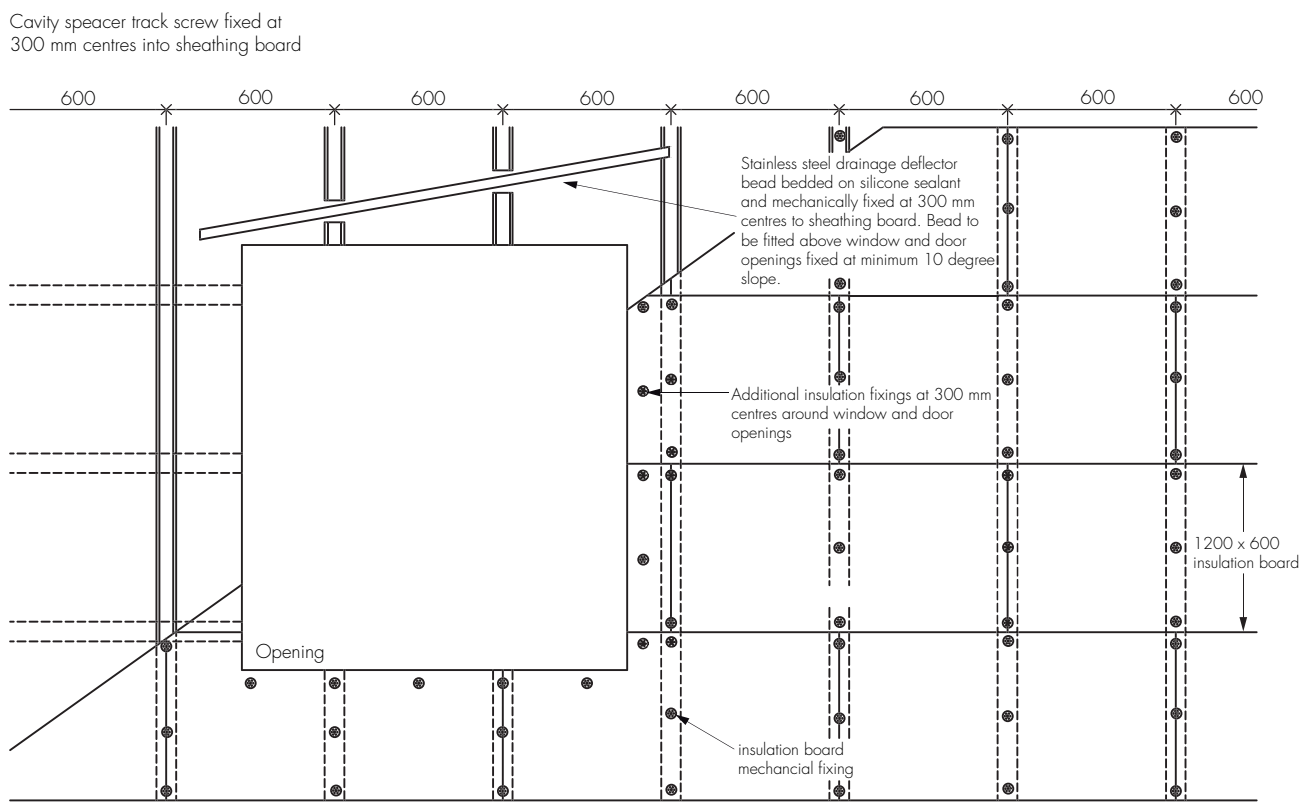
16.4 The starter/base profile is secured to the external wall above the dpc (see Figure 3) using approved profile fixings at approximately 300 mm centres. Starter/base profile connectors are inserted at the base of the system's joints. Extension profiles are fixed to the front lip of the starter/base profile. Stop end profiles are installed where required.

Figure 3 Typical section of starter/base



16.5 The Epsitec cavity spacer tracks are mounted vertically and mechanically fixed to the sheathing board and/or timber-frame substrate with hammer-driven screws at a maximum of 300 mm centres either side of the rail. Rails may need to be packed to ensure they are true to line and level. Drainage deflection channels are mechanically fixed over all window and door openings (see Figure 4).Horizontal and vertical intumescent strips are installed following the designer's instructions. Care should be taken not to overdrive the fixings.

Figure 4 Rail profile fixing pattern

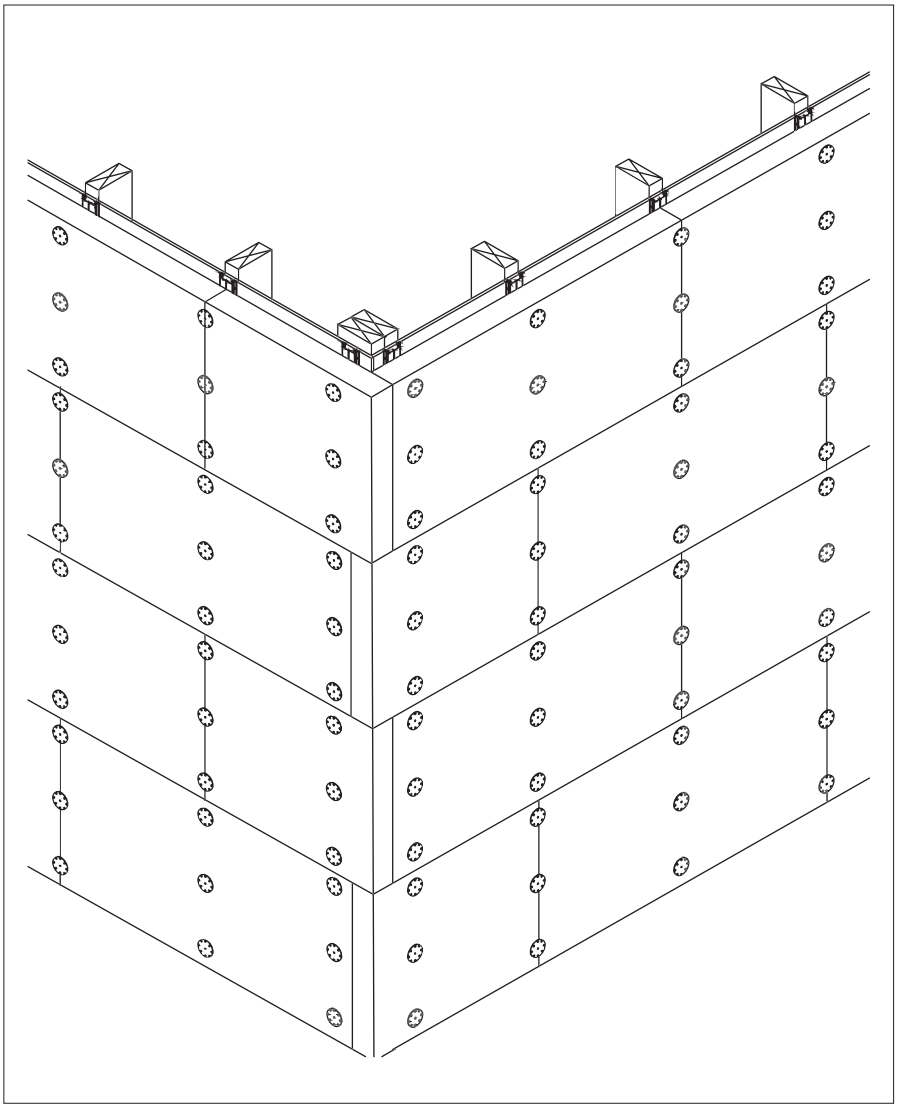


- 6 fixings required through each board, three fixings through the board centre line and 3 half fixings down each side.
- Rails to be fixed each side at 300 mm centres.
- In areas where the board is not fully supported, horizontal cavity spacer tracks to be installed where appropriate.

16.6 The first insulation board is positioned on the starter track and secured through the centre of the board into the cavity spacer track. Once a row of insulation boards has been positioned, fixings are installed through the insulation into the top hat profile to suit the required fixing pattern using the fasteners given in section 1.2. Subsequent boards are positioned so that vertical board joints are staggered by a minimum of 100 mm and overlapped at building corners (see Figure 5); any open joints in the insulation systems must be filled.

16.7 Care must be taken to ensure that fixings are not overdriven and alignment is checked as work proceeds. The surface of the boards should be smooth without high spots or irregularities. Fire barriers must be installed where required following the designer's instructions.

Figure 5 Typical arrangement of insulation boards at corners



16.8 Once boards are positioned, the remaining fixings are installed as per the Epsitec fixing pattern, securing the insulation to the Epsitec cavity spacer rails, ensuring a minimum of 8 fixings per square metre.

16.9 Gaps greater than 10 mm should be closed by repositioning or, where appropriate, by cutting boards to fit.

16.10 To fit around details such as doors and windows, insulation boards may be cut with a sharp knife or a fine-tooth saw. Purpose-made window-sills, seals and deflection channels designed to prevent or manage water ingress are fitted which allow water to be shed clear of items bridging the cavity. Corner profiles are fixed to all building corners and to door and window heads and jambs.

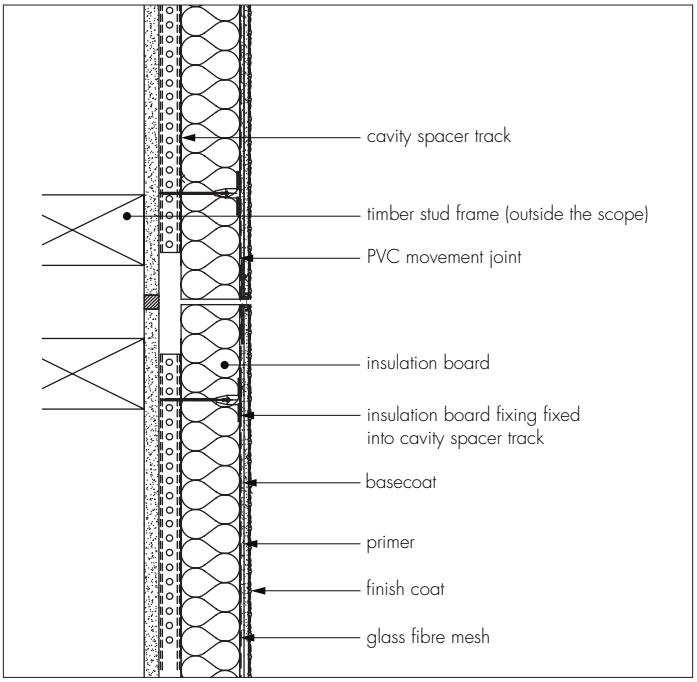
16.11 Installation continues until the whole wall is completely covered including, where appropriate, the building soffits.

Movement joints

16.12 The system incorporates provision for movement joints (see Figure 6).

16.13 Expansion beads are fixed horizontally or vertically through the insulated render system in predetermined positions, according to the installation specification and the individual requirements of each project.

Figure 6 Vertical movement joint detail



Application of basecoat and reinforcement mesh

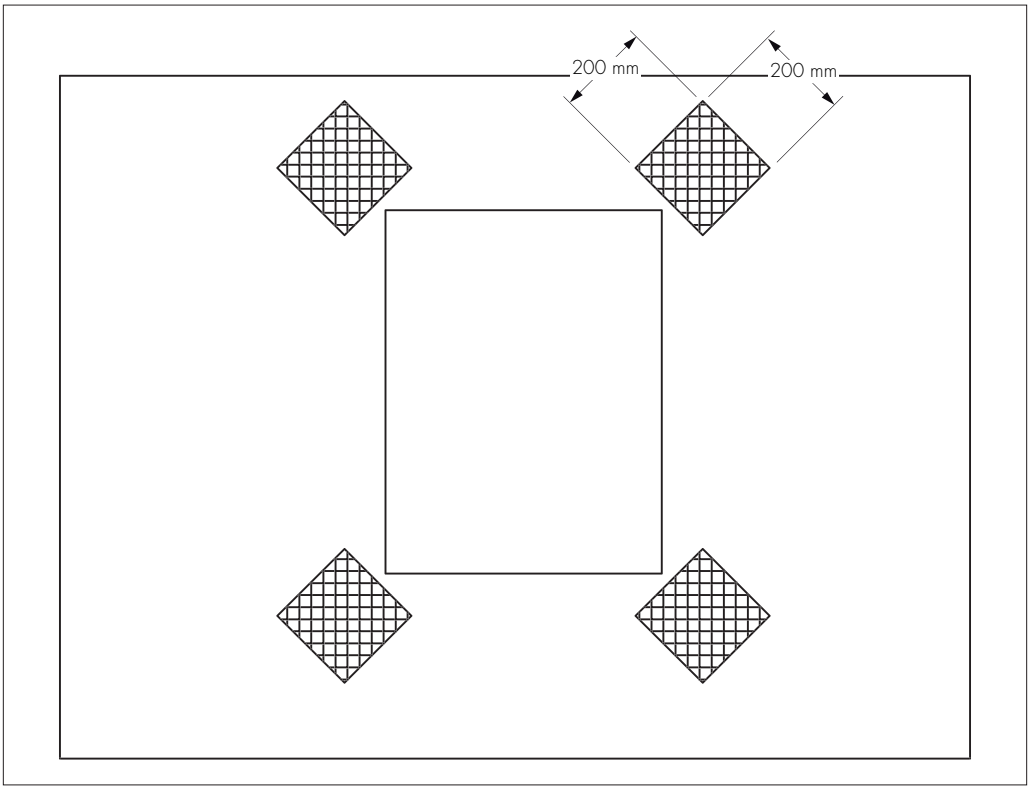
16.14 Prior to the application of the reinforcement coat, pre-compressed sealing tape is inserted where required, at overhanging eaves, gas and electric meter boxes, and wall vents, or where the render abuts any other building material or surface. Alternatively, gun-applied joint sealants or the use of proprietary sealing beads can be used in accordance with the Certificate holder's instructions.

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

16.16 The first coat of the mixed basecoat render is trowel-applied to the surface of dry insulation boards to a thickness of 4 mm to 6 mm. The reinforcing mesh is immediately bedded into the basecoat, and overlapped at all mesh joints by 100 mm; it is important to ensure the mesh is free of wrinkles. The first layer basecoat should be left to harden.

16.17 Additional pieces of reinforcing mesh (200 mm by 200 mm) are used diagonally at the corners of openings, as shown in Figure 7.

Figure 7 Additional reinforcement at openings



16.18 PVC meshed corner beads are bedded into the basecoat at external corners and around openings as required.

16.19 A second coat of Heck K+A Basecoat is applied to a thickness of between 2 mm and 3 mm, ensuring all mesh is covered and finished smooth to receive the primer. The drying time will depend upon weather conditions, but at least 12 hours should elapse before applying the primer, in accordance with the Certificate holder's instructions.

16.20 When the basecoat render is dry, a primer coat is applied to the entire basecoat with a roller.

16.21 Continuous surfaces should be completed without a break.

Rendering and finishing

16.22 Once the primer is dry, the pre-mixed topcoat is trowel-applied to a thickness of 1.5 mm to 3 mm. The silicone texture render is lightly mixed and applied in an even thickness to the grain size. The topcoat is applied in a continuous motion, always working to a wet edge.

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

16.24 Once the topcoat is dry, silicone sealant is installed at all openings (eg windows and doors), overhanging eaves and parapets, 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.

16.25 Care should be taken in the detailing of the system around such features as openings, projections, eaves and parapets (see Figures 8, 9 and 10), to ensure adequate protection against water ingress and to limit the risk of water penetrating the system.

16.26 On completion of the installation, external fittings, eg rainwater goods, are securely fixed to timber grounds or extended fixings that have been built into the system during installation.

Figure 8 Roof eaves detail

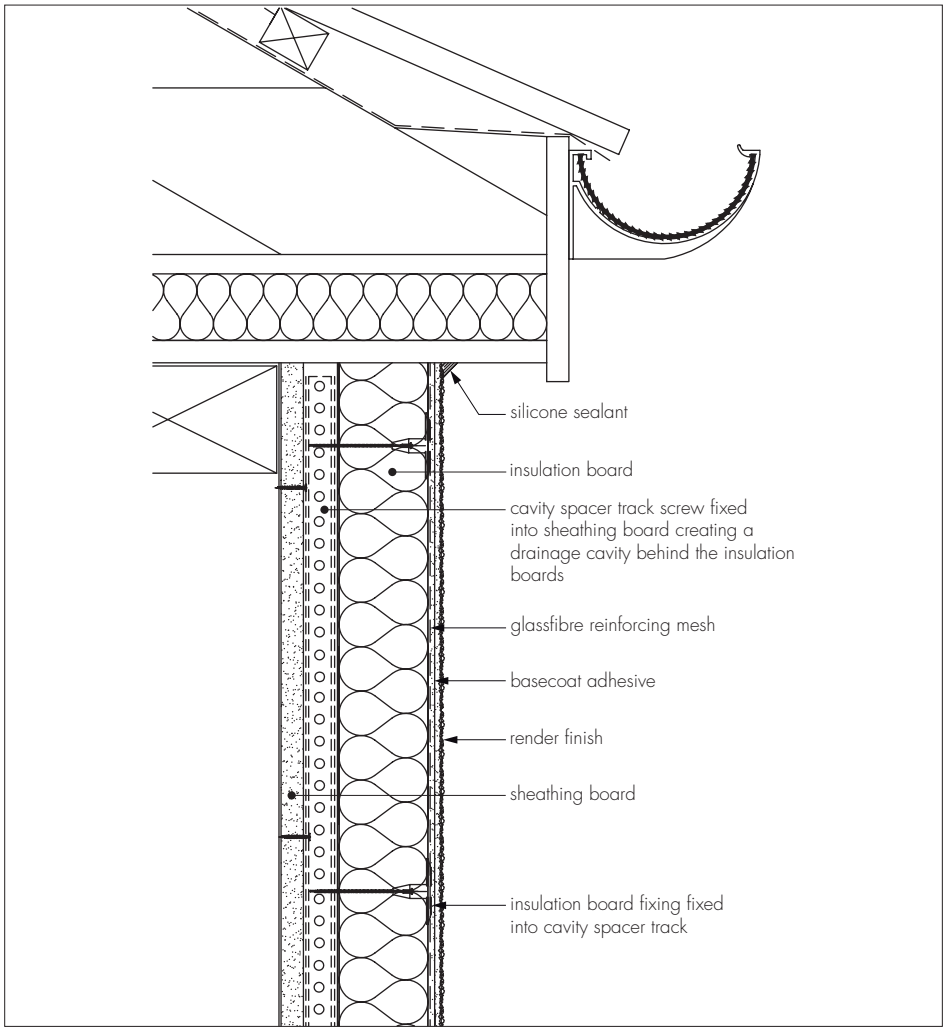


Figure 9 Insulated window reveal detail

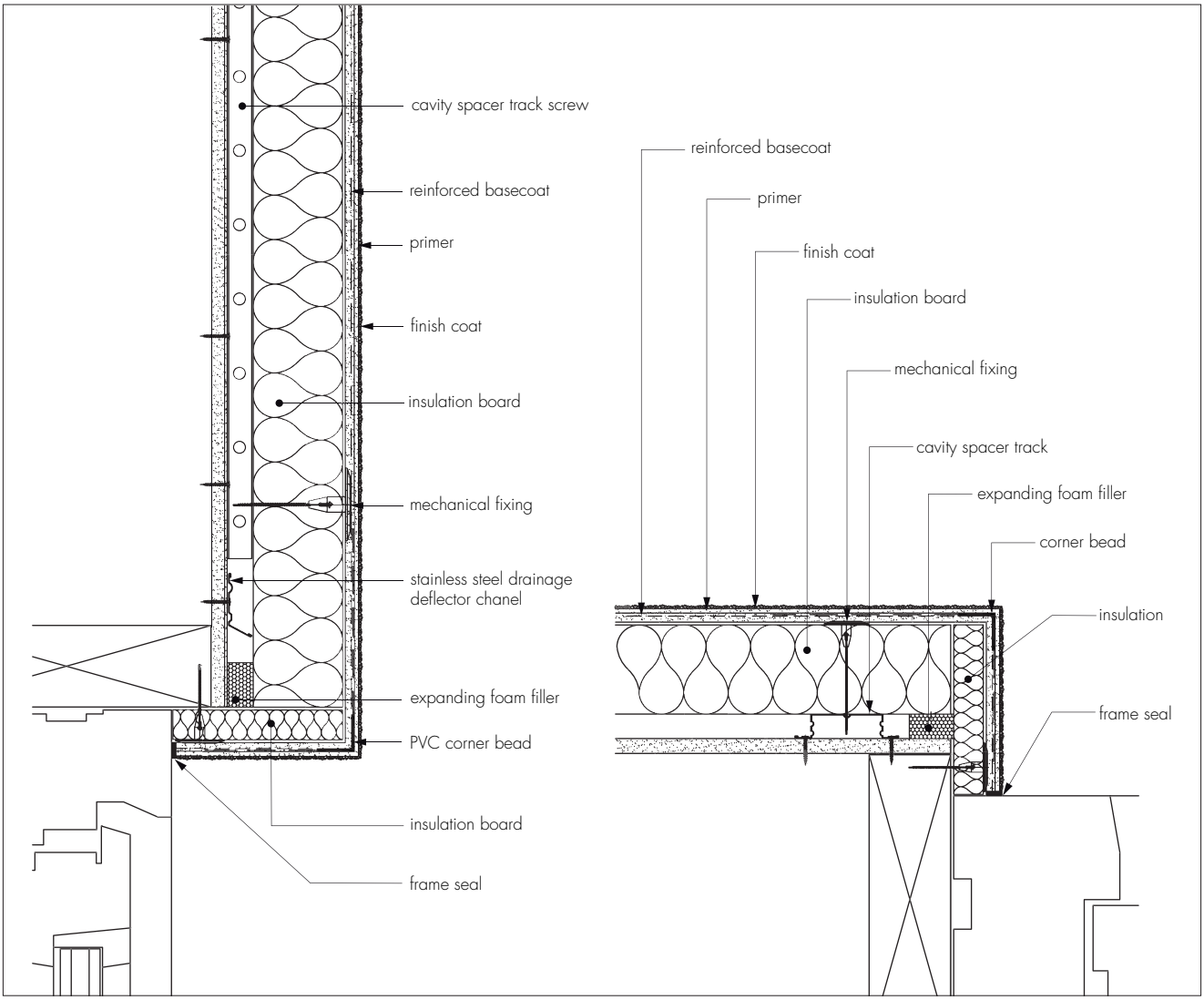
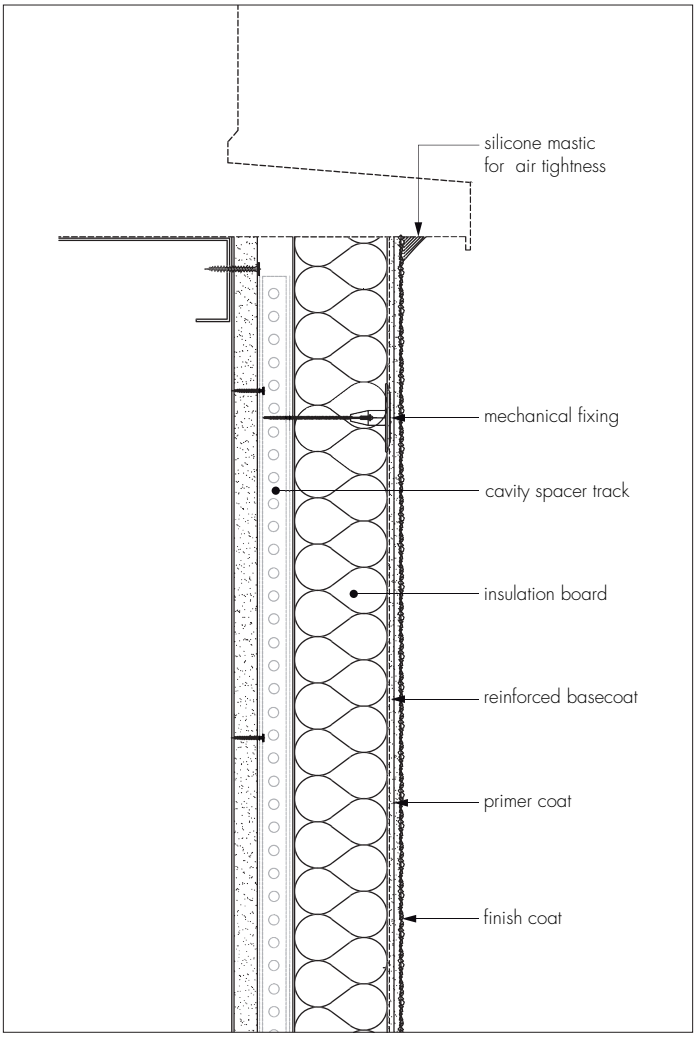


Figure 10 Window sill detail



Technical Investigations

17 Tests

17.1 Tests were conducted and the results assessed to determine the systems:

- bond strength
- hygrothermal performance and resistance to freeze thaw
- resistance to hard body impact
- water absorption of render and water vapour permeability
- wind load resistance
- pull through strength of fixings
- weathertightness.

17.2 An assessment was made of data relating to:

- reaction to fire
- thermal conductivity
- durability
- the risk of interstitial condensation.

18 Investigations

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

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

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ETAG 014 : 2011 *Guideline for European Technical Approval of Plastic Anchors for fixing of External Thermal Insulation Composite Systems with Rendering*

19 Conditions

19.1 This Certificate:

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

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

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

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

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

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

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

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

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