

## Wetherby Building Systems Limited

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Agrément Certificate  
**09/4625**  
Product Sheet 1

### WETHERBY EXTERNAL WALL INSULATION SYSTEMS

### EPSITEC EXTERNAL WALL INSULATION SYSTEM FOR STEEL FRAMED BUILDINGS

This Agrément Certificate Product Sheet<sup>(1)</sup> relates to the Epsitec External Wall Insulation System for Steel Framed Buildings, comprising mechanically fixed Phenolic, expanded polystyrene (EPS) or Enhanced EPS insulation boards and glassfibre reinforcement mesh and render finishes, and suitable for use, with height restrictions, on new or existing domestic and non-domestic buildings.

(1) Hereinafter referred to as 'Certificate'.

#### CERTIFICATION INCLUDES:

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

#### KEY FACTORS ASSESSED

**Thermal performance** — the system can be used to improve the thermal performance of external walls and contribute to satisfying 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 system can have a Bs1, d0 reaction to fire classification in accordance with BS EN 13501-1: 2007 and its use is restricted (see section 8).

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

**Durability** — when installed and maintained in accordance with the Certificate holder's recommendations and the terms of this Certificate, the system will remain effective for at least 30 years (see section 13).



The BBA has awarded this Certificate to the company named above for the system described herein. This system has been assessed by the BBA as being fit for its intended use provided it is installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

A handwritten signature in black ink, appearing to read 'John Albon'.

John Albon — Head of Approvals  
Energy and Ventilation

A handwritten signature in black ink, appearing to read 'Claire Curtis-Thomas'.

Claire Curtis-Thomas  
Chief Executive

Date of Second issue: 16 January 2014

Originally certificated on 27 February 2009

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

*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](http://www.bbacerts.co.uk)*

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

*Any photographs are for illustrative purposes only, do not constitute advice and should not be relied upon.*

#### British Board of Agrément

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# Regulations

In the opinion of the BBA, the Epsitec External Wall Insulation System for Steel Framed Buildings, if installed, used and maintained in accordance with this Certificate, will 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)

<b>Requirement:</b>	<b>A1</b>	<b>Loading</b>
Comment:	The system can sustain and transmit wind loads to the structural frame. See sections 7.4 and 7.10 of this Certificate.	
<b>Requirement:</b>	<b>B3(4)</b>	<b>Internal fire spread</b>
Comment:	The system is restricted by this Requirement. See sections 8.1 to 8.4 of this Certificate.	
<b>Requirement:</b>	<b>B4(1)</b>	<b>External fire spread</b>
Comment:	The system is restricted by this Requirement. See sections 8.1 to 8.4 of this Certificate.	
<b>Requirement:</b>	<b>C2(b)</b>	<b>Resistance to moisture</b>
Comment:	The system provides a degree of protection against rain ingress. See sections 4.5 and 10.1 of this Certificate.	
<b>Requirement:</b>	<b>C2(c)</b>	<b>Resistance to moisture</b>
Comment:	The system contributes to minimising the risk of surface and interstitial condensation. See sections 11.1, 11.2 and 11.4 of this Certificate.	
<b>Requirement:</b>	<b>L1(a)(i)</b>	<b>Conservation of fuel and power</b>
Comment:	The system can contribute to satisfying Requirement. See sections 6.2 and 6.3 of this Certificate.	
<b>Regulation:</b>	<b>7(1)</b>	<b>Materials and workmanship</b>
Comment:	The system is acceptable. See section 13.1 and the <i>Installation</i> part of this Certificate.	
<b>Regulation:</b>	<b>7(2)</b>	<b>Materials and workmanship</b>
Comment:	The system is restricted by this Regulation. See sections 8.1 to 8.4 of this Certificate.	
<b>Regulation:</b>	<b>26</b>	<b>Building standards applicable to conversions</b>
Comment:	The system can contribute to satisfying this Regulation. See sections 6.2 and 6.3 of this Certificate.	



## The Building (Scotland) Regulations 2004 (as amended)

<b>Regulation:</b>	<b>8(1)(2)</b>	<b>Fitness and durability of materials and workmanship</b>
Comment:	The system can contribute to a construction satisfying this Regulation. See sections 12.1 and 13.1 and the <i>Installation</i> part of this Certificate.	
<b>Regulation:</b>	<b>9</b>	<b>Building standards applicable to construction</b>
Standard:	<b>1.1</b>	Structure
Comment:	The system can sustain and transmit wind loads to the structural frame. See sections 7.4 and 7.10 of this Certificate.	
Standard:	<b>2.6</b>	Spread to neighbouring buildings
Comment:	The external face of the system is restricted, with reference to clauses 2.6.1 <sup>(1)(2)</sup> , 2.6.2 <sup>(1)(2)</sup> , 2.6.4 <sup>(1)(2)</sup> , 2.6.5 <sup>(1)</sup> and 2.6.6 <sup>(2)</sup> . See sections 8.1 to 8.3, 8.5 and 8.6 of this Certificate.	
Standard:	<b>2.7</b>	Spread on external walls
Comment:	The external face of the system is restricted, with reference to clauses 2.7.1 <sup>(1)(2)</sup> and 2.7.2 <sup>(2)</sup> and Annex 2A <sup>(1)</sup> . See sections 8.1 to 8.3, 8.5 and 8.6 of this Certificate	
Standard:	<b>3.10</b>	Precipitation
Comment:	The system can satisfy this Standard, with reference to clauses 3.10.1 <sup>(1)(2)</sup> and 3.10.6 <sup>(1)(2)</sup> . See sections 4.5 and 10.1 of this Certificate.	
Standard:	<b>3.15</b>	Condensation
Comment:	The system can satisfy the requirements of this Standard, with reference to clauses 3.15.1 <sup>(1)</sup> , 3.15.4 <sup>(1)</sup> and 3.15.5 <sup>(1)</sup> . See sections 11.3 and 11.4 of this Certificate.	
Standard:	<b>6.1(b)</b>	Carbon dioxide emissions
Standard:	<b>6.2</b>	Buildings insulation envelope
Comment:	The system can contribute to satisfying these Standards, with reference to clauses (or parts of) 6.1.1 <sup>(1)</sup> , 6.1.2 <sup>(1)(2)</sup> , 6.1.3 <sup>(2)</sup> , 6.1.5 <sup>(2)</sup> , 6.1.6 <sup>(1)</sup> , 6.2.1 <sup>(1)</sup> , 6.2.3 <sup>(1)</sup> , 6.2.4 <sup>(1)</sup> , 6.2.5 <sup>(1)(2)</sup> and 6.2.10 <sup>(2)</sup> . See sections 6.2 and 6.3 of this Certificate.	
Standard:	<b>7.1(a)(b)</b>	Statement of sustainability
Comment:	The system can contribute to satisfying the relevant requirements of Regulation 9, Standards 1 to 6, and therefore will contribute to a construction meeting a bronze level of sustainability as defined in this Standard. In addition, the product can contribute to a construction meeting a higher level of sustainability as defined in this Standard, with reference to clauses 7.1.4 <sup>(1)(2)</sup> [Aspects 1 <sup>(1)(2)</sup> and 2 <sup>(1)</sup> ], 7.1.6 <sup>(1)(2)</sup> [Aspects 1 <sup>(1)(2)</sup> and 2 <sup>(1)</sup> ] and 7.1.7 <sup>(1)(2)</sup> [Aspect 1 <sup>(1)(2)</sup> ]. See section 6.2 of this Certificate.	
<b>Regulation:</b>	<b>12</b>	<b>Building standards applicable to conversions</b>
Comment:	All comments given for this system under Regulation 9, Standards 1 to 6, also apply to this Regulation, with reference to clause 0.12 <sup>(1)(2)</sup> and Schedule 6 <sup>(1)(2)</sup> . (1) Technical Handbook (Domestic). (2) Technical Handbook (Non-Domestic).	



## The Building Regulations (Northern Ireland) 2012

Regulation:	23	Fitness of materials and workmanship
Comment:		The system is acceptable. See section 13.1 and the <i>Installation</i> part of this Certificate.
Regulation:	28(b)	Resistance to moisture and weather
Comment:		The system provides a degree of protection against rain ingress. See sections 4.5 and 10.1 of this Certificate.
Regulation:	29	Condensation
Comment:		The system contributes to minimising the risk of interstitial and surface 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 structural frame. See sections 7.4 and 7.10 of this Certificate.
Regulation:	36(a)	External fire spread
Comment:		The system is restricted by this Regulation. See sections 8.1 to 8.4 of this Certificate
Regulation:	39(a)(i)	Conservation measures
Regulation:	40	Target carbon dioxide emission rate
Comment:		The system can enable a construction to satisfy the requirements of 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* (3.1 and 3.3) of this Certificate.

## Additional Information

### NHBC Standards 2014

NHBC accepts the use of the Epsitec External Wall Insulation System for Steel Framed Buildings, provided it is installed, used and maintained in accordance with this Certificate, in relation to *NHBC Standards, Part 6 Superstructure (excluding roofs)*, Chapters 6.9 *Curtain walling and cladding* and 6.10 *Light steel framed walls and floors*.

## Technical Specification

### 1 Description

1.1 The Epsitec External Wall Insulation System for Steel Framed Buildings comprises Phenolic, EPS or Epsitherm (enhanced EPS) insulation mechanically fixed to the sheathed, lightweight, steel-framed structure through steel top-hat sections, with glassfibre reinforcement mesh and render finishes, as follows (see Figure 1)

#### Cavity spacer track

- Epsitec rail — galvanized steel top-hat section through which the mechanical fixings pass to create the 15 mm wide drainage cavity.

#### Insulation

- Phenolic insulation boards — 1200 mm by 600 mm in a range of thicknesses between 40 mm and 130 mm, with a nominal density of 40 kg·m<sup>-3</sup>, minimum tensile strength of ≥ 70 kN·m<sup>-2</sup> and a minimum compressive strength of 150 kN·m<sup>-2</sup>. Boards of 20 mm thickness are also available for use in window reveals
- Expanded polystyrene (EPS) insulation boards — 1200 mm by 600 mm in a range of thicknesses between 50 mm and 240 mm. The boards are manufactured to comply with the requirements for EPS 70, Class E material to BS EN 13163 : 2012, and have a minimum tensile strength of ≥ 100 kN·m<sup>-2</sup> and a minimum compressive strength of 70 kN·m<sup>-2</sup>
- Epsitherm 70E and 90E — enhanced expanded polystyrene (EPS) insulation boards, 1200 mm by 600 mm, in a range of thicknesses between 50 mm and 240 mm. The boards are manufactured to comply with the requirements for EPS 70 and EPS 90, Class E materials to BS EN 13163 : 2012 and have a minimum compressive strength of 70 kN·m<sup>-2</sup> and 90 kN·m<sup>-2</sup> respectively.

#### Mechanical fixings

- Self-Drilling LS Range Screws — 5.5 mm diameter screws made of case-hardened carbon steel with a Climadur organic coat and used for fastening the Epsitec rail and cement particle board to the steel frame substrate. Other fixings of similar or better characteristics approved by the Certificate holder can be used
- Self-Drilling TKR Range Screws — 4.8 mm diameter screws made of case-hardened carbon steel with a Climadur organic coat and used with a 60 mm diameter Bravoll TIT shaft of 0.9 kN·mm<sup>-1</sup> stiffness with a central hole to accommodate a self-drilling screw of adequate length to suit the insulation thickness. Used for fastening the insulation to the steel Epsitec rail. Other fixings of similar or better characteristics approved by the Certificate holder can be used.

### Basecoat

Heck K+A Basecoat — a cement-based, ready-mixed render conforming to BS EN 13139 : 2002, and supplied as a powder to which clean water is added.

### Reinforcement

Reinforcing scrim — a multi-stranded, alkali-resistant glassfibre, 4 mm by 4 mm mesh, with a polymer coating and a nominal weight of 160 gm<sup>-2</sup>.

### Primer

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

### Finishes

Heck Siliconharputz K and Heck Siliconharputz R render topcoats — silicon-based ready-made pastes available with aggregate sizes from 1.5 mm to 3 mm and 1.5 mm to 2 mm, respectively.

1.2 The following items are supplied with the system but are outside the scope of this Certificate:

- steel frame
- sheathing board
- breather membrane
- starter tracks
- insect mesh
- end stops
- water drainage deflector channels (for use above openings)
- sealant
- intumescent strips
- cavity stops
- cement particle board
- corner beads
- expanding foam filler.

Figure 1 The Epsitec External Wall Insulation System

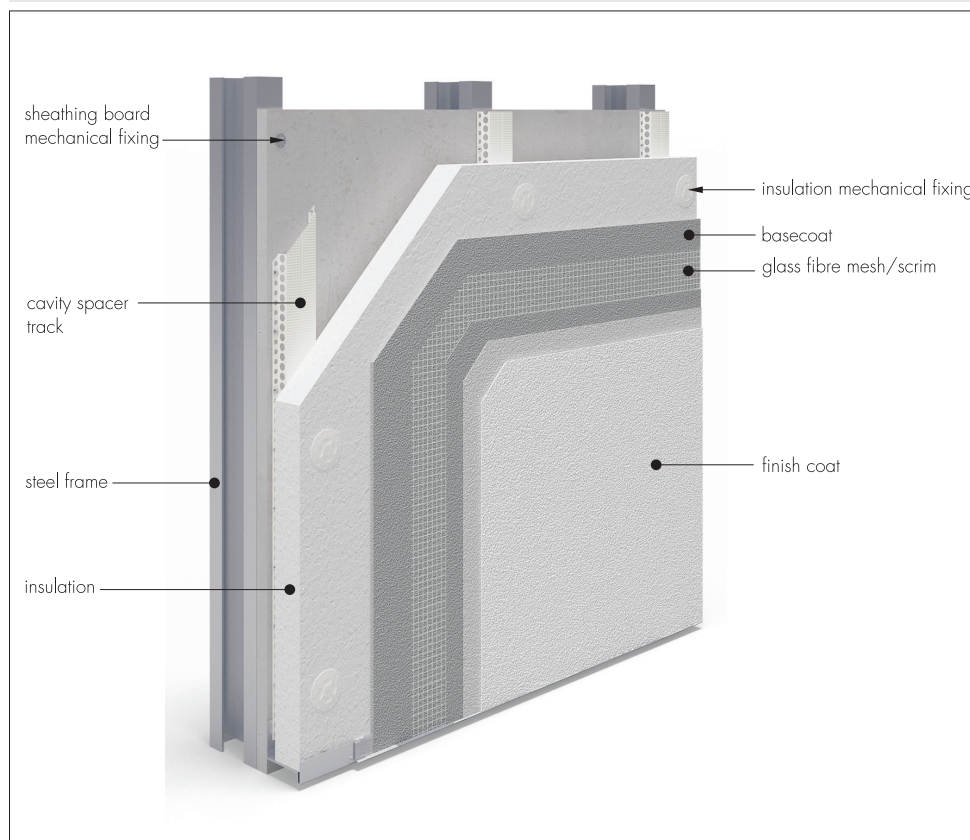
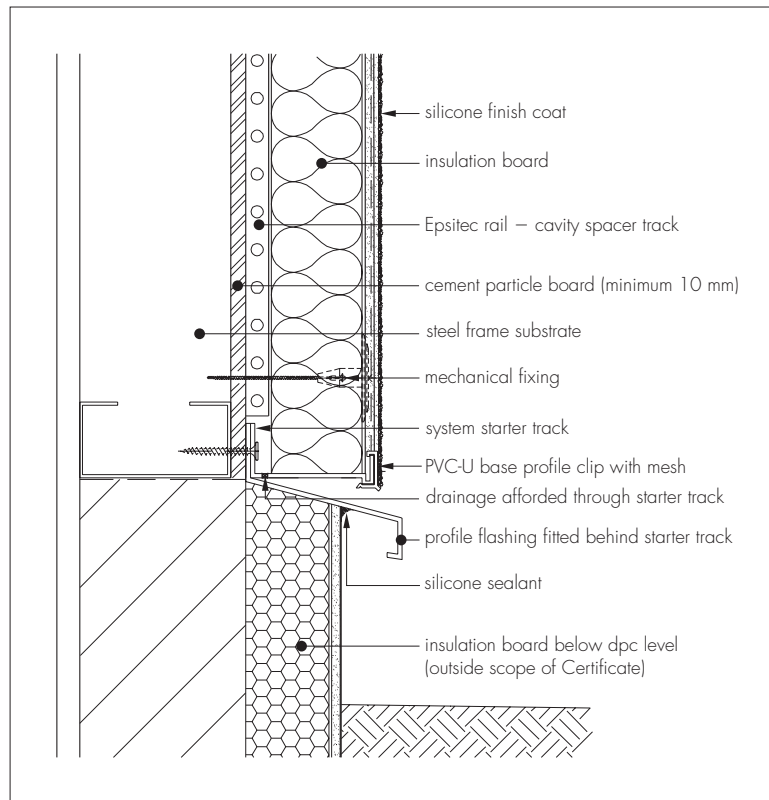


Figure 2 Typical section at base level



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

Table 1 Component supply details

Component	Quantity and packaging
Insulation	polythene wrapped
Reinforcing scrim	1 metre wide rolls, 50 metre length
Basecoats	25 kg bag
Primer	23 kg tub
Finish coat	25 kg tub
Mechanical fixings	boxed by manufacturer

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

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

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

3.5 The primer and finish coat should be stored in a safe area, under cover and protected from excessive heat and frost.

# Assessment and Technical Investigations

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

## Design Considerations

### 4 General

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

4.2 The system will improve the weather resistance of a wall and provide a decorative finish. However, it may be installed only where the substrate is inherently waterproof in its own right and where there are no signs of dampness on the inner surface of the wall, other than those caused solely by condensation residue.

4.3 The system is for use on the outside of exterior walls of new or existing domestic and non-domestic sheathed, lightweight steel-framed buildings with height restrictions (see section 8). Prior to installation of the system, the wall surfaces should comply with section 14 of this Certificate.

4.4 Steel-framed buildings must incorporate vertical steel studs (minimum thickness 1.2 mm and minimum flange width 50 mm) at 600 mm centres, sheathed with 10 mm thick (minimum) cement particle board or boards with equivalent structural properties (see Table 2). The system incorporates steel top-hat sections secured to the particle board, creating a 15 mm wide cavity between the sheathing and insulation. In addition, top-hat sections are fixed to the sheathing around openings and where required, to ensure the insulation boards are fully supported.

Table 2 Minimum construction specification

Item	Characteristic	Specification
Steelwork <sup>(1)</sup>	Grade and coating	BS EN 10326 : 2009 type S 320 GD +Z275
	Thickness	1.2 mm
Sheathing board <sup>(1)</sup> (fire-rated)	Type	BS EN 634-2 : 2007 (contact Certificate holder for details)

(1) The board is of exterior grade and the minimum acceptable specification is given here. The specification of the frame and sheathing is outside the scope of this Certificate and should be determined by the building designer. The board thickness must also be determined by the building designer.



4.5 New walls subject to the national Building Regulations should be constructed in accordance with the relevant recommendations of BS EN 1993-1-1 : 2005, and other parts where appropriate.

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

4.7 Drainage deflection beads are incorporated into the system to deflect water present in the drainage cavity around openings, other penetrations or items that block the drainage cavity.

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

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

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

4.11 External plumbing should 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.

### 5 Practicability of installation

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

**Note:** The BBA operates a UKAS-accredited Approved Installer Scheme for external wall insulation; details of approved installer companies are included on the BBA website ([www.bbacerts.co.uk](http://www.bbacerts.co.uk)).

## 6 Thermal performance

6.1 Calculations of the thermal transmittance (U value) must include the effect of the specific type of cavity used within the system and should be carried out in accordance with BS EN ISO 6946 : 2007 and BRE Report BR 443 : 2006, using the declared thermal conductivity ( $\lambda_D$  value) given in Table 3.

Table 3 Insulation thermal conductivity

Insulation	Thickness (mm)	$\lambda_D$ value ( $W \cdot m^{-1} \cdot K^{-1}$ )
Phenolic	40–45	0.021
Phenolic	$\geq 45$	0.020
White EPS	50–240	0.038
Epsitherm 70E	50–240	0.032
Epsitherm 90E	50–240	0.030



6.2 The U value of a wall construction will depend on the selected insulation thickness, the degree of ventilation to the cavity, the fixing method and the insulating value of the substrate and its internal finish. Example U values for a steel-framed construction with an unventilated cavity are given in Table 4.

Table 4 Insulation thickness required to achieve some typical design values<sup>(1)</sup>

U value ( $W \cdot m^{-1} \cdot K^{-2}$ )	Thickness of insulation (mm) <sup>(2)</sup>			
	Phenolic	EPS	Epsitherm 70E	Epsitherm 90E
0.19	120	220	180	170
0.25	80	150	130	120
0.26	80	140	120	120
0.28	70	130	110	100
0.30	70	120	100	100
0.35	50	100	80	80

(1) Wall construction:

- 15 mm plasterboard ( $\lambda = 0.21 W \cdot m^{-1} \cdot K^{-1}$ )
- 100 mm air cavity bridged by 0.3 % steel tophat sections ( $\lambda = 50 W \cdot m^{-1} \cdot K^{-1}$ )
- 12 mm cement particle board ( $\lambda = 0.23 W \cdot m^{-1} \cdot K^{-1}$ )
- 15 mm unventilated drainage cavity (BS EN ISO 6946 : 2007)
- 8.3 fixings per  $m^2$  with a point thermal transmittance  $\chi_p = 0.004 W \cdot K^{-1}$
- 8 mm render ( $\lambda = 1 W \cdot m^{-1} \cdot K^{-1}$ ).

(2) Based upon incremental insulation thicknesses of 10 mm.



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

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

**Scotland** — Accredited Construction Details (Scotland)

**Northern Ireland** — Accredited Construction Details (version 1.0).

## 7 Strength and stability

### General

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 is transferred to the substrate wall directly via bending and compression of the render and insulation to the fixing rail, and through the sheathing board to the structural frame.

7.3 Negative wind pressure is resisted by the bond between each component; the insulation boards are retained by the mechanical fixings and secured to the frame with the appropriate fixing screw (see section 1.1). Intermediate fixings relay the load via the sheathing board to the structural frame.



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 (additional fixings and cavity spacer tracks may be necessary). In accordance with BS EN 1990 : 2002, it is recommended that a load factor of 1.5 is used to determine the ultimate wind load to be resisted by the system.

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

- the steel frame and sheathing has been designed to withstand the loads applied to it from the insulation system, resist the additional loads that may be applied as a result of installing the system (ignoring any positive contribution that may occur from the system) and give an acceptable resistance to pull-out of fixings. The system must be secured to the substrate with fixings that pass through the Epsitec rail to create a nominal 15 mm wide cavity between the sheathing and insulation. This drainage cavity must not be vented to the outside air to an extent that would affect the thermal performance of the system.
- the proposed system and associated fixing layout provide adequate resistance to negative wind loads, based on the results of the site investigation and test results
- an appropriate number of site-specific pull-out tests are conducted on the steel frame to determine the minimum resistance to failure of the fixings. The characteristic pull-out resistance should be determined in accordance with the guidance given in ETAG 014 : 2011, Annex D, using 60% of the mean value of the five smallest measured values at the ultimate load.

7.6 The number and centres of rails and fixings should be determined by the system designer. Provided the substrate wall is suitable and an appropriate fixing is selected, the mechanical fixings will adequately support and transfer the weight of the render and insulation system to the substrate wall.

7.7 The dynamic wind load test carried out on the phenolic system indicates that for fixings spaced at 600 mm horizontal centres and with vertical centres of 150 mm, the equivalent ultimate pressure that be can sustained is 0.5 kPa. For calculation of the wind loading resistance of Epsitherm 70E and 90E and EPS systems, the characteristic pull-through values stated in Table 6 should be used.

7.8 Typical characteristic pull-out strengths for the fixings are given in Table 5; the fixing must be selected to suit the loads concerned.

*Table 5 Fixings – typical characteristic pull-out strengths*

Fixing type	Substrate	Typical pull-out strength (N)
Self-Drilling LS Range Screws	1.2 mm thick steel frame	1200
Self-Drilling TKR Range Screws	Epsitec rail	1000

7.9 The pull-through resistances determined by the BBA are given in Table 6.

*Table 6 Pull-through resistances*

Factor (unit)	Insulation type	
	EPS	Epsitherm 70/90
Insulation thickness (mm)	60	40
Plate diameter of anchor (mm)	60	60
Characteristic pull-through resistance <sup>(1)</sup> (per anchor) (N)	400	833
Factor of safety	2.5	2.5
Design pull-through resistance <sup>(2)</sup> (N)	160	333

(1) Characteristic value in accordance with BS EN 1990 : 2002, Annex D7.2.

(2) The safety factor of 2.5 is applied and based on the assumption that all insulation slabs are quality control tested to establish tensile strength perpendicular to the face of the slab.



7.10 The system is not affected by the deflections permitted when designing steel-frame structures to BS EN 1993-1-3 : 2006, ie span/300. Deflection must be limited to prevent damage to the insulation system, and the Certificate holder's advice should be sought.

## Impact loading

7.11 Hard body impact tests were carried out and the system is suitable for use in Use Category III, as defined in ETAG 004 : 2013<sup>(1)</sup>

- (1) • 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
- 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
- Use 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<sup>(1)</sup> of B-s1, d0 in accordance with BS EN 13501-1 : 2007

(1) Exova Warrington fire 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 system may be used on buildings at any proximity to a boundary. The system is restricted for use in buildings up to 18 m in height.



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

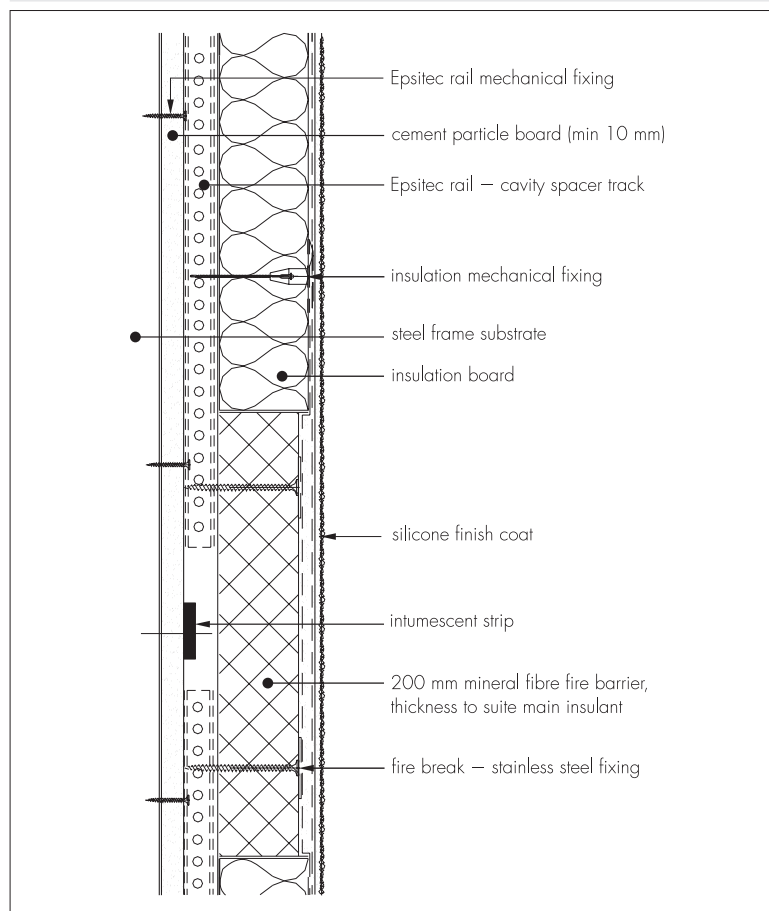
8.6 In Scotland, the systems should not be used on any building with a storey more than 11 m above the ground, or on any entertainment or assembly building with a total storey area more than 500 m<sup>2</sup>, or on any hospital or residential care building with a total storey area more than 200 m<sup>2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

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 fire barriers in line with compartment walls and floors, as advised in BRE Report BR 135 : 2013.

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 3 Fire barriers



## 9 Proximity of flues and appliances

When the insulation 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<sup>(1)(2)</sup>

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

**Northern Ireland** — Technical Booklet L.

## 10 Water resistance



10.1 The system will provide a degree of protection against rain ingress. However, care should be taken to ensure that walls are adequately weathertight prior to its application. It 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. Only details approved by the Certificate holder should be used.

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

10.4 Where used, the sheathing board substrate must be of a suitable exterior grade, with appropriately sealed joints, sealed penetrations and vapour control layers where required. Examples of relevant detailing for external wall insulation systems with a drainage cavity can be seen in SCI Publication P343 (Steel Construction Institute, 2006).

10.5 At the tops of walls, the system should be protected by an adequate overhang or other detail designed for use with this type of system (see Figure 8).

## 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 given in 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 system used with the system has an equivalent air layer thickness ( $S_a$ )  $\leq 1.0 \text{ m}$ . This corresponds to a water resistance factor ( $\mu$  value) of  $\leq 125$  for a render thickness of 8 mm.

11.6 The water vapour resistance factor ( $\mu$  value) is 50 for the phenolic and 60 for the enhanced EPS and EPS insulation boards, as 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
- necessary repairs effected immediately and the sealant joints at window and door frames replaced at regular intervals
- maintenance schedules, which should include the replacement and resealing of joints, for example between the insulation system and window and door frame.

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

## 13 Durability



13.1 The system will 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 finishes may break up the flow of water on the surface and reduce the risk of discoloration by water runs. The finish may become discoloured with time, the rate depending on locality, 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.

## Installation

### 14 Site survey and preliminary work

14.1 A pre-installation survey of the property must be carried out to determine whether repairs are required to the sheathing board or steel frame and repairs should be carried out before application of the Epsitec External Wall Insulation System. A specification is prepared for each elevation of the building indicating, for example:

- position of starter tracks, cavity spacer tracks and render beads
- additional reinforcing scrim at corners of openings
- detailing around windows, doors and at eaves
- damp-proof course (dpc) level
- location and type of weather seals to be used and location of water-deflection channels
- areas where suitable silicone sealants must be used
- position of fire barriers and cavity fire stops.

14.2 The survey should include tests conducted on the steel frame 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. 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 relevant wind speed data for the site and the pull-out resistances (see section 7).

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

14.4 On existing buildings, purpose-made window sills must be fitted to extend beyond the finished face of the system (see section 16.7). New buildings should incorporate suitably deep sills.

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

14.6 All modifications, such as provision for fire stopping (see section 8) and necessary repairs to the building must be 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 requirements 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 Application of the system is carried out in accordance with the Certificate holder's current installation instructions.

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

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 Vertical cavity spacer tracks are mechanically fixed to the cement particle board and/or steel at a maximum of 300 mm centres either side of the rail. Rails may need packing to ensure they are true to line and level. Drainage-

deflection channels are mechanically fixed over all window and door openings, and horizontal and vertical intumescent strips are installed following the designer's instructions.

16.5 The first insulation board is positioned on the starter track and secured into the cavity spacer track using a self-drilling, self-tapping fastening. Subsequent boards are positioned so that the joints are staggered and overlapped at the building corners (see Figures 4 and 5). Care must be taken to ensure the fixings are not overdriven. Fire barriers must be installed following the designer's instructions.

Figure 4 Arrangement of insulation boards and typical fixing pattern

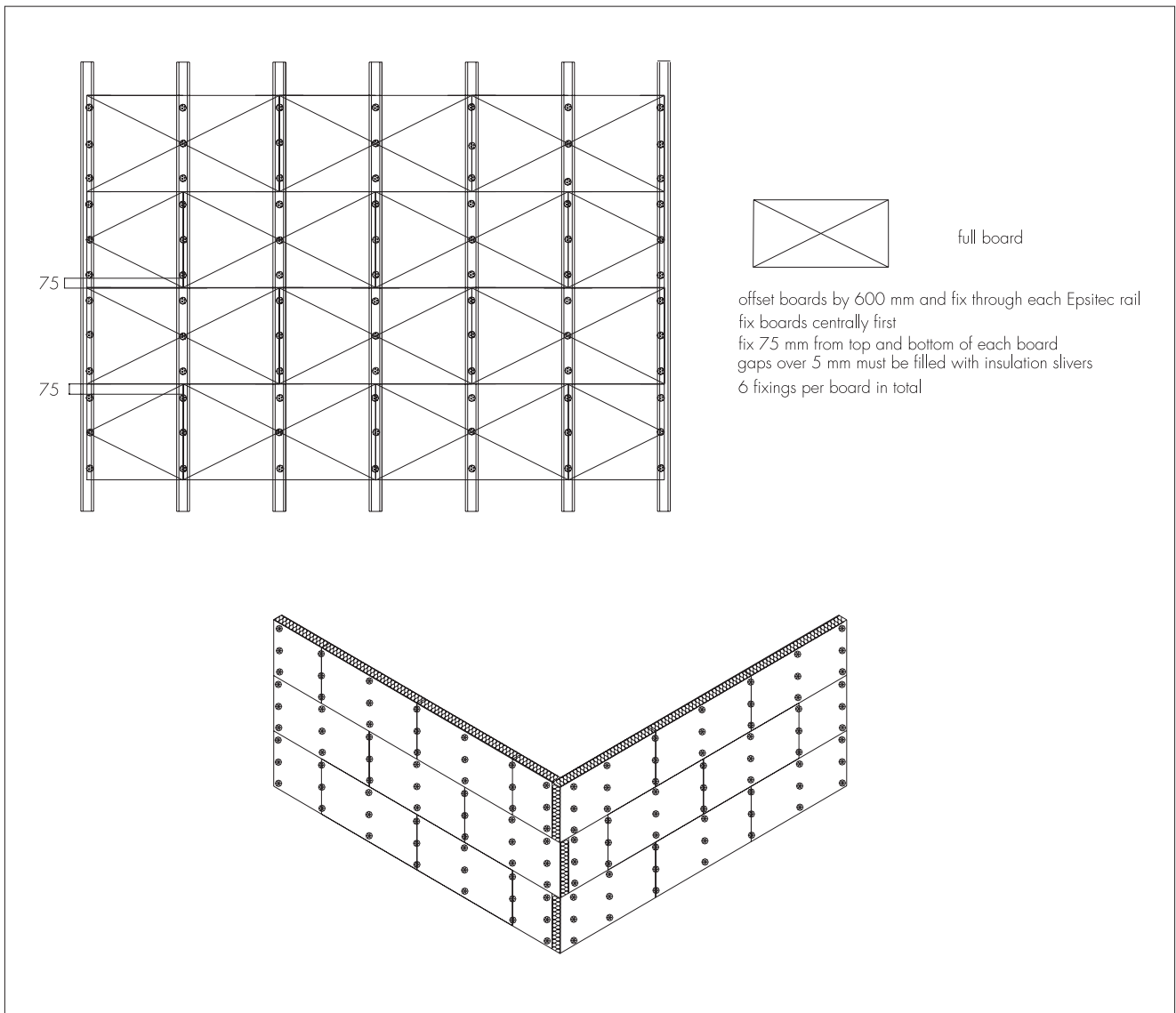
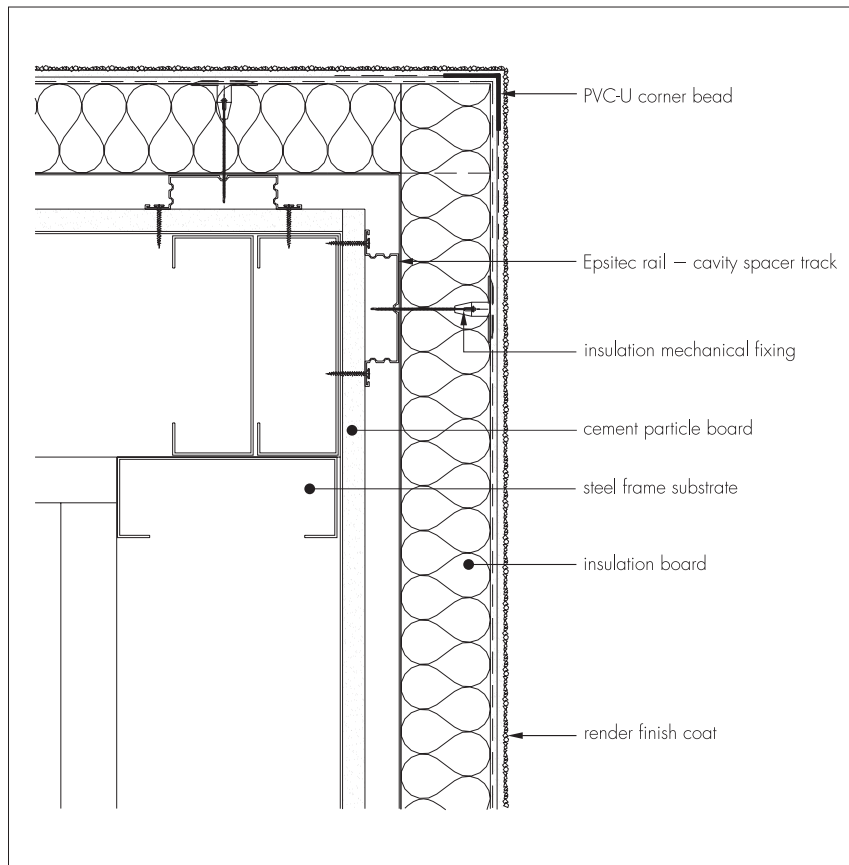


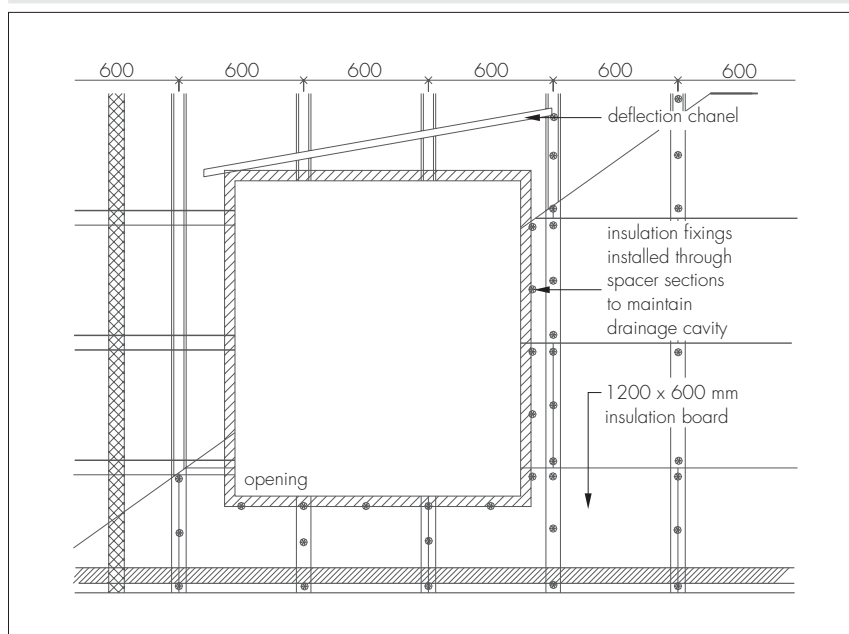
Figure 5 Typical corner detail



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

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

Figure 6 Typical opening details showing deflection channel



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

#### Movement joints

16.9 The system incorporates provision for movement joints.

16.10 Expansion beads are fixed horizontally and vertically in predetermined positions, according to the installation specification and the individual requirements of each project.

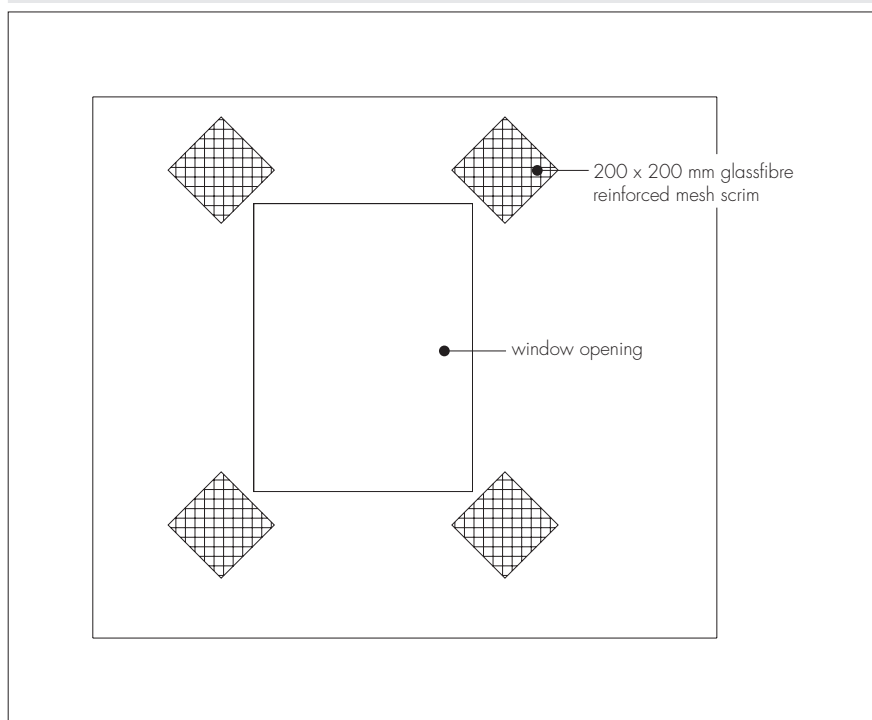
16.11 Surface mounted PVC render beads are fixed with firtree fixings to the insulation boards where required.

### Reinforcing, rendering and finishing

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

16.13 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 scrim is bedded into the basecoat with 100 mm laps at joints, ensuring all PVC wings of beading are overlapped with reinforcing scrim. Additional reinforcement should be applied at corners of windows and doors or similar openings as shown in Figure 7.

Figure 7 Corner reinforcement



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

16.15 The drying period of any render will depend on weather conditions; however, once applied, the basecoat must be left to harden for at least one day before application of a further basecoat layer.

16.16 A second coat of Heck K+A Basecoat is applied to a thickness of between 2 mm and 3 mm and finished smooth to receive the primer/silicone texture.

16.17 Continuous surfaces should be completed without a break.

16.18 In multi-storey buildings, holes are drilled at 1 m centres for additional fixings before the basecoat hardens, and stainless steel fixings are inserted through the reinforcing scrim, insulation and into the substrate wall. 100 mm by 100 mm scrim patches are required over each stainless steel fixing head.

16.19 When the basecoat render is dry, a primer coat is applied.

16.20 The topcoat is supplied pre-mixed in a tub and is trowel-applied to a thickness of 1.5 mm to 3 mm. The silicon 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.

16.21 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.

16.22 Relevant seals are positioned and installed at all openings (for example windows and doors), overhanging eaves, gas and electric meter boxes, wall vents or where the render abuts any other building material or surface. This helps to reduce the risk of water ingress into the structure.

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

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

Figure 8 Typical roof eaves detail

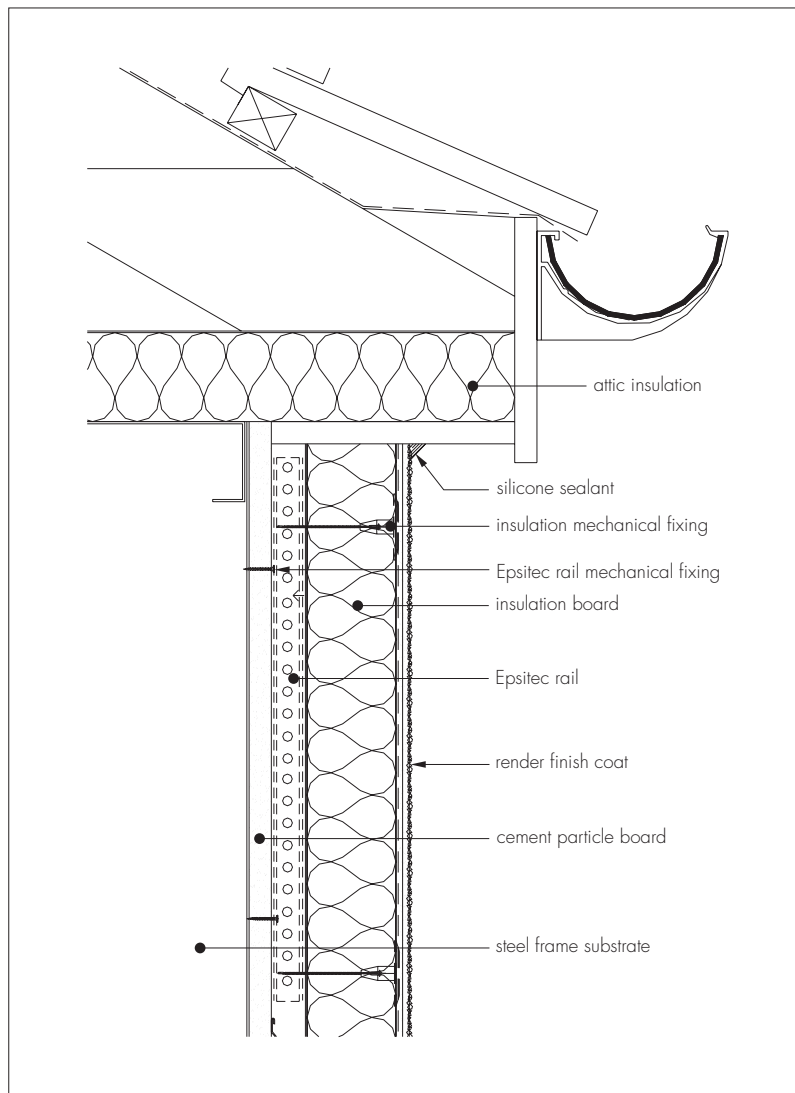
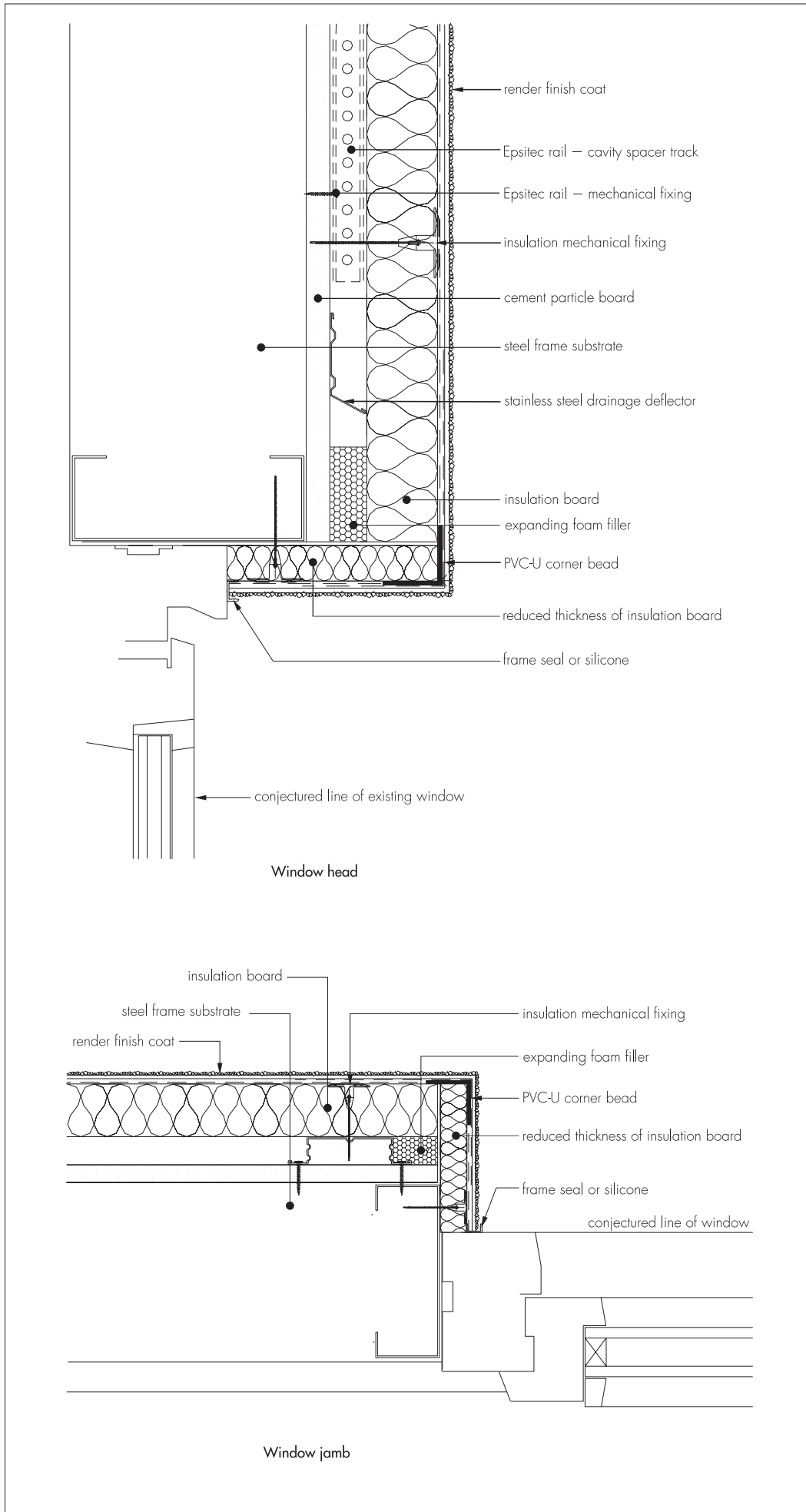


Figure 9 Typical window head and jamb details





## 17 Tests

An examination was made of data relating to:

- heat/spray cycling
- resistance to freeze/thaw
- impact resistance
- water vapour permeability
- fire performance
- durability of finish coatings
- bond strength between basecoat and insulation
- pull-through resistance.

## 18 Investigations

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

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

18.3 The adequacy of fixings and durability of finish was checked.

18.4 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 EN 634-2 : 2007 *Cement bonded particleboards — Specifications — Requirements for OPC bonded particle boards for use in dry, humid and exterior conditions*
- BS EN 1990 : 2002 *Eurocode — Basis of structural design*
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- BRE Report BR 135 : 2013 *Fire performance of external insulation for walls of multistorey buildings*
- BRE Report BR 262 : 2002 *Thermal insulation: avoiding risks*
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- ETAG 004 : 2013 *Guideline for European Technical Approval of External Thermal Insulation Composite Systems with Rendering*
- ETAG 014 : 2011 *Guideline for European Technical Approval of Plastic Anchors for fixing of External Thermal Insulation Composite Systems with Rendering*
- SCI Publication P343 *Insulated Render System Used With Light Steel Framing (Steel Construction Institute, 2006)*

## 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.