Isosystems AG
Malmedyer Weg 62
4770 Amel/Schoppen
Belgium
Tel: +32 (0) 80 34 80 00 Fax: +32 (0) 80 34 80 28
e-mail: info@isosystems.be
website: www.isosystems.be

BBA APPROVAL INSPECTION TESTING CERTIFICATION
TECHNICAL APPROVALS FOR CONSTRUCTION

Agrément Certificate
07/4403
Product Sheet 2

GEBRIK INSULATING BRICK CLADDING SYSTEMS

GEBRIK INSULATING BRICK CLADDING SYSTEM FOR FRAME/SIP SYSTEMS

This Agrément Certificate Product Sheet(1) relates to the Gebrik Insulating Brick Cladding System for Frame/SIP Systems, suitable for mechanical fixing to a sheathed, lightweight steel or timber framed structure or structural insulated panels (SIP), and comprising a facing layer of clay brick-slips, factory-produced by casting to rigid polyurethane (PUR) foam. It is suitable for use on the outside of external walls in 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 can contribute to satisfying the requirements of the national 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 has a B-s1, d0 reaction to fire classification in accordance with BS EN 13501-1 : 2007 and it is restricted in some cases (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

Date of First issue: 17 September 2014

John Albon — Head of Approvals
Construction Products

Claire Curtis-Thomas
Chief Executive

Originally certificated on 19 January 2007

Certificate amended on 15 January 2019 to include Regulation 7(2) for England and associated text.
Certificate amended on 26 April 2019 to update section 8 and associated text.
Certificate amended on 25 June 2020 to include new regulatory guidance for fire in Scotland and Wales.

Regulations

In the opinion of the BBA, the Gebrik Insulating Brick Cladding System for Frame/SIP Systems, 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)

Requirement:	A1	Loading
Comment:		The system can sustain and transmit wind loads to the structural frame. See section 7.4 of this Certificate.
Requirement:	B3(4)	Internal fire spread (structure)
Comment:		The system may be restricted by this Requirement. See section 8.2 of this Certificate.
Requirement:	B4(1)	External fire spread
Comment:		The system is restricted by this Requirement. See sections 8.1 and 8.4 of this Certificate.
Requirement:	C2(b)	Resistance to moisture
Comment:		The system provides a degree of protection against rain ingress. See section 10.1 of this Certificate.
Requirement:	C2(c)	Resistance to moisture
Comment:		The system contributes to minimising the risk of surface and interstitial condensation. See sections 11.1, 11.2 and 11.5 of this Certificate.
Requirement:	L1(a)(i)	Conservation of fuel and power
Comment:		The system can contribute to satisfying this Requirement. See sections 6.2 and 6.3 of this Certificate.
Regulation:	7(1)	Materials and workmanship
Comment:		The system is acceptable. See section 13 and the *Installation* part of this Certificate.
Regulation:	7(2)	Materials and workmanship
Comment:		The system is restricted by this Regulation. See sections 8.1 and 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 performance values for new dwellings (applicable to Wales only)
Comment:		The system can contribute to satisfying these Regulations when appropriate compensating fabric/services measures are taken. 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 system can contribute to a construction satisfying this Regulation. See sections 12.1 and 13 and the *Installation* part of this Certificate.
Regulation:	9	Building standards applicable to construction
Standard:	1.1	Structure
Comment:		The system can sustain and transmit wind loads to the structural frame. See section 7.4 of this Certificate.
Standard:	2.4	Cavities
Comment:		The system may be restricted by this Standard, with reference to clause 2.4.2[1][2]. See section 8.2 of this Certificate.
Standard:	2.6	Spread to neighbouring buildings
Comment:		The system is restricted by this Standard, with reference to clauses 2.6.4[1][2], 2.6.5[2] and 2.6.6[2]. See sections 8.1, 8.5 and 8.6 of this Certificate.
Standard:	2.7	Spread on external walls
Comment:		The system is restricted by this Standard, with reference to clause 2.7.1[1][2]. See sections 8.1, 8.5 and 8.6 of this Certificate.
Standard:	3.10	Precipitation
Comment:		The system will contribute to a construction satisfying this Standard, with reference to clauses 3.10.1[1][2] and 3.10.6[1][2]. See section 10.1 of this Certificate.
Standard:	3.15	Condensation
Comment:		The system can satisfy the requirements of this Standard, with reference to clauses 3.15.1[1], 3.15.4[1] and 3.15.5[1]. See sections 11.3 and 11.5 of this Certificate.
Standard:	6.1(b)	Carbon dioxide emissions
Standard:	6.2	Buildings insulation envelope
Comment:		The system can contribute to satisfying these Standards, with reference to clauses (or parts of) 6.1.1[1], 6.1.2[1][2], 6.1.3[2], 6.1.5[2], 6.1.6[1], 6.2.1[1], 6.2.3[1], 6.2.4[1], 6.2.5[1][2] and 6.2.10[2]. See sections 6.2 and 6.3 of this Certificate.
Standard:	7.1(a)(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. See section 6.2 of this Certificate.
Regulation:	12	Building standards applicable to conversions
Comment:		All comments given for this product under Regulation 9, Standards 1 to 6, also apply to this Regulation, with reference to clause 0.12.1[1][2] and Schedule 6[1][2].

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

The Building Regulations (Northern Ireland) 2012

Regulation:	23	Fitness of materials and workmanship
Comment:		The system is acceptable. See section 13 and the *Installation* part of this Certificate.
Regulation:	28(b)	Resistance to moisture and weather
Comment:		The system provides a degree of protection against rain ingress. See section 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 11.5 of this Certificate.
Regulation:	30	Stability
Comment:		The system can sustain and transmit wind loads to the structural frame. See section 7.4 of this Certificate.
Regulation:	35(4)	Internal fire spread - Structure
Comment:		The system may be restricted by this Regulation. See section 8.2 of this Certificate.
Regulation:	36(a)	External fire spread
Comment:		The system is unrestricted by this Regulation. See sections 8.1 to 8.3 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 3.2) of this Certificate.

Additional Information

NHBC Standards 2014

NHBC accepts the use of the Gebrik Insulating Brick Cladding System for Frame/SIP Systems, when installed with a minimum cavity width of 15 mm, and used in accordance with this Certificate, in relation to *NHBC Standards*, Part 6 *Superstructure (excluding roofs)*, Chapter 6.2 *External timber framed walls*, Chapters 6.9 *Curtain walling and cladding* and 6.10 *Light steel framed walls and floors*.

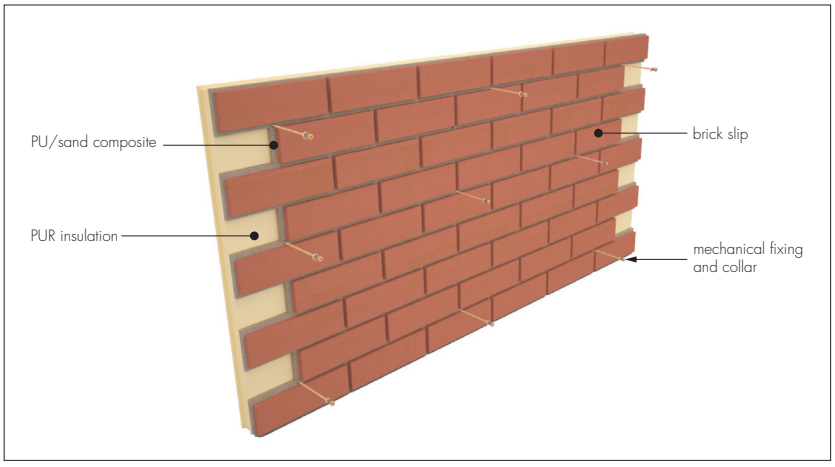
The Gebrik Insulating Brick Cladding System for Frame/SIP Systems is distributed in the United Kingdom by Aquarian Cladding Systems, Eversea Business Centre, 13 Gardens Road, Clevedon, North Somerset, BS21 7QQ, England (tel: 0844 334 0077, fax: 0844 755 0289, www.aquariancladding.co.uk).

Technical Specification

1 Description

1.1 The Gebrik Insulating Brick Cladding System for Frame/SIP Systems (see Figures 1, 2 and 3) is for use on lightweight steel and timber framed buildings and structural insulated panel (SIP) constructions, and comprises the followings components:

Figure 1 Gebrik Insulating Brick Cladding System



Gebrik panels

- Gebrik panels are factory-produced by casting brick slips in rigid polyurethane (PUR) foam. See Table 1 for characteristics.

Table 1 Gebrik panel characteristics

Panel type	Brick-slip dimensions[1] (mm)		Brick-slip thickness[2] (mm)	Panel size[3] (mm)		Panel thickness[4] (mm)	PUR thickness (mm)
	Length	Height		Length	Height		
Gebrik 5	240	52	15 to 20	1391.4	714.5	60	≥ 40
Gebrik 6	240	65/66.4	15 to 20	1391.4	714.5	60	≥ 40
Gebrik 8	240	89.1	15 to 20	1391.4	714.5	60	≥ 40
Gebrik 13	240	130	15 to 20	1391.4	714.5	60	≥ 40
Gebrik 61	240	65/66.4	15 to 20	1375.0	687.6	60	≥ 40
Gebrik GC	265	127.5	15 to 20	1375.0	687.6	60	≥ 40
Gebrik R5	440	50	15 to 20	1350.0	675.0	60	≥ 40
Gebrik R6	440	65	15 to 20	1350.0	675.0	60	≥ 40
Gebrik UK	215	65	15 to 20	1350.0	675.0	60	≥ 40
Gebrik UK KP	102.5	65	15 to 20	1350.0	675.0	60	≥ 40
Gebrik WF	215	50	15 to 20	1350.0	675.0	60	≥ 40
Gebrik WF KP	102.5	50	15 to 20	1350.0	675.0	60	≥ 40

(1) With a tolerance (mm) of +1/−2 (length/height) for extruded brick-slips, and +1/−5 (length) and +1/−3 (height) for handformed brick-slips.
(2) With a tolerance (mm) of +1/−2.
(3) With a tolerance (mm) of ±1.5 (length) and ±1 (height).
(4) With a tolerance (mm) of ±2.

Corner panels

- Corner panels are factory-formed by cutting normal panels and gluing with PU-based adhesive, or factory-bonding corner slips and slips to PUR with cement-based or PU-based adhesive. The available types are HE, ST, UE and PUE + ER + R (external corners); FE (window corners); and RE (lintel corners) — see Figure 3.

Insulation

- Polyurethane foam insulation (PUR) — with a nominal density of 35 kg·m^{-3} and a minimum compressive strength of 120 kN·m^{-2}, manufactured to comply with BS EN 13165 : 2012.

Brick-slip adhesive

- 2COMP-PU Adhesive — a two-component polyurethane adhesive for the fabrication of the cut and bonded corners, and the prefabrication of panels and corner elements
- ISO-COL Adhesive — cement-based adhesive to apply to brick-slips on site to maintain stretcher or Flemish bond, and to corner and brick-slips on factory-produced PUE-type corners.

Clay brick-slips

- Clay brick-slips — with a thickness of 15 mm to 20 mm, and available in different sizes (see Table 1) and any of the colours, structures and finishes listed Table 2. The brick-slips are resistant to freezing in accordance with DD CEN/TS 772-22 : 2006 and EN ISO 10545-12 : 1997.

Table 2 Brick-slip colours, structures and surface finishes

Colours[1]	Structures	Surface finishes[2]
Black	Dragwired	
Blue	Grained	
Brown	Grained and sanded	Engobed
Cream	Hand moulded	Flamed
Grey	Heavy grained	Glazed
Red	Heavy grained and sanded	Shaded
Salmon	Smooth	
White	Smooth and sanded	
Yellow	Waterstruck	

(1) Other colours available on request.
(2) Other finishes available on request.

Brick-slips pointing mortar

- pointing grout/mortar — water-repellent, frost-resistant, cementitious grouting mortar. Mortar mixes must be selected in accordance with class 12, 6 or 4 of BS EN 998-2 : 2010 or BS EN 13888 : 2009.

Mechanical fixings[1]

- HS6 — 6.0 mm diameter galvanized or stainless steel screws with lengths of 70 mm to 260 mm used in combination with DTeller or DTeller-K polyamide protect collars. Suitable for fastening the insulated panels to the exterior grade sheathing board.

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

Figure 2 Range of Gebrik panels

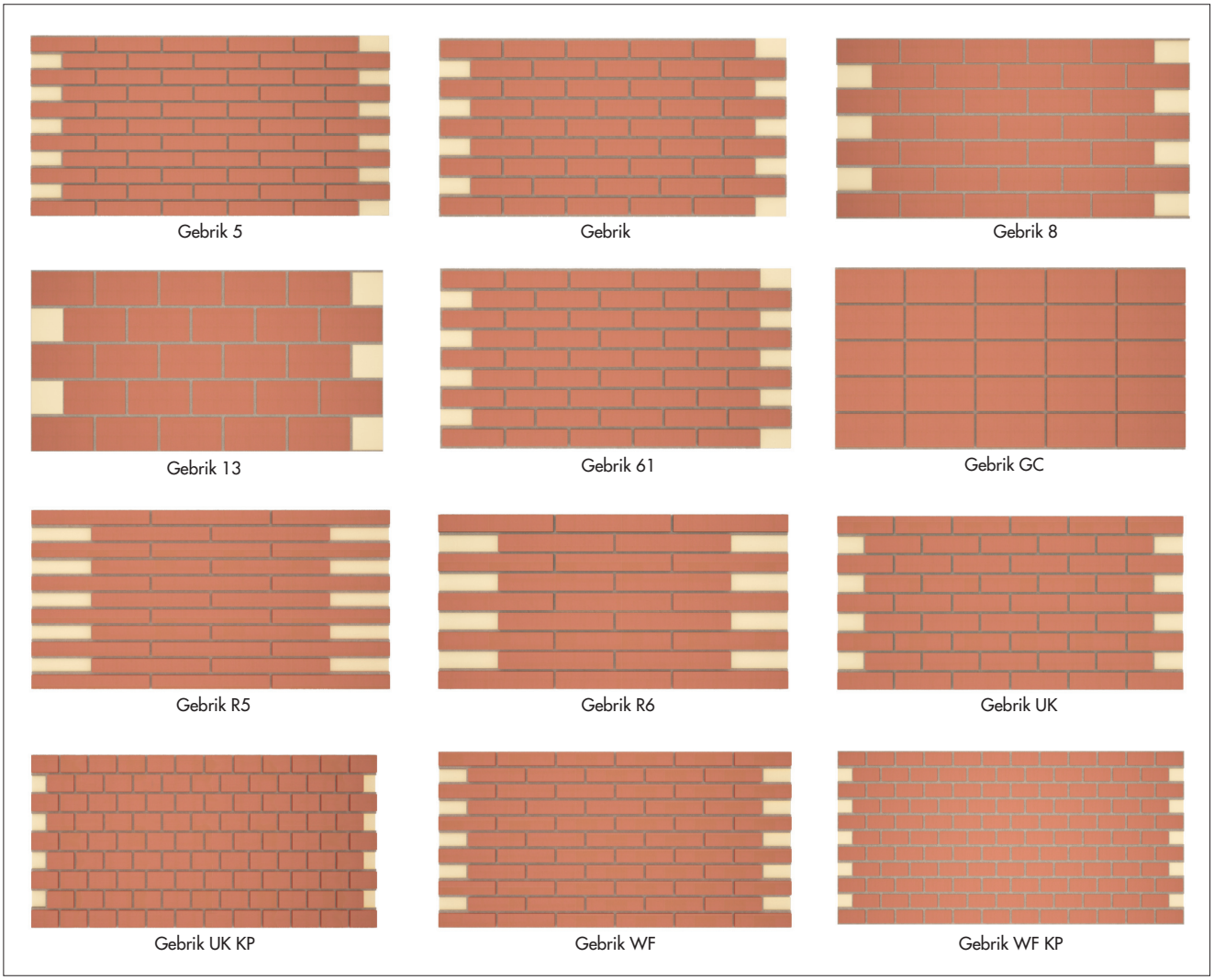
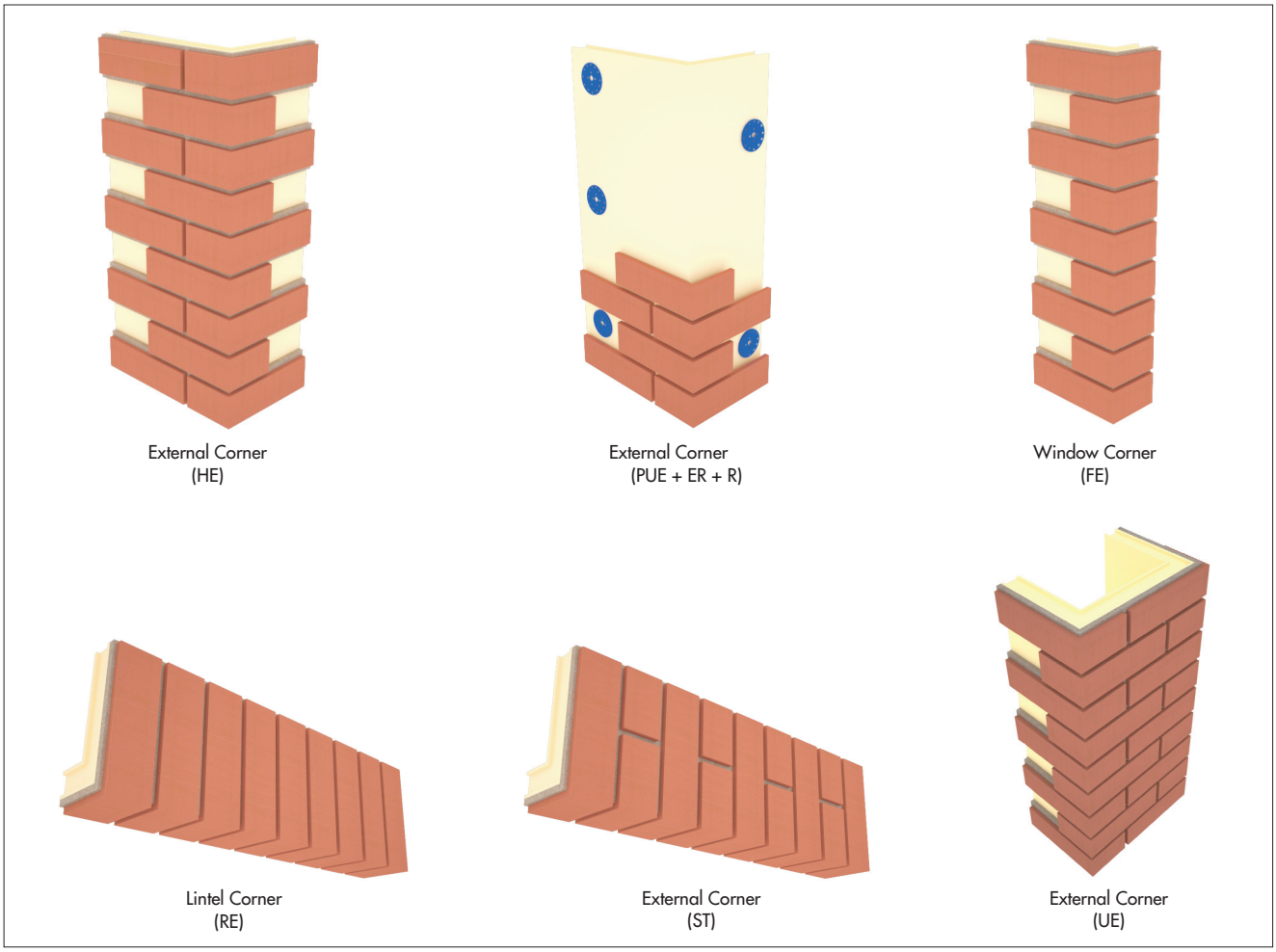


Figure 3 Corners

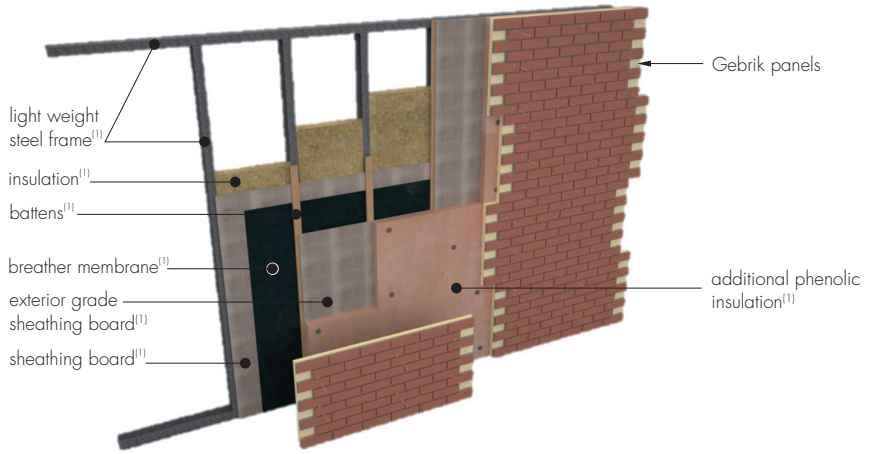


1.2 Ancillary items used with the system, but outside the scope of this Certificate:

- sheathing board
- breather membrane
- starter tracks and beading profiles
- insect mesh
- end stops
- sealant
- additional rigid insulation
- intumescent strips.

1.3 The Gebrik panels and corners are secured to an exterior grade sheathing board using mechanical fixings. An additional layer of rigid insulation board can also be applied to the sheathing board prior to the application of the panels/corners to achieve improved U-values. Vertical battens or brackets, and angles or top hats, are mechanically fixed between the external layer of sheathing board and sheathed steel/timber frame or SIP substrate fixings to create a nominal 15 mm wide cavity (see Figure 4).

Figure 4 Light-weight steel construction using Gebrik Insulated Panel System



(1) Outside the scope of the certificate.

2 Manufacture

2.1 The base of the mould is lined with brick-slips and sand. The foam is then expanded onto the brick-slips and sand, and after curing, the brick-slips are set into the foam panel.

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.

3 Delivery and site handling

3.1 Panels (each, 26 to 28 kg in weight) are delivered to site stacked flat on pallets, along with the corners, with a polythene cover. Each pallet, panel and corner carries the product identification and manufacturer's batch number.

3.2 Stacks of panels should not exceed 28 high and should be protected from precipitation, direct sunlight, ground water and impact damage.

3.3 Panels should be carried vertically and handled with care to avoid damage. Containers of adhesive, mortars, sealants and expanding foam should be stored in dry conditions and protected from frost and excessive heat. Fixings, trims and rails should be protected from damp.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on the Gebrik Insulating Brick Cladding System for Frame/SIP Systems.

Design Considerations

4 General

4.1 The Gebrik Insulating Brick Cladding System for Frame/SIP Systems, when applied to the frame or SIP structure in accordance with this Certificate, is effective in reducing the thermal transmittance (U value) of new and existing buildings above the damp proof course (dpc) level.

4.2 For further improvement in the thermal/carbon-emissions performance, the designer should consider additional/alternative fabric and/or services measures.

4.3 The panel system is applied to the face of the SIP and timber/steel frame outside the external walls of the sheathed, lightweight, steel and timber frame and SIP structures and is suitable for use on new or existing domestic and non-domestic buildings.

4.4 The specification of the frame and sheathing is outside the scope of this Certificate and should be designed and installed by suitably experienced and competent individuals (see section 14).

4.5 The panel system, when used in steel or timber-framed structures, must incorporate steel or timber studs at maximum 600 mm centres sheathed with boards with equivalent structural properties to those stated in Table 3 and incorporating a minimum of 15 mm ventilated or vented and drained cavity. In addition, studs should be fixed between the two layers of sheathing around openings and where required to ensure that the panels are fully supported.

Table 3 Minimum construction specification

Item	Characteristic	Specification
Sheathing board[1] (fire rated)	Type	BS EN 634-2 : 2007 (see Certificate holder for details)
	Thickness	12 mm (minimum)

(1) The board must of exterior grade, with the minimum acceptable specification as shown. The Certificate holder should be consulted for an appropriate specification for a particular installation.

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

- galvanized steel framework, which must be structurally sound, designed and constructed in accordance with BS EN 1993-1-1 : 2005 and BS EN 1993-1-3 : 2006 and other parts where appropriate
- timber stud walls and timber battens, which must be structurally sound, designed and constructed in accordance with BS EN 1995-1-1 : 2004, and preservative treated in accordance with BS EN 351-1 : 2007
- structural insulated panels (SIP), which must be structurally sound, designed and constructed in accordance with BS EN 1995-1-1 : 2004, and preservative treated in accordance with BS EN 351-1 : 2007. The methods given in BS EN 1995-1-1 : 2004 or BS 5268-6.1 : 1996 may be used to assess racking resistance.

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

4.8 It is essential that the detailing techniques specified in this Certificate are carried out to a high standard if the ingress of water into the insulation is to be avoided and the full thermal benefit obtained from the system. Only details specified by the Certificate holder should be used.

4.9 The panel 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.

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

4. 11 The fixing of rainwater goods, satellite dishes, clothes lines, hanging baskets and similar items is outside the scope of this Certificate.

4.12 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.

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

5 Practicability of installation

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

6 Thermal performance

6.1 Calculations of thermal transmittance (U value) should be carried out in accordance with BS EN ISO 6946 : 2007, BRE Digest 465 and BRE Report 443 : 2006 using the insulation thermal conductivity (λ_D value) of 0.029 $W \cdot m^{-1} \cdot K^{-1}$ for PUR foam insulation and 0.77 $W \cdot m^{-1} \cdot K^{-1}$ for brick-slips (see Table 4 of this Certificate).

6.2 The U value of a wall will depend on the type and thickness of additional insulation (if used), the number and type of fixings and the insulating value of the substrate wall and its internal finish. Example additional insulation thicknesses required for a Gebrik panel (40 mm PUR and 20 mm brick-slip) to achieve the U values shown in the documents supporting the national Building Regulations are given in Table 4.

Table 4 Additional phenolic insulation thicknesses (mm) to achieve typical design U values[1]

U value ($W \cdot m^{-2} \cdot K^{-1}$)	Timber frame[2]	Metal frame[3]	SIP panel[4]
0.18	75	85	55
0.26	20	35	0
0.28	10	30	0
0.30	0	20	0

(1) Gebrik panel includes fixings, n_f = 10 per m^2, A_f = 28.3 mm^2 and λ_f = 50 $W \cdot m^{-1} \cdot K^{-1}$.
Additional insulation layer includes 2 extra fixings per m^2, λ = 0.023 $W \cdot m^{-1} \cdot K^{-1}$ (<25 mm), 0.021 $W \cdot m^{-1} \cdot K^{-1}$ (24 to 44 mm) and 0.020 $W \cdot m^{-1} \cdot K^{-1}$ (>44 mm)
Calcium silicate board λ = 0.23 $W \cdot m^{-1} \cdot K^{-1}$, timber and OSB λ = 0.13 $W \cdot m^{-1} \cdot K^{-1}$, mineral wool λ = 0.040 $W \cdot m^{-1} \cdot K^{-1}$ and plasterboard λ = 0.25 $W \cdot m^{-1} \cdot K^{-1}$.
All cavities are unventilated.
(2) With phenolic thickness as shown + 12 mm calcium silicate board over 15 mm timber battens (6.3% fraction) + 10 mm calcium silicate board + 89 mm timber studs (15%), fully filled wtih mineral wool, + 12.5 mm plasterboard.
(3) With phenolic thickness as shown + 12 mm calcium silicate board over 15 mm timber battens (6.3% fraction) + 10 mm calcium silicate board + 100 mm steel frame (0.28% and flange width < 80 mm), fully filled wtih mineral wool, + 12.5 mm plasterboard)
(4) With phenolic thickness as shown + 12 mm calcium silicate board over 15 mm timber battens (6.3% fraction) + 15 mm OSB (oriented strand board) + 70 mm PUR (λ = 0.029 $W \cdot m^{-1} \cdot K^{-1}$) with two 15 x 100 mm OSB/PUR splines (8.2%) + 15 mm OSB + 10 mm timber battens (11.8%) + 12.5 mm plasterboard.

6.3 The system can contribute to maintaining continuity of thermal insulation at junctions between elements. Detailed guidance on limiting heat loss and air infiltration can be found in the documents supporting the national Building regulations.

7 Strength and stability

General

7.1 When installed on suitable walls, the panel 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 panel (brick-slips and insulation) and through the sheathing board and battens to the structural frame or SIP.

7.3 Negative wind pressure is resisted by the bond between each component; the panels are retained by the mechanical fixings secured to the sheathing board and battens to the structural frame or SIP.

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 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 An assessment of the structural performance for a particular building must be carried out by a suitably qualified and experienced individual to confirm that:

- the SIP, steel and timber frame and sheathing are capable of withstanding the loads applied to it from the panel system and resisting the temporary additional loads that may be applied as a result of installing the system (ignoring any positive contribution that may occur from the system), and have an acceptable resistance to the pull-out of fixings. The system must be secured to the substrate with fixings that pass through the outer layer of the sheathing board, which must be mechanically fixed to the vertical supports within the cavity to create a nominal 15 mm wide drained cavity in front of the sheathed steel/timber frame or SIP substrate. The cavities can be ventilated, or vented and drained depending on the frame structure (see Figure 4)
- 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 sheathing board and steel/timber frame or SIP 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 battens and fixings should be determined by the system designer. Provided the substrate is suitable and an appropriate fixing is selected, the mechanical fixings will adequately support and transfer the weight of the brick-slip panel system to the substrate wall.

7.7 The dynamic wind load test carried on the Gebrik Insulating Brick Cladding System fixed to a steel framed structure with studs spaced at 600 mm centres and mechanically fixed with 9 fixings per panel, achieved the ultimate design pressure of 2.4 kPa.

7.8 A typical example of characteristic pull-out strengths for the fixings taken from tests, is given in Table 5: the fixings must be selected to suit the loads concerned.

Table 5 Fixings — typical characteristic pull-out strengths

Fixing type	Substrate	Typical pull-out strength (N)
Ejot JT2, JT3 and JF3 – self-drilling screws	12 mm thick exterior grade sheathing board	300

7.9 The system is not affected by the deflections permitted when designing framed structures to BS EN 1995-1-1 : 2004 (for timber frame and SIP) or BS EN 1993-1-3 : 2006 (for steel frame), ie span/200. Deflection must be limited to prevent damage to the brick-slip panel system.

Impact resistance

7.10 Hard body impact tests were carried out and the system is suitable for use in all Use Categories as defined in ETAG 017 : 2005[1].

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

8 Behaviour in relation to fire

The system has a reaction to fire classification of B – s1, d0 in accordance with BS EN 13501-1 : 2007[1]. This relates to the full range of thicknesses and brick-slip finishes referred to in section 1 of this Certificate.

(1) Designers should refer to Efectis Nederland BV test report 2012-Efectis-R0395 Rev 1 Issue 1, and Efectis Nederland BV assessment 2015-Efectis-B0124/SEC/TNL, both available from the Certificate holder.

8.2 Cavity barriers should be provided in accordance with the requirements of the documents supporting the national Building Regulations, based on the reaction to fire classifications of the materials forming the faces of the drained and vented cavity[1].

(1) Outside of the scope of this Certificate.

8.3 The insulation material in isolation is not classified as non-combustible or of limited combustibility.

8.4 In England, Wales and Northern Ireland, the system may be used on buildings with no storey 18 m or more above the ground and less than 1 m or more from a boundary.

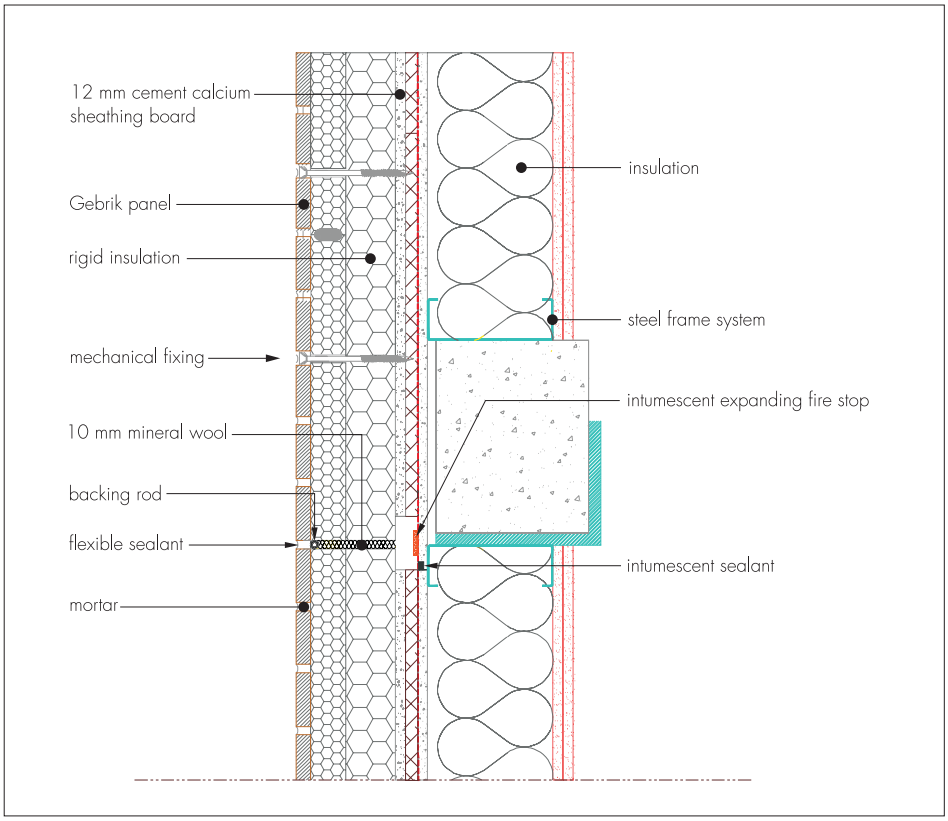
8.5 In Scotland, the panels are not classified as non-combustible, and may be used on buildings more than 1 m from a boundary and, on houses, 1 m or less from a boundary. With minor exceptions, the panels should be included in calculations of unprotected area, except on houses where the external wall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

8.6 In Scotland, the panels 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 should consider the use of intumescent expanding fire stops in line with floors (see Figure 5).

8.8 Designers should refer to the national Building Regulations and guidance for detailed conditions of use, particularly in respect of requirements for substrate fire performance, service penetrations and combustibility limitations for other materials and components used in the overall wall construction, for example, additonal thermal insulation.

Figure 5 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[1][2]

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

Northern Ireland — Technical Booklet L.

10 Water resistance

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

10.2 Designers and installers should take particular care in detailing around openings, penetrations, panel joints and movement joints to minimise the risk of rain ingress. Only details approved by the Certificate holder should be used.

10.3 The sheathing board substrate must be of a suitable exterior grade with appropriately sealed joints, sealed penetrations and vapour control layers (VCL) where required. For guidance, examples of relevant detailing for an external wall insulation system with a drainage cavity can be seen in SCI Publication P343 (Steel Construction Institute, 2006).

10.4 The designer should check that the windows, door sets, flashings, and other similar items have been specifically designed for the prevention of water ingress. For example, at junctions between the insulation system and windows, openings and penetrations, details should be designed to deflect water away from the insulation and onto the external face of the wall.

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, including requirements for VCLs and breather membranes in timber frame construction applications and a minimum 15 mm cavity.

Surface condensation

11.2 Walls will adequately limit the risk of surface condensation where 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 8, Annex D) and BRE Report BR 262 : 2002.

Interstitial condensation

11.4 The risk of interstitial condensation in the external walling is greatest when the building is drying out after construction. Guidance on preventing condensation is given in BRE Digest 369 : 1992 and BRE Report 262 : 2002.

11.5 Dynamic simulations to BS EN 15026 : 2007 indicate that the system can function effectively without significant risk of interstitial condensation. The simulations were applicable to particular locations, orientations and vapour resistances of the framed substrate. The suitability of other constructions/parameters may be assessed by using an appropriate dynamic modelling package and actual site data.

11.6 The Gebrik Insulating Brick Cladding System has an equivalent air layer of thickness (S_d) of 7.64 m.

12 Maintenance and repair

12.1 Regular checks should be made on the installed system:

- visual inspection of the brick-slips for signs of disbondment. Dislodged slips should be re-fixed using brick-slip adhesive
- 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 brick-slip panel
- necessary repairs must be 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 brick-slip panels and window and door frame
- damaged brick slips are removed and replaced with new ones, using the brick-slips adhesive as supplied by the Certificate holder.

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

13 Durability

The system will remain effective for at least 30 years, provided any damage is repaired immediately, and regular maintenance is undertaken as described in section 12 of this Certificate.

Installation

14 Site survey and preliminary work

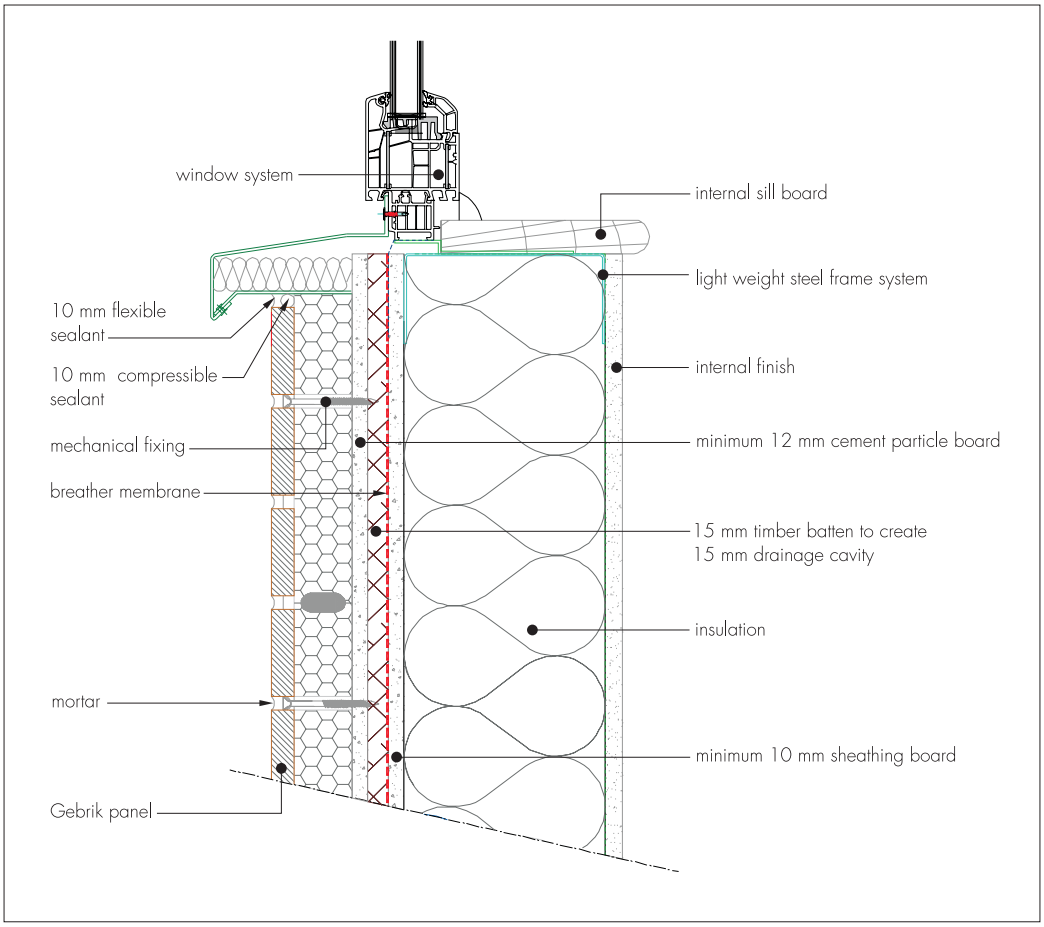
14.1 A pre-installation survey of the property must be carried out to determine whether repairs are required to the sheathing board or structural frames and repairs should be carried out before application of the system. A specification is prepared for each elevation of the building indicating, for example:

- position of starter tracks, cavity spacer tracks
- detailing around windows, doors and at eaves
- damp-proof course (dpc) level
- areas where suitable sealants must be used.

14.2 The survey should include tests conducted on the structural frames of the building by the Certificate holder or their approved installers (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) of this Certificate.

14.3 On existing buildings, purpose-made window sills must be fitted to extend beyond the finished face of the system (see Figure 6). New buildings should incorporate suitably deep sills.

Figure 6 Window sill detail



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

14.5 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, must be carried out by approved installers recommended or recognised by the Certificate holder or holder's agent. Such an installer is a company:

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

16 Procedure

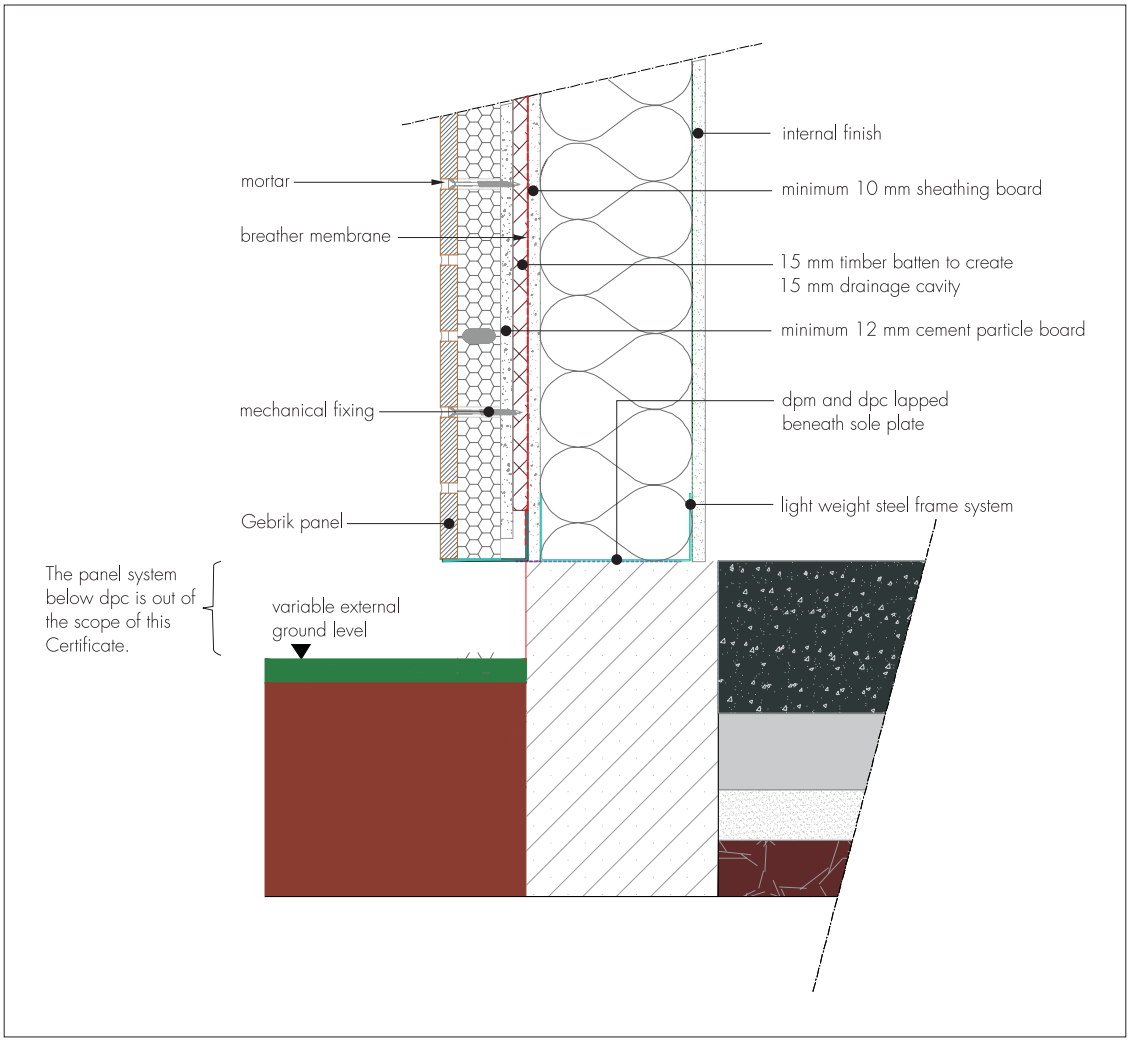
General

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

Positioning and securing panels

16.2 An aluminium angle starter rail is positioned above the dpc. A double strip of sealant, or a single strip of expanding foam, is applied to the back of the angle face that is screwed to the wall at 600 mm centres (see Figure 7). A similar seal is applied to the upper surface of the angle before the panel is positioned, starting from the corner of a wall.

Figure 7 Typical section of base profile



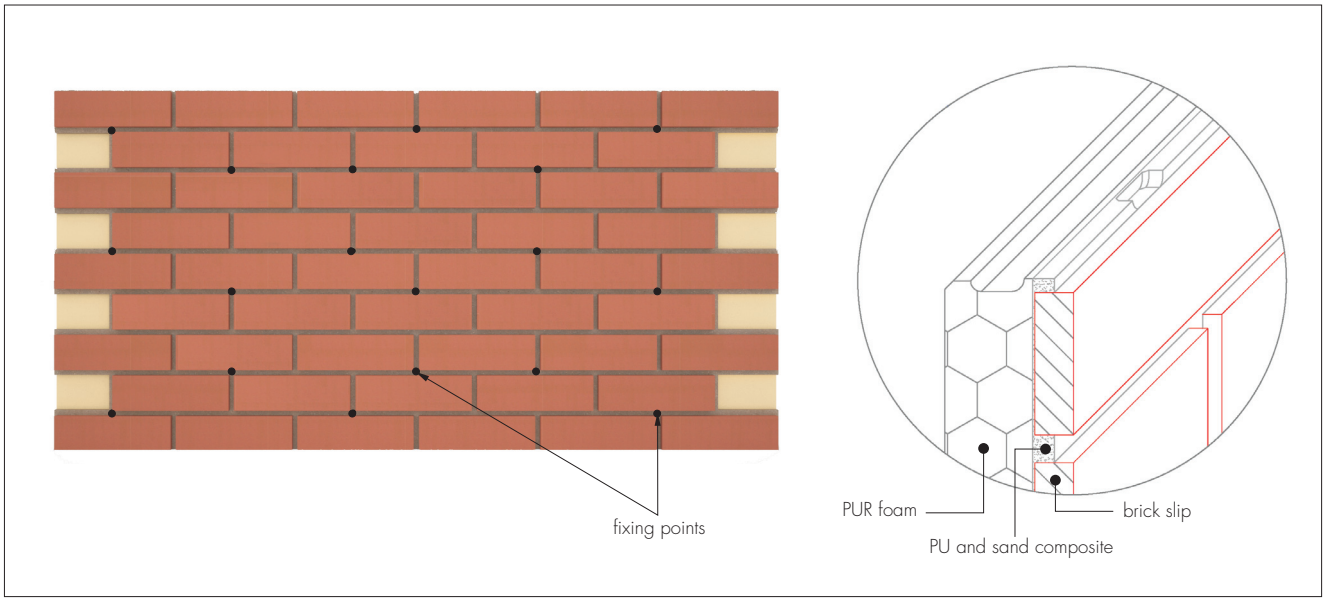
16.3 A factory-formed corner (see Figure 3) is placed vertically on the starter rail. Three fixings are drilled through the longest leg of the corner and two through the shortest leg, into the outer layer of sheathing board at the pre-located fixings positions.

16.4 It is essential that protective collars are used with the screws, which are evenly spaced, and achieve an appropriate minimum embedment depth in a sound substrate. This may require the use of longer fixings if they have to bridge voids or other layers which may not provide adequate anchorage.

16.5 Care should be taken neither to undertighten nor overtighten the screws.

16.6 Panels are fixed in a similar manner through at least nine of the preformed fixing points (see Figure 8). Additional fixing points are used on each panel so that where wind loading and/or site pull-out tests indicate a greater fixing rate, the required additional fixings can be applied (see section 7).

Figure 8 Gebrik panel factory proposed fixing pattern and details



16.7 Care should be taken to ensure that panels are applied flat and fully abut each other and brick courses align neatly. To seal the joints between panels, the recessed edge profile in the foam is filled with expanding foam, or later through the provided injection holes (see Figure 8). Once the expandable foam has been applied, the system should again be checked for flatness and re-tightened if necessary.

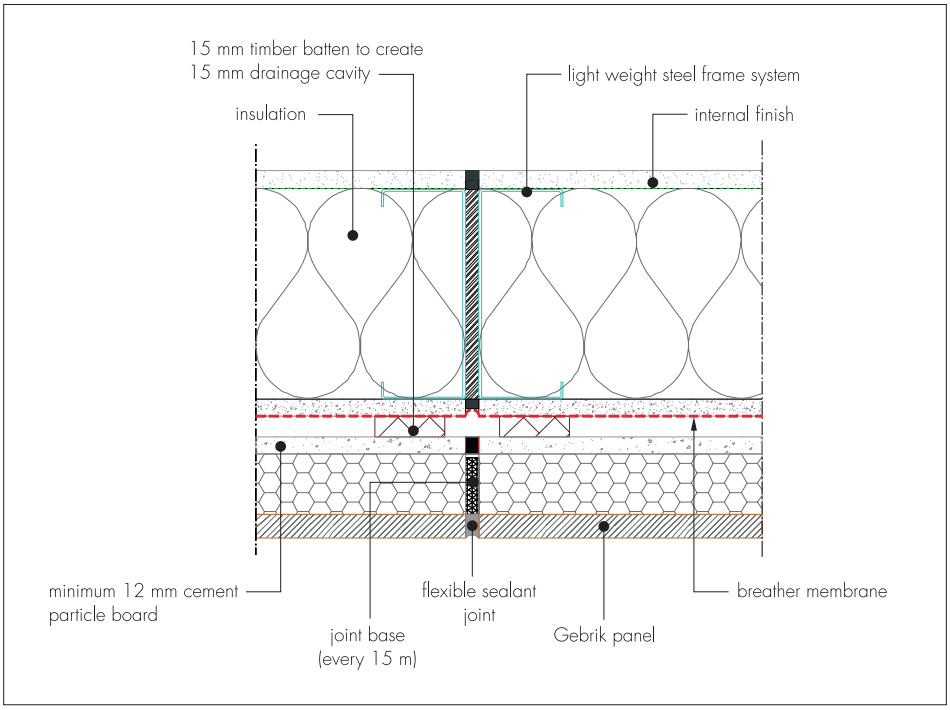
16.8 Subsequent rows of panels can be break-bonded or stack-bonded, taking care to maintain the bond, keep the foam rebate free from debris and maintain a flat and true appearance to the façade.

Expansion joints

16.9 The system incorporates provision for movement joints (see Figure 9).

16.10 Vertical expansion joints should be provided at intervals not exceeding 15 m. Horizontal expansion joints should be provided at intervals not exceeding 7 m.

Figure 9 Movement joint



Bridging slips

16.11 At vertical joints between panels, if the bond pattern dictates, every other brick course requires the application of a brick-slip using ISO-COL Adhesive. It is essential that the manufacturer's instructions are followed carefully. Panels with stack-bonded slips do not require the application of these slips.

16.12 The insulation surface of the panel and of the brick-slip must be clean, dry and grease-free. The adhesive is prepared and spread over the lower half of the slip, which is then placed at an angle against the recess of the panel and pressed in, spreading the adhesive upwards and over the whole area of the slip. One 25 kg bag of adhesive mix should be sufficient for approximately 375 to 400 slips.

16.13 To prevent slipping before the adhesive has set, the brick-slips should be supported by two or three nails. The setting for the adhesive is nominally 30 minutes but can be considerably less in warm or dry weather.

Detail work

16.14 Panels can be cut on-site using a diamond bladed, portable cutter. To allow cut edges to be sealed against adjacent panels a recessed profile is created. Alternate brick-slips are removed from cut vertical edges and then prised away from the foam with a flat tool.

16.15 Placing and sealing of the cut panel then proceeds as for full panels ensuring a minimum of 9 fixings or pro-rata with full panel area, whichever is greater.

16.16 Units at opening reveals, sills and heads are fixed in the same way as a wall corner unit.

16.17 Where a panel or unit is to abut a window, door frame, rail/trim or similar element, a pre-formed gasket plus, either, a double strip of sealant or single strip of expanding foam is applied to the surface to which the foam component of the panel is to abut.

Pointing

16.18 Pointing mortar is applied in accordance with the Certificate holder's instructions and not less than one week after the panels have been installed. Pointing should not be carried out in direct sunlight.

16.19 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 panel abuts any other building material or surface.

16.20 Care should be taken in the detailing of the system around such features as openings, projections and at eaves (see Figures 10 and 11) to ensure adequate protection against water ingress and to limit the risk of water penetrating the system.

Figure 10 Typical window head and jamb details

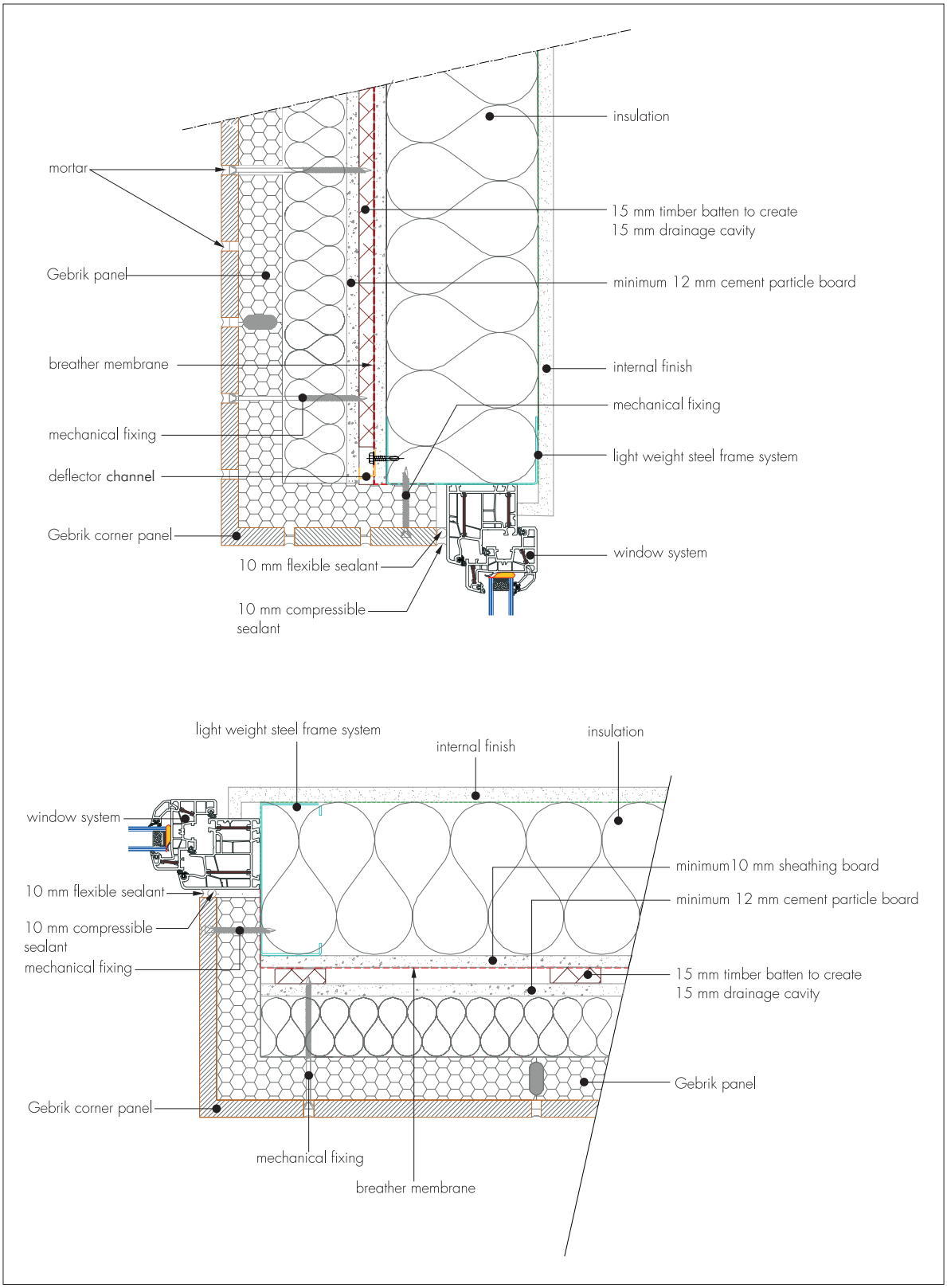
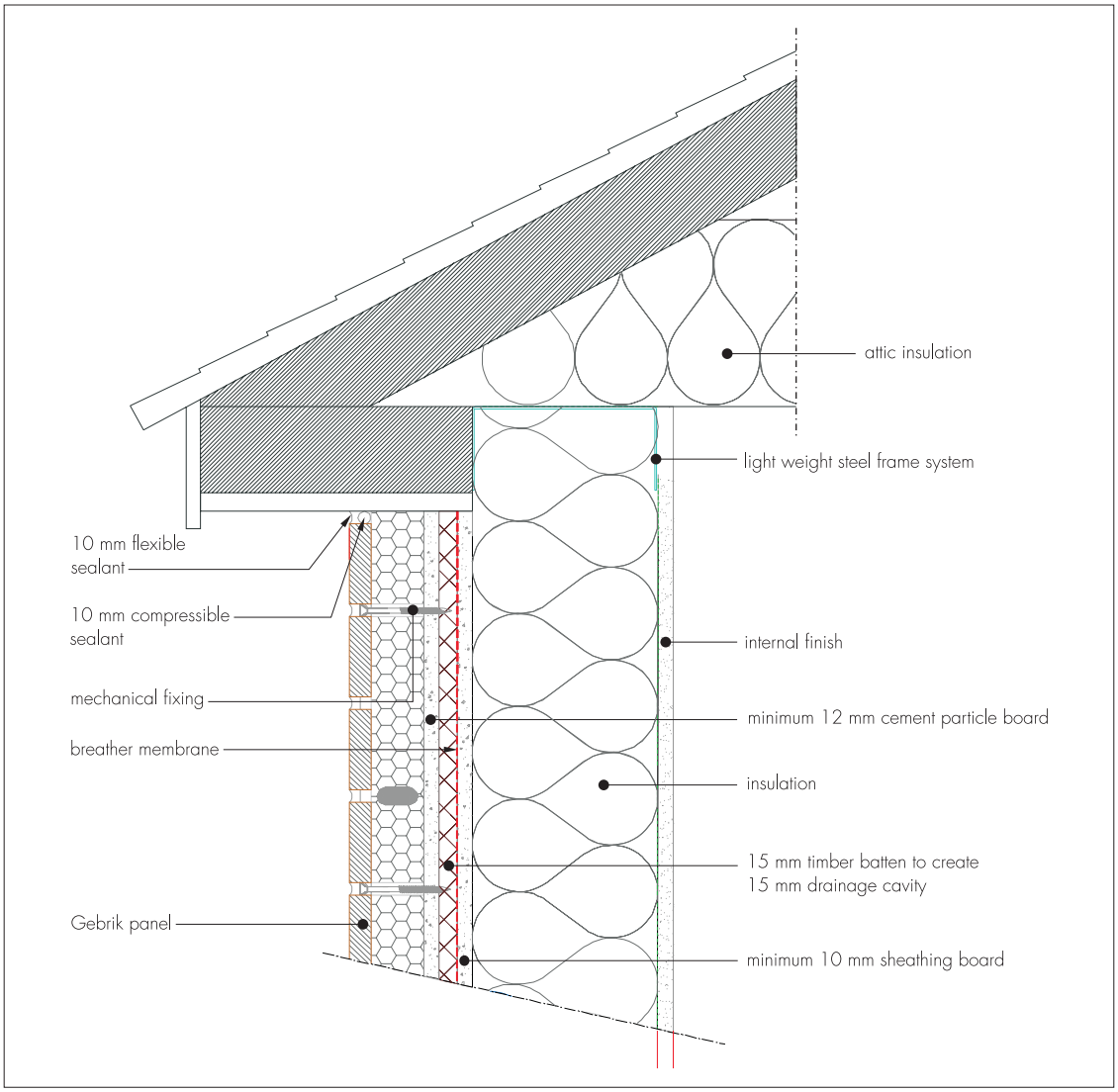


Figure 11 Typical roof eaves detail



16.21 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

Technical Investigations

17 Tests

Tests were carried out to determine:

- for PUR foam:
  - thermal conductivity
  - characterisation tests
  - water absorption
  - water vapour permeability
  - tensile strength
  - shear strength
  - dimensional stability with humidity
  - dimensional stability with temperature.
- for the brick-slips:
  - frost resistance
  - water absorption.

- for the composite panel:
  - — adhesion
  - — effect of heat/spray and freeze thaw
  - — resistance to hard and soft body impact — dynamic wind loading resistance
  - — reaction to fire.

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 the system was assessed.

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 5268-6.1 : 1996 *Structural use of timber — Code of practice for timber frame walls — Dwellings not exceeding four storeys*

BS EN 351-1 : 2007 *Durability of wood and wood-based products — Preservative-treated solid wood — Classification of preservative penetration and retention*

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 998-2 : 2010 *Specification for mortar for masonry — Masonry mortar*

BS EN 1990 : 2002 *Eurocode — Basis of structural design*

BS EN 1991-1-4 : 2005 *Eurocode 1 : Actions on structures — General actions — Wind actions*

BS EN 1993-1-1 : 2005 *Eurocode 3 : Design of steel structures — General rules and rules for buildings*
BS EN 1993-1-3 : 2006 *Eurocode 3 : Design of steel structures — General rules — Supplementary rules for cold-formed members and sheeting*

BS EN 1995-1-1 : 2004 *Eurocode 5 : Design of timber structures — General — Common rules and rules for buildings*

BS EN 13165 : 2012 *Thermal insulation products for buildings — Factory made rigid polyurethane foam (PU) products — Specification*

BS EN 13501-1 : 2007 + A1 : 2009 *Fire classification of construction products and building elements — Classification using test data from reaction to fire tests* BS EN 13888 : 2009 *Grouts for tiles — Requirements, evaluation of conformity, classification and designation*

BS EN 15026 : 2007 *Hygrothermal performance of building components and building elements — Assessment of moisture transfer by numerical simulation*

BS EN ISO 6946 : 2007 *Building components and building elements — Thermal resistance and thermal transmittance — Calculation method*

BS EN ISO 10545-12 : 1997 *Ceramic tiles — Determination of frost resistance*

BRE Report (BR 135 : 2003) *Fire Performance of External Insulation For Walls of Multistorey Buildings*

BRE Report (BR 262 : 2002) *Thermal insulation: avoiding risks*

BRE Report (BR 443 : 2006) *Conventions for U-value calculations*

Digest 369 : 1992 *Interstitial condensation and fabric degradation*

BRE Digest 465 : 2002 *U-values for light steel-frame construction*

DD CEN/TS 772-22 : 2006 *Methods of test for masonry units — Determination of freeze/thaw resistance of clay masonry units*

ETAG 004 : 2013 *Guideline for European Technical Approval of External Thermal Insulation Composite Systems with Rendering*

SCI Publication P343 *Insulated Render System Used With Light Steel Framing (Steel Construction Institute, 2006)*

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

Conditions of Certificate

Conditions

1. This Certificate:

- relates only to the product 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.

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.

3 This Certificate will be displayed on the BBA website, and the Certificate Holder is entitled to use the Certificate and Certificate logo, provided that the product 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.

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

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

6. Any information relating to the manufacture, supply, installation, use, maintenance and removal of this product which is contained or referred to in this Certificate is the minimum required to be met when the product 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.

British Board of Agrément
1st Floor, Building 3, Hatters Lane
Croxley Park, Watford
Herts WD18 8YG
tel: 01923 665300
clientservices@bbacerts.co.uk
www.bbacerts.co.uk