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Agrément Certificate
14/5137
Product Sheet 1

WETHERBY EXTERNAL WALL INSULATION SYSTEMS

EPSIBRICK 7 EXTERNAL WALL INSULATION SYSTEM

This Agrément Certificate Product Sheet(1) relates to the Epsibrick 7 External Wall Insulation System, comprising enhanced expanded polystyrene insulation (EPS), mechanically fixed, with supplementary adhesive where required, a reinforced basecoat and a clay brick-slip finish. The system is suitable for use with height restrictions on the outside of external masonry 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 has sufficient resistance to impact damage (see section 7).

Behaviour in relation to fire — the system can have a B-s1, d0 reaction to fire classification in accordance with BS EN 13501-1 : 2018 and its use is restricted (see section 8).

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

Durability — when installed and maintained in accordance with the Certificate holder's recommendations and the terms of this Certificate, the system 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

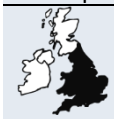
Date of Second issue: 6 October 2021

Originally certificated on 8 July 2014

Hardy Giesler
Chief Executive Officer

Regulations

In the opinion of the BBA, the Epsibrick 7 External Wall Insulation System, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements of the following Building Regulations (the presence of a UK map indicates that the subject is related to the Building Regulations in the region or regions of the UK depicted):



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

Requirement:	**A1**	**Loading**
Comment:		The system can sustain and transmit wind loads to the substrate wall. See sections 7.1 to 7.13 of this Certificate.
Requirement:	**B4(1)**	**External fire spread**
Comment:		The system is restricted by this Requirement. See sections 8.1 to 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 can contribute to minimising the risk of interstitial and surface condensation. See sections 11.2 and 11.4 of this Certificate.
Requirement:	**L1(a)(i)**	**Conservation of fuel and power**
Comment:		The system can contribute to satisfying this Requirement. See sections 6.1 and 6.2 of this Certificate.
Regulation:	**7(1)**	**Materials and workmanship**
Comment:		The system is acceptable. See section 13.1 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 to 8.4 of this Certificate.
Regulation:	**26**	**CO_2 emission rate for new buildings**
Regulation:	**26A**	**Fabric energy efficiency rates for new dwellings (applicable to England only)**
Regulation:	**26A**	**Primary energy consumption rates for 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. See sections 6.1 and 6.2 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 and 13.1 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 substrate wall. See sections 7.1 to 7.13 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[(1)] and 2.6.6[(2)]. See sections 8.1 to 8.3, 8.5 and 8.6 of this Certificate.
Standard:	2.7	Spread on external walls
Comment:		The system can satisfy this Standard, with reference to clause 2.7.1[(1)(2)]. See sections 8.1 to 8.3, 8.5 and 8.6 of this Certificate.

Standard:	3.10	Precipitation The system will contribute to satisfying this Standard, with reference to clauses 3.10.1[(1)(2)] and 3.10.2[(1)(2)]. See section 10.1 of this Certificate.
Standard: Comment:	3.15	Condensation The system can contribute to satisfying this Standard, with reference to clauses 3.15.1[(1)(2)], 3.15.4[(1)(2)] and 3.15.5[(1)(2)]. See sections 11.3 and 11.4 of this Certificate.
Standard: Standard: Comment:	6.1(b) 6.2	Carbon dioxide emissions Buildings insulation envelope 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[(1)(2)], 6.1.4[(2)], 6.1.6[(1)], 6.1.8[(2)], 6.1.10[(2)], 6.2.1[(1)(2)], 6.2.3[(1)], 6.2.4[(1)], 6.2.5[(1)(2)], 6.2.6[(2)], 6.2.7[(2)], 6.2.11[(1)] and 6.2.13[(2)]. See sections 6.1 and 6.2 of this Certificate.
Standard: Comment:	7.1(a)(b)	Statement of sustainability The system can contribute to satisfying the relevant requirements of Regulation 9, Standards 1 to 6, and therefore will contribute to a construction meeting the bronze level of sustainability as defined in this Standard. In addition, the system can contribute to a construction meeting a higher level of sustainability as defined in this Standard with reference to clauses 7.1.4[(1)(2)] [Aspect 1[(1)(2)] and 2[(1)]], 7.1.6[(1)(2)] [Aspect 1[(1)(2)] and 2[(1)]] and 7.1.7[(1)(2)] [Aspect 1[(1)(2)]]. See section 6.1 of this Certificate.
Regulation: Comment	**12**	**Building standards applicable to conversions** All comments given for the system 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 (as amended)

Regulation: Comment:	**23**	**Fitness of materials and workmanship** The system is acceptable. See section 13.1 and the *Installation* part of this Certificate.
Regulation: Comment:	**28(b)**	**Resistance to moisture and weather** The system provides a degree of protection against rain ingress. See section 10.1 of this Certificate.
Regulation: Comment:	**29**	**Condensation** Walls insulated with the system will satisfy the requirements of this Regulation. See section 11.4 of this Certificate.
Regulation: Comment:	**30**	**Stability** The system can sustain and transmit wind loads to the substrate wall. See sections 7.1 to 7.13 of this Certificate.
Regulation: Comment:	**36(a)**	**External fire spread** The system is restricted by this Regulation. See sections 8.1 to 8.4 of this Certificate.
Regulation: **Regulation:** Comment:	**39(a)(i)** **40**	**Conservation measures** **Target carbon dioxide emission rate** The system can contribute to satisfying these Regulations. See sections 6.1 and 6.2 of this Certificate.

Construction (Design and Management) Regulations 2015
Construction (Design and Management) Regulations (Northern Ireland) 2016

Information in this Certificate may assist the client, designer (including Principal Designer) and contractor (including Principal Contractor) to address their obligations under these Regulations.

See sections: 3 *Delivery and site handling* (3.1 and 3.3) and 12 *Maintenance and repair* of this Certificate.

Additional Information

NHBC Standards 2021

In the opinion of the BBA, the Epsibrick 7 External Wall Insulation System, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements in relation to NHBC Standards(1) 2021, Part 6 *Superstructure (excluding roofs)*, Chapter 6.9 *Curtain Walling and cladding*.

(1) There is a general requirement in NHBC Standards Chapter 6.9 for fire-retardant-treated EPS insulation to be used with this system in accordance with BS EN 13163 : 2012.

Technical Specification

1 Description

1.1 The Epsibrick 7 External Wall Insulation System consists of grey enhanced expanded polystyrene (EPS) insulation boards, mechanically fixed to the substrate wall, with supplementary adhesive where required (with a minimum of 40% coverage of adhesive), with reinforced glass fibre mesh embedded in the basecoat, and clay brick-slip finish (see Table 1).

Table 1 Epsibrick 7 External Wall Insulation System

Components	
Supplementary adhesive	Wetherby Bedding Adhesive
Insulation	Wetherby Epsitherm 70E and 90E
Basecoat	Wetherby Scrim Adhesive Basecoat
Reinforcement	Reinforcement mesh
Finish	Wetherby Brick-Slip Adhesive + Wetherby Brick-Slips
Mortar	Wetherby Pointing Mortar

1.2 The insulation boards are mechanically fixed, with supplementary adhesive(1) where required, to the external surface of the substrate. Five mechanical fixings are installed per board (seven per square metre), then basecoat render is trowel-applied to the board face to a thickness of 4 to 6 mm and the reinforcement mesh embedded immediately. One mechanical fixing per square metre is fixed through the mesh. The system is left to cure before application of the brick-slip finish. The brick-slip adhesive is applied directly to the basecoat with a notched trowel, or to the back of each slip which is then installed onto the basecoat (see Figure 1). Once the adhesive is dry, pointing mortar is applied.

(1) Supplementary adhesive is not required for the allowable dry fix configurations.

1.3 The system combinations, by method of fixings, covered under this Certificate are:

- All system combinations that are mechanically fixed using supplementary adhesive (minimum of 40%)
- A dry-fixed system, the maximum permissible insulation thicknesses for which is 110 mm for Epsitherm 70E insulation and 140 mm for Epsitherm 90E insulation, along with the clay brick slip finish.

1.4 The system comprises the following components:

Adhesive (supplementary)

- Wetherby Bedding Adhesive — polymer-modified cementitious basecoat, comprising limestone sand, cement and additives. Supplied as a powder requiring the addition of 5 to 6 litres of clean water per 25 kg bag, applied to a thickness of 4 to 6 mm with a coverage of 7.2 to 10.8 kg·m^{-2}.

Insulation[(1)(2)]

- Wetherby Epsitherm 70E and 90E – enhanced (grey) expanded polystyrene (EPS) 70 and 90 insulation boards — 1200 x 600 mm in a range of thicknesses between 90[(2)] and 240 mm, with a nominal density of 15 kg·m^{-3} for Epsitherm 70E, and 19 kg·m^{-3} for Epsitherm 90E, a minimum tensile strength (perpendicular to the faces) of ≥ 100 kN·m^{-2} and a minimum compressive strength of 70 kN·m^{-2} and 90 kN·m^{-2} respectively. The boards are manufactured to comply with the requirements for EPS 70 and 90, Class E material to BS EN 13163 : 2012.

(1) For declared thermal conductivity values (λ_D) see Table 3.
(2) For details of insulation less than 90 mm thick, the advice of the Certificate holder should be sought.

Mechanical fixings

mechanical fixings[(1)(2)(3)(4)] — fixing anchors with various length to suit the substrate and the insulation thickness, approved and supplied by the Certificate holder, and selected from:

- Ejotherm NT U — polyethylene (HDPE) anchor sleeve with stainless steel or galvanized steel pin
- Termoz 8U — polyamide with steel, stainless steel or galvanized pin
- Termoz 8UZ — polypropylene with glass fibre-reinforced polyamide pin
- Termoz CN8 — polypropylene with polyamide, steel, stainless steel or galvanized steel pin
- Koelner TFIX-8S — polypropylene sleeve with electro-galvanized-steel pins
- Koelner TFIX-8ST — polypropylene sleeve with steel, electro-galvanized-steel screw and polyamide GF expansion screw head
- Koelner TFIX-8M — polypropylene sleeve with electro-galvanized-steel pin
- Ejotherm NK U — polyethylene (HDPE) with stainless steel or galvanized steel pin
- Ejotherm NTK U — polyethylene (HDPE) with glass fibre-reinforced polyamide pin
- Bravoll PTH-S — copolymer polypropylene with stainless steel or electro-galvanized pin
- Spit ISO 10[(2)] — polypropylene plastic expansion sleeve with a polypropylene or polyamide 6 plastic nail.

(1) Other fixings may be used provided it can be demonstrated that they have equal (or higher) pull-out strength, plate diameter, plate stiffness and load resistance characteristics to the fixing used for the relevant test (see section 7 and Table 5)
(2) Only metal fixing pins/screws are allowed for dry fix systems (plastic pins are not allowed)
(3) Fixings must be surface mounted only
(4) Fixings cannot be used for dry fix applications.

Basecoat

- Wetherby Scrim Adhesive Basecoat — a polymer-modified cementitious powder, comprising limestone sand, cement and additives. Supplied as a powder requiring 5 to 6 litres of clean water per 25 kg bag, applied to a thickness of 4 to 6 mm with a coverage of 7.2 to 10.8 kg·m^{-2}.

Reinforcement

- Reinforcement mesh – premium alkali resistant scrim cloth reinforcing mesh, a 1 m thick mesh (grid size 3.5 x 3.8 mm) of multi-strength alkali-resistant glass fibres, with a polymer coating, organic content of 20%, PCS value of 5.80 MJ·kg^{-1} and a nominal weight of 160 g·m^{-2}. The mesh is embedded into the basecoat render.

Brick-slip adhesive

- Wetherby Brick-Slip Adhesive — cementitious-based mortar conforming to BS EN 12004 : 2007, cement conforming to BS EN 197-1 : 2011 and additives. Supplied as a grey powder requiring 4 to 5 litres of clean water per 25 kg bag, applied to a thickness of 4 to 6 mm with a coverage of 1.8 kg·m^{-2}.

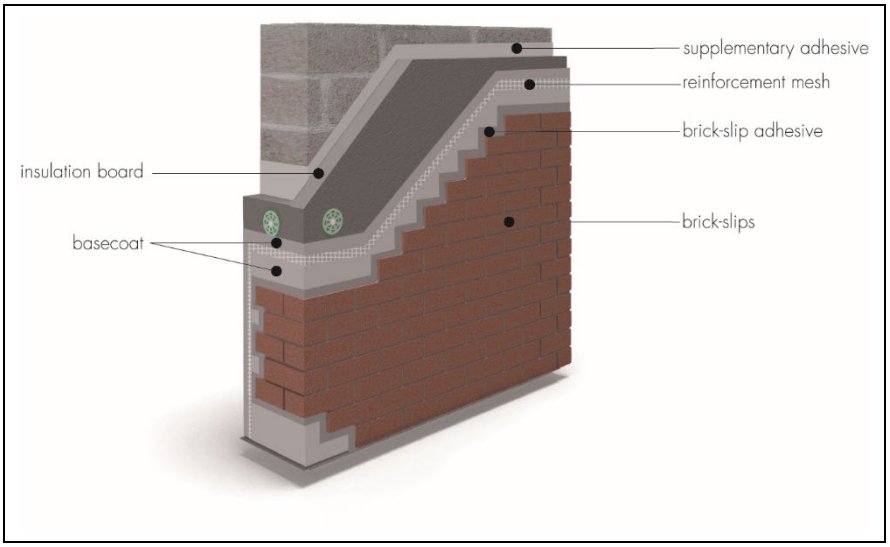
Brick-slip finishes

- Wetherby Brick-Slips — hand made, extruded or cut brick-slips, available in sizes 215 x 65 x 7 to 15 mm (average), conforming to BS EN 771-1 : 2011 and available in a range of colours
- Wetherby Brick-Slip Pistols — 215/100 x 65 mm x 7 to 15 mm clay brick-slip pistol corners conforming to BS EN 14411 : 2016 and available in a range of colours.

Pointing mortar

- Wetherby Pointing Mortar — pre-coloured, cementitious pointing mortar, in accordance with BS EN 13888 : 2009 and conforming to BS EN 13139 : 2013. Supplied as a grey powder requiring 5 to 6 litres of clean water per 25 kg bag, with a coverage of 2.5 to 2.8 kg·m^{-2}.

Figure 1 The Epsibrick 7 External Wall Insulation System



1.5 Ancillary materials used with the system are:

- a range of aluminium, PVC-U or stainless-steel profiles comprising:

- base profile
- edge profile
- corner profile with optional PVC-U nosing
- render stop profile.

1.6 Ancillary materials also used with the system, but which are outside the scope of this Certificate, are:

- profile connectors and fixings
- silicone-based joint sealant
- fungicidal wash
- PU foam filler
- sealing tape.

2 Manufacture

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

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

- agreed with the manufacturer the quality control procedures and product testing to be undertaken
- assessed and agreed the quality control operated over batches of incoming materials
- monitored the production process and verified that it is in accordance with the documented process

- evaluated the process for management of nonconformities
- checked that equipment has been properly tested and calibrated
- undertaken to carry out the above measures on a regular basis through a surveillance process, to verify that the specifications and quality control operated by the manufacturer are being maintained.

2.3 The management system of Wetherby Building Systems Limited has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2015, BS EN ISO 14001 : 2015, and BS ISO 45001 : 2018 by Alcumus ISOQAR (Certificates 16512-QMS-001, 16512-EMS-001, and 16512-OHS-001 respectively).

3 Delivery and site handling

3.1 The system components are delivered to site in the packaging and quantities listed in Table 2. Each package carries the product identification and batch number.

Table 2 Component supply details

Component	Quantity and packaging
Insulation boards	Polythene shrink-wrapped sealed packs
Wetherby Bedding Adhesive	25 kg bags
Wetherby Scrim Adhesive Basecoat	25 kg bags
Reinforcement mesh	50 x 1 m rolls
Wetherby Brick-slip adhesive	25 kg bags
Wetherby Pointing mortar	25 kg bags
Wetherby Brick-Slips and Brick-Slip Pistols	boxed by manufacturer
Mechanical fixings	boxed by manufacturer

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

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

3.4 The powder components should be stored in dry conditions, off the ground and protected from frost at all times. Bags of unopened render will have a shelf-life of 12 months when stored correctly.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on the Epsibrick 7 External Wall Insulation System.

Design Considerations

4 General

4.1 The Epsibrick 7 External Wall Insulation System, when installed in accordance with this Certificate, is satisfactory for use in reducing the thermal transmittance (U value) of external masonry or concrete 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 (eg the insulation must be protected by an overhang, and window sills should be designed and installed so as to direct water away from the building).

4.2 For improved thermal/carbon-emissions performance of the structure, the designer should consider additional/alternative fabric and/or services measures.

4.3 The system is for application to the outside of external walls of masonry, normal weight concrete, lightweight concrete, autoclaved concrete and no-fines concrete construction, on new or existing domestic and non-domestic buildings (with or without existing render) with height restrictions (see section 8 of this Certificate). Prior to the installation of the system, wall surfaces should comply with section 14 of this Certificate.

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

- BS EN 1992-1-1 : 2004 and its UK National Annex
- BS EN 1996-1-1 : 2005 and its UK National Annex
- BS EN 1996-2 : 2006 and its UK National Annex
- BS 8000-0 : 2014
- BS 8000-2.2 : 1990
- BS 8000-3 : 2001.

4.5 New walls not subject to regulatory requirements should also be built in accordance with the Standards identified in section 4.4 of this Certificate.

4.6 Movement joints should be incorporated into the system in line with existing movement joints in the building structure and in accordance with the Certificate holder's recommendations for the specific installation.

4.7 The system will improve the weather resistance of a wall and provide a decorative finish. However, for existing buildings, it should only be installed where there are no signs of dampness on the inner surface of the wall other than those caused solely by condensation.

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

4.9 The fixing of sanitary pipework, plumbing, rainwater goods, satellite dishes, clothes lines, hanging baskets and similar items to the system is outside the scope of this Certificate (see section 4.10).

4.10 External pipework and ducts should be removed before installation, and alterations made to underground drainage to accommodate repositioning of the pipework to the finished face of the system. The Certificate holder may advise on suitable fixing methods, but these are outside the scope of this Certificate.

4.11 The designer should select a construction appropriate to the local wind-driven rain index, paying due regard to the design detailing, workmanship and materials to be used.

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

5 Practicability of installation

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

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

6 Thermal performance

6.1 Calculations of thermal transmittance (U value) should be carried out in accordance with BS EN ISO 6946 : 2017 and BRE Report BR 443 : 2006, using the declared thermal conductivity (λ_D) of the insulations given in Table 3 of this Certificate.

6.2 The U value of a completed wall will depend on the selected insulation type and thickness, fixing method and type and number of fixings, the insulating value of the substrate masonry and its internal finish. Calculated U values for sample constructions in accordance with the national Building Regulations are given in Table 4, and are based on the thermal conductivities given in Table 3.

Table 3 Declared thermal conductivities (λ_D) values and available thicknesses

Insulation types	Insulation board thickness range (mm)	Thermal conductivity ($W \cdot m^{-1} \cdot K^{-1}$)
Wetherby Epsitherm EPS 70E	90 — 240	0.032
Wetherby Epsitherm EPS 90E		0.030

Table 4 Insulation thickness required to achieve design U values[1][2][3] given in the national Building Regulations

U value[4] ($W \cdot m^{-2} \cdot K^{-1}$)	Thickness of insulation[3] (mm)			
	215 mm Brickwork, λ = 0.56 $W \cdot m^{-1} \cdot K^{-1}$		200 mm Dense blockwork, λ = 1.75 $W \cdot m^{-1} \cdot K^{-1}$	
	Epsitherm EPS 70E	Epsitherm EPS 90E	Epsitherm EPS 70E	Epsitherm EPS 90E
0.18	190	180	200	190
0.19	180	170	190	170
0.25	130	120	140	130
0.26	120	110	130	120
0.28	110	100	120	110
0.30	100	100	110	100
0.35	80	80	90	90

(1) Wall construction inclusive of 13 mm plaster (λ = 0.57 $W \cdot m^{-1} \cdot K^{-1}$), 15 mm brick-slip (render) (λ = 0.77 $W \cdot m^{-1} \cdot K^{-1}$), brickwork (protected) with 17.1% mortar or dense blockwork with 6.7% mortar (λ = 0.88 $W \cdot m^{-1} \cdot K^{-1}$). Declared thermal conductivity of insulation values (λ_D) is as shown in Table 3

(2) Calculations based on a mechanical system that included 7 galvanized steel fixings per square metre, with 8 mm diameter sleeve and with a point thermal transmittance (X_p) of 0.004 $W \cdot K^{-1}$ per steel pin. Use of other types of fixings should be calculated in accordance with BS EN ISO 6946 : 2017

(3) Based upon incremental insulation thickness of 10 mm

(4) When applying the maximum available insulation thickness, these walls can achieve U values from 0.14 to 0.15 $W \cdot m^{-2} \cdot K^{-1}$ using Epsitherm EPS 90E and 0.15 to 0.16 $W \cdot m^{-2} \cdot K^{-1}$ using Epsitherm EPS 70E depending on insulation type and wall type.

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

7 Strength and stability

General

7.1 The Certificate holder is ultimately responsible for the design of the system and it is the responsibility of the company installing the system to accurately follow the installation instructions (see also section 5 of this Certificate). The Certificate holder must also verify that a suitably experienced and qualified individual (with adequate professional indemnity) establishes that:

- the wind loads on the different zones of the building's elevation for the specific geographical location have been calculated correctly (see section 7.3)
- the system can adequately resist and safely transfer the calculated loads, accounting for all possible failure modes, to the substrate wall and supporting structure (see sections 7.3 to 7.6).

7.2 The substrate and supporting structure must be capable of transferring all additional loading due to the installation of the system to the ground in a satisfactory manner. The adequacy of the substrate and supporting structure must be verified by the person or party responsible for the global stability of the building to which the system is applied. Any defects should be made good prior to the system being installed.

7.3 The wind loads on the walls should be calculated, taking into account all relevant factors such as location and topography, in accordance with BS EN 1991-1-4 : 2005 and its UK National Annex. All of the factors affecting wind load on each elevation and specific zones of the building must be considered. In accordance with BS EN 1990 : 2002 and its UK National Annex, a partial factor of 1.5 must be applied to the calculated characteristic wind pressure values to establish the design wind load to be resisted by the system.

7.4 Installations correctly designed in accordance with this Certificate will safely accommodate the applied loads due to the self-weight of the system, wind and impact.

7.5 Positive wind load is transferred to the substrate wall directly via compression through the render and insulation system.

7.6 Negative wind load is transferred to the substrate wall via[1][2]:

- the bond between the insulation and render system (see section 7.7)
- the pull-out resistance of the fixing from the substrate wall (see section 7.8)
- the pull-through resistance of the fixing (see section 7.9).

(1) For mechanically fixed systems with supplementary adhesive, the contribution of the adhesive is not considered when calculating resistance to wind load

(2) Further guidance is available from BBA Guidance Note 1, available on the BBA website (www.bbacerts.co.uk).

7.7 The characteristic bond resistance between the insulation and render interface derived from test results was 80 $kN \cdot m^{-2}$. The design resistance of the bond between the insulation and render (N_{RD1}) should be taken as the characteristic bond resistance divided by a partial factor of 9.

7.8 Typical characteristic pull-out resistances for the fixings taken from the corresponding European Technical Assessment (ETA) are given in Table 5; the values are dependent on the fixing type and must be selected to suit the specific loads and substrate concerned. In situations where suitable data does not exist[1], the characteristic pull-out resistance must be established from site-specific pull-out tests conducted on the substrate of the building to ascertain the minimum resistance to pull-out failure of the fixings, and determined in accordance with the guidance given in EOTA TR051 : 2016 (minimum test characteristic value = 0.6 x mean of 5 lowest test results). To obtain the design pull-out resistance of the fixings (N_{RD2}), this characteristic pull-out resistance should then be divided by the partial factor given in Table 5.

(1) To qualify as suitable data, the age and condition of the substrate must be equivalent to that used to establish the values in the ETA.

Table 5 Fixings — typical characteristic pull-out resistances

Fixing type[1]	ETA number	Substrate	Drill diameter (mm)	Effective anchorage depth (mm)	Characteristic pull-out resistance (kN)[2]	Partial factor
Ejotherm NT U	05/0009	Concrete C12/15 Clay bricks	8	25	1.2 1.5	2
Fischer Termoz 8U	02/0019	Concrete C12/15 Clay bricks	8	70	1.5	2
Fischer Termoz 8UZ	02/0019	Concrete C12/15 Clay bricks	8	35	1.2 1.5	2
Fischer Termoz CN 8	09/0394	Concrete C12/15 Clay bricks	8	35	0.9	2
Koelner TFIX-8S	11/0144	Concrete C12/15 Clay bricks	8	25	1.2	2
Koelner TFIX-8ST	11/0144	Concrete C12/15 Clay bricks	8	25	1.2 1.5	2
Koelner TFIX-8M	07/0336	Concrete C12/15 Clay bricks	8	25	1.2	2
Ejotherm NK U	05/0009	Concrete C12/15 Clay bricks	8	25	1.2 1.5	2
Ejotherm NTK U	07/0026	Concrete C12/15 Clay bricks	8	40	0.6 0.9	2
Bravoll PTH-S	08/0267	Concrete C12/15 Clay bricks	8	25	0.9 1.5	2
Spit ISO 10	04/0076	Concrete C12/15 Clay bricks	10	30	0.2 0.3	2

(1) The minimum value for plate stiffness of fixings is 0.4 $kN \cdot m^{-2}$ and the load resistance is 1.6 kN relate to the Fischer Termoz CN 8 fixing, which achieved a design pull-through resistance value of 0.14 kN and which was used for the pull-through test

(2) Values are determined in accordance with EAD 330196-00-0604 : 2016 and are dependent on the substrate. The Use Categories are defined in the corresponding ETA.

7.9 The characteristic pull-through resistance of the fixings was determined from tests using a 60 mm diameter fixing plate and minimum insulation thickness of 90 mm. The design resistance per fixing (N_{RD3}) is obtained by applying an appropriate partial factor as shown in Table 6.

Table 6 Design pull-through resistances

Factor (unit)	**Pull-through data for Wetherby Epsitherm 70E and 90E**
Tensile resistance of the insulation ($kN.m^{-2}$)	≥ 150
Fixing type(1)	Fischer Termoz CN 8
Fixing plate diameter (mm)	60
Insulation thickness (mm)	≥ 90
Characteristic pull-through resistance(2) per fixing (kN)	0.51
Partial factor(3)	2.5
Design pull-through resistance per fixing (N_{RD3}) (kN)	0.204
Design pull-through resistance per board (kN) (based on minimum number of fixings)(4)	1.02
Design pull-through resistance per board (kN) (based on maximum number of fixings)(5)	2.448

(1) See Table 5 for typical characteristic pull-out resistance of the fixings
(2) Characteristic pull-through resistance of insulation over the head of the fixing, in accordance with BS EN 1990 : 2002, Annex D7.2 and its UK National Annex
(3) The partial factor is based on the assumption that all insulation boards are quality controlled and tested to establish tensile strength perpendicular to the face of the board
(4) The minimum design pull through resistance per board is based on a minimum of 5 fixings per board (1200 x 600 mm), which equates to approximately 7 fixings per m^2. The design resistance for the minimum number of fixings is based on the fixing pattern provided in Figure 4 of this Certificate and minimum insulation thickness specified in this Table
(5) The maximum design pull-through resistance per board is based on a maximum of 12 fixings per board (1200 x 600 mm), which equates to approximately 12 fixings per m^2. The design resistance for the maximum number of fixings is only applicable to the minimum insulation thickness tested and as specified in this Table. The fixing pattern, insulation thickness and interaction of the fixings should be considered when calculating the design resistance per board.

7.10 The number and spacing of the fixings should be determined by the Certificate holder. The number of fixings must not be less than the minimum specified for the system and the fixings should be symmetrically positioned and evenly distributed about the centre of the board both vertically and horizontally, except at openings and building corners.

7.11 Dry fix installations (that is, with no supplementary adhesive) correctly designed in accordance with this Certificate) will safely accommodate the applied loads due to the self-weight of the system, wind and impact when using insulation with a maximum thickness as per section 1.3 of the Certificate and the finish and fixings as per section 1.4 of the Certificate. Seals and interfaces with the render system should be designed and detailed to accommodate the anticipated movement.

7.12 The data obtained from sections 7.7 to 7.9 must be assessed against the design wind load and the following expression must be satisfied:

For safe design:

$Rd \geq W_e$
$Rd_{b.ins/rend} = A_r * N_{RD1}$
$Rd_{pull\text{-}out} = n * N_{RD2}$
$Rd_{pull\text{-}through} = (N_{RD3panel} * n_{panel}) + (N_{RD3joint} * n_{joint})/A_{board}$

Where:

Rd is the design ultimate resistance ($kN \cdot m^{-2}$) taken as the minimum of $Rd_{b.ins/rend}$, $Rd_{pull\text{-}out}$ and $Rd_{pull\text{-}through}$
W_e is the maximum design wind load ($kN \cdot m^{-2}$)
$Rd_{b.ins/rend}$ is the design bond resistance between the insulation and render ($kN \cdot m^{-2}$)
$Rd_{pull\text{-}out}$ is the design pull-out resistance of the insulation fixings per metre square ($kN \cdot m^{-2}$)
$Rd_{pull\text{-}through}$ is the design pull-through resistance of the insulation fixings per metre square ($kN \cdot m^{-2}$)
A_r is the reinforced basecoat bond area (based on % area covered)
N_{RD1} is the design adhesive bond resistance between the insulation and render, based on test ($kN \cdot m^{-2}$)

n	is the number of fixing fixings per m^2
N_{RD2}	is the design pull-out resistance per fixing based on test (kN)
$N_{RD3panel}$	is the design pull-through resistance per fixing not placed at the panel joint, based on test (kN)
$N_{RD3joint}$	is the design pull-through resistance per fixing placed at the panel joint, based on test (kN)
n_{panel}	is the number of internal fixings in a panel
n_{joint}	is the number of joint anchors in a panel
A_{board}	is the area of the board (m^2).

7.13 The insulation system is mechanically fixed to the substrate wall with a minimum of five fixings per board or approximately seven fixings per square metre, as per the fixing pattern shown in Figure 4, and in conjunction with a minimum 40% coverage of supplementary adhesive where required (see section 16 of this Certificate). Additional fixings may be required, depending on the results of the calculations detailed above for the specific site.

Impact resistance

7.14 Hard body impact tests were carried out in accordance with ETAG 004 : 2013. The system is suitable for use in all Use Categories.

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

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

8 Behaviour in relation to fire

8.1 The system can have a classification of B-s1, d0[(1)] in accordance with BS EN 13501-1 : 2018.

(1) Warringtonfire test report WF 420574.

8.2 The classification applies to the full range of thicknesses covered by this Certificate and the brick slip colour Blue. The classification of other colours should be confirmed by reference to the requirements of the documents supporting the national Building Regulations.

8.3 The EPS Insulation materials in isolation have an E classification in relation to fire in accordance with BS EN 13501-1 : 2018.

8.4 For all buildings in England, Wales and Northern Ireland, the system is suitable for use on or at any distance from the boundary. The system is restricted for use in buildings up to 18 m in height.

8.5 In Scotland, the system 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.

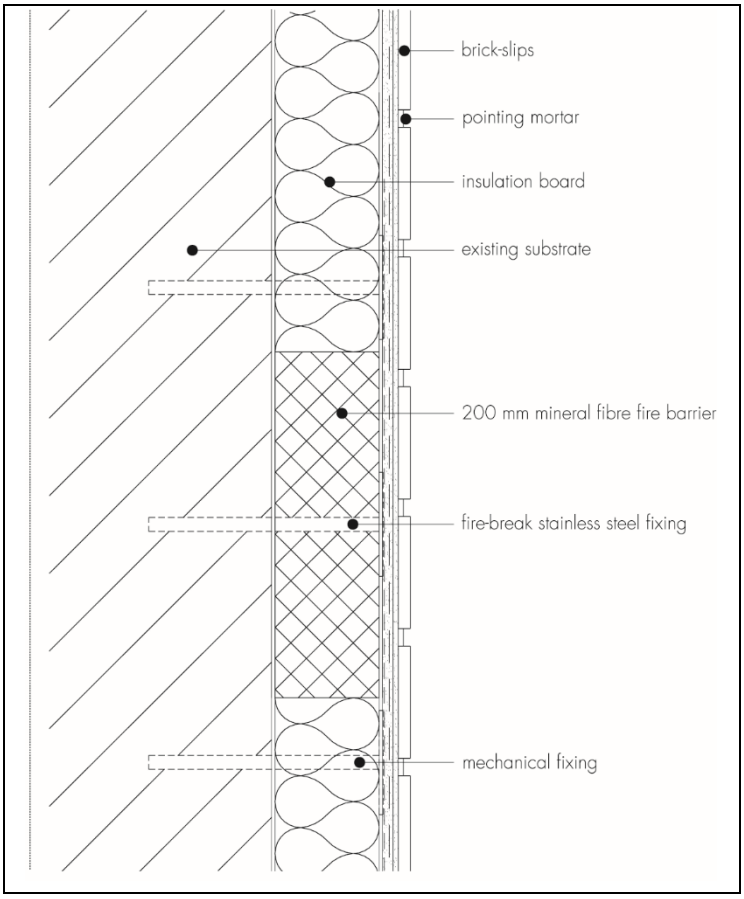
8.6 In Scotland, the system should not be used on any building with a storey more than 11 m above the ground, or on any entertainment or assembly building with a total storey area more than 500 m^2, or on any hospital or residential care building with a total storey area more than 200 m^2.

8.7 For application to second storey floors 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 (see Figure 2).

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

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

Figure 2 Fire barrier details



9 Proximity of flues and appliances

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

10 Water resistance

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

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

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

10.4 At the top of walls, the system should be protected by an adequate coping, overhang or other detail designed for use with this type of system (see section 16).

11 Condensation

11.1 Designers must ensure that an appropriate condensation risk analysis has been carried out for all parts of a construction, including at junctions, openings and penetrations at junctions between the insulation system and windows, to minimise the risk of condensation. The recommendations of 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 $W \cdot m^{-2} \cdot K^{-1}$ at any point, and the junctions with other elements and openings comply with section 6.3 of this Certificate.

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

11.5 The water vapour resistance (μ) factor for the insulation board, and equivalent air layer thickness (S_d) for the brick-slips, are shown in Table 7.

Table 7 Water vapour resistance factor and equivalent air layer thickness

Description	S_d (m)	μ
Wetherby Epsitherm 70E	—	20 to 40(1)
Wetherby Epsitherm 90E	—	30 to 70(1)
Basecoat + topcoat and finishes below:		
Wetherby Scrim Adhesive Basecoat + Wetherby Brick-Slip Adhesive + Brick-Slip + Pointing Mortar	0.65(2)	—

(1) The water vapour resistance factor (μ) is taken from BS EN ISO 10456 : 2007, Table 4

(2) The values are obtained from tests, including those on the basecoat, mesh, brick-slip adhesive, brick-slips and pointing mortar.

12 Maintenance and repair

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

- visual inspection of the render for signs of damage. Cracks in the render exceeding 0.2 mm must be repaired
- examination of the sealant around openings and service entry points
- visual inspection of architectural details designed to shed water to confirm that they are performing properly
- visual inspection to ensure that water is not leaking from external downpipes or gutters; such leakage could penetrate the rendering
- necessary repairs effected immediately and the sealant joints at window and door frames replaced at regular intervals
- maintenance schedules, which should include the replacement and resealing of joints (for example, between the insulation systems and window and door frame).

12.2 Damaged areas must be repaired using the appropriate components and the procedures detailed in the Certificate holder's installation instructions and in accordance with BS EN 13914-1 : 2016.

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 of this Certificate.

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

Installation

14 Site survey and preliminary work

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

- the position of beads
- detailing around windows, doors and at eaves
- damp-proof course (dpc) level
- exact position of expansion joints, if required
- additional corner mesh and reinforcement, where required
- areas where flexible sealants must be used
- any alterations to external plumbing
- the position of fire barriers.

14.2 The survey should include tests conducted on the walls of the building by the Certificate holder or their approved installers to determine the pull-out resistance of the proposed mechanical fixings. An assessment is carried out and recommendation made on the type and number of fixings required to withstand the building's expected wind loading based on calculations using the test data and pull-out resistance (see section 7). The advice of the Certificate holder should be sought to ensure the proposed bonding pattern (supplementary adhesive) is sufficient.

14.3 All modifications, such as provision for fire barriers (see section 8) and necessary repairs to the building structure, must be completed before installation of the system commences.

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

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

14.6 On existing buildings, purpose-made window sills must be fitted to extend beyond the finished face of the system. New buildings should incorporate suitably deep sills (see Figure 5).

14.7 In new buildings, internal wet work (eg screed or plastering) should be completed and allowed to dry prior to the application of the system.

14.8 All modifications and necessary repairs to the building structure should be completed before installation commences.

14.9 In multi-storey buildings, at least one non-combustible type fixing per square metre is recommended, to provide the increased stability that may be required in a fire (see section 8.7).

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. Such an installer is a company:

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

16 Procedure

General

16.1 Installation of the system must be carried out in accordance with the Certificate holder's installation instructions.

16.2 Weather conditions should be monitored to ensure correct application and curing conditions. Application of coating materials must not be carried out at temperatures below 5^{o}C or above 30^{o}C, or if exposure to frost is likely, and the coating must be protected from rapid drying. Installation should not take place during rainfall or if rain is anticipated. In addition, cementitious-based renders must not be applied if the temperature will fall below 0°C within 72 hours of completion.

16.3 One coat of fungicidal wash is applied by brush, roller or spray to the entire surface of the wall, where required.

16.4 The planarity of the substrate must be checked, and any protrusions exceeding 10 mm removed.

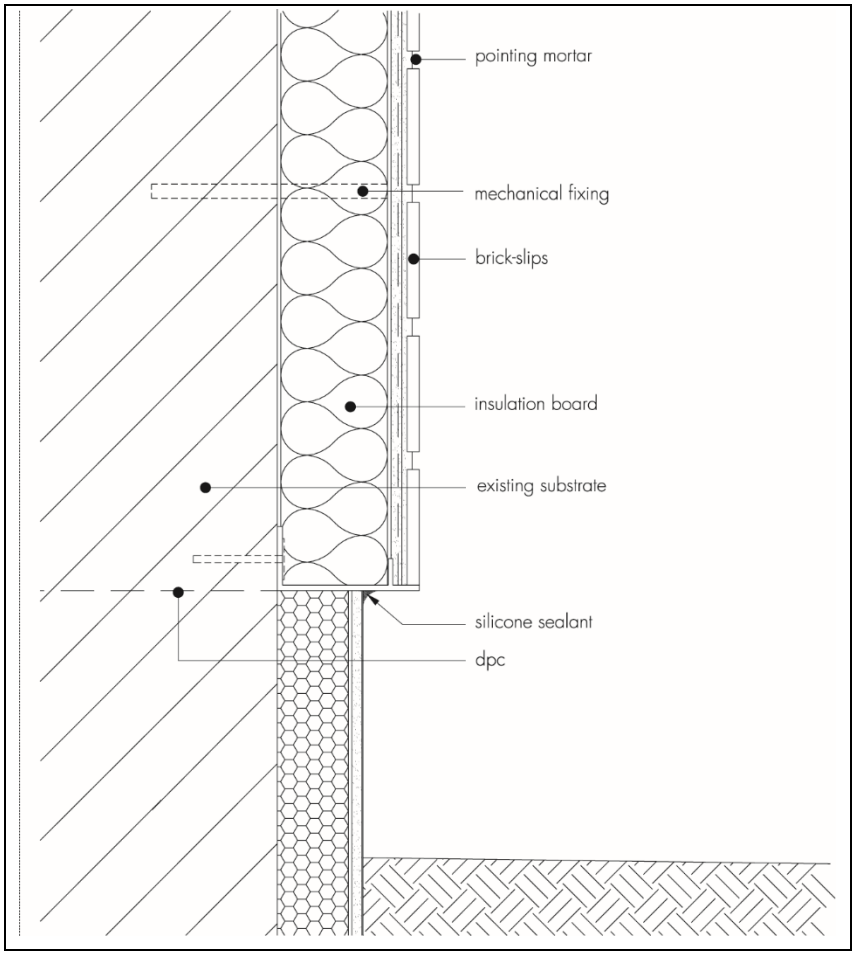
16.5 All rendering should be in accordance with the relevant recommendations of BS EN 13914-1 : 2016.

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

Positioning and securing insulation boards

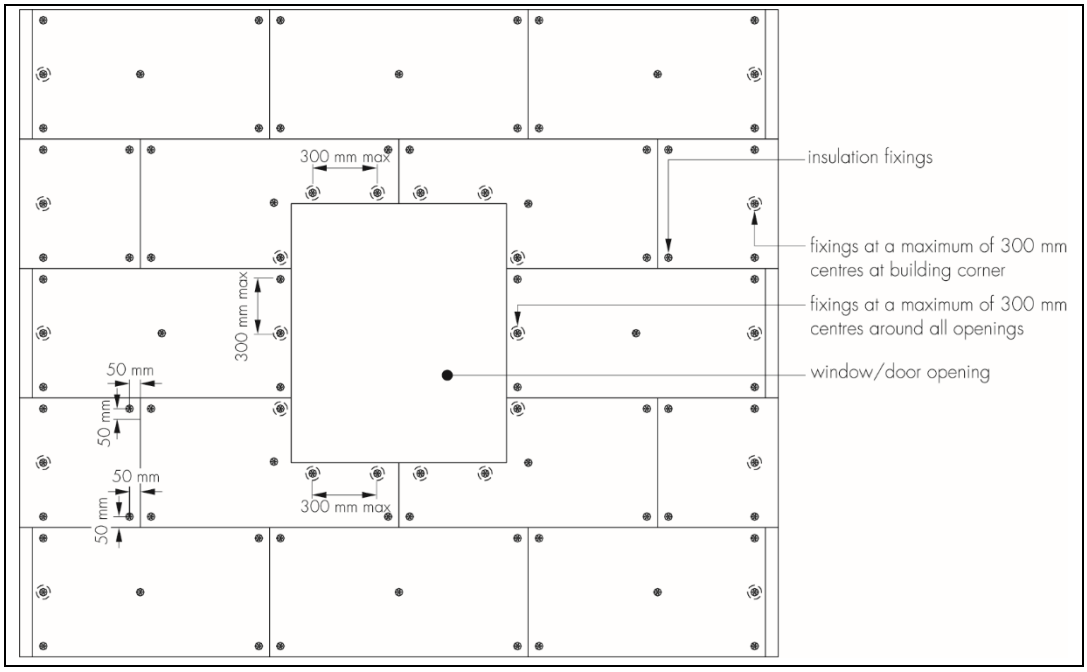
16.7 The base profile is secured to the external wall above the dpc using the approved profile fixings at approximately 300 mm centres (see Figure 3). Starter tracks connectors are inserted at all profile joints. Extension profiles are fixed to the front lip of the base rail or stop end channel where appropriate.

Figure 3 Typical section of base profile



16.8 The insulation boards should be bonded to the wall, where required, using Wetherby Bedding Adhesive as described in section 1.2. The adhesive is prepared by mixing each bag with clean water (see section 1.2) in a suitable container, using a paddle drill mixer. The supplementary adhesive must be applied to the back of the insulation boards by one of two methods, depending on whether the substrate is flat or undulating. For flat substrates, the adhesive can be applied with a 10 mm notched trowel to the full area of the back of the insulation board. For undulating substrates, a dot and dab method can be adopted. In this method, the edges of the insulation board must be coated with adhesive, and 3 large dabs of adhesive applied at even spacing to the centre of the board. The adhesive must cover at least 40% of the board.

Figure 4 Insulation boards fixing pattern

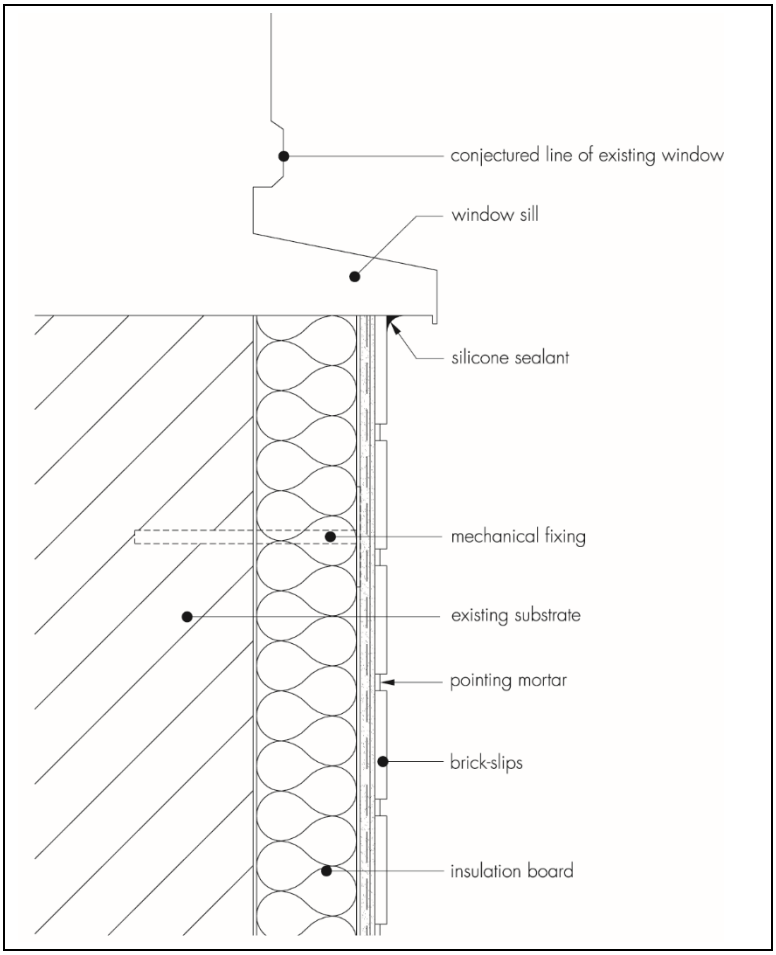


16.9 The first run of insulation boards is positioned on the base profile with the adhesive applied and pressed firmly against the wall, butted tightly together and aligned to achieve a level finish.

16.10 Insulation boards should be installed with joints staggered by at least 200 mm, including staggered joints at the building corners, from the base-profile upward (see Figure 4). Joints between boards greater than 2 mm should be filled with PU foam. Gaps greater than 10 mm should be closed by repositioning or, where appropriate, by cutting boards to fit. Any gaps, high spots or irregularities are removed by lightly planing with a rasp over the whole surface. Alignment should be checked as work proceeds.

16.11 Holes are drilled into the substrate wall to the required depth through the insulation at the corners of each board and at positions which would result in a minimum of five fixings per board or seven fixings per square metre. In addition, one mechanical fixing per square metre is fixed through the mesh (a 100 by 100 mm patch is placed over each fixing head of the fixings installed through the mesh), to further secure the insulation boards to the substrate. The fixing pattern is shown in Figure 4 for a board size of 1200 x 600 mm. Around openings, additional fixings should be used at 300 mm centres (see Figure 4). At corners, fixings should be positioned inwards by 75 mm, plus the thickness of the insulation. The mechanical fixings are inserted and tapped or screwed firmly into place, securing the insulation to the substrate.

Figure 5 Typical sill detail



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

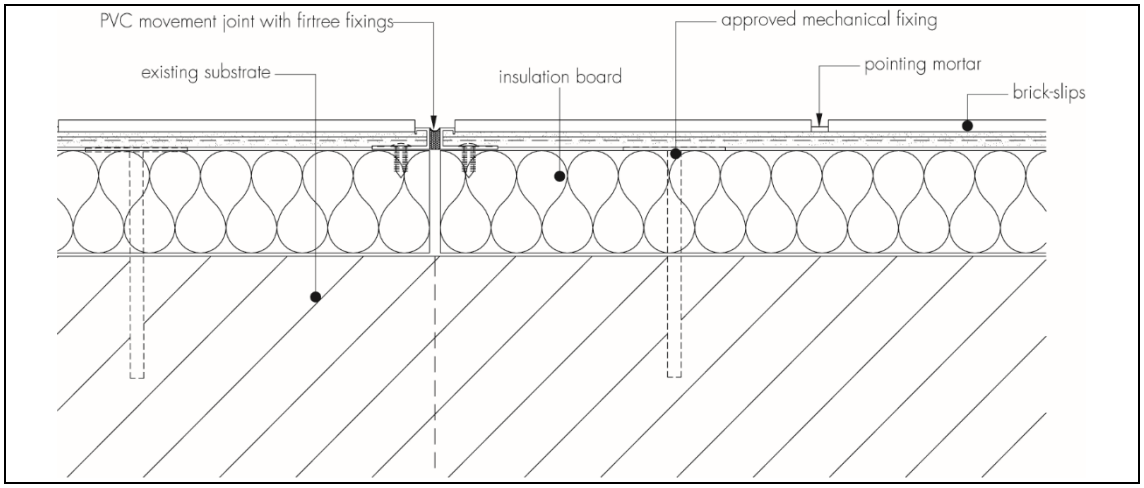
16.13 Window and door reveals should be insulated to minimise the effects of cold bridging. Where clearance is limited, strips of approved insulation should be installed to suit available margins and details. Installation continues until the whole wall is completely covered including, where appropriate, the building soffits and eaves.

16.14 At all locations where there is a risk of insulant exposure, eg window reveals or eaves, the system must be protected by such features as an adequate overhang or by purpose-made sub-sills, seals or flashing. All corners are fixed with mesh angles installed with adhesive mortar to building corners, door and window heads and jambs before applying basecoat to form the corners in accordance with the Certificate holder's instructions. Where appropriate, the PVC angle with drip mesh is installed to allow the rainwater to drain away.

Movement joints

16.15 Generally, movement joints are not required in the system but, if such a joint is already incorporated in the substrate, a movement joint must be provided in the insulation system (see Figure 6).

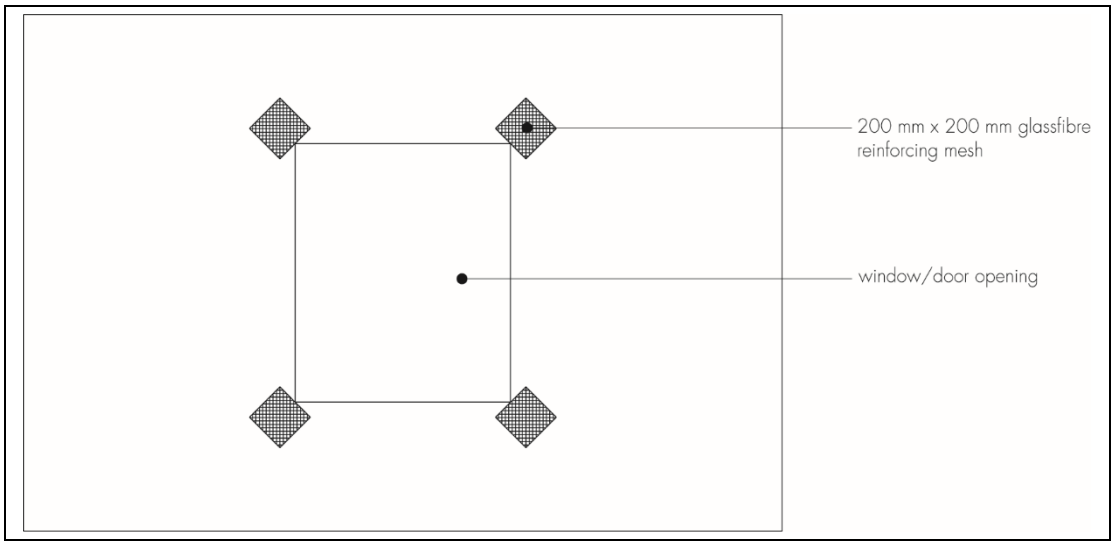
Figure 6 Movement joint detail



Application of basecoat and reinforcement mesh

16.16 The basecoat is prepared with the required amount of water (see section 1.2) and mixed with a paddle mixer until the desired consistency is achieved. The basecoat is applied either by spray equipment or stainless steel trowel to the surface of the dry insulation, to a minimum thickness of 4 to 6 mm. The mesh is applied and immediately bedded into the basecoat, with 100 mm minimum overlap at joints, and must be in the upper third of the basecoat render. Mechanical fixings are applied as described in section 16.11 of this Certificate. Additional pieces of reinforcing mesh (200 by 200 mm) are used diagonally at the corners of openings, as shown in Figure 7. Corner details are reinforced using the corner beads.

Figure 7 Additional reinforcement at openings



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

16.18 Surface-mounted PVC render beads are fixed with fir-tree fixings and bedded in scrim adhesive, ensuring all mesh/PVC is covered. The basecoat should be keyed, ready to accept the brick-slip finish.

16.19 Where required (see section 8.7 of this Certificate), stainless steel fixings should be provided at the rate of one per square metre; the fixing design should take account of the extra duty required under fire conditions. These fixings are inserted through the mesh, insulation and into the substrate wall.

Finishing

16.20 The drying period of the basecoat will depend on the applied thickness and weather conditions but it must be left to harden for at least one day before application of the brick-slips and brick-slip adhesive.

16.21 The Wetherby Brick-Slip Adhesive is mixed with clean water (as described in section 1.2 of this Certificate) and buttered to the back of the pistol corner brick-slips, which are then applied to corners and door/window reveals. The distance between corners and/or outer edges should be measured to identify the number of bricks required per course and the subsequent width of the vertical pointing joint.

16.22 Where required, the brick-slips are cut to size using a bench saw or standard tile cutter. Consistent joint spaces (approximately 10 mm) are made between the brick-slips (spacers may be required). Vertical joints are staggered to give the appearance of conventional brickwork or installed in a stack bond pattern in accordance with the required design.

16.23 Once the brick-slips have set, pointing is performed using Wetherby Pointing Mortar and a pointing gun. Shaping of the mortar is done by using a pointing trowel. Once the mortar is dry, walls should be brushed to remove all loose mortar etc.

16.24 Once the brick slip finish is dry, a bead of clear silicone rubber mastic is gun applied at window and door frames, overhanging eaves, gas, and electric meter boxes, wall vents or where the render abuts any other building material or surface.

16.25 At the top of walls, the system should be protected by an adequate overhang (see Figure 9) or other detail designed for use with this type of system.

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

Figure 8 Insulated window or door reveal

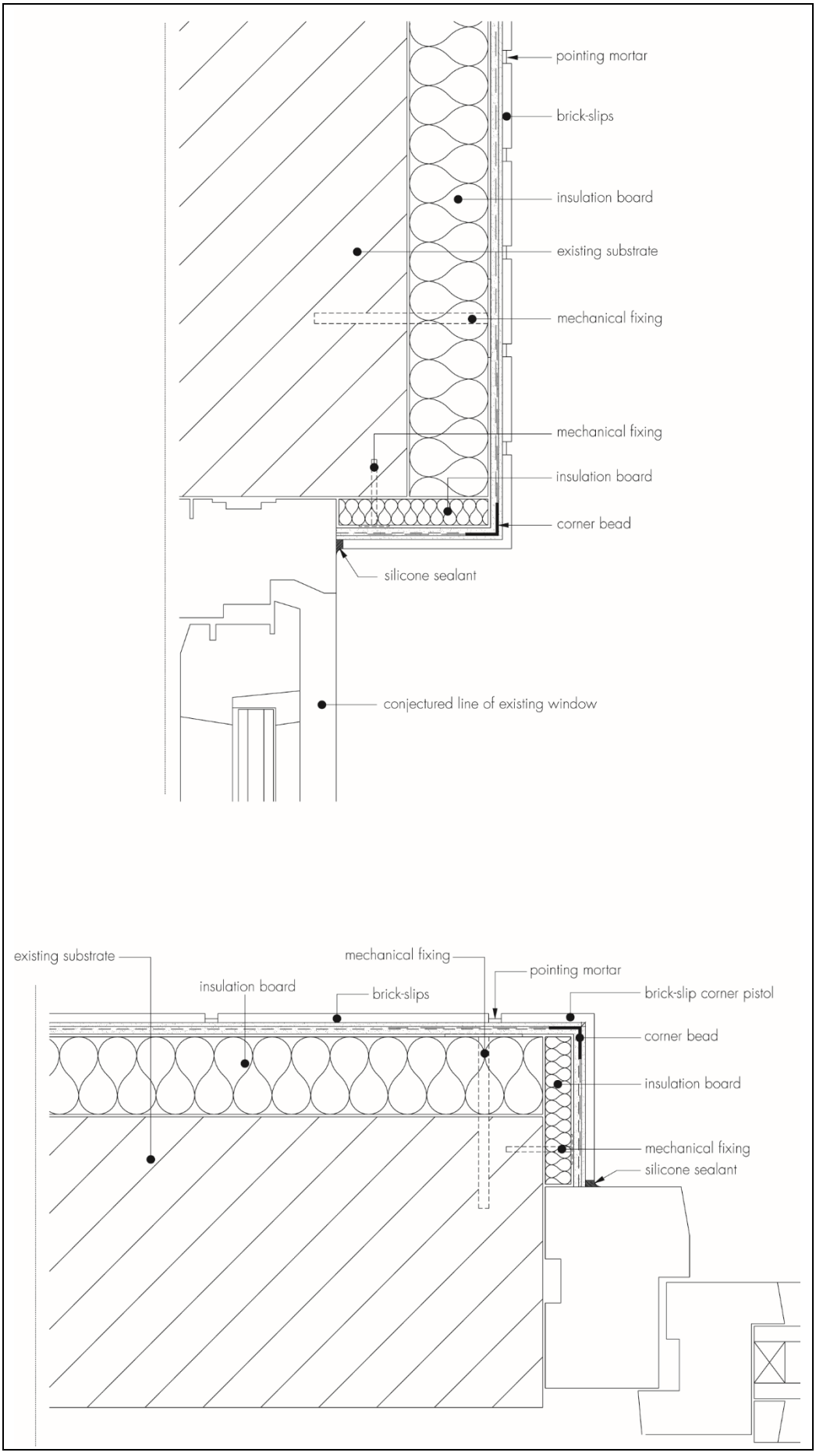
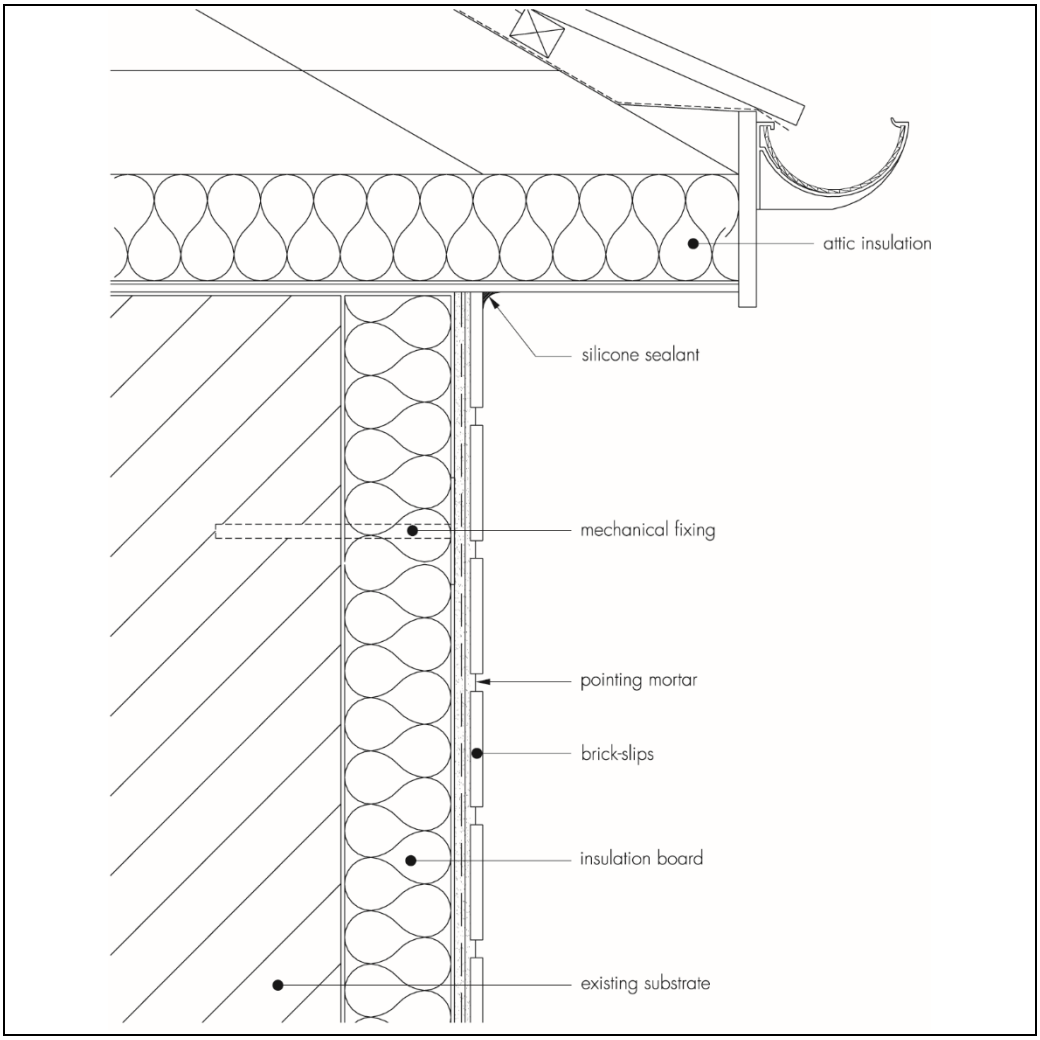


Figure 9 Insulated window or door reveal



General guidelines

16.27 Care should be taken in the detailing of the system around openings and projections and at eaves (see Figures 5 and 7 to 9) to ensure adequate protection against water ingress and to limit the risk of water penetrating the system.

16.28 Stop profiles are positioned vertically, eg at party wall positions where the adjoining property does not require treatment.

16.29 Damaged areas must be repaired using the appropriate components and procedures detailed in the Certificate holder's installation instructions and taking into account the relevant recommendations of BS EN 13914-1 : 2016.

Technical Investigations

17 Investigations

17.1 The system was examined and assessed to determine:

- hygrothermal performance(heat/spray cycling)
- resistance to freeze/thaw
- resistance to hard body impact
- water vapour permeability
- render/insulation bond strength
- pull-through resistance of fixings.

17.2 An examination was made of data relating to:

- durability
- fire performance
- adequacy of the fixing system
- the risk of interstitial condensation
- thermal conductivity and example U values
- system wind load resistance.

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

17.4 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.

Bibliography

BRE Report BR 135 : 2013 *Fire performance of external thermal insulation for walls of multistorey buildings*

BRE Report BR 262 : 2002 *Thermal insulation : avoiding risk*

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

BS 5250 : 2011 + A1 : 2016 *Code of practice for control of condensation in buildings*

BS 8000-0 : 2014 *Workmanship on construction sites — Introduction and general principles*
BS 8000-2.2 : 1990 *Workmanship on building sites — Code of practice for concrete work — Sitework with in situ and precast concrete*
BS 8000-3 : 2001 *Workmanship on building sites — Code of practice for masonry*

BS EN 197-1 : 2011 *Cement — Composition, specifications and conformity*

BS EN 771-1 : 2011 + A1 : 2015 *Specification for masonry units — Clay masonry units*

BS EN 1990 : 2002 + A1 : 2005 *Eurocode — Basis of structural design*
NA to BS EN 1990 : 2002 + A1 : 2005 UK National Annex to *Eurocode — Basis of structural design*

BS EN 1991-1-4 : 2005 + A1 : 2010 *Eurocode 1 — Actions on structures — General actions — Wind actions*
NA to BS EN 1991-1-4 : 2005 + A1 : 2010 UK National Annex to *Eurocode 1 — Actions on structures — General actions — Wind actions*

BS EN 1992-1-1 : 2004 + A1 : 2014 *Eurocode 2 — Design of concrete structures — General rules and rules for buildings*
NA + A2 : 14 to BS EN 1992-1-1 : 2004 + A1 : 2014 UK National Annex to *Eurocode 2 — Design of concrete structures — General rules and rules for buildings*

BS EN 1996-1-1 : 2005 + A1 : 2012 *Eurocode 6 — Design of masonry structures — General rules for reinforced and unreinforced masonry structures*
NA to BS EN 1996-1-1 : 2005+ A1 : 2012 UK National Annex to *Eurocode 6 — Design of masonry structures — General rules for reinforced and unreinforced masonry structures*
BS EN 1996-2 : 2006 *Eurocode 6 — Design of masonry structures — Design considerations, selection of materials and execution of masonry*
NA to BS EN 1996-2 : 2006 UK National Annex to *Eurocode 6 — Design of masonry structures — Design considerations, selection of materials and execution of masonry*

BS EN 12004 : 2007 + A1 : 2012 *Adhesives for tiles — Requirements, evaluation of conformity, classification and designation*

BS EN 13139 : 2013 *Aggregates for mortar*

BS EN 13163 : 2012 + A2 : 2016 *Thermal insulation products for buildings — Factory made products of expanded polystyrene (EPS) — Specification*

BS EN 13501-1 : 2018 *Fire classification of construction products and building elements — Classification using data from reaction to fire tests*

BS EN 13888 : 2009 *Grout for tiles — Requirements, evaluation of conformity, classification and designation*

BS EN 13914-1 : 2016 *Design, preparation and application of external rendering and internal plastering — External rendering*

BS EN 14411 : 2016 *Ceramic tiles — Definition, classification, characteristics, assessment and verification of constancy of performance and marking*

BS EN ISO 6946 : 2017 *Building components and building elements — Thermal resistance and thermal transmittance — Calculation method*

BS EN ISO 9001 : 2015 *Quality management systems — Requirements*

BS EN ISO 10456 : 2007 *Building materials and products — Hygrothermal properties — Tabulated design values and procedures for determining declared design thermal values*

BS EN ISO 11600 : 2003 + A1 : 2011 *Building construction — Jointing products — Classification and requirements for sealants*

BS ISO 45001 : 2018 *Occupational health and safety management systems — Requirements with guidance for use*

EAD 330196-00-0604 : 2016 *Plastic anchors made of virgin or non-virgin material for fixing of external thermal insulation composite systems with rendering*

EOTA TR051 : 2016 *Recommendations for job-site tests of plastic anchors and screws*

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

18 Conditions

18.1 This Certificate:

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

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

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

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

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

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

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

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