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BBA APPROVAL INSPECTION TESTING CERTIFICATION
TECHNICAL APPROVALS FOR CONSTRUCTION

Agrément Certificate
09/4670
Product Sheet 1

WEBER EXTERNAL WALL INSULATION SYSTEMS

WEBER.THERM XP EXTERNAL WALL INSULATION SYSTEM

This Agrément Certificate Product Sheet(1) relates to the weber.therm XP External Wall Insulation System, comprising mechanically-fixed expanded polystyrene (EPS) or polyisocyanurate (PIR) insulation boards, supplementary adhesive where necessary, a reinforced one-coat render, and finishes, 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 (see section 8).

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

Durability — when installed and maintained in accordance with the Certificate holder's recommendations and the terms of this Certificate, the system will remain effective for at least 30 years. The durability can be extended to 60 years by using specific fixings and by following a planned inspection and maintenance schedule, as described in sections 12 and 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 Third issue: 10 May 2016

Originally certificated on 6 April 2011

John Albon — Head of Approvals
Construction Products

Claire Curtis-Thomas
Chief Executive

The BBA is a UKAS accredited certification body — Number 113. The schedule of the current scope of accreditation for product certification is available in pdf format via the UKAS link on the BBA website at www.bbacerts.co.uk

Readers are advised to check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA direct.

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Regulations

In the opinion of the BBA, the weber.therm XP 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 7.5 of this Certificate.
Requirement:	B4(1)	External fire spread
Comment:		The system can satisfy 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 sections 4.4 and 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 11.1, 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 6.2 and 6.3 of this Certificate.
Regulation:	7	Materials and workmanship
Comment:		The system is acceptable. See section 13.1 and the *Installation* part 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; however, compensatory fabric/services measures may be required. 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 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 7.5 of this Certificate.
Standard:	2.6	Spread to neighbouring buildings
Comment:		The system can satisfy 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 8.6 of this Certificate.
Standard:	2.7	Spread on external walls
Comment:		The system can meet this Standard, and is acceptable for use more than one metre from a boundary, with reference to clauses 2.7.1[1][2] and 2.7.2[2], and Annex 2A[1]. See sections 8.1 to 8.6 of this Certificate.
Standard:	3.10	Precipitation
Comment:		The system can contribute to a construction satisfying this Standard, with reference to clauses 3.10.1[1][2] and 3.10.2[1][2]. See sections 4.4 and 10.1 of this Certificate.
Standard:	3.15	Condensation
Comment:		The 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:	6.1(b)	Carbon dioxide emissions
Standard:	6.2	Building insulation envelope
Comment:		The system can contribute to satisfying these Standards, with reference to clauses (or parts of) 6.1.1[1], 6.1.2[1][2], 6.1.3[1][2], 6.1.6[1], 6.1.10[2], 6.2.1[1][2], 6.2.3[1], 6.2.4[2], 6.2.5[2], 6.2.6[1], 6.2.7[1], 6.2.8[2], 6.2.9[1][2], 6.2.10[1], 6.2.11[1], 6.2.12[2] and 6.2.13[1][2]. See sections 6.2 and 6.3 of this Certificate.
Standard:	7.1(a)(b)	Statement of sustainability
Comment:		The 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 6.2 of this Certificate.
Regulation:	12	Building standards applicable to conversions
Comments:		All comments given for this 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:	23	Fitness of materials and workmanship
Comment:		The system is acceptable. See section 13.1 and the *Installation* part of this Certificate.
Regulation:	28(b)	Resistance to moisture and weather
Comment:		Walls insulated with the system can satisfy this Regulation. See sections 4.4 and 10.1 of this Certificate.
Regulation:	29	Condensation
Comment:		Walls insulated with the system can satisfy the requirements of this Regulation. See section 11.4 of this Certificate
Regulation:	30	Stability
Comment:		The system can sustain and transmit wind loads to the substrate wall. See sections 7.1 to 7.5 of this Certificate.
Regulation:	36(a)	External fire spread
Comment:		The system can satisfy this Regulation. See sections 8.1 to 8.4 of this Certificate.
Regulation:	39(a)(i)	Conservation measures
Regulation:	40	Target carbon dioxide emission rate
Comment:		The system can contribute to satisfying these Regulations. See sections 6.2 and 6.3 of this Certificate.

Construction (Design and Management) Regulations 2015

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

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

See section: 3 *Delivery and site handling* (3.2 and 3.4) of this Certificate.

Additional Information

NHBC Standards 2016

NHBC accepts the use of the weber.therm XP External Wall Insulation System, provided it is installed, used and maintained in accordance with this Certificate, in relation to *NHBC Standards*, Part 6 *Superstructure (excluding roofs)*, Chapter 6.9 *Curtain walling and cladding*.

Technical Specification

1 Description

1.1 The weber.therm XP External Wall Insulation System consists of EPS or PIR insulation boards which are mechanically fixed to the substrate wall, with supplementary adhesive where necessary, and a reinforcing glassfibre mesh embedded in one-coat render, plus various finishes.

1.2 The system is mechanically fixed through the insulation (for a 30-year durability) or through the mesh (for a 60-year durability) into the external surface of the substrate wall (See Figure 1 for both applications, and section 16). For the 60-year durability application, the mechanical fixings are applied through the mesh while the basecoat is wet, before mesh patches are applied over the fixing heads and fully embedded. Further basecoat is then used, in order to achieve the same thickness as that applied over the insulation boards for a 30-year durability, when measured from the top of the fixing plate. In addition, for a 60-year durability application, the supplementary adhesive must be used. For both applications, when the basecoat has dried, a decorative finish is applied (see Table 1).

Table 1 weber.therm XP summary

Component	Option 1	Option 2
Supplementary adhesive	weber.rend LAC	weber.rend LAC
Insulation	weber.therm EPS or weber.therm PIR	weber.therm EPS
Basecoat	weber.therm M1	weber.therm M1
Reinforcement	weber mesh	weber mesh
Topcoat	weber dry dash aggregate weber.therm M1	weber.rend RBF

1.3 The system comprises the following components:

Supplementary adhesive

- weber.rend LAC — a factory-batched, polymer-modified, adhesive mortar, supplied as a powder, to which clean water is added.

Insulation

- weber.therm EPS (expanded polystyrene) insulation boards — 1200 mm by 600 mm in a range of thicknesses between 20 mm and 200 mm in 10 mm increments, with a nominal density of 14 to 16 $kg \cdot m^{-3}$, minimum compressive strength of 70 $kN \cdot mm^{-2}$ and tensile strength perpendicular to the faces of 20 $kN \cdot mm^{-2}$. The boards comply with BS EN 13163 : 2012
- weber.therm PIR (polyisocyanurate) glass-tissue-faced insulation boards — 1200 mm by 600 mm in a range of thicknesses between 50 mm and 150 mm in 10 mm increments, with a nominal density of 40 $kg \cdot m^{-3}$, minimum compressive strength of 120 $kN \cdot mm^{-2}$ and tensile strength perpendicular to the faces of 80 $kN \cdot mm^{-2}$. The boards comply with BS EN 13165 : 2012.

Mechanical fixings

- mechanical fixings[1][2] — anchors with adequate length to suit the substrate and insulation thickness, approved and supplied by the Certificate holder, and selected from:
  - Ejotherm NT U and NK U — polyethylene, PE-HD anchor sleeve with stainless steel or electro-galvanized steel pin
  - Ejotherm STR U and STR U 2G[3] – polyethylene, PE-HD anchor sleeve with stainless steel or electro-galvanized screw with polystyrene insulation cover or anchor cup
  - Ejotherm SDK U — polyethylene, PE-HD anchor sleeve with stainless steel or electro-galvanized steel screw, to fix the base profile
  - Fischer Termoz CN 8 — polypropylene with stainless steel or electro-galvanized pin
  - Fischer Termoz CS 8 — polypropylene with stainless steel or electro-galvanized screw.

(1) Other fixings aside from those listed may be used provided they can be demonstrated to have equal or higher pull-out and plate stiffness characteristics.

(2) Polyethylene, PE-HD or polyamide anchor sleeve with a stainless steel pin or screw are required in order to achieve a 60 year durability performance

(3) Ejotherm STR U anchors cannot be specified when using insulation thickness of either 40 mm or 50 mm.

Basecoat

- weber.therm M1 — a factory-batched, polymer-modified, through-coloured, lightweight mineral one-coat render, supplied as a powder to which potable water is added. Applied to a thickness of 12 mm to 15 mm. Available in twelve standard colours[1]. Also used as a dash receiver and brick effect render.

(1) Other colours are available to special order.

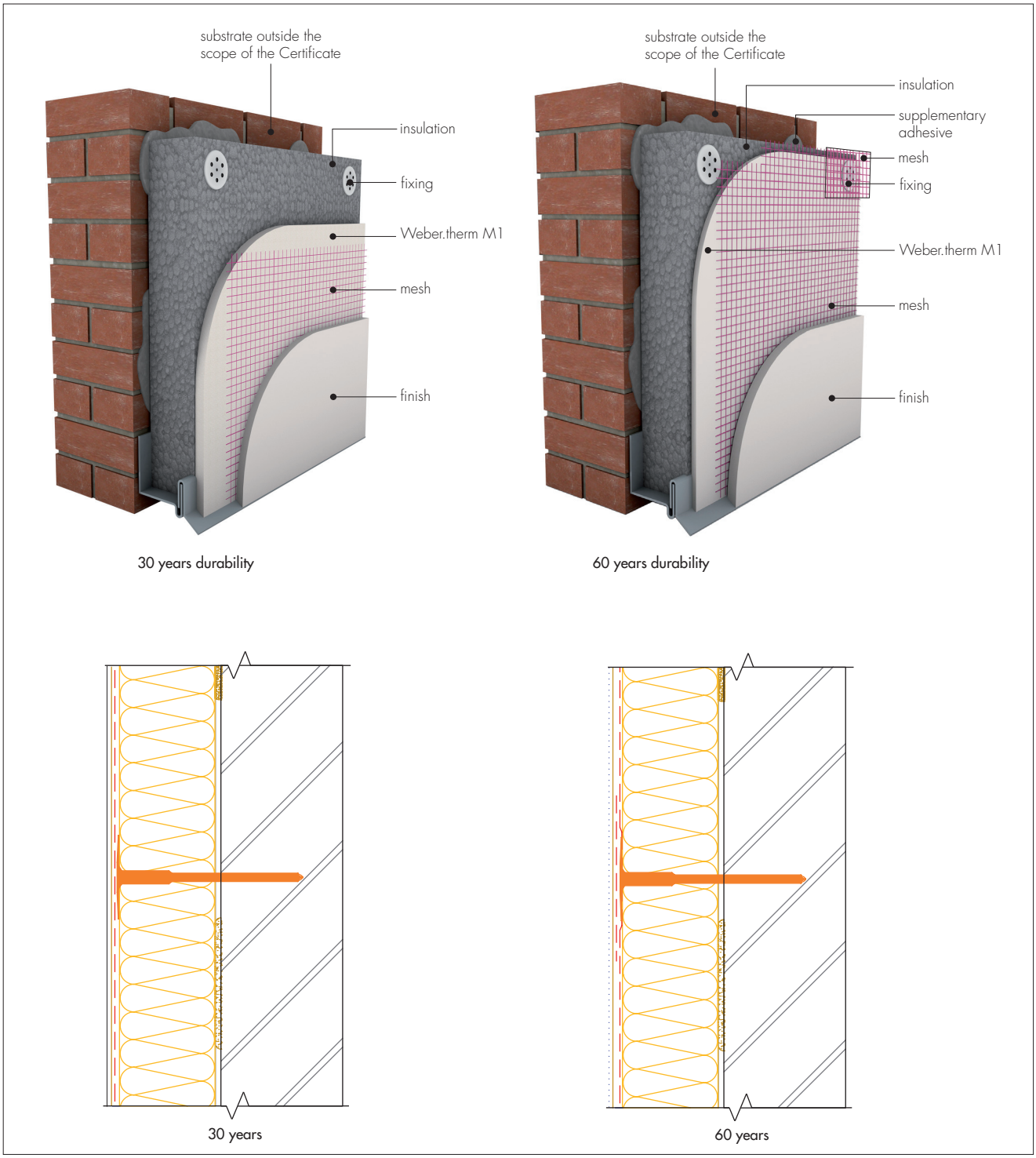
Reinforcement

- weber mesh — woven glassfibre reinforcing mesh (3.5 mm by 3.5 mm) with a polymer coating and a nominal weight of 160 gm^{-2}.

Finishes

- weber.therm M1 — can be applied to obtain Scrape texture, Ashlar marking and Spray roughcast finishes
- weber.rend RBF (brick effect render) — a factory-batched, polymer-modified, cement-based mortar to which potable water is added. Applied to a thickness of 2 mm to 3 mm
- weber dry dash aggregate — sized up to 6 mm and available in a range of colours. Applied direct to weber.therm M1.

Figure 1 weber.therm XP External Wall Insulation System



1.4 Ancillary materials used with the system:

- range of aluminium, PVC-U or stainless steel profiles, comprising:
  - base profile, edge, corner, render stop end
  - edge profile
  - corner profile
  - stop profile
  - V expansion and movement joint profiles
  - Ejotherm TID-MR — stainless steel fixing to use on fire barrier details.

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

- PU foam filler
- algae and fungal wash
- sealing tape
- aluminium or PVC-U V expansion and movement joint profiles.

2 Manufacture

2.1 Components are 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 Saint-Gobain Weber has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2008 by BSI (Certificate FM 01209).

3 Delivery and site handling

3.1 The insulation boards are delivered in sealed packs, with the product identification and manufacturer's batch numbers.

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

Table 2 Component supply details

Component	Quantity/packaging
weber.therm M1	20 kg bag
weber mesh	50 m roll, 1 m wide
weber dry-dash aggregate	25 kg bag
weber.rend RBF	25 kg bag
mechanical fixings	boxed by manufacturer, 100 per box
base, stop, corner, horizontal drip and movement beads	2.5 or 3 m lengths

3.3 The insulation boards should be stored off the ground on a firm, clean, level base and must be protected from prolonged exposure to sunlight, either by storing opened packs under cover or re-covering with opaque polythene sheeting.

3.4 Care must be taken when handling the insulation boards to avoid both damage and contact with solvents or bitumen products. The boards must not be exposed to open flame or other ignition sources. Boards that become damaged, soiled or wet must be discarded.

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

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on the weber.therm XP External Wall Insulation System.

Design Considerations

4 General

4.1 The weber.therm XP External Wall Insulation System, when installed in accordance with this Certificate, is effective in reducing the thermal transmittance (U value) of external walls in new and existing buildings (see section 4.3). 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 — see section 16 — and window sills should be designed and installed so as to direct water away from the building). Only details specified by the Certificate holder should be used.

4.2 For improved thermal/carbon-emissions performance, 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, or dense and no-fines concrete construction, on new or existing domestic and non-domestic buildings (with or without existing render) up to 18 metres in height. Prior to the installation of the system, wall surfaces should comply with section 14 of this Certificate.

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

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

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

4.6 The system will improve the weather resistance of a wall and provide a decorative finish. However, it may be installed only where other potential sources of moisture penetration have been dealt with separately and where there are no signs of dampness on the inner surface of the wall, other than those caused solely by condensation.

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

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

4.9 External plumbing should be removed before installation and alterations made to underground drainage, where appropriate, to accommodate repositioning of the plumbing to the finished face of the system.

4.10 All detailing, such as window sills, should be designed and installed so as to discharge water away from the building.

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

4.12 For a 60 year durability, the following components must be manufactured from stainless steel grade 1.4301 to BS EN 10088-2 : 2014:

- starter track and full system including the fixings
- corner profile (dash application only)
- nail or screw for mechanical fixings.

5 Practicability of installation

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

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

6 Thermal performance

6.1 Calculations of thermal transmittance (U value) should be carried out in accordance with BS EN ISO 6946 : 2007 and BRE Report BR 443 : 2006, using the declared thermal conductivity values (λ_D) of the insulation given in Table 3 of this Certificate.

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

Insulation type	Thickness (mm)	Thermal conductivity ($W \cdot m^{-1} \cdot K^{-1}$)
weber.therm EPS	20 to 200	0.032(1)
weber.therm PIR	50 to 70	0.027(1)
	80 to 110	0.026(1)
	120 to 150	0.025(1)

(1) U value calculations have been determined for these thermal conductivities as the corresponding insulation thicknesses fall within the typical thicknesses that would be applied to the external wall.

6.2 The U value of a completed wall will depend on the selected insulation type and thickness, the type and number of fixings, and 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 Tables 4 and 5, and are based on the thermal conductivities given in Table 3.

Table 4 Insulation thickness required to achieve U values[1][2][3] using galvanized steel fixings (30 year durability)

U value[4] ($W \cdot m^{-2} \cdot K^{-1}$)	Thickness of insulation (mm)			
	215 mm brickwork $\lambda = 0.56\ W \cdot m^{-1} \cdot K^{-1}$		200 mm dense blockwork $\lambda = 1.75\ W \cdot m^{-1} \cdot K^{-1}$	
	weber.therm EPS	weber.therm PIR	weber.therm EPS	weber.therm PIR
0.18	190	150	200	—[5]
0.19	180	140	180	150
0.25	130	100	130	110
0.26	120	100	130	100
0.28	110	90	120	90
0.30	100	80	110	90
0.35	80	80	90	80

(1) Wall construction inclusive of 13 mm plaster ($\lambda = 0.57\ W \cdot m^{-1} \cdot K^{-1}$), brickwork (protected) with 17.1% mortar or dense blockwork with 6.7% mortar ($\lambda = 0.88\ W \cdot m^{-1} \cdot K^{-1}$) and an external render thickness of 12 mm ($\lambda = 1\ W \cdot m^{-1} \cdot K^{-1}$). 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 a point thermal transmittance (χ_p) of $0.004\ W \cdot K^{-1}$ per galvanized steel pin. Use of other types of fixings should be calculated in accordance with BS EN ISO 6946 : 2007.
(3) Based upon incremental insulation thickness of 10 mm.
(4) When applying the maximum available insulation thickness, these walls can achieve U values from $0.17\ W \cdot m^{-2} \cdot K^{-1}$ to $0.19\ W \cdot m^{-2} \cdot K^{-1}$ depending on the insulation and wall type.
(5) See section 4.2.

Table 5 Insulation thickness required to achieve U values[1][2][3] using stainless steel fixings (60 year durability)

U value[4] ($W \cdot m^{-2} \cdot K^{-1}$)	Thickness of insulation (mm)			
	215 mm brickwork $\lambda = 0.56\ W \cdot m^{-1} \cdot K^{-1}$		200 mm dense blockwork $\lambda = 1.75\ W \cdot m^{-1} \cdot K^{-1}$	
	weber.therm EPS	weber.therm PIR	weber.therm EPS	weber.therm PIR
0.18	170	130	180	140
0.19	160	130	170	130
0.25	120	100	120	100
0.26	110	90	120	100
0.28	100	80	110	90
0.30	90	80	100	80
0.35	80	80	80	80

(1) Wall construction inclusive of 13 mm plaster ($\lambda = 0.57\ W \cdot m^{-1} \cdot K^{-1}$), brickwork (protected) with 17.1% mortar or dense blockwork with 6.7% mortar ($\lambda = 0.88\ W \cdot m^{-1} \cdot K^{-1}$). Declared thermal conductivity of insulation values (λ_D) is as shown in Table 3. A 5 mm thick adhesive layer ($\lambda = 1\ W \cdot m^{-1} \cdot K^{-1}$) covering 50% of the area is also included, together with a board emissivity of 0.9 and an external render thickness of 12 mm ($\lambda = 1\ W \cdot m^{-1} \cdot K^{-1}$).
(2) Calculations based on a mechanical system that included 5 stainless steel fixings per square metre with a point thermal transmittance (χ_p) of $0.002\ W \cdot K^{-1}$ per steel pin. Use of other types of fixings should be calculated in accordance with BS EN ISO 6946 : 2007.
(3) Based upon incremental insulation thickness of 10 mm.
(4) When applying the maximum available insulation thickness, these walls can achieve U values from $0.16\ W \cdot m^{-2} \cdot K^{-1}$ to $0.17\ W \cdot m^{-2} \cdot K^{-1}$ depending on the insulation 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 When installed on suitable walls, the system can adequately transfer to the wall the self-weight and positive (pressure) and negative (suction) wind loads normally experienced in the United Kingdom.

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

7.3 Negative wind load is resisted by the bond of insulation and render and system anchors. The insulation boards are retained by the external wall insulation system anchors.

7.4 The wind loads on the walls should be calculated in accordance with BS EN 1991-1-4 : 2005. Special consideration should be given to locations with high wind-load pressure coefficients, as additional fixings may be necessary. In accordance with BS EN 1990 : 2002, it is recommended that a load factor of 1.5 is used to determine the ultimate wind load to be resisted by the system.

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

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

7.6 The number and centre of fixings should be determined by the system designer; however, the number of fixings must not be less than the minimum specified for the system (see sections 16.15, 16.19 and 16.22). Provided the substrate wall is suitable and the appropriate mechanical fixings are selected, the fixings will adequately support and transfer the weight of the render insulation system to the substrate wall at the minimum spacings given in this Certificate.

7.7 Typical characteristic pull-out strengths for the fixings taken from the European Technical Approval (ETA) are given in Table 6; however, these values are dependent on the substrate and the fixing must be selected to suit the loads and substrate concerned.

Table 6 Fixings — typical characteristic pull-out strengths[1]

Fixing type	ETA number	Substrate	Drill diameter (mm)	Effective anchorage depth (mm)	Typical pull-out strength (kN)
Ejotherm NT U, Ejotherm NK U	05/0009	Concrete C12/15 Clay brickwork	8	25	1.2 1.5
Ejotherm STR U, Ejotherm STR U 2G, Ejotherm SDK U	04/0023	Concrete C12/15 Clay brickwork	8	25	1.5
Fischer Termoz CN 8	09/0394	Concrete C12/15 Clay brickwork	8	35	0.9
Fischer Termoz CS 8	14/0372	Concrete C12/15 Clay brickwork	8	35	1.5

(1) Values are determined in accordance with ETAG 014 : 2011 and are dependent on the substrate.

7.8 The design pull-through resistance data given in Table 7 is the result of calculations based upon pull-through resistances determined by the BBA from tests on anchors with 60 mm diameters.

Table 7 Typical calculation to establish the pull-through resistances

Factor	Insulation		
	EPS 70		PIR
Fixings — plate diameter (mm)	60		60
Fixings — types	see Table 6		
Insulation thickness (mm)	30	>90	60
Characteristic pull-through resistance[1] per fixing (N)	214[3]	746[3]	750[3]
Factor of safety[2]	2.5	2.5	2.5
Design pull-through resistance per fixing (N)	85.6	298.4	280.4

(1) Characteristic pull-through resistance of insulation over the head of the fixing, in accordance with BS EN 1990 : 2002, Annex D7.2.

(2) The safety factor of 2.5 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, and failure mode.

(3) Values obtained with fixings not placed at the panel joints.

Impact resistance

7.9 Hard body impact tests were carried out in accordance with ETAG 004 : 2013. The systems as listed in Table 8 are suitable for Use Category II.

Table 8 weber.therm XP External Wall Insulation System — impact resistance

Rendering system: Insulation + render (with different finishes)	Use Category[1]
PIR + weber.therm M1 + RBF (brick effect finish) EPS + weber.therm M1 + RBF (brick effect finish)	Category II

(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 systems listed in Table 9 have a B-s1, d0 reaction to fire classification, according to BS EN 13501-1 : 2007.

Table 9 Reaction to fire classification

Rendering system:	Standard	Fire classification
weber.therm M1 + (dry dash; scrape texture; ashlar marking or spray roughcast) weber.therm M1 + weber RBF	BS EN 13501-1 : 2007	B-s1, d0

8.2 The fire classification applies to the full range of thicknesses covered by this Certificate.

8.3 The system is restricted for use in buildings up to 18 metres in height.

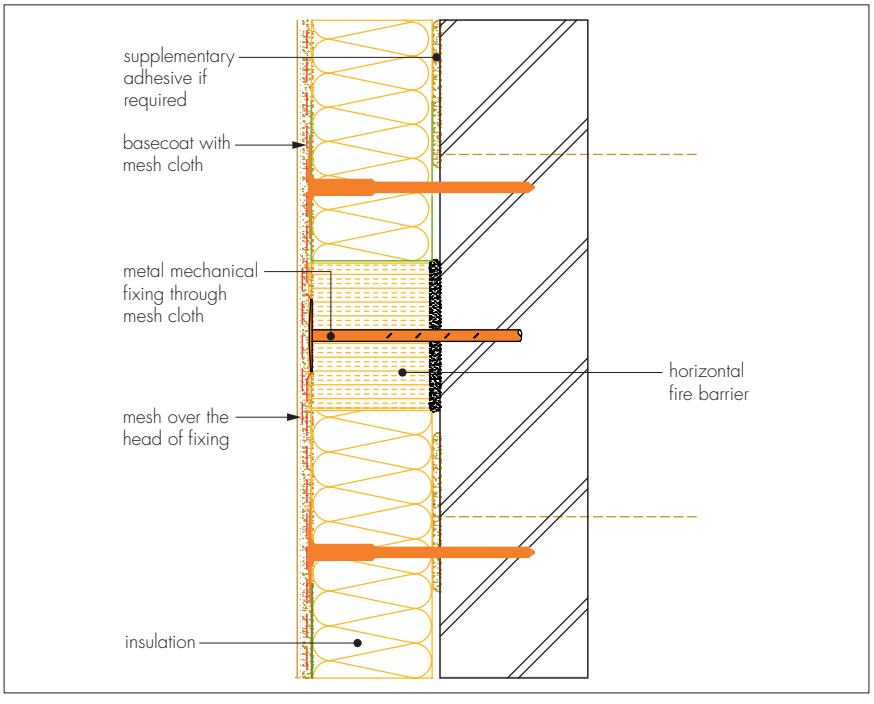
8.4 For houses in Scotland, and for all buildings in England and Wales and Northern Ireland, the system is considered suitable for use on or at any distance from the boundary.

8.5 For flats and maisonettes and non-domestic buildings in Scotland, the system is suitable only for use more than one metre from the boundary.

8.6 The system is not classified as 'non-combustible; therefore, calculations for unprotected areas may apply, depending on the fire resistance characteristics of the wall.

8.7 For application to second storey walls and above, it is recommended that the designer includes 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).

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 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 water ingress. Care should be taken to ensure that walls are adequately watertight prior to the application of the system. The system must only be installed where there are no signs of dampness on the inner surface of the substrate other than those caused solely by condensation.

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

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

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

11 Risk of condensation

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

Surface condensation

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

11.3 Walls will limit the risk of surface condensation adequately when the thermal transmittance (U value) does not exceed 1.2 $W \cdot m^{-2} \cdot K^{-1}$ at any point and detailing is in accordance with BS 5250 : 2011. Additional guidance may be obtained from 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 factor (μ) for the insulation boards, and equivalent air layer thickness (s_d) for the render systems are shown in Table 10.

Table 10 Water vapour resistance (μ) factors and equivalent air layer thickness (s_d)

	Thickness (mm)	s_d (m)	μ
EPS 70	—	—	20 to 40
PIR	—	—	50
weber.therm M1 + scrape texture finish; ashlar marking or spray roughcast finish	15	0.16	20[1]
weber.therm M1 + weber dry dash aggregate	12	0.20	20[1]
weber.therm M1 + weber.rend RBF (12 mm + 3 mm)	15	0.79	—

(1) Value taken from first issue of this Certificate.

12 Maintenance and repair

12.1 Regular checks should be made on the installed system, including:

- an initial inspection after 12 months and subsequently every five years
- visual inspection of the render for signs of damage. Cracks in the render exceeding 0.2 mm must be repaired
- examination of the sealant around openings and service entry points

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

12.2 For a 60 year durability, a detailed maintenance plan must be prepared and provided to the building manager/owner on completion.

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

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

13.3 The render may become discoloured with time, the rate depending on the initial colour, degree of exposure and atmospheric pollution, as well as the design and detailing of the wall. In common with traditional renders, discoloration by algae and lichens may occur in wet areas. The appearance may be restored by a suitable power wash or, if required, by over coating, provided the coating does not adversely affect the water vapour transmission or fire characteristics of the system. The advice of the Certificate holder should be sought as to the suitability of a particular product.

Installation

14 Site survey and preliminary work

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

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

14.2 The survey should include tests conducted on the walls of the building by the Certificate holder or their approved operatives (see section 15) to determine the pull-out resistance of the specified mechanical fixings for the appropriate substrate. In addition, the correct type and number of fixings must be selected (see sections 7, 16.15 and 16.22). The advice of the Certificate holder should be sought to ensure the proposed bonding pattern is sufficient.

14.3 All modifications and necessary repairs to the building structure must be completed before installation 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 spanning the storey height. Any excessive irregularities, ie greater than 10 mm in one metre, must be made good prior to installation to ensure that the insulation boards are installed with a smooth, in-plane finished surface.

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

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

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

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 recommended 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 current installation instructions.

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

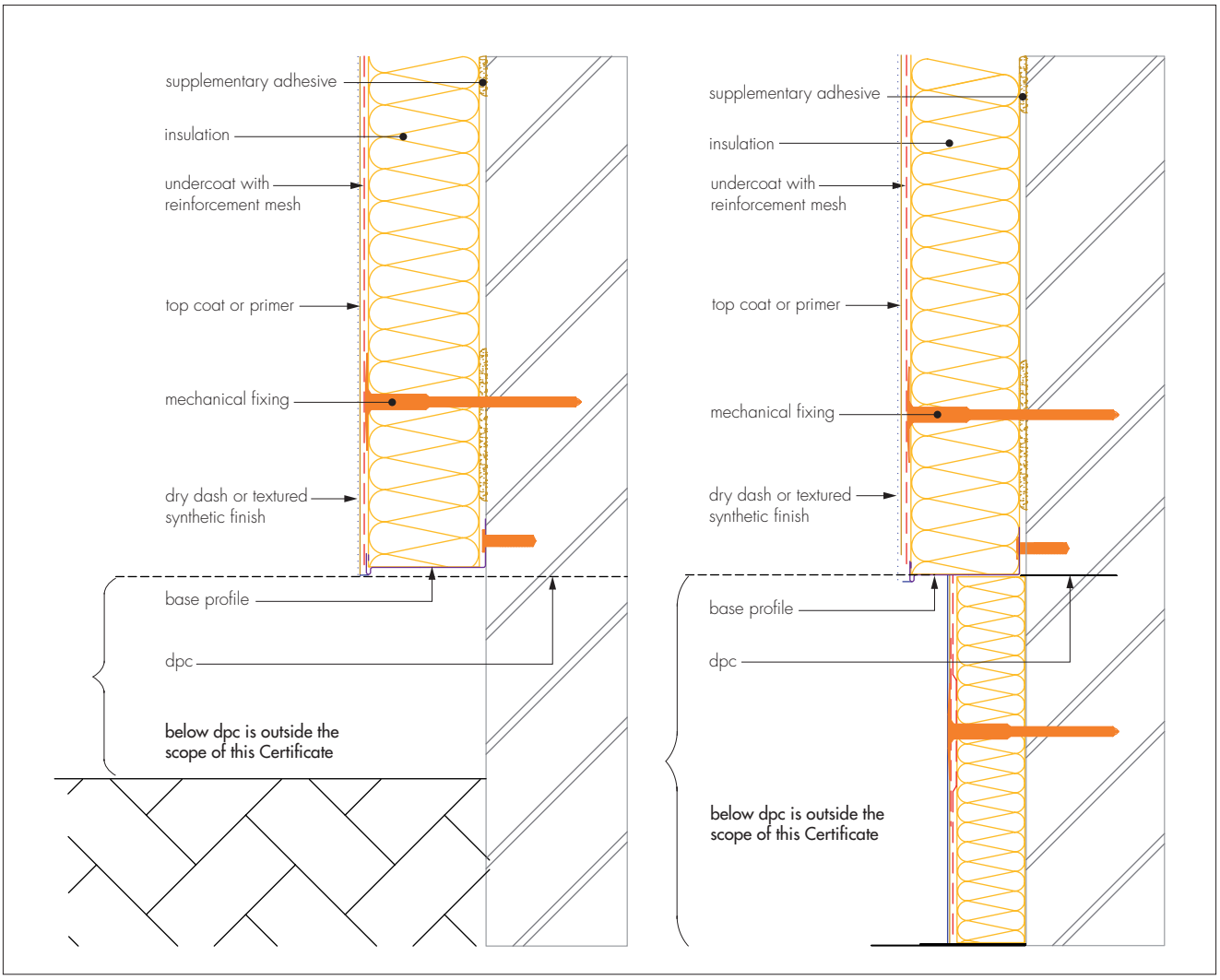
16.3 All rendering should be in accordance with the relevant recommendations of BS EN 13914-1 : 2016.

16.4 The initial installation procedure is common to both systems and is described in sections 16.5 to 16.14.

Positioning and securing of insulation boards

16.5 The base profile is secured to the external wall above the dpc using profile fixings at maximum 700 mm centres (see Figure 3). Base rail 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. Note: For 60 year durability applications, the starter track must be constructed from stainless steel.

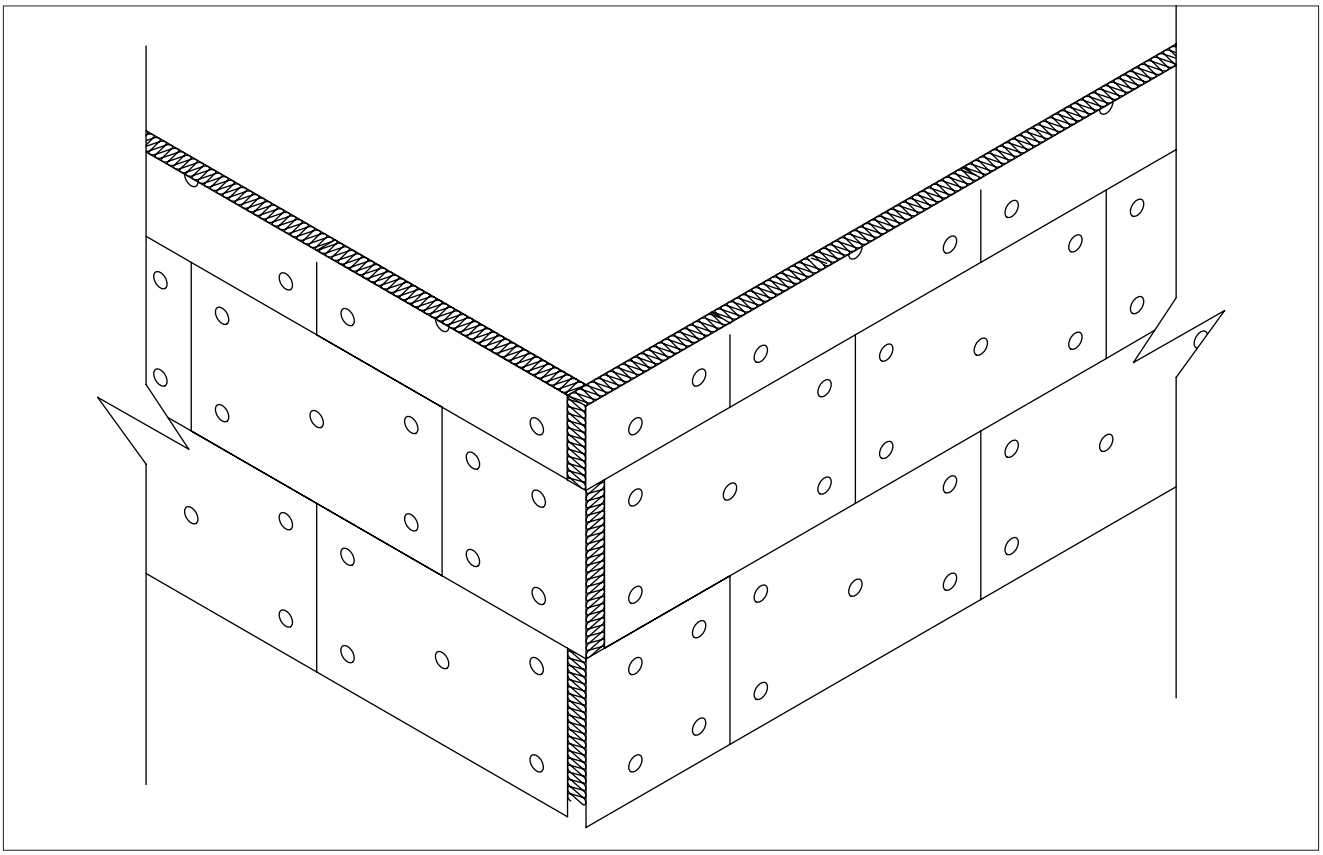
Figure 3 Typical section of base profile



16.6 The supplementary adhesive, if required, is prepared with the required amount of water and mixed with a paddle mixer until the desired consistency is achieved. After allowing it to rest for five minutes, the adhesive is applied to the insulation in four vertical strips, 100 mm wide and 25 mm to 30 mm thick. The adhesive should cover around 50% of the board after boards have been pressed against the wall.

16.7 The first run of insulation boards (with or without adhesive) is positioned on the perforated base profile. The boards must be pressed firmly against the wall and butted tightly together. Subsequent rows of boards are positioned so that vertical board joints are staggered by at least 250 mm (see Figure 4). Joints between boards greater than 6 mm should be filled with slivers of insulation board or PU foam. Gaps greater than 10 mm should be closed by repositioning or, where appropriate, by cutting boards to fit. Alignment should be checked as work proceeds. Care must be taken to ensure that all board edges are butted tightly together, and surface alignment should be checked as work proceeds. High spots or irregularities in the EPS insulation are removed by lightly planing with a rasp. As PIR cannot be planed, adhesive is applied to the back of the boards to allow edges to be levelled during application.

Figure 4 Typical arrangement of insulation boards



16.8 Mechanical fixings are applied to secure the insulation boards during installation of the system (see sections 16.15, 16.19 and 16.22 for the system's application).

16.9 To fit around details such as doors and windows, the boards may be cut with a sharp knife or a fine-tooth 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, but their performance is outside the scope of this Certificate.

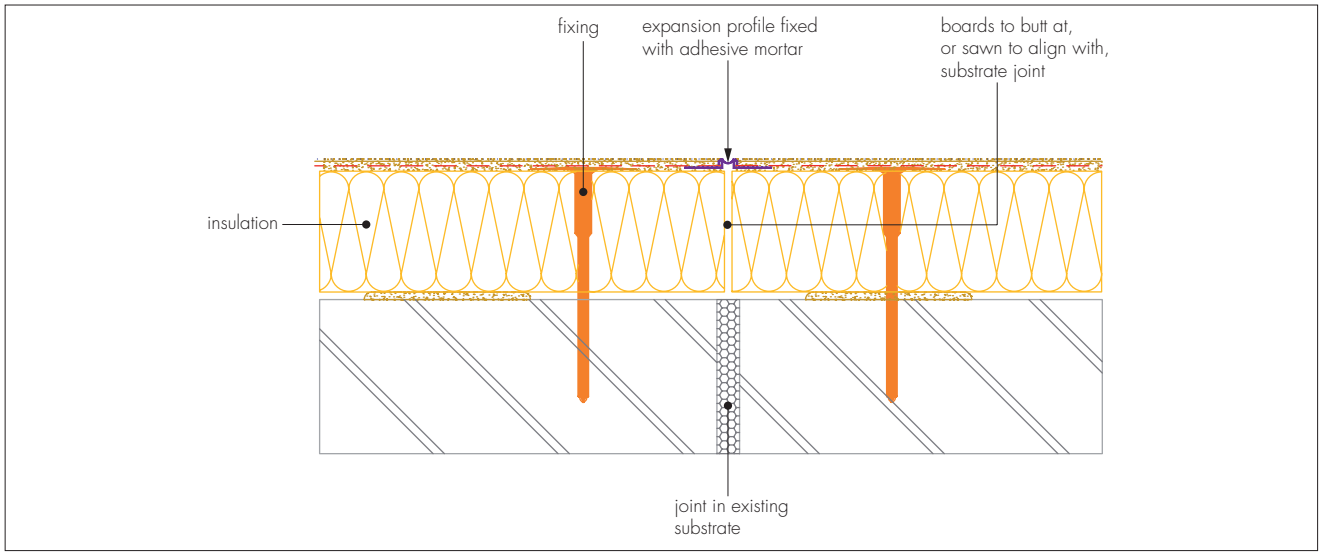
16.10 Installation continues until the whole wall is completely covered including, where appropriate, the building soffits. Building corners, door and window heads and jambs are formed using mesh angle profiles bonded to the insulation. Where appropriate, application-specific profiles are installed to allow the rainwater to drain, in accordance with the manufacturer's instructions.

16.11 Periodic checks should be carried out as work proceeds. Allowance should be made where either existing render is on the wall or dubbing out render has been used to align the boards, as the effective embedment will be reduced. Window and door reveals should be insulated to minimise the effects of cold bridging.

Movement joints

16.12 Generally, movement joints in the substrate must be continued through the system by cutting through the insulation boards to coincide with the building's movement joint. The weber expansion joint profile is fully bedded in mortar on the insulation board surface (see Figure 5). The rendered area should take account of the shape of the work. Where necessary, render movement joints are formed as described before. Unbroken panels of render should be limited to areas between 45 m^2 and 50 m^2, with an aspect ratio no greater than 4 : 1.

Figure 5 Movement joint detail

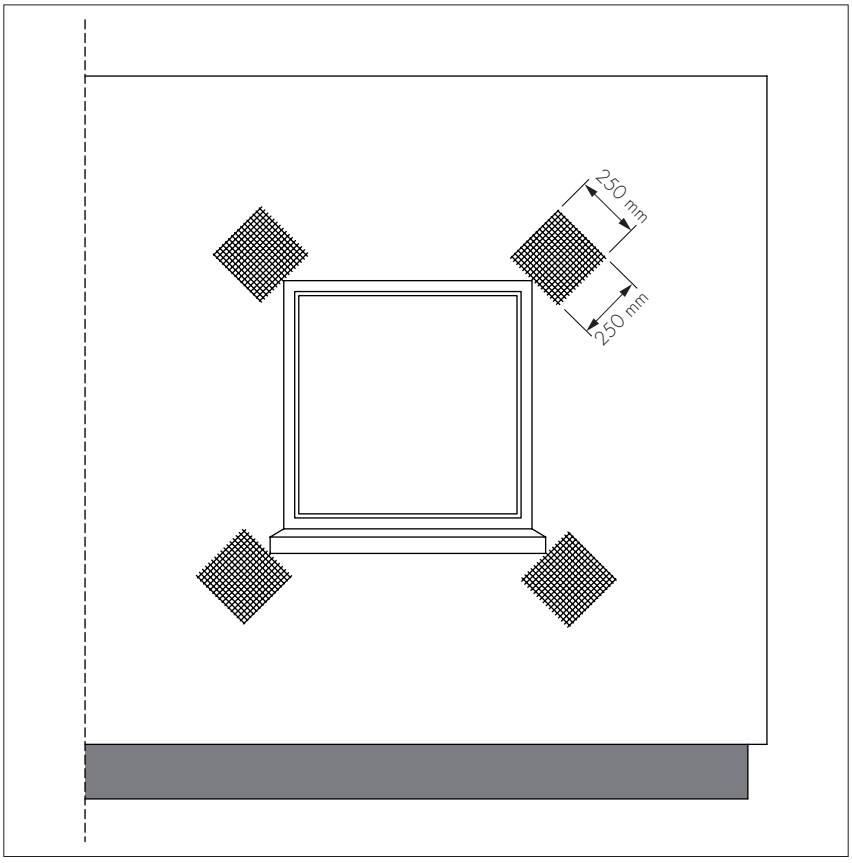


Application of the basecoat and reinforcement mesh

16.13 The basecoat is prepared (20 kg of weber.therm M1 to 4.5 to 5 litres of potable water).

16.14 After the application of the render and mesh, pieces of reinforcing mesh (approximate size 250 mm by 250 mm) should be used diagonally at the corners of windows and doors and other building openings so that they extend equally either side of the corner (see Figure 6).

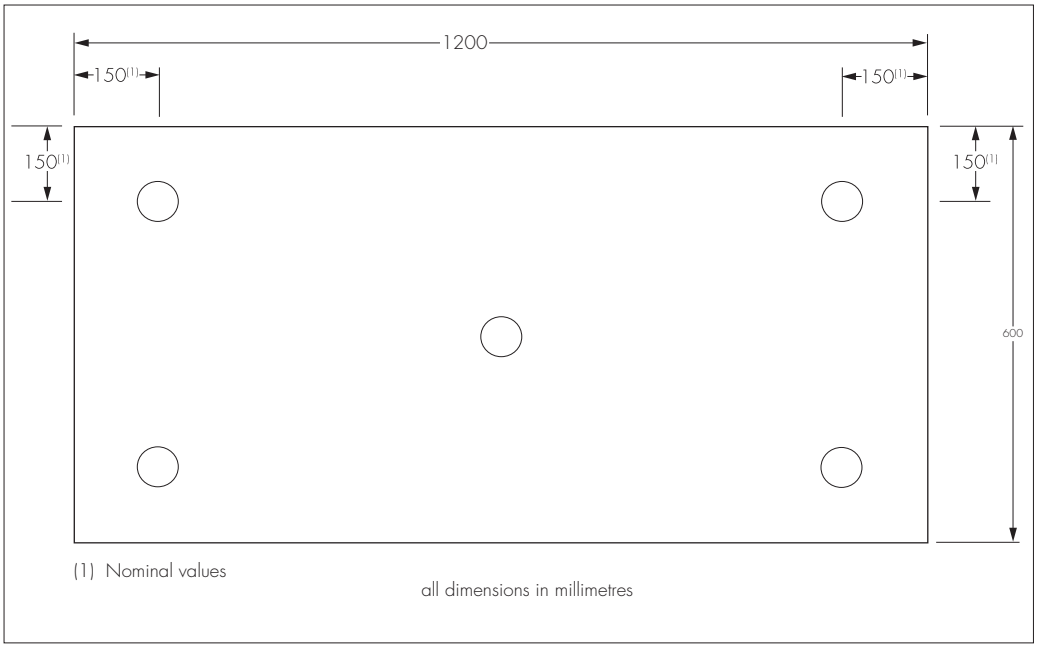
Figure 6 Additional reinforcement at openings



Application of 30 year durability system — mechanical fixings through the insulation boards

16.15 Generally fixings are installed at a rate of 5 per insulation board. Holes are drilled into the substrate through the insulation board in a 'saltire' pattern; mechanical fixings are inserted through the holes and tapped or screwed firmly home. It may be necessary, in specific cases, to adjust the fixing rate and pattern to resist the expected wind loads (in which case the manufacturer should be consulted). See Figure 7.

Figure 7 Typical fixing pattern



16.16 The base coat is applied in two passes. The first layer of basecoat is applied progressively by trowel or spray machine to the surface of the dry insulation to achieve an approximate thickness of 6 mm to 7 mm.

16.17 Reinforcement mesh is immediately applied and embedded into the basecoat using the trowel, and overlapped at all mesh joints by not less than 100 mm. A further layer of basecoat is applied to give an overall minimum thickness of 12 mm to 15 mm (depending on the finish chosen), and the surface ruled level.

16.18 It is important to make sure that the mesh is free of wrinkles and completely covered, and that the required minimum thickness of basecoat is achieved.

Application of 60 year durability system — mechanical fixings through the reinforcement mesh

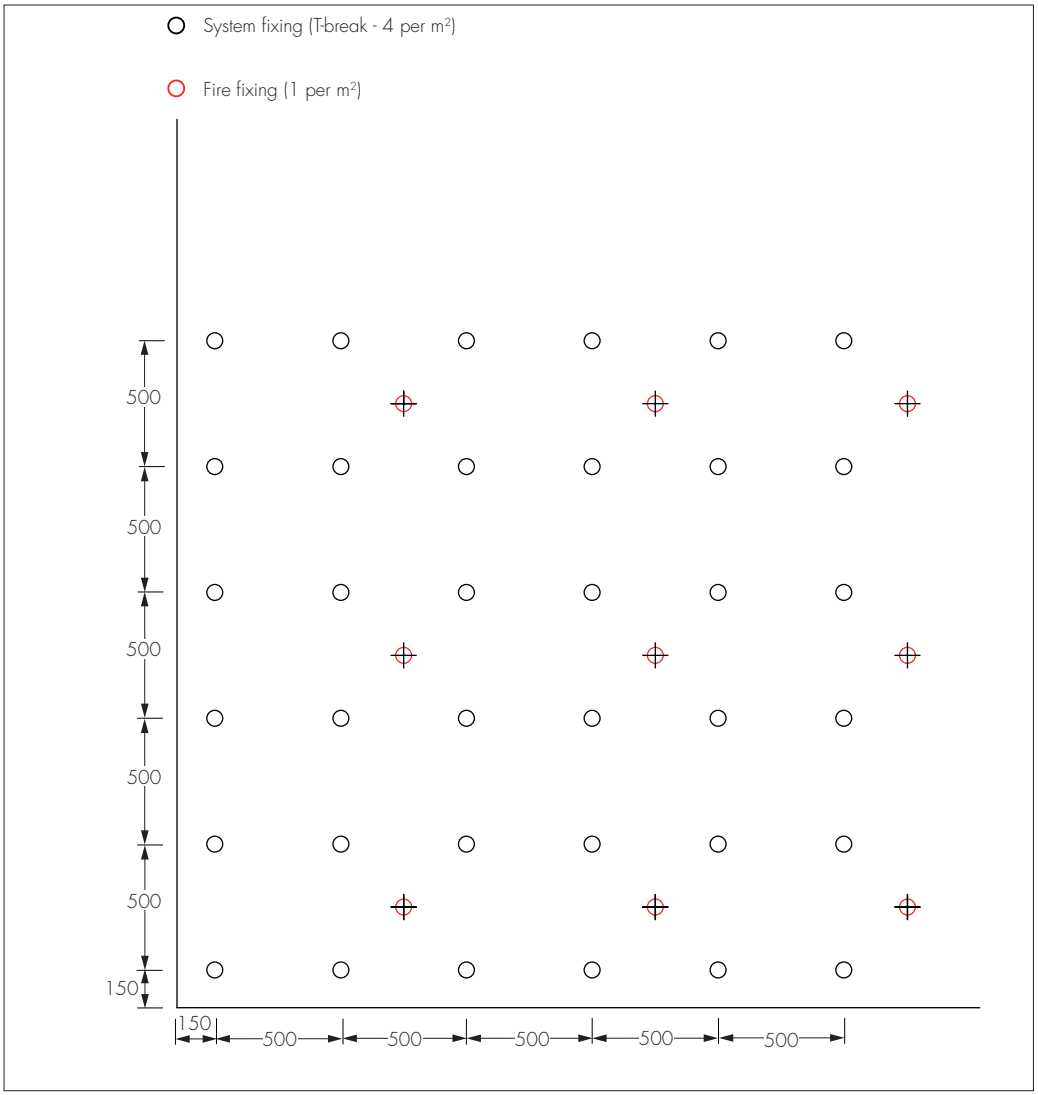
16.19 While the supplementary adhesive is still wet, two mechanical fixings are applied though each insulation board to secure them during installation of the system. The render is applied in several passes. The first layer of render is applied progressively to the surface of the insulation to a thickness of 6 mm to 7 mm.

16.20 Reinforcement mesh is immediately applied and embedded into the one-coat render basecoat using the trowel, and overlapped at all mesh joints by not less than 100 mm.

16.21 It is important to make sure that the mesh is free of wrinkles and completely covered, and that the required minimum thickness of render achieved.

16.22 While the render is still wet, holes are drilled through the reinforcement mesh and insulation boards into the substrate wall to the required depth at the specified frequency and pattern, but not less than four fixings per square metre (see Figure 8). The mechanical fixings are inserted and tapped or screwed firmly into place, securing the mesh and insulation boards to the substrate wall. The fixings are slightly overdriven into the substrate wall in order to allow the fixing plate to partially penetrate through onto the face of the insulation boards.

Figure 8 60 years durability fixing pattern



16.23 While the render is still wet, 250 mm by 250 mm stress patches of reinforcing mesh are applied over the head of the fixings and fully embedded with the render. Further render is then applied to maintain an approximate thickness of 12 mm to 15 mm when measured from the top of the fixing head. The render is applied progressively, working in one-metre sections in a vertical or horizontal direction before being left to set for approximately 18 to 24 hours; depending on weather and substrate conditions, a longer period may be required [not applicable for weber.rend RBF (brick effect render)].

Finish coats

Scrape texture finish

16.24 When the render has set but not fully hardened, the whole surface should be carefully and evenly scraped in a circular motion with a scarping tool, ensuring all laitance is removed. The finished render thickness should be a minimum of 12 mm.

16.25 When complete, the scraped finish should be brushed thoroughly with a soft bristle brush.

Ashlar marking

16.26 The render is applied as described in sections 16.16, 16.17, 16.19 and 16.20 to a minimum finished thickness of 15 mm. Light ashlar marking (not more than 3 mm deep) is cut into the surface using the square-edge cutting tool.

Dry dash finish

16.27 The render is applied as described in sections 16.16, 16.17, 16.19 and 16.20 to a minimum finished thickness of 12 mm and flattened. While the render is still soft, the dry-dash is applied with a dashing trowel. On competition, the surface should be checked to ensure an even coverage.

Spray roughcast finish

16.28 The render is applied as described in sections 16.16, 16.17, 16.19 and 16.20 to a minimum finished thickness of 12 mm and ruled flat. When the render begins to set, a light spray is applied to achieve an overall thickness of 15 mm to 16 mm.

Brick effect finish (RBF)

16.29 When the weber.rend M1 has hardened, 2 to 3 mm of weber.rend RBF is applied and the surface textured lightly with a dry, soft bristle brush. It is left to dry, then the surface set out with the chosen brick pattern, taking care not to damage the face coat. The horizontal lines must be marked out first. Horizontal joints should be cut (although not deeply) using a spirit level and the weber.rend RB cutter.

16.30 After joints have been formed and when the surface is partially cured (hard, but not fully set), all traces of cut-out material should be removed by brushing with a dry, soft bristle brush.

General

16.31 To prevent the finish from drying too rapidly, it should not be applied in direct sunlight. The finished render surface should be protected from rain and frost until the material is dry and hard, approximately 24 hours in favourable conditions; in winter, this may take at least 48 hours. Continuous surfaces must be completed without a break.

16.32 At the tops of the walls, the system must be protected by an adequate coping, overhang or sealed, purpose-made flashing (see Figure 9). Care must be taken in the detailing of the system around openings and projections (see Figures 10, 11 and 12).

Figure 9 Roof eaves detail

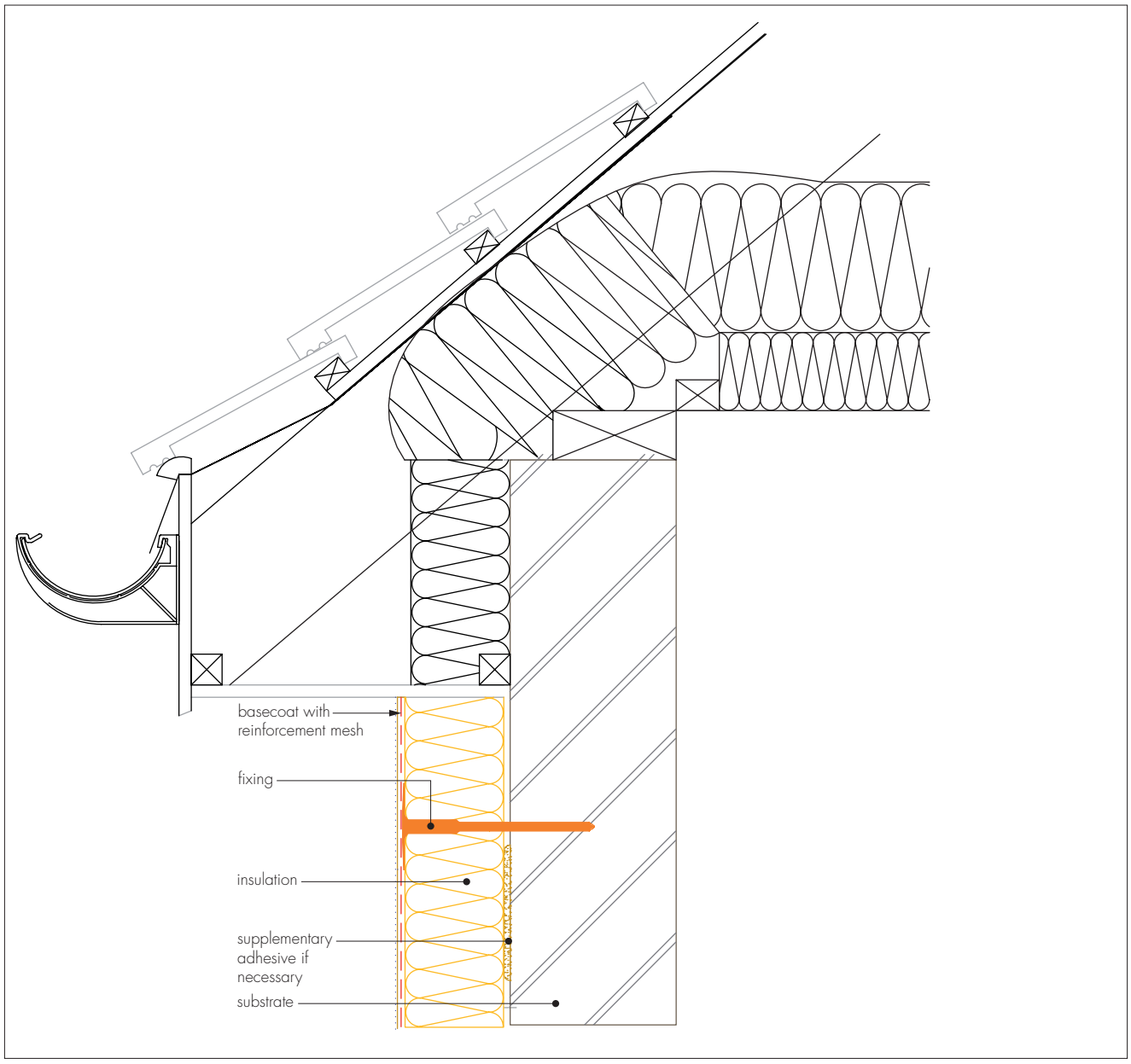


Figure 10 Typical window reveal detail

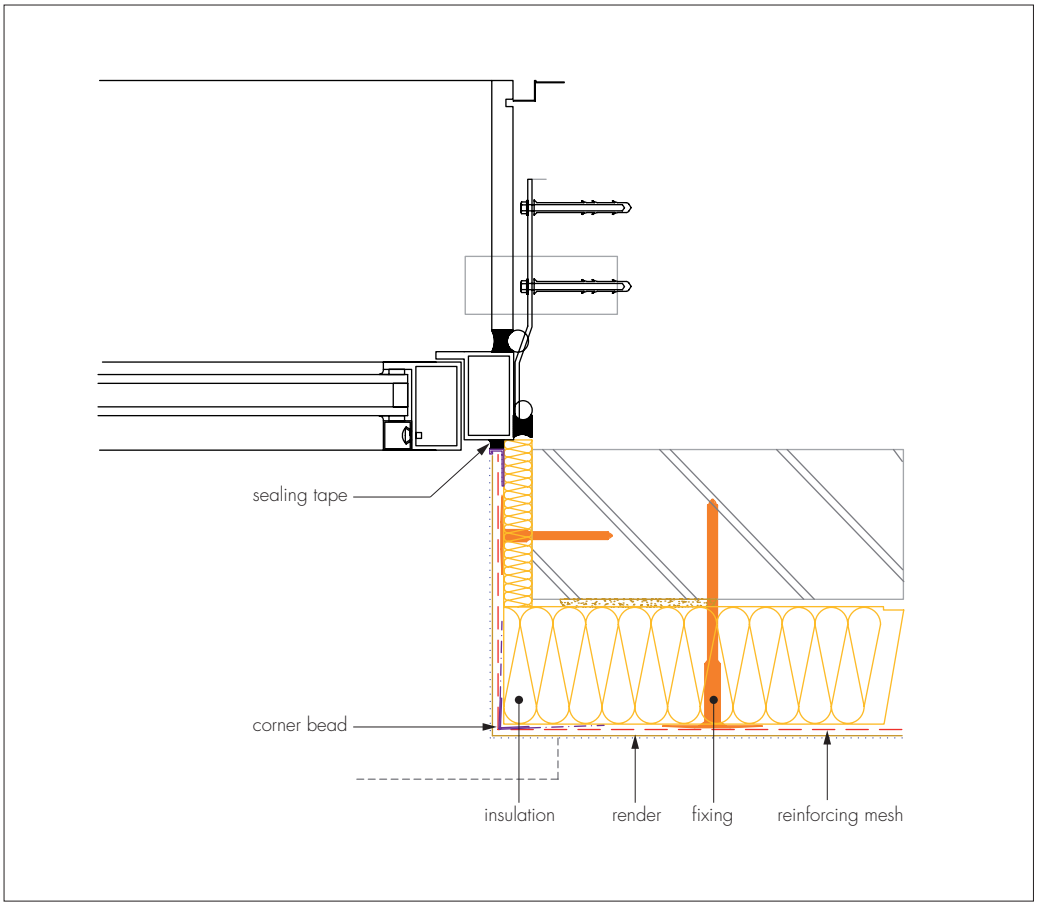


Figure 11 Typical window head detail

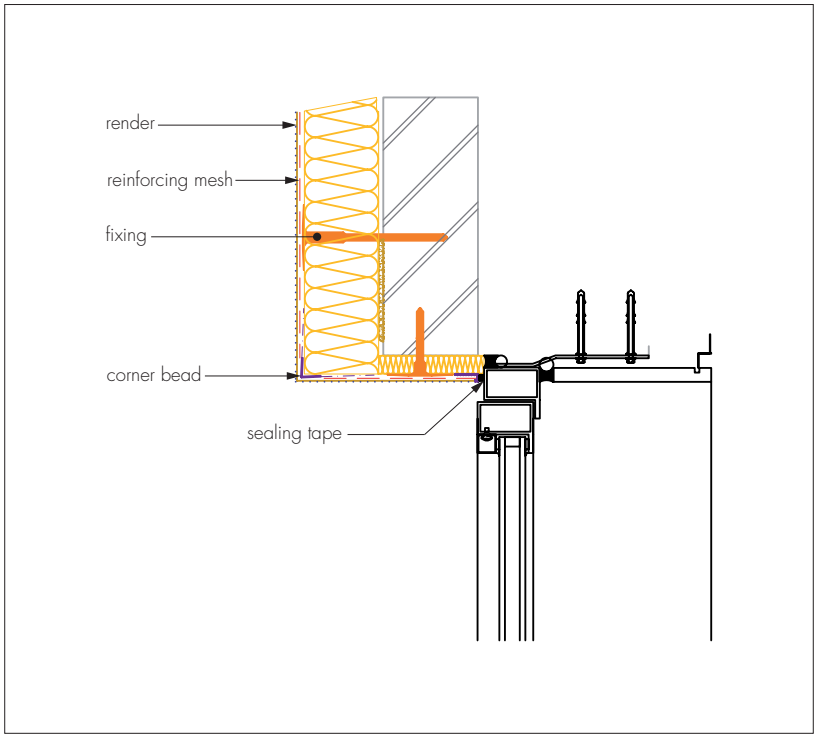
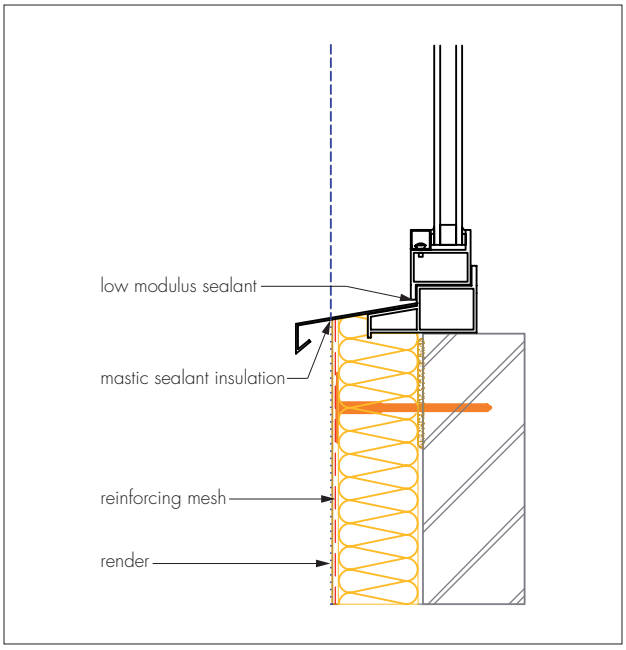


Figure 12 Window sill detail



Technical Investigations

17 Investigations

17.1 The system was evaluated and test results assessed to determine:

- fire classification of the surface spread of flame in accordance with BS 476-7:1997
- bond strength
- the risk of interstitial condensation
- pull-through
- hygrothermal performance
- resistance to freeze thaw
- resistance to impact
- water absorption (capillary test)
- water vapour permeability
- thermal conductivity
- 60 years durability assessment.

17.2 The practicability of installation and the effectiveness of detailing techniques were assessed.

17.3 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

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

BS 8000-3 : 2001 *Workmanship on building sites — Code of practice for masonry*

BS EN 1990 : 2002 +A1 2005 *Eurocode — Basis of structural design*

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

BS EN 1996-2 : 2006 *Eurocode 6 : Design of masonry structures — Design considerations, selection of materials and execution of masonry*

BS EN 10088-2 : 2014 *Stainless steels — Technical delivery conditions for sheet/plate and strip of corrosion resisting steels for general purposes*

BS EN 13163 : 2012 +A1 2015 *Thermal insulation products for buildings — Factory made expanded polystyrene (EPS) products — Specification*

BS EN 13165 : 2012 +A1 2015 *Thermal insulation products for buildings — Factory made rigid polyurethane foam (PU) products — Specification*

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

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

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

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

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

18 Conditions

18.1 This Certificate:

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

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

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

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

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

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

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

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

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