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Agrément Certificate
12/4955
Product Sheet 1

JUB EXTERNAL WALL INSULATION SYSTEMS

JUBIZOL EPS EXTERNAL WALL INSULATION SYSTEM

This Agrément Certificate Product Sheet⁽¹⁾ relates to the Jubizol EPS External Wall Insulation System, a mechanically-fixed system with supplementary adhesive, comprising white or grey expanded polystyrene (EPS) insulation boards, glassfibre-mesh-reinforced basecoat and various finish coats. It is suitable for use on the outside of external walls in new or existing domestic and non-domestic buildings.

(1) Hereinafter referred to as 'Certificate'.

CERTIFICATION INCLUDES:

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

KEY FACTORS ASSESSED

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

Strength and stability — the system can adequately resist wind loads and impact damage (see section 7).

Behaviour in relation to fire — the system has a reaction to fire classification of B-s1, d0 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 a least 30 years. The durability can be extended to 60 years by using different fixings and by following a planned inspection and an effective 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

John Albon — Head of Approvals
Construction Products

Claire Curtis-Thomas
Chief Executive

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Originally certificated on 16 November 2012

The BBA is a UKAS accredited certification body — Number 1113. 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 Jubizol EPS 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 8.6 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 sections 13.1 and 13.2 and the <i>Installation</i> part of this Certificate.
Regulation: 26	CO₂ 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. 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, 13.1 and 13.2 and the <i>Installation</i> 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 8.8 of this Certificate.
Standard: 2.7	Spread on external walls
Comment:	The system can satisfy 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 8.8 of this Certificate.
Standard: 3.10	Precipitation
Comment:	The system will contribute to a construction satisfying this Standard, with reference to clauses 3.10.1 ⁽¹⁾⁽²⁾ and 3.10.2 ⁽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
Comment:	All comments given for this system under Regulation 9, Standards 1 to 6, also apply to this Regulation, with reference to clause 0.12.1 ⁽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 sections 13.1 and 13.2 and the <i>Installation</i> part of this Certificate.
Regulation:	28(b)	Resistance to moisture and weather
Comment:		Walls insulated with the system will satisfy this Regulation. See sections 4.4 and 10.1 of this Certificate.
Regulation:	29	Condensation
Comment:		Walls insulated with the system will 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 has a low risk surface and can satisfy this Regulation. See sections 8.1 to 8.6 of this Certificate.
Regulation:	39(a)(i)	Conservation measures
Comment:		The system can contribute to satisfying this Regulation. See sections 6.2 and 6.3 of this Certificate.
Regulation:	40	Target carbon dioxide emission rate
Comment:		The system can contribute to satisfying this Regulation. See sections 6.2 and 6.3 of this Certificate.

Construction (Design and Management) Regulations 2015

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

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

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

Additional Information

NHBC Standards 2016

NHBC accepts the use of Jubizol EPS 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 roof), Chapter 6.9 Curtain walling and cladding*.

Technical Specification

1 Description

1.1 The Jubizol EPS External Wall Insulation System comprises white or grey EPS insulation boards, mechanically fixed to the substrate wall, with supplementary adhesive, reinforced basecoat and various finish coats.

1.2 The system can be designed to achieve either a 30- or 60-year service life (see Figures 1a and 1b). Mechanical fixings are applied through the insulation boards (for 30-year systems) or through the reinforcing mesh and insulation boards (for 60-year systems), to the external surface of the substrate wall. See sections 1.3 and 1.4 for more information.

30-year durability (see Figure 1a)

1.3 After the boards have been secured to the wall with insulation adhesive (if required) and with four mechanical fixings per square metre, the basecoat (see section 1.6) is trowel-applied to the specified thickness, followed by the reinforcing mesh, which is fully embedded within the basecoat. The system is left to cure before application of the primer, finish and decorative coats (described in sections 1.6 and 1.6).

60-year durability (see Figure 1b)

1.4 After the boards have been secured to the wall with insulation adhesive and one mechanical fixing in the middle of each board, the basecoat (see section 1.6) is trowel-applied to the specified thickness, followed by the reinforcing mesh, which is fully embedded within the basecoat. While the basecoat is still wet, additional mechanical fixings are applied through the mesh and insulation boards into the substrate (resulting in a total of six fixings per square metre). Once the first layer of reinforced basecoat has cured, a second layer of mesh is applied, along with a second layer of basecoat. Finally, a third layer of basecoat is applied once the second layer has cured. The system is left to cure before application of the primer, finish and decorative coats (described in sections 1.6 and 1.6).

1.5 Additionally, for 60-year durability systems, the requirements of sections 1.6 (Mechanical fixings) and 4.12 must be met.

1.6 The system comprises the following components:

Adhesive (Supplementary)

- Jubizol Adhesive Mortar — cement-based powder requiring 4 litres to 4.4 litres of clean water per bag

- Jubizol Adhesive — cement-based powder requiring 3.8 litres to 4.2 litres of clean water per bag
- EPS Adhesive Mortar — high-elasticity cement-based mortar requiring 4 litres to 4.4 litres of clean water per bag.

Insulation⁽¹⁾

- EPS 70 White 039 — 1000 mm by 500 mm expanded polystyrene boards in 50 mm⁽²⁾ to 300 mm thicknesses, with a nominal density of 16.5 kg·m⁻³, minimum compressive strength of 70 kPa and minimum tensile strength perpendicular to the face of 150 kPa. Boards are manufactured to comply with BS EN 13163 : 2012, and are classified as Euroclass E in accordance with BS EN 13501-1 : 2007
- EPS 70 White 038 — 1000 mm by 500 mm expanded polystyrene insulation boards in 50 mm⁽²⁾ to 300 mm thicknesses, with a nominal density of 15 kg·m⁻³, minimum compressive strength of 70 kPa and minimum tensile strength perpendicular to the face of 100 kPa. Boards are manufactured to comply with BS EN 13163 : 2012, and classified as Euroclass E in accordance with BS EN 13501-1 : 2007
- EPS 70 Grey 032 — 1000 mm by 500 mm expanded polystyrene insulation boards in 50⁽²⁾ mm to 300 mm thicknesses, with a density between 15 and 17.5 kg·m⁻³, minimum compressive strength of 70 kPa and minimum tensile strength of either 100 kPa or 150 kPa. Boards are manufactured to comply with BS EN 13163 : 2012, and are classified as Euroclass E in accordance with BS EN 13501-1 : 2007.

(1) For declared thermal conductivity values (λ_D), see Table 2 of this Certificate.

(2) 50 mm thickness would normally be specified for reveals.

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:
 - EJOT ST U — polyethylene, PE-HD anchor sleeve with a stainless steel or electro-galvanized steel screw
 - EJOT STR-U⁽³⁾ — polyethylene, PE-HD anchor sleeve with a stainless steel or electro-galvanized steel screw
 - EJOT SDM-T plus — polyamide anchor sleeve with a stainless steel or electro-galvanized steel screw
 - EJOT NT-U — polyethylene, PE-HD anchor sleeve with a stainless steel or electro-galvanized steel pin
 - EJOT NK-U — polyethylene, PE-HD anchor sleeve with a stainless steel or electro-galvanized steel pin
 - Pritrdilno Sidro PSK⁽⁴⁾ — polypropylene (BD310MO), anchor sleeve with an electro-galvanized steel pin
 - Plasticno Pritrdilo PP⁽⁴⁾ — polypropylene (BD310MO), anchor sleeve and pin.

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

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

(3) EJOT STR-U anchors cannot be specified when using insulation thickness of either 60 mm or 70 mm.

(4) These fixings can only be specified for 30-year durability applications when using insulation boards with tensile resistance \geq 150 kPa.

Basecoat

- Jubizol Adhesive Mortar — cement-based powder requiring 4 litres to 4.4 litres of clean water per bag. Applied to a thickness of 3 mm to 6 mm
- EPS Adhesive Mortar — high-elasticity cement-based mortar, requiring 4 litres to 4.4 litres of clean water per bag. Applied to a thickness of 3 mm to 4 mm.

Reinforcing mesh

- Jubizol Glassfibre Mesh PF 290 — alkali-resistant glassfibre mesh (grid size 3.5 mm by 4.5 mm) with a polymer coating, and nominal weight of 160 g·m⁻²
- Jubizol Glassfibre Mesh SD 4420 G DIN — alkali-resistant glassfibre mesh (grid size 3.5 mm by 4.5 mm) with a polymer coating, and nominal weight of 160 g·m⁻².

Primer

- Unigrund — liquid, water-based acrylic slurry primer for use with all finishing coats (except mineral-based finishing coats, mineral-trowelled render, mineral smooth render and Nivellin D)
- Akril Emulsion — liquid, water-based acrylic primer for use with the mineral-based finishing coats
- Jubosil GX — liquid, water-based silicate primer for use with the silicate-based finishing coats
- Jubosil G — liquid, water-based silicone primer for use with the silicone-based finishing coats.

Finishing coats⁽¹⁾

- Mineral Trowelled Render — ready-mixed lime-cement-based mortar (particle sizes 2.0 mm to 2.5 mm) requiring 3.8 litres to 4.2 litres of clean water per bag
- Mineral Smooth Render — ready-mixed lime-cement-based mortar (particle sizes 1.5 mm to 2.5 mm) requiring 3.8 litres to 4.2 litres of clean water per bag
- Silicate Trowelled Render — ready-to-use paste (particle sizes 2 mm and 2.5 mm)
- Silicate Smooth Render — ready-to-use paste (particle sizes 1.5 mm, 2 mm and 2.5 mm)
- Silicone Trowelled Render — ready-to-use paste (particle sizes 2 mm and 2.5 mm)

- Silicone Smooth Render — ready-to-use paste (particle sizes 1.5 mm, 2 mm and 2.5 mm)
- Nivelin D⁽²⁾ — ready-mixed polymer-based mortar requiring 0.25 litres to 0.27 litres of clean water per kg, applied to a thickness of between 1.5 mm and 5 mm. Only for use in combination with basecoat Jubizol Adhesive Mortar
- Nanoxil G — silicone smooth render — ready-to-use paste (particle sizes 1.5 mm, 2.0 mm and 2.5 mm)
- Jubizol Dash Receiver — polymer-modified cement-based dash receiver applied to a thickness of 5 mm to 8 mm and used with a spar dash finish, requiring 3.8 litres to 4.2 litres of clean water per bag. Limited to eleven colours⁽³⁾ specified by Certificate holder.

(1) The thickness of the applied finish is regulated by the particle size specified.

(2) Finishing coat Nivelin D is applied without primer.

(3) Following colours only: white, ivory, cream, buff, fawn, beige, chestnut, chocolate, brick red, grey and Redburn.

Decorative coats

- Spar dash aggregate — available in 4 mm to 8 mm particle sizes and in a range of colours to suit the Jubizol Dash Receiver render
- Acrycolor — liquid exterior acrylic waterborne paint, used as a primer for the mineral-based finishing coats.

Figure 1a Jubizol EPS External Wall Insulation System (30-year durability)

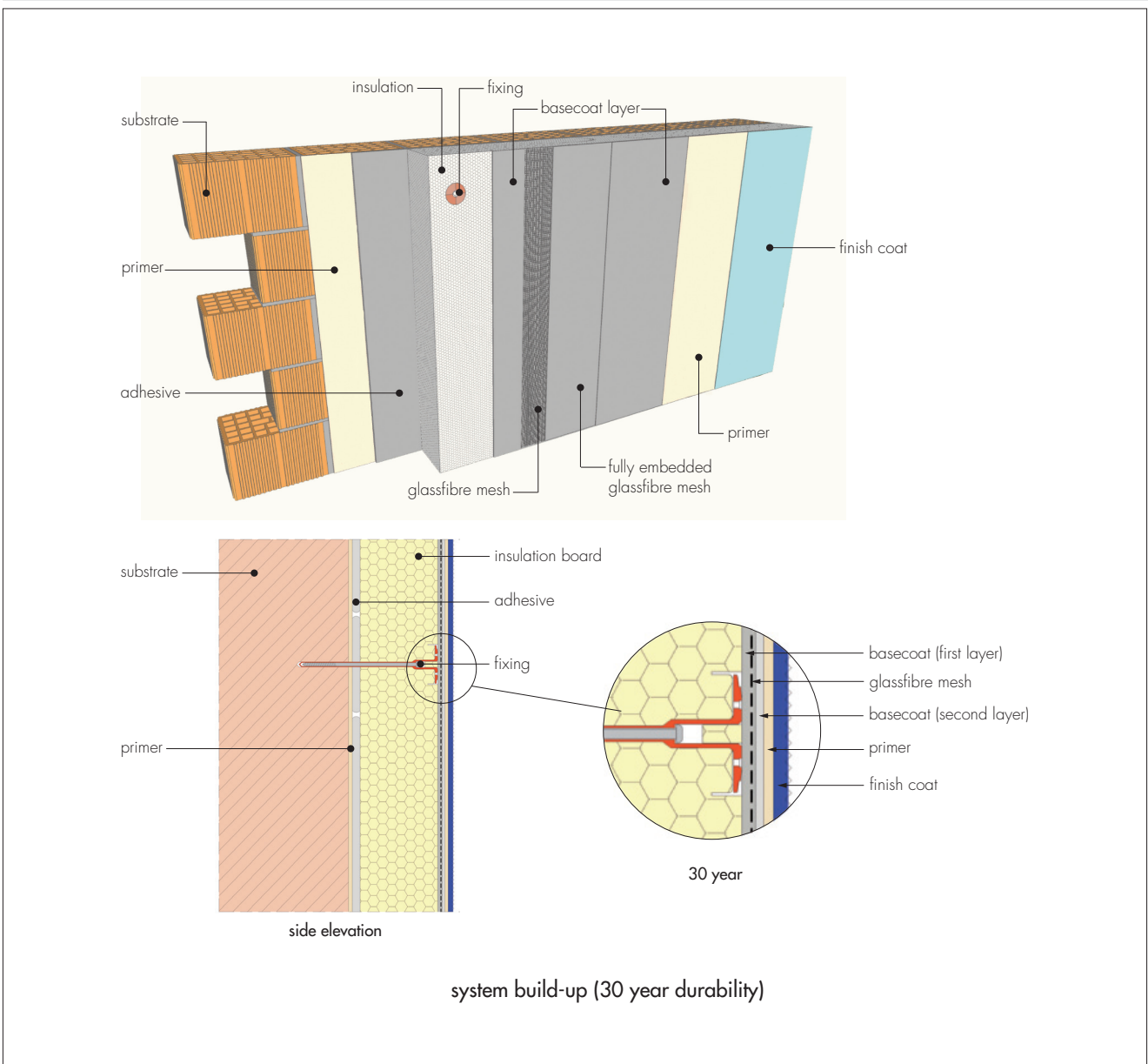
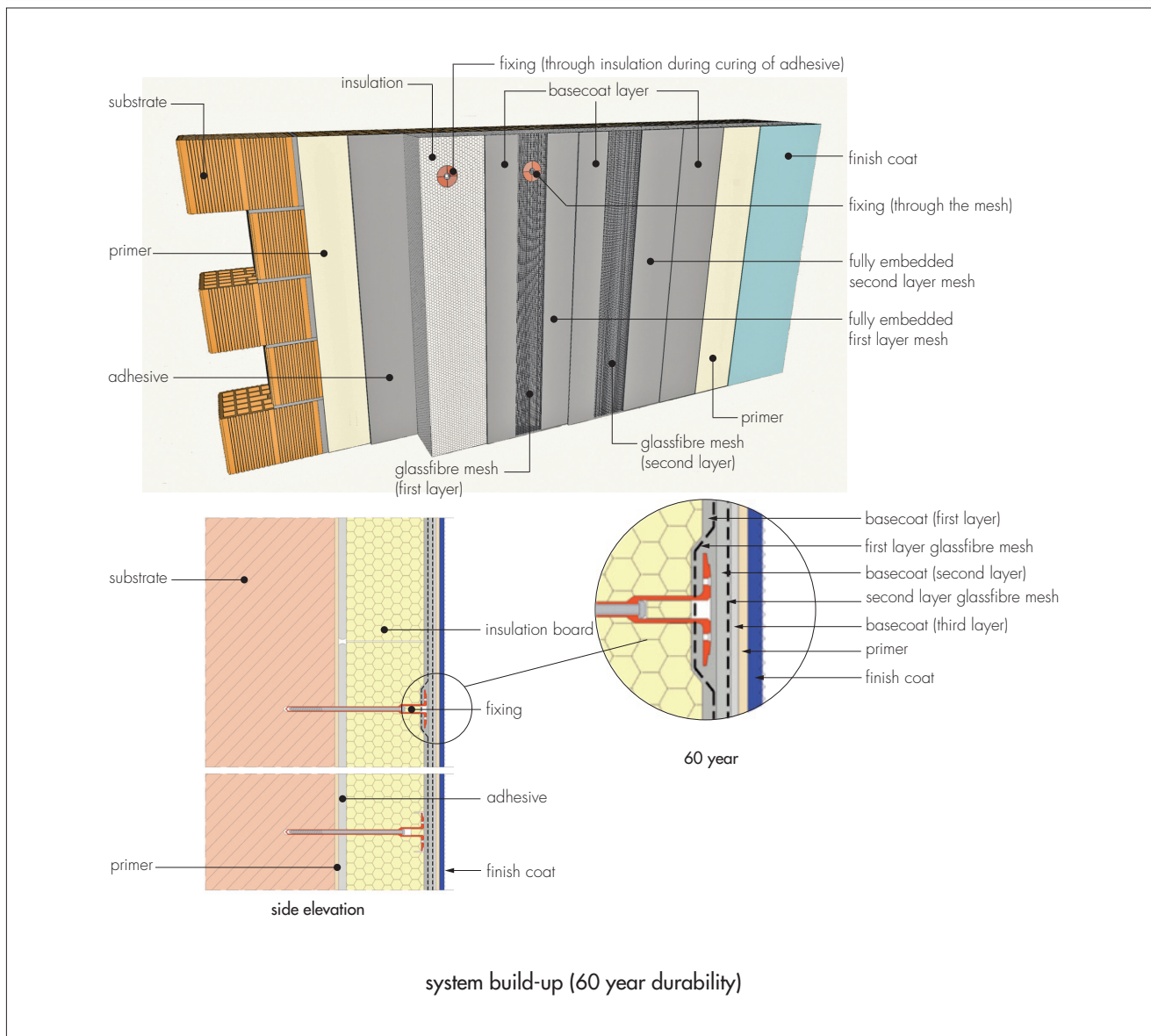


Figure 1b Jubizol EPS External Wall Insulation System (60-year durability)



1.7 Ancillary materials used with the system:

- range of aluminium, PVC-U or stainless steel profiles⁽¹⁾, comprising:
 - base profile
 - edge profile
 - corner profile with optional PVC-U nosing
 - render stop profile
- mechanical fixing used for fire barrier application.

(1) For 60-year durability system, these profiles must be made of stainless steel (see section 13.2).

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

- range of aluminium, PVC-U or stainless steel profiles, comprising:
 - movement joint
 - expansion joint
- profile connectors and fixings
- fungicidal wash
- sealants — silicone in accordance with BS EN ISO 11600 : 2003
- expansion foam — polyurethane foam used for filling gaps between insulation boards.

2 Manufacture

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

- agreed with the manufacturer the quality control procedures and product testing to be undertaken
- assessed and agreed the quality control operated over batches of incoming materials

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

2.2 The management system of JUB kemična industrija d.o.o. has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2008 and BS EN ISO 14001 : 2004 by IQNet (Certificates SI-Q-159 and SI-E-034 respectively).

3 Delivery and site handling

3.1 The insulation boards are delivered in sealed packs and each pack carries the product identification and manufacturer's batch numbers.

3.2 The other components are delivered in the quantities and packaging listed in Table 1. Each package carries the product identification and manufacturer's batch number.

Component	Quantity and package
Adhesive/basecoat – Jubizol Adhesive Mortar, Jubizol Adhesive and EPS Adhesive Mortar	20 kg bag
Jubizol Glassfibre Mesh (PF 290 and SD 4420 G DIN)	50 m roll, 1 m wide
Unigrund primer	18 kg plastic container
Akril Emulsion primer	1 kg, 5 kg and 18 kg container
Jubosil GX and Jubosil G primer	5 litre container
Mineral renders (Trowelled and Smooth)	20 kg bag
Silicate renders (Trowelled and Smooth)	25 kg container
Silicone renders (Trowelled and Smooth)	25 kg container
Nivelin D	5 kg and 20 kg bag
Nanoxil G	25 kg plastic container
Jubizol Dash Receiver	25 kg bag
Mechanical fixings	boxed by manufacturer
Acrycolor paint	5 litre and 15 litre container
Spar dash aggregate	25 kg bag

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

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

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

3.6 The primer should be stored in a safe area, under cover, and protected from excessive heat and frost at all times.

Assessment and Technical Investigations

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

Design Considerations

4 General

4.1 The Jubizol EPS 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 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). 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 or 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 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 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 the Standards identified in 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 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.

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

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

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

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

4.11 The Jubizol EPS External Wall Insulation System can be adapted to achieve an extended service life of 60 years instead of the standard 30. The difference between 30- and 60-year durability systems is covered in sections 1.2 to 1.5, with the detailed installation procedure covered in section 16.

4.12 For 60-year durability systems, the insulation board adhesive must be used and the mechanical fixings must be applied through the reinforcement mesh. Additionally, the following components must be constructed from stainless steel grade 1.4301 to BS EN 10088-2 : 2014:

- base profile and render stop end including the fixings. In addition any other profile component which would remain exposed after the application of the finish coat
- corner profile (if exposed after application of the system)
- pin or screw for mechanical fixings.

5 Practicability of installation

The system should only be installed by specialised contractors who have successfully undergone training and registrations 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's 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 (λ_D) values of the insulations given in Table 2 of this Certificate.

Table 2 Declared thermal conductivities values (λ_D) and available thicknesses

Insulation types	Insulation board thickness range (mm)	Thermal conductivity ($W \cdot m^{-1} \cdot K^{-1}$)
EPS 70 White 039		0.039
EPS 70 White 038	50 to 300	0.038
EPS 70 Grey 032		0.032



6.2 The U value of a completed wall will depend on the selected insulation type and thickness, fixing method and type of fixing, and the insulating value of the substrate masonry and its internal finish. Calculated U values for sample construction in accordance with the national Building Regulations are given in Tables 3 and 4, and are based on the thermal conductivities given in Table 2.

Table 3 Insulation thickness required to achieve U value⁽¹⁾⁽²⁾⁽³⁾ using galvanized steel fixings (30-year durability)

U value ⁽⁴⁾ (W·m ⁻² ·K ⁻¹)	Insulation thickness ⁽³⁾ (mm)					
	215 mm brickwork, $\lambda = 0.56 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$			200 mm dense blockwork, $\lambda = 1.75 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$		
	EPS 70 White 039	EPS 70 White 038	EPS 70 Grey 032	EPS 70 White 039	EPS 70 White 038	EPS 70 Grey 032
0.18	230	220	190	230	230	190
0.19	210	210	170	220	210	180
0.25	150	150	130	160	160	130
0.26	140	140	120	150	150	130
0.28	130	130	110	140	140	120
0.30	120	120	100	130	130	110
0.35	100	100	80	110	110	90

- (1) Wall construction inclusive of 13 mm plaster ($\lambda = 0.57 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$), brickwork (protected) with 17.1% mortar or dense blockwork with 6.7% mortar ($\lambda = 0.88 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$). Declared thermal conductivity (λ_p) of the insulation is as shown in Table 2. A 5 mm thick adhesive layer with $\lambda = 0.43 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$ covering 100% of the area is also included, and a board emissivity of 0.9, together with an external render thickness of 4.5 mm with $\lambda = 1.0 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$.
- (2) Calculations based on a mechanically-fixed system that included six galvanized steel fixings per m², with a point thermal transmittance (X_p) of 0.004 W·K⁻¹ per pin. Use of other types of fixings should be calculated in accordance with BS EN ISO 6946 : 2007. A gap correction (ΔU) of zero is assumed.
- (3) Based upon incremental insulation thickness of 10 mm.
- (4) When applying the maximum available insulation thickness, these walls can achieve U values from 0.12 W·m⁻²·K⁻¹ to 0.15 W·m⁻²·K⁻¹ depending on insulation type and wall type.

Table 4 Insulation thickness required to achieve U value⁽¹⁾⁽²⁾⁽³⁾ using stainless steel fixings (60-year durability)

U value ⁽⁴⁾ (W·m ⁻² ·K ⁻¹)	Insulation thickness ⁽³⁾ requirement (mm)					
	215 mm brickwork, $\lambda = 0.56 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$			200 mm dense blockwork, $\lambda = 1.75 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$		
	EPS 70 White 039	EPS 70 White 038	EPS 70 Grey 032	EPS 70 White 039	EPS 70 White 038	EPS 70 Grey 032
0.18	210	200	170	220	210	180
0.19	200	190	160	210	200	170
0.25	140	140	120	150	150	130
0.26	140	130	110	150	140	120
0.28	130	120	100	140	130	110
0.30	120	110	100	130	120	100
0.35	100	90	80	110	100	90

- (1) Wall construction inclusive of 13 mm plaster ($\lambda = 0.57 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$), brickwork (protected) with 17.1% mortar or dense blockwork with 6.7% mortar ($\lambda = 0.88 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$). Declared thermal conductivity (λ_p) of the insulation is as shown in Table 2. A 5 mm thick adhesive layer with $\lambda = 0.43 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$ covering 100% of the area is also included, and a board emissivity of 0.9, together with an external render thickness of 4.5 mm with $\lambda = 1 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$.
- (2) Calculations based on a mechanically-fixed system that included six stainless steel fixings per m², with a point thermal transmittance (X_p) of 0.002 W·K⁻¹ per pin. Use of other types of fixings should be calculated in accordance with BS EN ISO 6946 : 2007. A gap correction (ΔU) of zero is assumed.
- (3) Based upon incremental insulation thickness of 10 mm.
- (4) When applying the maximum available insulation thickness, these walls can achieve U values from 0.11 W·m⁻²·K⁻¹ to 0.14 W·m⁻²·K⁻¹ 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 When installed on suitable walls, the system can adequately transfer to the wall the self-weight and negative (suction) and positive (pressure) wind loads normally experienced in the United Kingdom.

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

7.3 Negative wind load is resisted by the bond between the insulation and render (resistance $\geq 80 \text{ kN}\cdot\text{m}^{-2}$ and using a safety factor of 9) and 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 individual to confirm that:

- the substrate wall has adequate strength to resist the additional loads that may be applied as a result of installing the system, ignoring any positive contribution that may occur from the system
- the proposed system and associated fixing layout (see Figures 5 and 6) provides adequate resistance to negative wind loads, based on the results of site investigation and test results (see section 7.7 and Table 6) of this Certificate
- 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 characteristics value = 0.6 x mean of 5 lowest tests results).

7.6 The number and centres 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 16.22 and 16.31). Provided the substrate wall is suitable and an appropriate fixing selected, the mechanical fixings will adequately support and transfer the weight of the render insulation system to the substrate wall at the spacings given in this Certificate.

7.7 Typical characteristic pull-out strengths for the fixings taken from the corresponding European Technical Approval (ETA) are given in Table 5; however, these values are dependent on the substrate, and the fixing must be selected to suit the loads and substrate concerned.

Table 5 Fixings — typical characteristic pull-out strengths

Fixing type	ETA number	Substrate	Drill diameter (mm)	Effective anchorage depth (mm)	Characteristic pull out strength (kN) ⁽¹⁾	Partial safety factor ⁽²⁾
EJOT ST U	02/0018	Concrete C12/15 Clay brickwork	8	25	0.75 1.2	2
EJOT STR-U	04/0023	Concrete C12/15 Clay brickwork	8	25	1.5	2
EJOT SDM-T plus	04/0064	Concrete C12/15 Clay brickwork	8	50	1.5	2
EJOT NT-U	05/0009	Concrete C12/15 Clay brickwork	8	25	1.2 1.5	2
EJOT NK-U	05/0009	Concrete C12/15 Clay brickwork	8	25	1.2 1.5	2
Pritrdilno Sidro PSK ⁽³⁾	05/0148	Concrete C16/20 Clay brickwork	8	55	0.4 0.3	2
Plasticno Pritrdilo PP ⁽³⁾	05/0149	Concrete C16/20 Clay brickwork	10	50	0.4 0.6	2

(1) Values are determined in accordance with ETAG 014 : 2011 and are dependent on the substrate. The use categories are defined in the corresponding ETA.

(2) Values quoted for concrete and clay brickwork.

(3) Pritrdilno Sidro PSK and Plasticno Pritrdilo PP fixings cannot be specified when using insulation boards with tensile strength of less than 150 kPa.

7.8 The insulation system is mechanically fixed to the substrate wall with a minimum of four fixings per square metre or six fixings per square metre, as per the fixing patterns shown in Figures 5 and 6 respectively, with a minimum of 40% supplementary adhesive (see section 16 of this Certificate).

7.9 The design pull-through resistance data given in Table 6 is the result of calculations based upon pull-out resistances determined by BBA from tests on anchors with 60 mm diameter plate.

Table 6 Design pull-through resistances

Factor (unit)	EPS 70 Insulation 1000 mm x 500 mm			
	EJOT NT U, ST U and SDM-T plus fixings	EJOT STR U fixings	PSK fixings	PP fixings
Tensile resistance of the insulation (kPa)	≥ 100	≥ 100	≥ 150	≥ 150
Fixings types ⁽¹⁾	EJOT NT U, ST U and SDM-T plus fixings	EJOT STR U fixings	PSK fixings	PP fixings
Fixings plate diameter (mm)	60	60	60	60
Insulation thickness (mm)	≥ 60	≥ 80	≥ 50	≥ 50
Characteristic pull-through resistance ⁽²⁾ per fixing (N) applied at insulation board joints	340	480	482	350
Factor of safety ⁽³⁾	2.5	2.5	2.5	2.5
Design pull-through resistance per fixing (N)	136	192	193	140

(1) See Table 5 for typical characteristic pull-out strengths of the fixings.

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

(3) 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.

Impact resistance

7.10 Hard body impact tests were carried out in accordance with ETAG 004 : 2013. The system is suitable for the use Categories⁽¹⁾ listed in Table 7 of this Certificate.

Table 7 Jubizol EPS External Wall Insulation System impact resistance

Render system: Basecoat as specified + finishing coats indicated below:	Particle size (mm)	Category ⁽¹⁾			
		Basecoat		Basecoat	
		Jubizol Adhesive Mortar		EPS Adhesive Mortar	
		Single mesh	Double mesh	Single mesh	Double mesh
Mineral Trowelled Render Mineral Smooth Render	All	Category II	—	Category III	Category II
Nivellin D		—	Category II	—	—
Silicate Trowelled Render	1.5	Category II	—	—	—
Silicate Smooth Render	2.0 – 2.5	Category I	—	—	—
	All	—	Category I	Category II	Category II
Silicone Trowelled Render	1.5	Category II	—	—	—
Silicone Smooth Render	2.0 – 2.5	Category I	—	—	—
	All	—	Category I	Category II	Category II
Nanoxil G	All	Category II	Category I	Category II	Category II
Jubizol Dash Receiver	5 – 8	Category I	—	—	—

(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 reaction to fire classification is B-s1, d0 in accordance with BS EN 13501-1 : 2007.

8.2 The fire classification applies to the full range of insulation thicknesses covered by the Certificate (see section 1.6).

8.3 The classification applies to the full range of colours available on the finishing coats unless specified otherwise (see section 1.6, Finishing coats — Jubizol Dash Receiver).

8.4 The EPS insulation material in isolation is not classified as non-combustible.

8.5 The system is restricted for use in buildings up to 18 m in height.

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

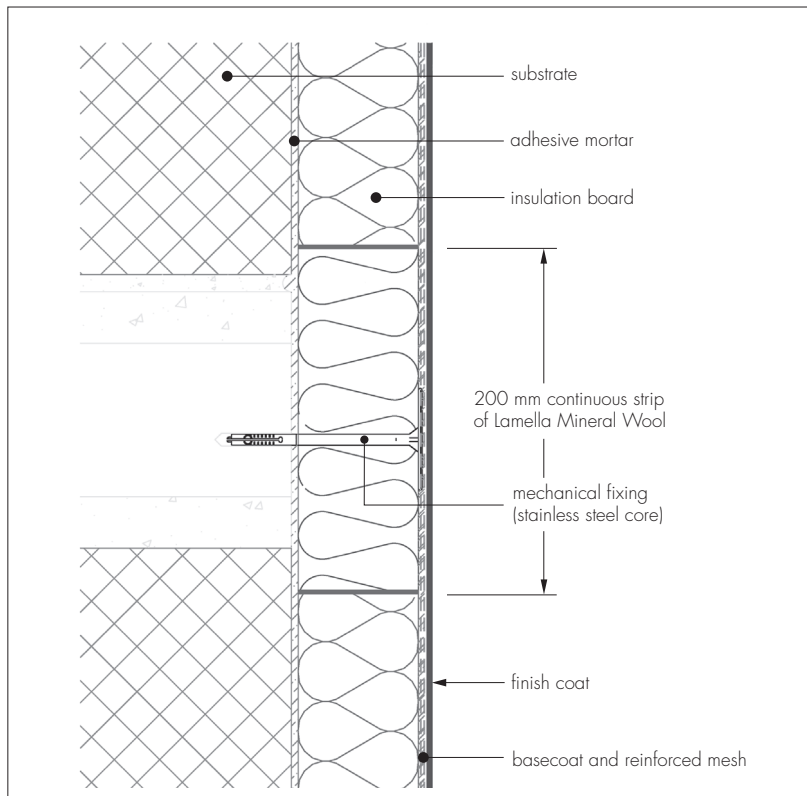


8.7 For flats and maisonettes and non-domestic buildings in Scotland, the system is only suitable for use more than one metre from the boundary.

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

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

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 rain ingress. However, care should be taken to ensure that walls are adequately watertight prior to the application of the system. The system shall 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 top of walls, the system should be protected by a coping, adequate 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 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 $0.7 \text{ W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}$ at any point and the junctions with other elements and openings comply with section 6.3 of this Certificate.



11.3 Walls will adequately limit the risk of surface condensation when the thermal transmittance (U value) does not exceed $1.2 \text{ W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}$ at any point. Guidance may be obtained from BS 5250 : 2011, section 4 and Annex G, and BRE Report 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 factors (μ) and equivalent air layer thicknesses (s_d) are shown in Table 8.

Table 8 Water vapour resistance factor and equivalent air layer thickness

Components	Thickness (mm)	μ	s_d (m)
Expanded polystyrene insulation – white and grey EPS 70	50 to 300	20 – 40 ⁽¹⁾	–
Rendering system: Jubizol Adhesive Mortar basecoat ⁽²⁾ plus, as appropriate, primer + finish coat (specific particle size) as indicated below:			
Mineral Trowelled Render or Mineral Smooth Render	4.5 to 8.5	–	0.1
Silicate Trowelled Render or Silicate Smooth Render	4.5 to 8.5	–	0.1
Silicone Trowelled Render or Silicone Smooth Render	4.5 to 8.5	–	0.2
Nivelin D	4.5 to 11	–	0.1
Nanoxil G	4.5 to 8.5	–	0.3
Rendering system: EPS Adhesive Mortar basecoat ⁽³⁾ plus, as appropriate, primer + finish coat (specific particle size) as indicated below:			
Mineral Trowelled Render or Mineral Smooth Render	4.5 to 6.5	–	0.1
Silicate Trowelled Render or Silicate Smooth Render	4.5 to 6.5	–	0.2
Silicone Trowelled Render or Silicone Smooth Render	4.5 to 6.5	–	0.3
Nanoxil G	4.5 to 6.5	–	0.3

(1) It is recommended that the lower figure is used when assessing the interstitial condensation risk.

(2) Jubizol Adhesive Mortar basecoat applied to a thickness of between 3 mm and 6 mm.

(3) EPS Adhesive Mortar basecoat applied to a thickness of between 3 mm and 4 mm.

12 Maintenance and repair



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

- an initial inspection after twelve 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. The plan should include details of the inspection programme (eg inspection visits, checklist and report) to be used by the building manager/owner, in order to maintain documented evidence of the inspection carried out twelve months after the application of the system and subsequently every five years.

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 : 2005.

13 Durability



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

13.2 The system's service life can be extended to 60 years provided a planned inspection and maintenance programme is introduced in accordance with section 12 of this Certificate. An extended 60 years' service life requires the use of stainless steel base and corner profiles, stainless steel fixings or centre pin Grade 1.4301 and plastic anchor sleeve material such as polyamide (PA6 and PA6.6), polyethylene (PE) or polypropylene (PP) and the following of an appropriate repair and maintenance schedule as covered by the Certificate holder's Repair and Maintenance Manual. In order to achieve this, and depending on the building's location, degree of exposure and detailing, it may be necessary to repair or replace isolated areas. Any damage to the surface finish must be repaired within a time period

agreed in the Certificate holder's maintenance manual. Additionally, for 60-year durability systems, the insulation board adhesive must be used.

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

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

13.5 To maintain a high quality aesthetic appearance, it may be necessary to periodically overcoat the building using system-compatible coatings recommended by the Certificate holder and in accordance with BS EN 1062-1 : 2004. Care should be taken not to adversely affect the water vapour transmission or fire characteristics of the 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 treatment 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 installers (see section 15) to determine the pull-out resistance of the specified mechanical fixings for the appropriate substrate. An assessment and recommendation is made on the type and number of fixings required to withstand the building's expected wind loading based on calculations using the 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.

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.

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

16.4 The primer should be used as required and appropriately selected for the chosen finish coat (see section 1.6).

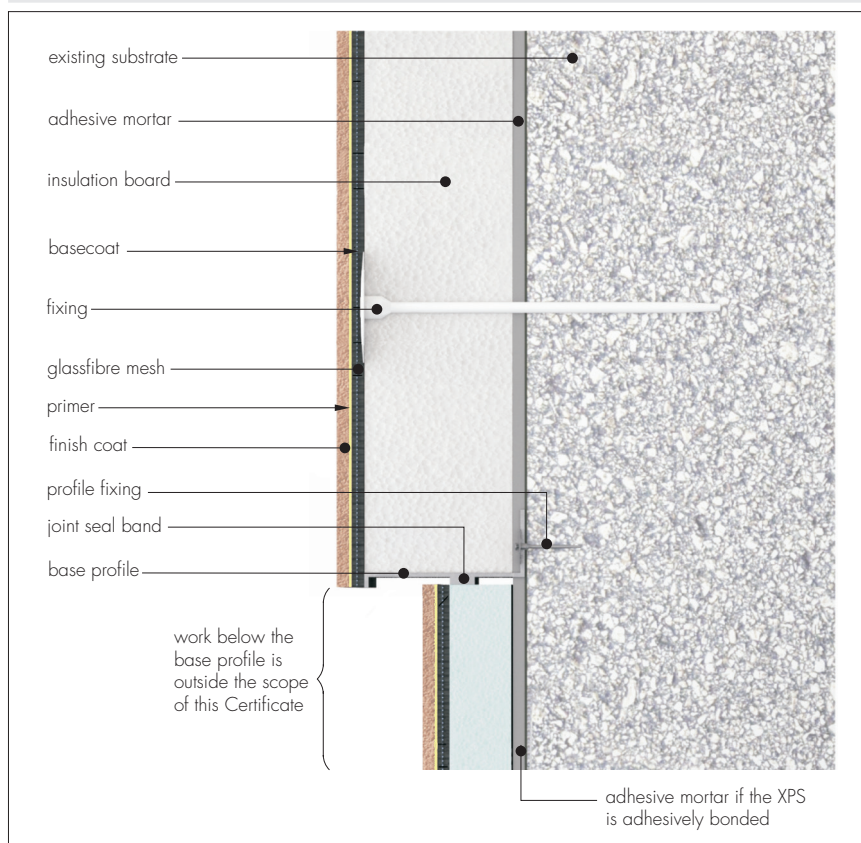
16.5 All rendering should be in accordance with the relevant recommendations of BS EN 13914-1 : 2005.

16.6 The difference between 30- and 60-year durability systems is described in section 1. The initial installation procedure that follows (sections 16.7 to 16.22) is common to both types of systems (with the exception in the selection of the material specification of system components — see sections 4.12 and 13.2).

Positioning and securing insulation boards

16.7 The base profile (see section 4.12) is secured to the external wall above the dpc using the approved profile fixings at approximately 300 mm centres (see Figure 3). Base profile connectors are inserted at all rail joints. Extension profiles are fixed to the front lip of the base profile or stop end channel where appropriate.

Figure 3 Typical section of base profile



16.8 The adhesive is prepared by mixing each bag with the required amount of clean water in a suitable container using a paddle drill mixer to create a paste-like mortar in accordance with the Certificate holder's instructions (see section 1.6).

16.9 The adhesive is applied in a continuous line around the perimeter of the insulation board (at least 30 mm wide) with at least six additional dabs of adhesive (approximately 80 mm to 120 mm in diameter) distributed uniformly over the remaining surface in order to achieve a 40% coverage after the board has been pressed against the wall. Alternatively, for even and smooth substrates, the whole board can be coated with adhesive using a notched trowel, to produce a coat 2 mm to 5 mm in thickness. The board should be immediately placed on the substrate and pressed into place.

16.10 The first run of boards are positioned on the base profile and pressed firmly against the wall. Care should be taken to ensure that all board edges are butted tightly together; alignment must be checked as work proceeds, to achieve a flush finish.

16.11 Subsequent rows of boards are positioned so that the vertical joints are staggered (see Figure 5) and overlapped at the building corners. The alignment should be constantly checked as work proceeds. Joints between the boards up to 10 mm can be filled with foam filler approved by the Certificate holder. Gaps greater than this can be filled with slivers of insulation board.

16.12 Where existing render is on the wall or dubbing out render has been used, care should be taken when aligning the boards as the effective embedment will be reduced.

16.13 To fit around details such as doors and windows, the boards may be cut with a sharp knife or a fine-tooth saw. Purpose-made powder-coated aluminium window sills (complete with sill end caps) are installed in accordance with the Certificate holder's instructions. 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.

16.14 Any high spots should be removed by lightly planing with a rasp. The surface of the boards should be smooth without high spots or irregularities. At all locations where there is a risk of insulant exposure (eg window reveals or eaves), the system must be protected (eg by an adequate overhang or by purpose-made sub-sills, seals or flashing).

16.15 Building corners, door and window heads and jambs are formed using corner profiles, in accordance with the Certificate holder's instructions. Corner profiles are fixed to all building corners. For a 60-year durability system, any portion of the corner profile that remains exposed after the application of the finish coat must be constructed from stainless steel in order to protect it from atmospheric exposure.

16.16 In order to protect the boards from strong winds, mechanical fixings should be applied through each board (one fixing in the centre) to secure them until the adhesive has stabilised. Holes are drilled through the boards into the substrate wall, and mechanical fixings are inserted and tapped or screwed firmly into place.

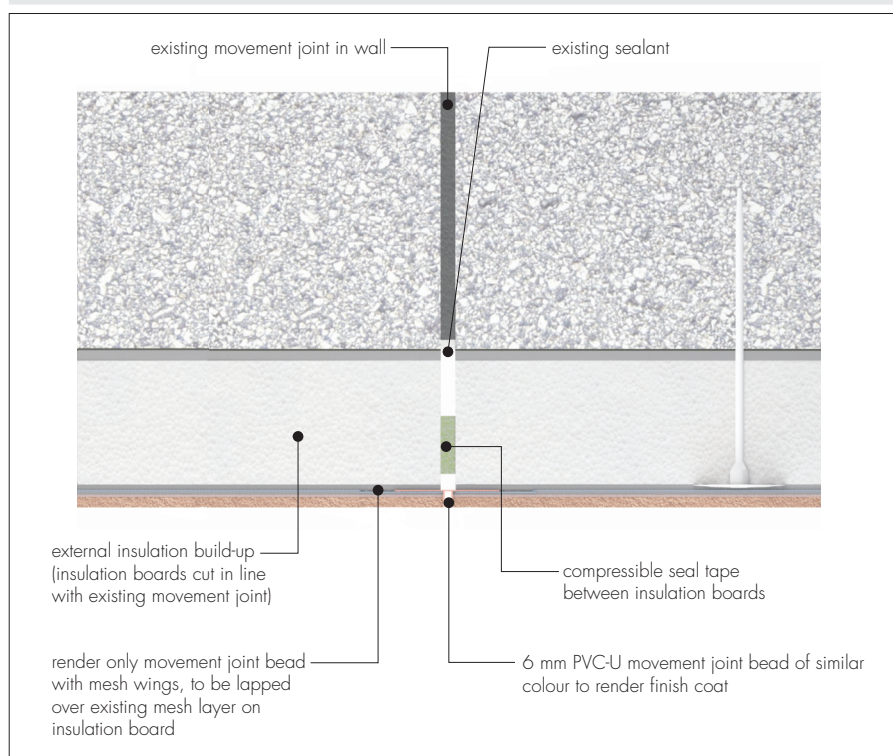
16.17 Installation continues until the whole wall is completely covered including, where appropriate, the building soffits.

16.18 After sufficient stabilisation of the installed insulation system (normally 48 hours, during which time the insulation should be protected from exposure to extreme weather conditions), the system is ready for the application of the basecoat (including the reinforcement mesh).

Movement joints

16.19 Generally, movement joints are not required in the system but, if an expansion joint is incorporated in the substrate, then movement joints must be carried through the insulation system (see Figure 4).

Figure 4 Movement joint detail



Application of basecoat and reinforcement

16.20 Prior to the application of the basecoat and reinforcement, a bead of silicone sealant is applied at window and door frames, overhanging eaves, gas and electric meter boxes, and wall vents, or where the render abuts any other building material or surface. Alternatively, an appropriate sealing tape may be used between the insulation and the object to provide a weathertight seal.

16.21 The basecoat is prepared by mixing each bag with the required amount of clean water in a suitable container using a paddle drill mixer to create a paste-like mortar in accordance with Certificate holder instructions (see section 1.6).

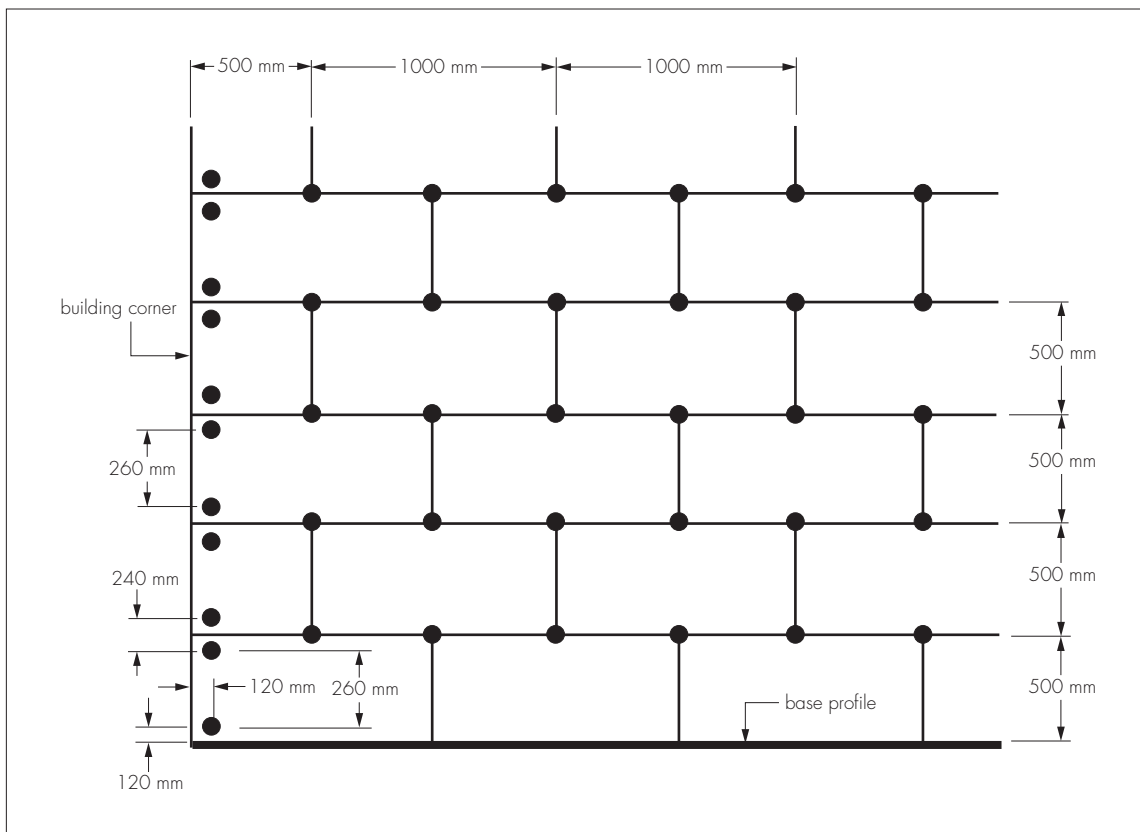
16.22 To provide the necessary reinforcement, stress patches of reinforcement mesh (approximately 200 mm by 200 mm) are applied with basecoat, diagonally over the insulation at the corners of openings (see Figure 7).

16.23 Further installation procedures specific to 30- and 60-year durability systems are described in sections 16.24 to 16.28 and 16.29 to 16.36 respectively.

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

16.24 Holes are drilled through the insulation board into the substrate wall and mechanical fixings (four per square metre) are inserted and tapped or screwed firmly into place, following the fixing pattern shown in Figure 5. As shown, additional fixings are applied at building corners. See Figure 1a, system build-up diagram (30-year durability).

Figure 5 Typical arrangement of insulation boards and fixing pattern for 30-year durability (four fixings per square metre)



16.25 The first layer of the basecoat is applied over the insulation boards using a stainless steel trowel, and floated with a Darby float to an approximate thickness of 2.5 mm. Reinforcement mesh (with its concave surface to the wall) is immediately embedded into the basecoat by trowelling from the centre to the edge and an additional light coat of basecoat is applied (whilst the initial coat is still wet) to ensure the mesh is free of wrinkles.

16.26 The reinforcement mesh should be overlapped at joints by at least 100 mm. Further basecoat is then applied as required, to ensure the mesh is completely covered and the required minimum thickness of basecoat is achieved whilst ensuring that the mesh is placed in the top one third of basecoat.

16.27 A second layer of basecoat is applied to an approximate thickness of 1 mm after the first coat of basecoat has been allowed to dry for approximately 48 hours.

16.28 The basecoat is left to dry for further 24 hours before the primer is applied, where required. The primer applied must be suitable for the required finish coat for the system (see section 1.6) and left to dry for another 12 hours before the application of the finish coat (see sections 16.37 to 16.41).

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

16.29 After the insulation adhesive has set, the system is ready for the application of basecoat (see section 16.21) and reinforcement mesh.

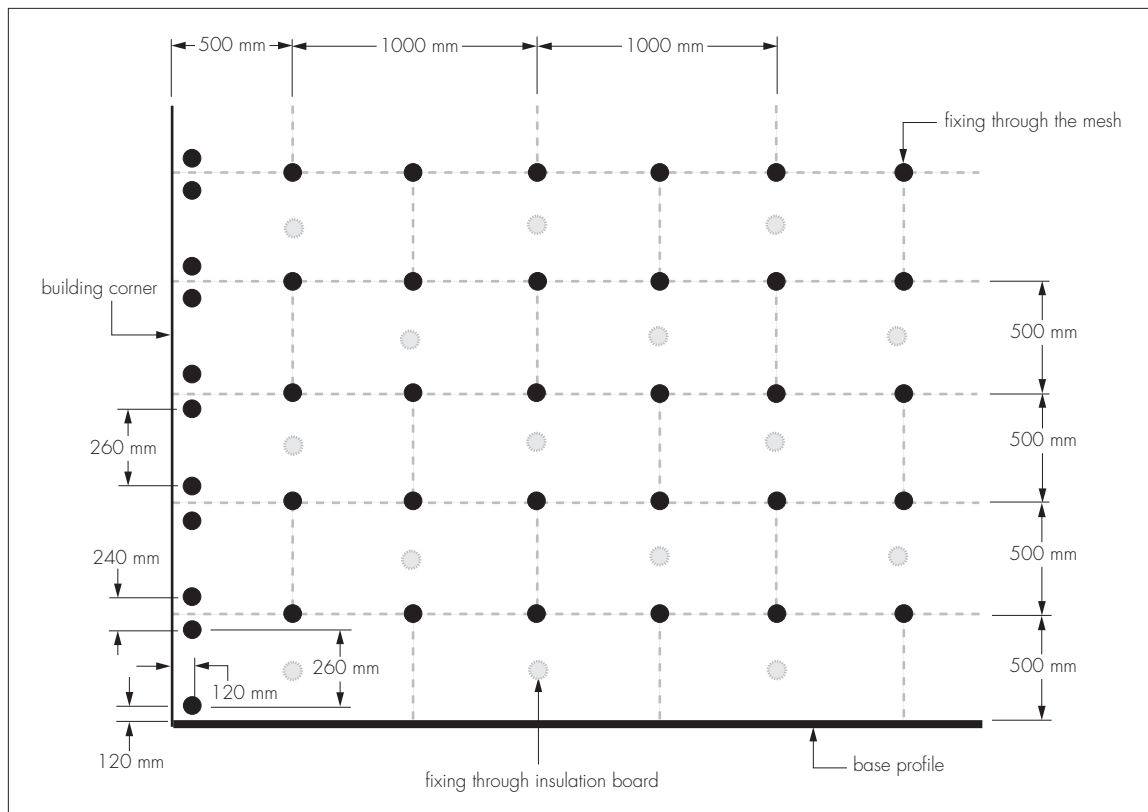
16.30 The first layer of the basecoat is progressively applied over the insulation boards to an approximate thickness of 2.5 mm, working in 1-metre sections in a vertical or horizontal direction using a stainless steel trowel, and floated with a Darby float.

16.31 The reinforcement mesh (with its concave surface to the wall) is applied and immediately embedded into the basecoat by trowelling from the centre to the edge; an additional light coat of basecoat is applied to ensure the mesh is free of wrinkles.

16.32 The reinforcement mesh should be overlapped at joints by at least 100 mm. Further basecoat is then applied as required, to ensure the mesh is completely covered whilst ensuring that the mesh is placed in the top one third of basecoat.

16.33 Holes are drilled through the mesh and insulation boards into the substrate wall to a required depth and, while the basecoat is still wet, mechanical fixings (additional to those initially applied to secure the boards) are inserted and tapped or screwed firmly into place, using the fixing pattern shown in Figure 6. This grid pattern represents a total of six fixings per square metre (the initial 2 fixings per square metre through the boards, plus the four fixings per square metre through the mesh – based on board size 1000 mm by 500 mm). The fixing plate is deliberately over-driven into the insulation to reduce the protrusion of the plate from the surface of the insulation board. See Figure 1b, system build-up diagram (60-year durability).

Figure 6 Typical arrangement of the fixing pattern through the mesh for 60-year durability (six fixings per square metre)

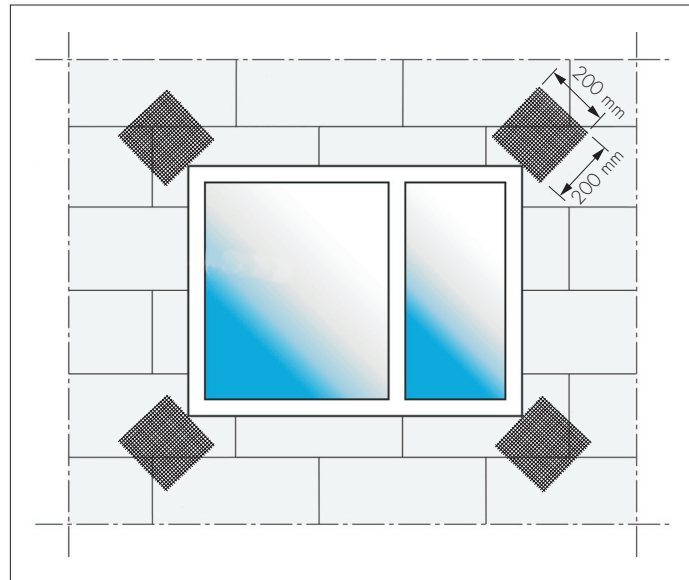


16.34 After the first layer of the reinforced basecoat has been allowed to dry for approximately 60 hours, a second layer of basecoat (to an approximate thickness of 2.5 mm) is applied, together with a second layer of mesh, with its concave surface to the wall. The mesh is immediately embedded into the basecoat by trowelling from the centre to the edge; an additional light coat of basecoat is applied to ensure the mesh is free of wrinkles.

16.35 The second layer of reinforced basecoat is left to dry for additional 60 hours. Finally, a third layer of basecoat (approximately 1 mm thickness) is applied.

16.36 The basecoat is left to dry for further 24 hours before the primer is applied, where required. The primer applied must be suitable for the required finish coat for the system (see section 1.6) and left to dry for another 12 hours before the application of the finishing coat (see 16.37 to 16.41).

Figure 7 Additional reinforcement of openings



Finishing coat

16.37 The basecoat and primer must be allowed to fully cure for the stated period at each stage of installation covered in this Certificate. Prior to the application of the finishing coat, sealant should be applied as required, as defined in the project-specific site package.

16.38 Finishing coats are applied in accordance with the Certificate holder's instructions (see section 1.6) and by following the design guidelines given in section 4.12 of this Certificate.

Jubizol Dash Aggregate finish

16.39 The dash receiver is trowel-applied over the basecoat to a thickness of between 5 mm and 8 mm. While the dash receiver is still soft, spar dash aggregate of the appropriate size is applied onto the receiver coat. On completion, the surface must be checked to ensure an even coverage of spar dash aggregate has been achieved. Where necessary, the aggregate should be lightly tamped to ensure a good bond is achieved.

General guidelines

16.40 Continuous surfaces must be completed without a break, so the coatings must always be applied to a wet edge. Care should be taken to prevent the finish coats from either drying too rapidly or freezing.

16.41 Care should be taken in the detailing of the system around openings and projections and at eaves (see Figures 8 and 9) to ensure adequate protection against water ingress and to limit the risk of water penetrating the system. To achieve a 60-year service life, the system is finished against a stainless steel stop bead at reveals, to allow for replacement of windows.

16.42 The finish coat should be allowed to dry thoroughly before painting any of the surrounding features.

16.43 At the top of walls, the system must be protected by a coping, an adequate overhang or by an adequately sealed, purpose-made flashing.

Figure 8 Roof eaves detail

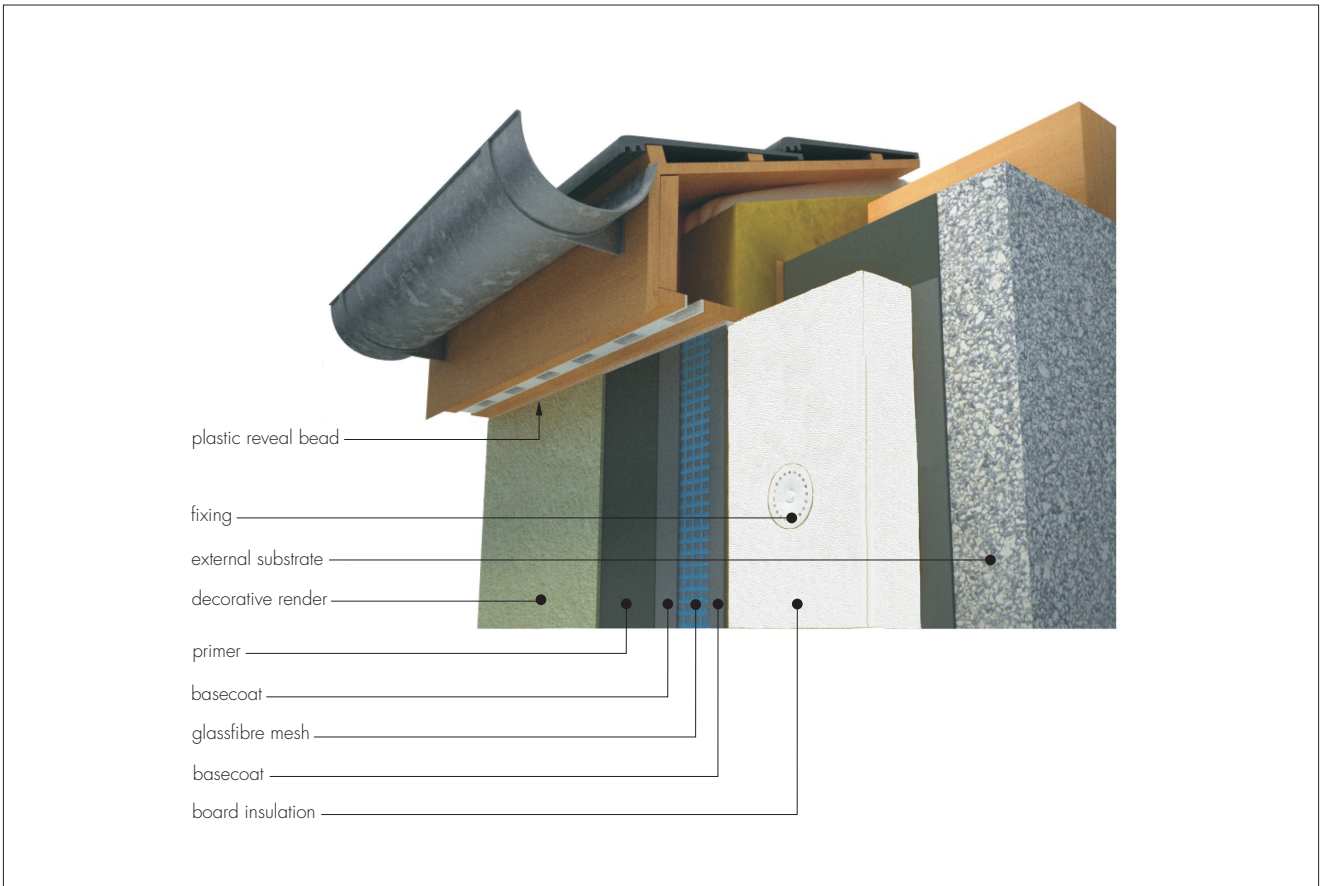
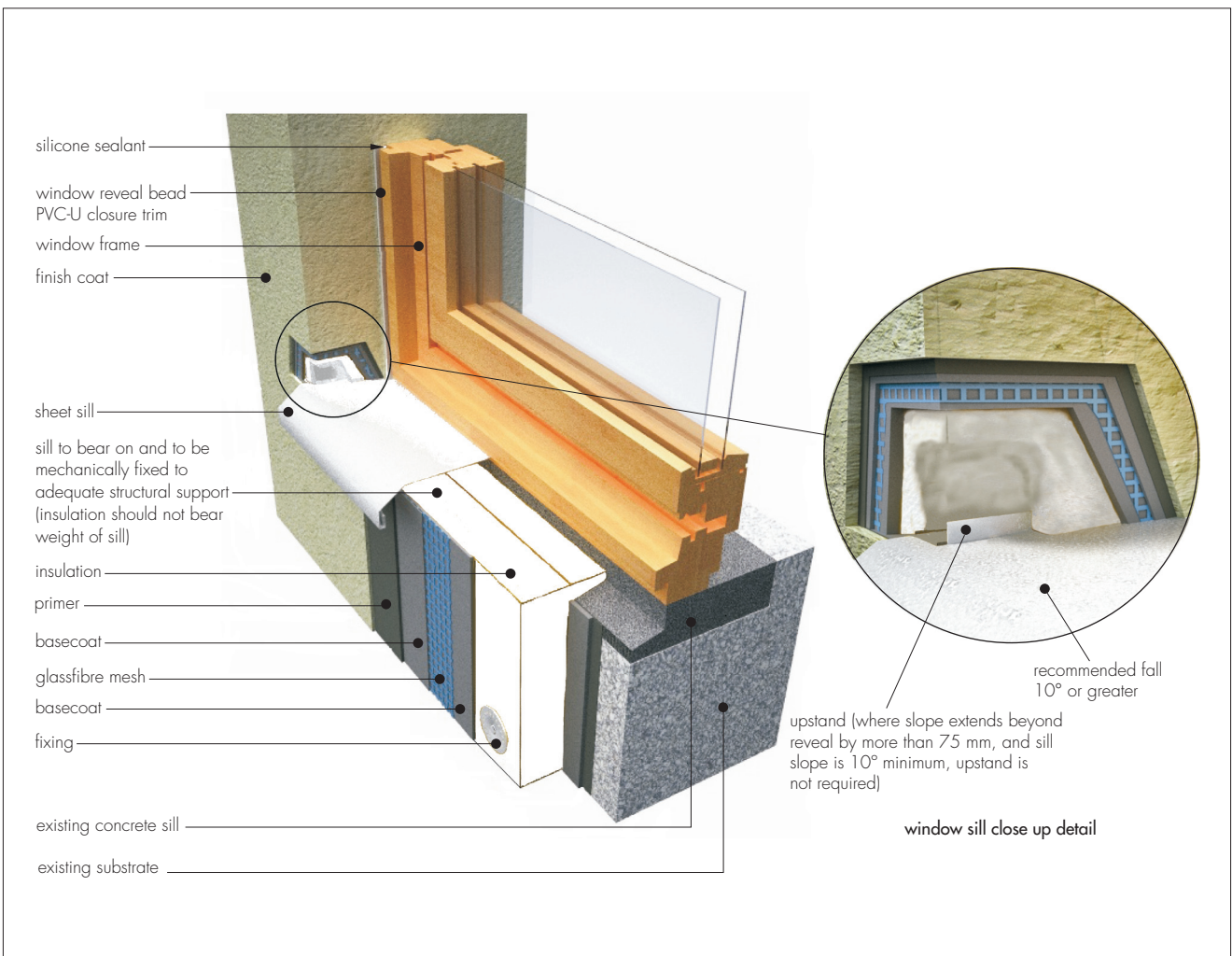


Figure 9 Window sill and reveal detail



17 Investigations

17.1 The system was examined to determine:

- fire performance
- bond strength
- hygrothermal performance and resistance to freeze thaw
- resistance to hard body impact
- water vapour permeability
- pull-through of fixing over insulation
- durability
- adequacy of fixing system
- the risk of interstitial condensation
- thermal conductivity.

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

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

Bibliography

- 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*
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- BS EN 1990 : 2002 *Eurocode — Basis of structural design*
- BS EN 1991-1-4 : 2005 *Eurocode 1 : Actions on structures — General actions — Wind actions*
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- BS EN 10088-2 : 2014 *Stainless steels — Technical delivery conditions for sheet/plate and strip of corrosion resisting steels for general purposes*
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- BS EN ISO 9001 : 2008 *Quality management systems — Requirements*
- BS EN ISO 11600 : 2003 *Building construction — Jointing products — Classification and requirements for sealants*
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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.