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Agrément Certificate
14/5091
Product Sheet 3

FASSATHERM EXTERNAL WALL INSULATION SYSTEMS

FASSATHERM MECHANICALLY FIXED MW EXTERNAL WALL INSULATION SYSTEMS

This Agrément Certificate Product Sheet(1) relates to Fassatherm Mechanically Fixed MW External Wall Insulation Systems, comprising mineral wool (MW) insulation slabs, mechanically fixed with supplementary adhesive, with a reinforced basecoat, primer and render finishes. They are suitable for use, without height restriction, on the outside of external walls in new and 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 systems 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 systems can be designed to resist the wind loads experienced for a particular location and have adequate impact resistance. The impact resistance is dependent on the system chosen (see section 7).

Behaviour in relation to fire — the systems have a reaction to fire classification of A2-s1, d0 in accordance with BS EN 13501-1 : 2007 (see section 8).

Condensation — the systems 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 systems will remain effective for at least 30 years (see section 13).

The BBA has awarded this Certificate to the company named above for the systems described herein. These systems have been assessed by the BBA as being fit for their intended use provided they are installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

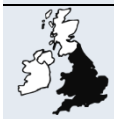
Date of Fourth issue: 10 November 2022

Originally certificated on 16 April 2014

Hardy Giesler
Chief Executive Officer

Regulations

In the opinion of the BBA, Fassatherm Mechanically Fixed MW External Wall Insulation Systems, 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 systems can sustain and transmit wind loads to the substrate wall. See sections 7.1 to 7.17 of this Certificate.
Requirement:	**B4(1)**	**External fire spread**
Comment:		The systems are unrestricted by this Requirement. See sections 8.1 to 8.4 of this Certificate.
Requirement:	**C2(b)**	**Resistance to moisture**
Comment:		The systems can provide a degree of protection against rain ingress. See section 10.1 of this Certificate.
Requirement:	**C2(c)**	**Resistance to moisture**
Comment:		The systems can contribute to minimising the risk of interstitial and surface condensation. See sections 11.2 and 11.4 of this Certificate.
Requirement:	**L1(a)(i)**	**Conservation of fuel and power**
Comment:		The systems can contribute to satisfying this Requirement. See sections 6.1 and 6.2 of this Certificate.
Regulation:	**7(1)**	**Materials and workmanship**
Comment:		The systems are acceptable. See section 13.1 and the *Installation* part of this Certificate.
Regulation:	**7(2)**	**Materials and workmanship**
Comment:		The systems are unrestricted by this Regulation. See sections 8.1 to 8.4 of this Certificate.
Regulation:	**26**	**CO_2 emission rates for new buildings**
Regulation:	**26A**	**Fabric energy efficiency rates for new dwellings (applicable to England only)**
Regulation:	**26A**	**Primary energy consumption rates for new buildings (applicable to Wales only)**
Regulation:	**26B**	**Fabric performance values for new dwellings (applicable to Wales only)**
Comment:		The systems can contribute to satisfying these Regulations; however, compensating fabric/services measures may be required. See sections 6.1 and 6.2 of this Certificate.

The Building (Scotland) Regulations 2004 (as amended)

Regulation:	**8(1)(2)**	**Durability, workmanship and fitness of materials**
Comment:		The systems 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 systems can sustain and transmit wind loads to the substrate wall. See sections 7.1 to 7.17 of this Certificate.
Standard:	2.6	Spread to neighbouring buildings
Comment:		The systems are unrestricted by this Standard, with reference to clauses 2.6.4(1)(2), 2.6.5(1) and 2.6.6(2). See sections 8.1 to 8.4 of this Certificate.

Standard:	2.7	Spread on external walls
Comment:		The systems are unrestricted by this Standard, with reference to clauses 2.7.1[(1)(2)] and 2.7.2[(2)]. See sections 8.1 to 8.4 of this Certificate.
Standard:	3.10	Precipitation
Comment:		The systems can contribute to a construction satisfying this Standard, with reference to clauses 3.10.1[(1)(2)] and 3.10.2[(1)(2)]. See section 10.1 of this Certificate.
Standard:	3.15	Condensation
Comment:		The systems 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 systems 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 6.1 and 6.2 of this Certificate.
Standard:	7.1(a)(b)	Statement of sustainability
Comment:		The systems 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 systems can contribute to a construction meeting a higher level of sustainability as defined in this Standard with reference to clauses 7.1.4[(1)(2)] [Aspect 1[(1)(2)] and 2[(1)]], 7.1.6[(1)(2)] [Aspect 1[(1)(2)] and 2[(1)]] and 7.1.7[(1)(2)] [Aspect 1[(1)(2)]]. See section 6.1 of this Certificate.
Regulation:	**12**	**Building standards applicable to conversions**
Comment		All comments given for the systems 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 systems are acceptable. See section 13.1 and the *Installation* part of this Certificate.
Regulation:	**28(b)**	**Resistance to moisture and weather**
Comment:		The systems provide a degree of protection against rain ingress. See section 10.1 of this Certificate.
Regulation:	**29**	**Condensation**
Comment:		The systems can contribute to minimising the risk of interstitial condensation. See section 11.4 of this Certificate.
Regulation:	**30**	**Stability**
Comment:		The systems can sustain and transmit wind loads to the substrate wall. See sections 7.1 to 7.17 of this Certificate.
Regulation:	**36(a)**	**External fire spread**
Comment:		The systems are unrestricted by this Regulation. See sections 8.1 to 8.4 of this Certificate.

Regulation:	**39(a)(i)**	**Conservation measures**
Regulation:	**40**	**Target carbon dioxide emission rate**
Comment:		The system can contribute to satisfying these Regulations when appropriate compensating fabric and/or services measures are taken. See sections 6.1 and 6.2 of this Certificate.

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

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

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

Additional Information

NHBC Standards 2022

In the opinion of the BBA, Fassatherm Mechanically Fixed MW External Wall Insulation Systems, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements in relation to *NHBC Standards*, Part 6 *Superstructure (excluding roofs)*, Chapter 6.9 *Curtain walling and cladding*.

Technical Specification

1 Description

1.1 Fassatherm Mechanically Fixed MW External Wall Insulation Systems comprise MW insulation slabs that are mechanically fixed to the substrate through the insulation only, or primarily through the reinforced basecoat/insulation. Both application methods require the use of a minimum 50% of supplementary adhesive (see Figure 1).

1.2 The system configurations, by method of fixing, covered under this Certificate include:

- all system combinations that are mechanically fixed through the insulation slabs only at a frequency of 8.3 fixings per m^2 (that is, not through the reinforced basecoat/insulation) and use supplementary adhesive (minimum of 50%), however excluding the systems utilising the Fassatherm RX 561 rendering systems. The basecoat is trowel-applied to the required thickness, and the reinforcing mesh is applied and fully embedded. After the reinforced basecoat has cured, primer is applied followed by the render finish
- all system combinations that are fixed through the reinforced basecoat/insulation, the insulation slabs are adhesively fixed and two mechanical fixings are applied per slab (2.7 per m^2), before the application of basecoat and reinforcing mesh. While the basecoat is partially set, additional fixings are applied through the reinforced basecoat/insulation at a frequency of 6.3 fixings per m^2, followed by the application of mesh patches (200 x 200 mm) over the fixing heads (with additional basecoat, to ensure they are fully encapsulated). After the reinforced basecoat has cured, primer is applied followed by the render finish.

1.3 The systems comprise:

Adhesives (supplementary)

- a range of cement-based adhesives, supplied as powder to which clean water is added and which should cover at least 50% of the bonded area of the slab. The range comprises:
  - Fassatherm A96 Adhesive — requiring the addition of approximately 6.5 litres of clean water per 25 kg of adhesive, applied to a coverage of 3 to 6 $kg \cdot m^{-2}$
  - Fassatherm AL88 Adhesive — requiring the addition of approximately 8 litres of clean water per 25 kg of adhesive, applied to a coverage of 3 to 6 $kg \cdot m^{-2}$

Insulation

- MW Slab — 1200 by 600 mm in a range of thicknesses between 50 and 200 mm, in increments of 10 mm, with a maximum density of 105 kg·m^{-3}and a minimum tensile strength perpendicular to the face of 10 kN·m^{-2}. Slabs are manufactured to comply with BS EN 13162 : 2012
- Rockwool Dual Density Slab — 1200 by 600 mm in a range of thicknesses between 50 and 200 mm, with an average density of 110 kg·m^{-3} and a minimum tensile strength perpendicular to the faces of 10 kN·m^{-2}. Slabs are manufactured to comply with BS EN 13162 : 2012

Fixings

- mechanical fixings — anchors with adequate length to suit the substrate and insulation thickness and selected from:
  - EJOT H1-ECO (Combi Fix) — high-density polyethylene (HDPE) with electro-galvanized pin and a polyamide, PA GF 50 mounting plug
  - EJOT STR U (Top Fix) — HDPE with stainless steel or electro-galvanized screws (this fixing must be surface mounted only when using Rockwool Dual Density Slab)

Basecoat

- Fassatherm A96 Basecoat — a cement-based powder requiring the addition of approximately 6.5 litres of clean water per 25 kg of basecoat. Applied to a thickness of between 4 and 6 mm, for use with any render finish, to a coverage of approximately 3 to 6 kg·m^{-2}
- Fassatherm AL88 Basecoat — cement-based powder requiring the addition of approximately 8 litres of clean water per 25 kg of basecoat. Applied to a thickness of between 5 and 6 mm and for use with any render finish, to a coverage of approximately 3 to 6 kg·m^{-2}

Reinforcement

- Fassanet 160 — 1.0 m wide alkali-resistant glass fibre mesh with a nominal weight of 155 g·m^{-2} and mesh size of 3.8 by 4.1 mm

Primers

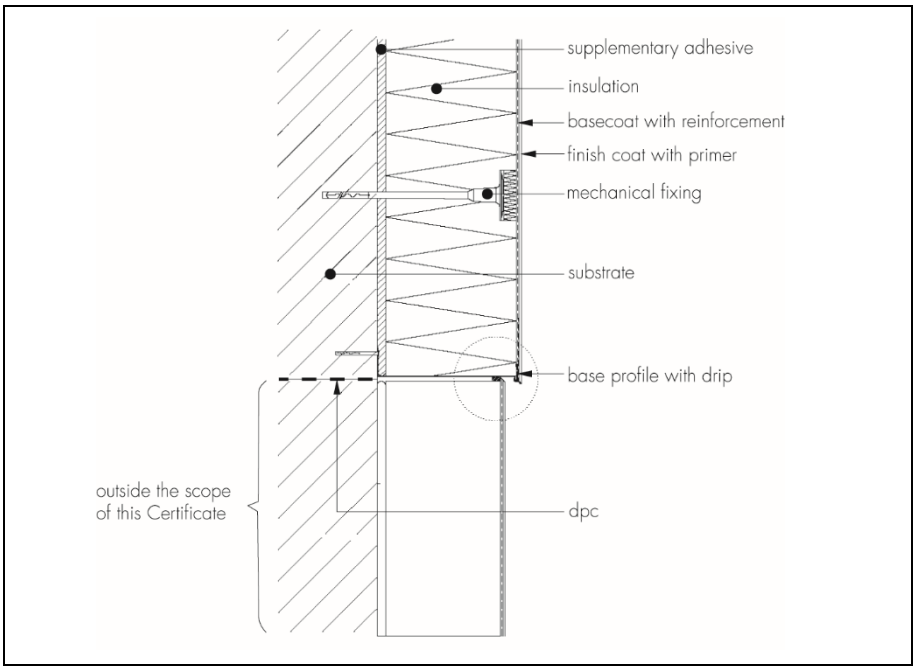
- Fassatherm FA 249 — liquid acrylic primer to which water is added, for use with Fassatherm RTA 549 render finish
- Fassatherm FS 412 — liquid silicone primer to which water is added, for use with Fassatherm RSR 421 render finish
- Fassatherm F328 — liquid silicate primer to which water is added, for use with Fassatherm R336 render finish
- Fassatherm FX 526 — liquid acrylic/siloxane primer to which water is added, for use with Fassatherm RX 561 render finish

Render finishes

- Fassatherm RTA 549 — an acrylic render available in a range of colours, with 1 1.5, 2 and 3 mm grain sizes(1), and a coverage of 2 to 4.2 kg·m^{-2}
- Fassatherm RSR 421 — a silicone render available in a range of colours, with 0.6, 1, 1.5, 2 and 3 mm grain sizes(1), and a coverage of 2 to 4.2 kg·m^{-2}
- Fassatherm R336 — a silicate render available in a range of colours, with 0.6, 1, 1.5, and 3 mm grain sizes(1), and a coverage of 2 to 4.2 kg·m^{-2}
- Fassatherm RX 561 — an acrylic/siloxane render available in a range of colours, with 1, 1.5, 2 and 3 mm grain sizes(1), and a coverage of 2 to 3.4 kg·m^{-2}. This finish is only for use with systems primarily fixed through the reinforced basecoat/insulation.

(1) Thickness is regulated by the grain size.

Figure 1 Fassatherm Mechanically Fixed MW External Wall Insulation Systems



1.4 Ancillary materials used with the systems are a range of aluminium or PVC-U profiles, comprising:

- starter/base profile
- edge, corner and render stop profiles
- connector profile and fixings.

1.5 Ancillary materials also used with the systems, but outside the scope of this Certificate, are:

- algal and fungal wash
- expanding tape — polyurethane soft foam tape for sealing around window sills
- silicone sealant
- extruded polystyrene (XPS) insulation boards [below the damp-proof course (dpc) level].

2 Manufacture

2.1 The systems 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 Fassa S.r.l. has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2015 by IQNet (Certificate 09278).

3 Delivery and site handling

3.1 The slabs 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 1. Each package carries the product identification and manufacturer's batch number.

Table 1 Component Supply details

Component	Quantity and packaging
Fassatherm supplementary adhesives and Fassatherm basecoats	25 kg bags
Mechanical fixings	Boxed by manufacturer
Reinforcement mesh	1 m wide rolls x 50 m length
Fassatherm primers	5 or 16 litre tubs
Fassatherm render finishes	25 kg tubs

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

3.4 The slabs should be protected from prolonged exposure to sunlight, either by storing opened packs under cover or re-covering with opaque polythene sheeting.

3.5 Care must be taken when handling the slabs to avoid contact with solvents or materials containing volatile organic components.

3.6 The adhesives, primers and render finishes must be stored in tightly closed original packaging, in cool and dry conditions, off the ground, and protected from moisture, excessive heat and frost at all times. Contaminated materials should be discarded.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Fassatherm Mechanically Fixed MW External Wall Insulation Systems.

Design Considerations

4 General

4.1 Fassatherm Mechanically Fixed MW External Wall Insulation Systems, when installed in accordance with this Certificate, are satisfactory for use in reducing the thermal transmittance (U value) of external masonry or concrete walls of new and existing buildings. It is essential that the detailing techniques specified in this Certificate are carried out to a high standard if the ingress of water into the insulation is to be avoided and the full thermal benefit obtained from treatment with the systems (eg the insulation must be protected by an overhang, and window sills should be designed and installed so as to direct water away from the building).

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

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

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

- BS EN 1992-1-1 : 2004 and its UK National Annex
- BS EN 1996-1-1 : 2005 and its UK National Annex
- BS EN 1996-2 : 2006 and its UK National Annex
- BS 8000-0 : 2014
- BS 8000-2.2 : 1990
- BS 8000-3 : 2001
- PD 6697 : 2019.

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

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

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

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

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

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

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

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

5 Practicability of installation

The systems should only be installed by specialist 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 installers 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 : 2017 and BRE Report BR 443 : 2006, using the declared thermal conductivity value (λ_D) of 0.036 $W \cdot m^{-1} \cdot K^{-1}$ for the insulation.

6.2 The U value of a completed wall will depend on the insulation thickness, the type and number of fixings, 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 Table 2, and are based on the thermal conductivity given in section 6.1.

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

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

(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 section 6.1. An adhesive layer, 5 mm thick with $\lambda = 0.43\ W \cdot m^{-1} \cdot K^{-1}$ covering 50% of the area is also included, and a slab emissivity of 0.9, together with an external render thickness of 5 mm with $\lambda = 1\ W \cdot m^{-1} \cdot K^{-1}$.

(2) Calculations based on a system that included 8.3 polyethylene fixings per square metre with a point thermal transmittance (X_p) of $0.002\ W \cdot K^{-1}$ per pin. Use of other types of fixings should be calculated in accordance with BS EN ISO 6946 : 2017. A gap correction ($\Delta U''$) of zero is assumed.

(3) Based upon an incremental insulation thickness of 10 mm.

(4) When applying the maximum available insulation thickness, these walls can achieve U values from 0.18 to $0.19\ W \cdot m^{-2} \cdot K^{-1}$ depending on insulation and wall type.

(5) See section 4.2.

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

7 Strength and stability

General

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

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

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

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

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

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

7.6 Negative wind load transfer to the substrate wall depends on the application of mechanical fixings and the respective primary resistance mechanisms as described in sections 7.7 and 7.14.

7.7 The primary resistance mechanisms when fixed with supplementary adhesive through the insulation are as given below[1][2].

- the bond between the insulation and render system (see section 7.8)
- the pull-out resistance of the fixing from the substrate wall (see section 7.9)
- the pull-through resistance of the fixing (see section 7.10).

(1) For mechanically fixed systems with supplementary adhesive, the contribution of the adhesive is not considered when calculating resistance to wind load.
(2) Further guidance is available from BBA Guidance Note 1, available on the BBA website (www.bbacerts.co.uk).

7.8 The characteristic bond resistance between the insulation and render interface derived from test results was 8 $kN \cdot m^{-2}$ for Fassatherm RTA 549 render finish with Fassatherm AL88 Basecoat, 6 $kN \cdot m^{-2}$ for Fassathem RTA 549 render finish with Fassatherm A96 Basecoat, and 10 $kN \cdot m^{-2}$ for all other system permutations. The design resistance of the bond between the insulation and render (N_{RD1}) should be taken as the characteristic bond resistance divided by a partial factor of 9.

7.9 Typical characteristic pull-out resistances for the fixings taken from the corresponding European Technical Assessment (ETA) are given in Table 3 of this Certificate. The values are dependent on the fixing type and must be selected to suit the specific loads and substrate concerned. In situations where suitable data does not exist[1], the characteristic pull-out resistance must be established from site-specific pull-out tests conducted on the substrate of the building to ascertain the minimum resistance to pull-out failure of the fixings, and determined in accordance with the guidance given in EOTA TR051 : 2016 (minimum test characteristic value = 0.6 x mean of 5 lowest test results). To obtain the design pull-out resistance of the fixings (N_{RD2}), this characteristic pull-out resistance should then be divided by the partial safety factor given in Table 3.

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

Table 3 Fixings — typical characteristic pull-out resistances

Fixing type[1]	ETA number	Substrate	Drill diameter (mm)	Effective anchorage depth (mm)	Characteristic pull-out resistance (kN)[2]	Partial safety factor
EJOT H1-ECO (Combi Fix)	11/0192	Concrete C12/15 Clay brickwork	8	25	0.9	2
EJOT STR U (Top Fix)	04/0023	Concrete C12/15 Clay brickwork	8	25[3]	1.5	2

(1) The minimum values for plate stiffness of fixings is 0.6 $kN \cdot mm^{-1}$ and the load resistance is 1.4 kN.
(2) Values are determined in accordance with EAD 330196-00-0604 : 2016 and are dependent on the substrate. The Use Categories are defined in the corresponding ETA.
(3) The fixing ETA references the effective anchorage depth for other substrates.

7.10 The characteristic pull-through resistance of the fixings was determined from tests using a 60 mm diameter fixing plate and minimum insulation thickness of 50 and 100 mm depending on fixing type. The design resistance per fixing (N_{RD3}) is obtained by applying an appropriate partial factor as shown in Table 4.

Table 4 Design pull-through resistances

Factor (unit)	MW insulation 1200 x 600 mm		Rockwool Dual Density Slab 1200 x 600 mm	
	Pull-through			
Tensile resistance of the insulation (kN·m^{-2})	≥ 10			
Fixing type(1)	EJOT H1-ECO (Combi Fix) and EJOT STR U (Top Fix)			
Fixing plate diameter (mm)	60		60	
Insulation thickness (mm)	≥ 100(6)		≥ 50(7)	
Characteristic pull-through resistance(2) per fixing (kN)	Panel joints	0.212	Panel joints	0.150
	At panel	0.222	At panel	0.150
Partial factor(3)	2.5		2.5	
Design pull-through resistance per fixing (N_{RD3}) (kN)	Panel joints	0.085	Panel joints	0.06
	At panel	0.089	At panel	0.06
Design pull-through resistance per slab (kN) (based on minimum number of fixings)(4)	0.526		0.360	
Design pull-through resistance per slab (kN) (based on maximum number of fixings)(5)	0.793		0.540	

(1) See Table 3 for typical characteristic pull-out resistance of the fixings.
(2) Characteristic pull-through resistance of insulation over the head of the fixing, in accordance with BS EN 1990 : 2002, Annex D7.2 and its UK National Annex.
(3) The partial factor is based on the assumption that all slabs are quality controlled and tested to establish tensile strength perpendicular to the face of the slab.
(4) The minimum design pull-through resistance per slab is based on a minimum of 6 fixings per slab (1200 x 600 mm), which equates to approximately 8.3 fixings per m². The design resistance for the minimum number of fixings is based on the fixing pattern shown in Figure 4 of this Certificate, and the minimum insulation thickness specified in this Table. The fixing pattern and interaction of the fixings should be considered when calculating the design resistance per slab.
(5) The maximum design pull-through resistance per slab is based on a maximum of 9 fixings per slab (1200 x 600 mm), which equates to approximately 12.5 fixings per m². The design resistance for the maximum number of fixings is only applicable to the minimum insulation thickness tested and as specified in this Table. The fixing pattern, insulation thickness and interaction of the fixings should be considered when calculating the design resistance per slab.
(6) The minimum residual thickness of the insulation, excluding the depth of the fixing die, must be ≥100 mm when embedding the EJOT STR U fixing in the insulation.
(7) Fixings for use with Rockwool Dual Density Slab must be surface mounted only.

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

7.12 The data obtained from sections 7.8 to 7.10 must be assessed against the design wind load and the following expression must be satisfied for safe design:

$Rd \geq W_e$

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

Where:

Rd	is the design ultimate resistance (kN·m^{-2}) taken as the minimum of $Rd_{b.ins/rend}$, $Rd_{pull\text{-}out}$ and $Rd_{pull\text{-}through}$
W_e	is the applied ultimate wind load (kN·m^{-2})
$Rd_{b.ins/rend}$	is the design bond resistance between the insulation and render (kN·m^{-2})
$Rd_{pull\text{-}out}$	is the design pull-out resistance of the insulation fixings per metre square (kN·m^{-2})
$Rd_{pull\text{-}through}$	is the design pull-through resistance of the insulation fixings per metre square (kN·m^{-2})
A_r	is the reinforced basecoat bond area (based on % area covered)
N_{RD1}	is the design adhesive bond resistance between the insulation and render, based on test (kN·m^{-2})
n	is the number of anchor fixings per m^2
N_{RD2}	is the design pull-out resistance per fixing based on test (kN)
$N_{RD3panel}$	is the design pull-through resistance per anchor not placed at the panel joint, based on test (kN)
$N_{RD3joint}$	is the design pull-through resistance per anchor placed at the panel joint, based on test (kN)
n_{panel}	is the number of internal anchors in a panel

n_{joint} is the number of joint anchors in a panel
A_{board} is the area of the board (m^2).

7.13 The systems are mechanically fixed to the substrate wall with a minimum of 6 fixings per slab or approximately 8.3 fixings per square metre, as per the fixing pattern shown in Figure 4, and in conjunction with a minimum 50% coverage of supplementary adhesive (see section 16). Additional fixings may be required, depending on the results of the calculations detailed above for the specific site.

7.14 The primary resistance mechanisms when fixed with supplementary adhesive through the reinforced basecoat / insulation are as given below(1)(2)

- the cohesion resistance of the finishing system
- the pull-out resistance of the fixing from the substrate wall (see section 7.8)
- the resistance of the anchor plate to breakdown or detachment
- the resistance of mesh fabric to tearing around the anchor plate.

(1) The resistance of the systems to negative wind load is obtained from the Dynamic Wind Uplift (DWU) test.
(2) Further guidance is available from *BBA Guidance Note 1*, available on the BBA website (www.bbacerts.co.uk).

7.15 The DWU test was carried out on a Fassatherm Mechanically Fixed MW External Wall Insulation System, fixed onto a masonry substrate. MW insulation slabs of 50 mm thickness were initially fixed with two EJOT H1 eco fixings through each insulation slab and then a further 6.3 EJOT H1 eco fixings per m^2 were applied through the reinforced basecoat/insulation providing an overall fixing frequency of 9 fixings per m^2 (see Figure 5) before the render finish was applied. The maximum characteristic negative wind load resistance that can be sustained by the systems as determined from the DWU test is 4.45 $kN \cdot m^{-2}$. The maximum design wind load resistance (Rd_{Test}) is 2.97 $kN \cdot m^{-2}$(1)(2)(3)(4)(5)(6), which was derived by dividing the maximum characteristic wind load resistance by a partial safety factor of 1.5.

(1) The maximum design wind load that can be resisted by the systems corresponds to the maximum allowed spacing, centres and layout of fixings. This fixing configuration with the appropriate fixings will also adequately transfer the systems self-weight, wind and impact loads to a suitable substrate wall.
(2) Minimum coverage area of supplementary adhesive is 50%.
(3) The partial factor for the DWU test is based on the mode of failure obtained in the test.
(4) The design resistance is determined by dividing the characteristic resistance value obtained from a DWU test by a partial safety factor of 1.5.
(5) Alternative fixings may be used provided it can be demonstrated that they have equal or higher plate diameter (minimum 60 mm), plate stiffness (≥ 0.6 $kN \cdot mm^{-1}$) and anchor plate load resistance (≥ 1.4 kN) characteristics.
(6) The maximum design wind load resistance value applies to systems with mineral wool slab thicknesses ≥ 50 mm.

7.16 The data derived from sections 7.9 and 7.15 must be assessed against the design wind load, and the following expressions must be satisfied:

For safe design:

$R_{dTest} \geq W_e$ and $N_{RD2} \geq W_e$

where:

R_{dTest} is the design negative wind load resistance of the system based on test ($kN \cdot m^{-2}$)
W_e is the maximum design wind load ($kN \cdot m^{-2}$)

N_{RD2} is the design pull-out resistance of the systems based on characteristic values from site tests; the number of fixings per unit area must be ≥ as tested in Static Foam Block test ($kN \cdot m^{-2}$).

7.17 The insulation systems are mechanically fixed through mesh/insulation to the substrate wall with a minimum of 9 fixings per square metre (as per the fixing pattern shown in Figure 5), and in conjunction with a minimum 50% coverage of supplementary adhesive (see section 16). The design wind load resistance is only applicable to the system tested and as described in sections 7.15. No enhancement to the wind load resistance may be gained by the addition of fixings; however, additional fixings, may be required depending on the design and installation conditions.

Impact resistance

7.18 Hard body impact tests were carried out in accordance with EAD 040083-00-0404. The systems are suitable for use in the Use Categories up to and including those specified in Table 5 of this Certificate.

Table 5 System impact resistance

Basecoat	Render	Use Category(1)	
		Single layer of mesh	Double layer of mesh
Fassatherm A96	Fassatherm RTA 549 Fassatherm RSR 421 Fassatherm R 336 Fassatherm RX 561	II	II
Fassatherm AL88	Fassatherm RTA 549 Fassatherm R 336 Fassatherm RX 561	II	II
Fassatherm AL88	Fassatherm RSR 421	III	II

(1) The Use Categories are defined in EAD 040083-00-0404 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 for all versions of the systems is A2-s1, d0 in accordance with BS EN 13501-1 : 2007(1).

(1) StaDt Wien, Vienna. 7 July 2009. Report number: MA 39 – VFA 2009-0811.01.

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

8.3 The MW insulation material in isolation is classified as A1 in accordance with BS EN 13501-1 : 2018.

8.4 The systems are not subject to any restriction on building height or proximity to boundaries.

8.5 For application to second storey walls and above, it is recommended that the designer considers at least one stainless steel fixing per square metre as advised in BRE Report BR 135 : 2013.

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

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

9 Proximity of flues and appliances

When the systems are installed in close proximity to certain flue pipes, the relevant provisions of the national Building Regulations should be satisfied.

10 Water resistance

10.1 The systems will provide a degree of protection against water ingress. However, care should be taken to ensure that walls are adequately watertight prior to application of the systems. The systems must only be installed where there is no sign of dampness on the inner surface of the substrate other than that 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 systems should be protected by an adequate coping, overhang or other detail designed for use with these types of systems (see section 16).

11 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 systems and windows, to minimise the risk of condensation. The recommendations of BS 5250 : 2021 should be followed.

Surface condensation

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

11.3 Walls will adequately limit the risk of surface condensation when the thermal transmittance (U value) does not exceed 1.2 $W \cdot m^{-2} \cdot K^{-1}$ at any point. Guidance may be obtained from BS 5250 : 2021 and BRE Report BR 262 : 2002.

Interstitial condensation

11.4 Walls incorporating the systems will adequately limit the risk of interstitial condensation when they are designed and constructed in accordance with BS 5250 : 2021 and Table 6 of this Certificate.

11.5 The equivalent air layer thickness (s_d) (for the render systems) and the water vapour resistance (μ) factor (for the slabs) are shown in Table 6 of this Certificate.

Table 6 Water vapour resistance factor and equivalent air layer thickness

	(s_d) (m)	(μ)
MW insulation thickness 50 to 200 mm	—	1
Render system:		
Fassatherm A96 Basecoat(1) + primer + render finish (specific particle size), as indicated below:		
Fassatherm FA 249 + Fassatherm RTA 549 (particle size 2.0 mm)	0.8	—
Fassatherm FS 412 + Fassatherm RSR 421 (particle size 2.0 mm)	0.5	—
Fassatherm F 238 + Fassatherm R 336 (particle size 2.0 mm)	0.3	—
Fassatherm FX 526 + Fassatherm RX 561 (particle size 1.0 mm)	0.5	—
Render system:		
Fassatherm AL88 Basecoat(2) + primer + render finish (specific particle size), as indicated below:		
Fassatherm FA 249 + Fassatherm RTA 549 (particle size 2.0 mm)	0.4	—
Fassatherm FS 412 + Fassatherm RSR 421 (particle size 2.0 mm)	0.3	—
Fassatherm F 238 + Fassatherm R 336 (particle size 2.0 mm)	0.2	—
Fassatherm FX 526 + Fassatherm RX 561 (particle size 1.0 mm)	0.5	—
Fassatherm FX 526 + Fassatherm RX 561 (particle size 2.0 mm)	0.8	—

(1) Applied to a thickness of approximately 4 mm.
(2) Applied to a thickness of approximately 5 mm.

12 Maintenance and repair

12.1 Regular checks should be made on the installed systems, 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 systems and window and door frame.

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

13 Durability

13.1 The systems will have a service life of 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 Renders containing Portland cement 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 is less noticeable on lighter colours.

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, provided the coating does not adversely affect the water vapour transmission or fire characteristics of the systems. 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 systems. A specification is prepared for each elevation of the building indicating:

- the position of beads
- detailing around windows and doors and at eaves
- dpc level
- exact position of expansion joints, if required
- areas where flexible sealants must be used
- any alterations to external plumbing
- the position of fire barriers.

14.2 The survey should include tests conducted on the walls of the building by the Certificate holder or their approved installers to determine the pull-out resistance of the proposed mechanical fixings. An assessment 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).

14.3 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 slabs are installed with a smooth, in-plane finished surface.

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

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

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

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

15 Approved installers

Application of the systems, within the context of this Certificate, must be carried out by installers approved by the Certificate holder. An approved installer is a company:

- employing operatives who have been trained and approved by the Certificate holder to install the systems
- 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 systems must be carried out in accordance with the Certificate holder's current installation instructions and this Certificate.

16.2 Weather conditions should be monitored to ensure correct application and curing conditions. The systems should not be applied at temperatures below 5°C or above 30°C, if exposure to frost is likely or in damp/wet conditions, and the render must be protected from rapid drying.

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

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

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

Positioning and securing insulation slabs

16.6 The base profile is secured to the external wall above the dpc using mechanical fixings at a minimum of 300 mm centres. Profiles and expansion joints are fitted as specified.

16.7 The adhesive is mixed in a suitable container using potable water and a high power drill and mixer spiral to create a paste-like mortar, whilst ensuring there are no lumps in the mixed material. The slabs are positioned on the starter track and bonded to the wall by applying the approved adhesive to the slabs using the strip and dot method or full surface application. A circumferential strip of adhesive at least 5 to 10 cm wide is applied to the slabs. Three evenly distributed patches of adhesive 5 to 10 cm in diameter are then applied to the slabs so that an adhesive surface of at least 50% is achieved. The insulation slab should be immediately placed on the substrate and pressed into place.

16.8 The first run of insulation slabs is positioned on the base profile and pressed firmly against the wall.

16.9 Subsequent rows of slabs are positioned so that the vertical slab joints are staggered and overlapped at the building corners.

16.10 Care must be taken to ensure that all insulation slab edges are butted tightly together, and that alignment is checked as work proceeds (to achieve a flush finish). Gaps must be filled with strips of the insulation material.

16.11 To fit around details such as doors and windows, insulation slabs may be cut with a sharp knife or a fine-toothed saw. Purpose-made window sills and seals designed to prevent or manage water ingress should be fitted. The performance of these components is outside the scope of this Certificate.

16.12 At all locations where there is a risk of insulant exposure (eg window reveals or eaves), the systems must be protected (eg by an adequate overhang or by purpose made sub-sills, seals or flashing).

16.13 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.

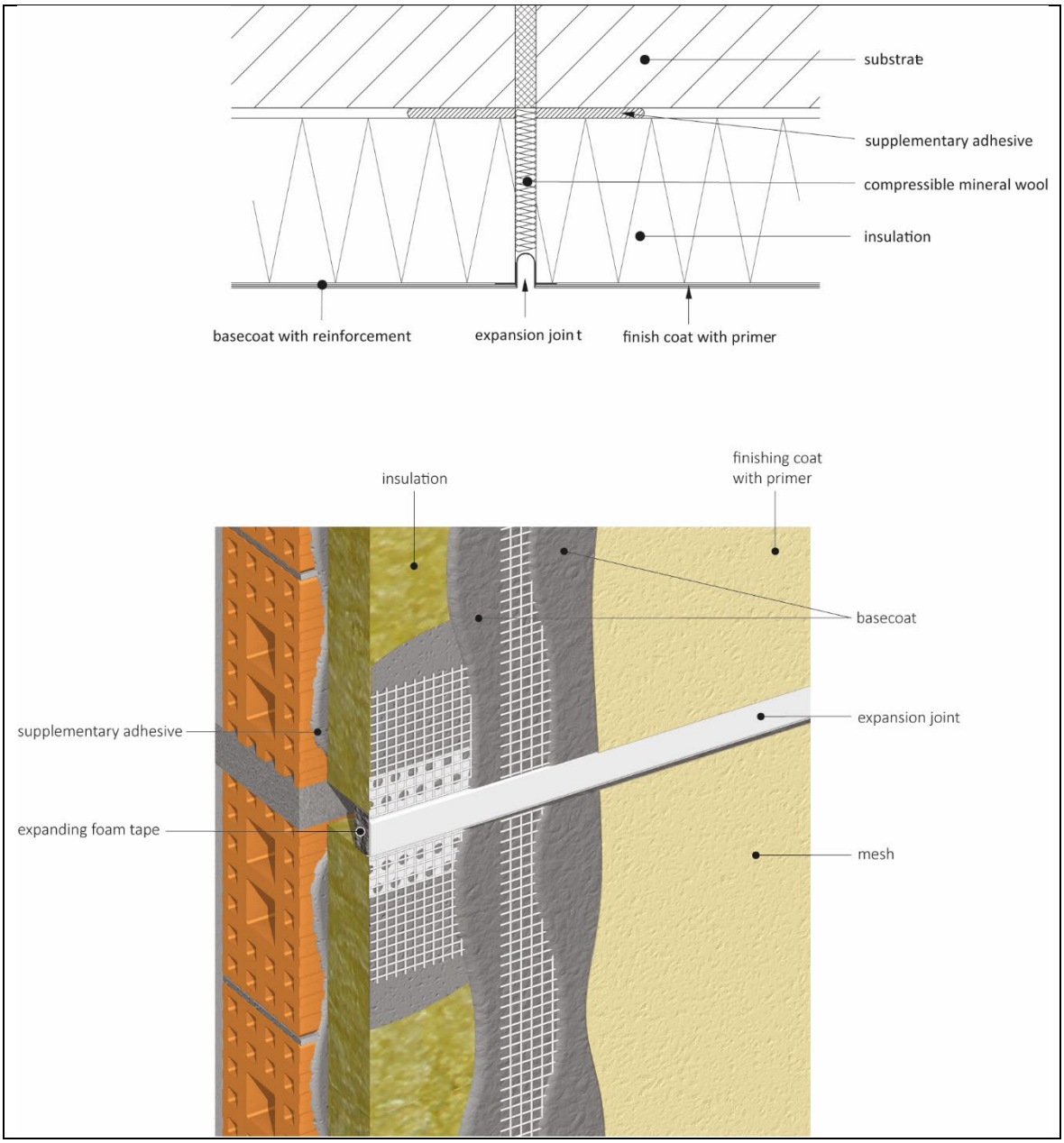
16.14 Installation continues until the whole wall is completely covered including, where appropriate, the building soffits.

16.15 Window and door reveals should be insulated to minimise the effects of cold bridging. Where clearance is limited, strips of insulation should be installed to suit available margins and details.

Movement joints

16.16 Movement joints should be incorporated where required. Existing structural expansion joints should be extended through to the surface of the insulation systems (see Figure 2).

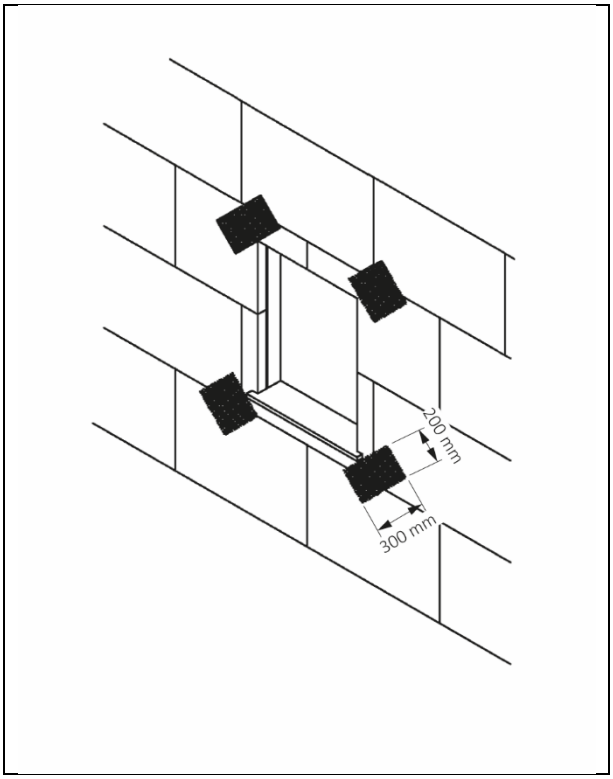
Figure 2 Example movement joint details



Application of reinforcing mesh

16.17 To provide the necessary reinforcement, stress patches of reinforcing mesh (approximate size 300 by 200 mm) are applied with basecoat, diagonally over the insulation slabs at the corners of openings (see Figure 3).

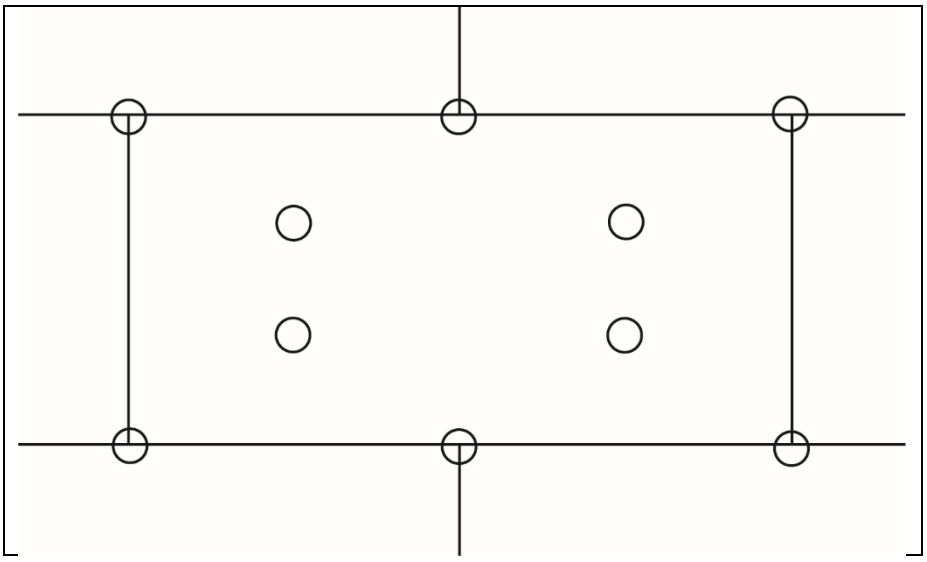
Figure 3 Additional reinforcement at openings



Application — mechanical fixings through the insulation only

16.18 Details of mechanical fixings (including their arrangement in the slabs) are specified in the project-specific design requirements based on pull-out test results, substrate type and wind loading data. A minimum of 8.3 fixings per m^2 should be installed, unless otherwise specified in the project-specific design (see Figure 4). If required, extra fixings can be applied at the edge zones to satisfy the wind load conditions. Holes are drilled into the substrate through the insulation, and the fixings are installed, fixing tightly to the slab using the dedicated driving system to ensure there is no risk of pull-off. Installation of mechanical fixings must commence no earlier than 24 hours after the insulation slabs have been adhesively fixed, and in any case after the adhesive has hardened. Care must be taken to ensure that the fixings are not overdriven.

Figure 4 Insulation slab fixing pattern



16.19 After sufficient stabilisation of the installed insulation (normally 2 days in warm and dry conditions, or a maximum of one week in cold and damp conditions, during which time the insulation should be protected from exposure to extreme weather conditions to prevent degradation), the wall is ready for the application of the basecoat.

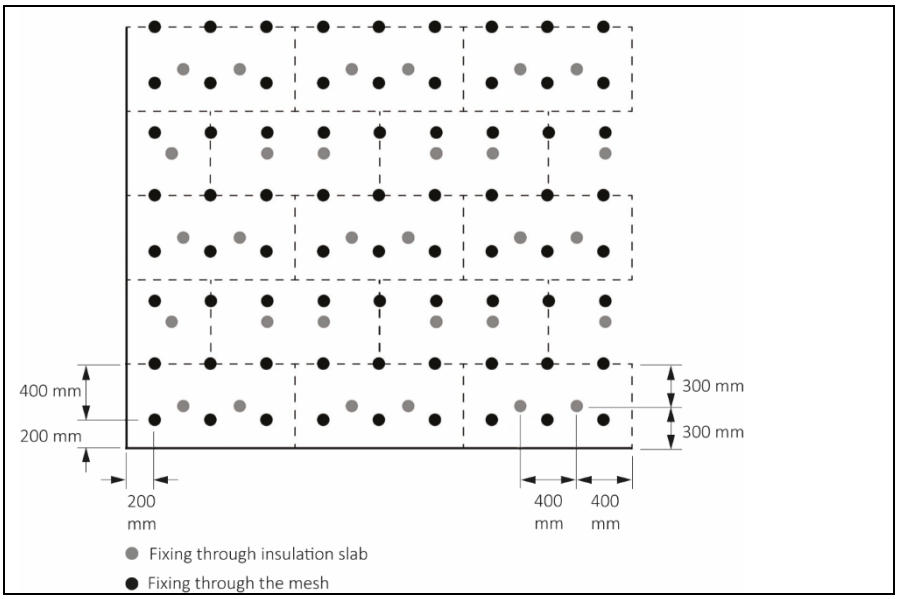
16.20 The basecoat is prepared as described in section 16.7. The material is applied over the slabs using a steel trowel, to a thickness between 4 and 5 mm. The reinforcing mesh is applied and is immediately embedded into the basecoat, ensuring the mesh is overlapped at joints by a minimum coverage of 100 mm. Once the first coat has dried, a second coat of approximately 1 mm thickness is applied to obtain a smooth and uniform surface.

Application — mechanically fixed through the reinforced basecoat/insulation

16.21 After the application of insulation slabs with supplementary adhesive, two fixings are installed uniformly and symmetrically in the middle of each slab after the adhesive has hardened.

16.22 The basecoat is applied over the slabs using a steel trowel, to a thickness of 3 mm. The reinforcing mesh is applied and is immediately embedded into the basecoat, ensuring the mesh is overlapped at joints by a minimum coverage of 100 mm and left to partially cure for 12 to 24 hours. Holes are then drilled into the partially cured basecoat at a frequency of 6.3 per m^2 (see Figure 5). The mechanical fixings are inserted and tapped or screwed firmly into place, securing the reinforced basecoat and insulation slabs to the substrate wall. The fixing plate is deliberately slightly over-driven into the basecoat to reduce protrusion of the fixing head so that the entire fixing head is 0.5 to 1 mm below the basecoat surface.

Figure 5 Insulation slab fixing pattern – through the insulation and through the reinforced basecoat/insulation



16.23 200 by 200 mm reinforcing mesh stress patches are applied over the mechanical fixing heads with basecoat. A further layer of basecoat is then applied to achieve a level surface, providing 3.5 to 4 mm coverage over each fixing head.

Rendering and finishing

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

16.25 The basecoat must be allowed to dry/cure (for approximately 2 to 3 weeks) prior to the application of the primer/render finish. Prior to the application of the render finish, silicone sealant should be applied as required, as defined in the project-specific site package in accordance with the Certificate holder's instructions.

16.26 Primers must be applied in accordance with the Certificate holder's instructions and allowed to dry for approximately 24 hours prior to the application of the render finish.

16.27 Render finishes are applied in accordance with the Certificate holder's instructions.

16.28 Care should be taken in the detailing of the systems around features such as openings, projections and at eaves (see Figures 6 to 9) to ensure adequate protection against water ingress and to limit the risk of water penetrating the systems.

Figure 6 Typical roof eaves detail

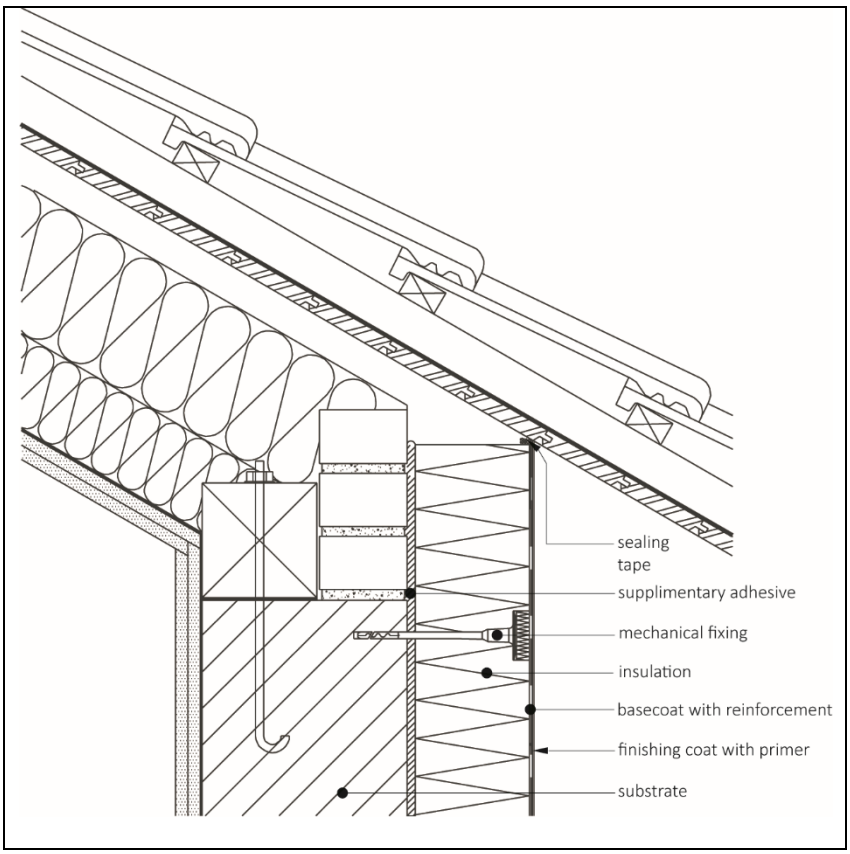


Figure 7 Window sill detail

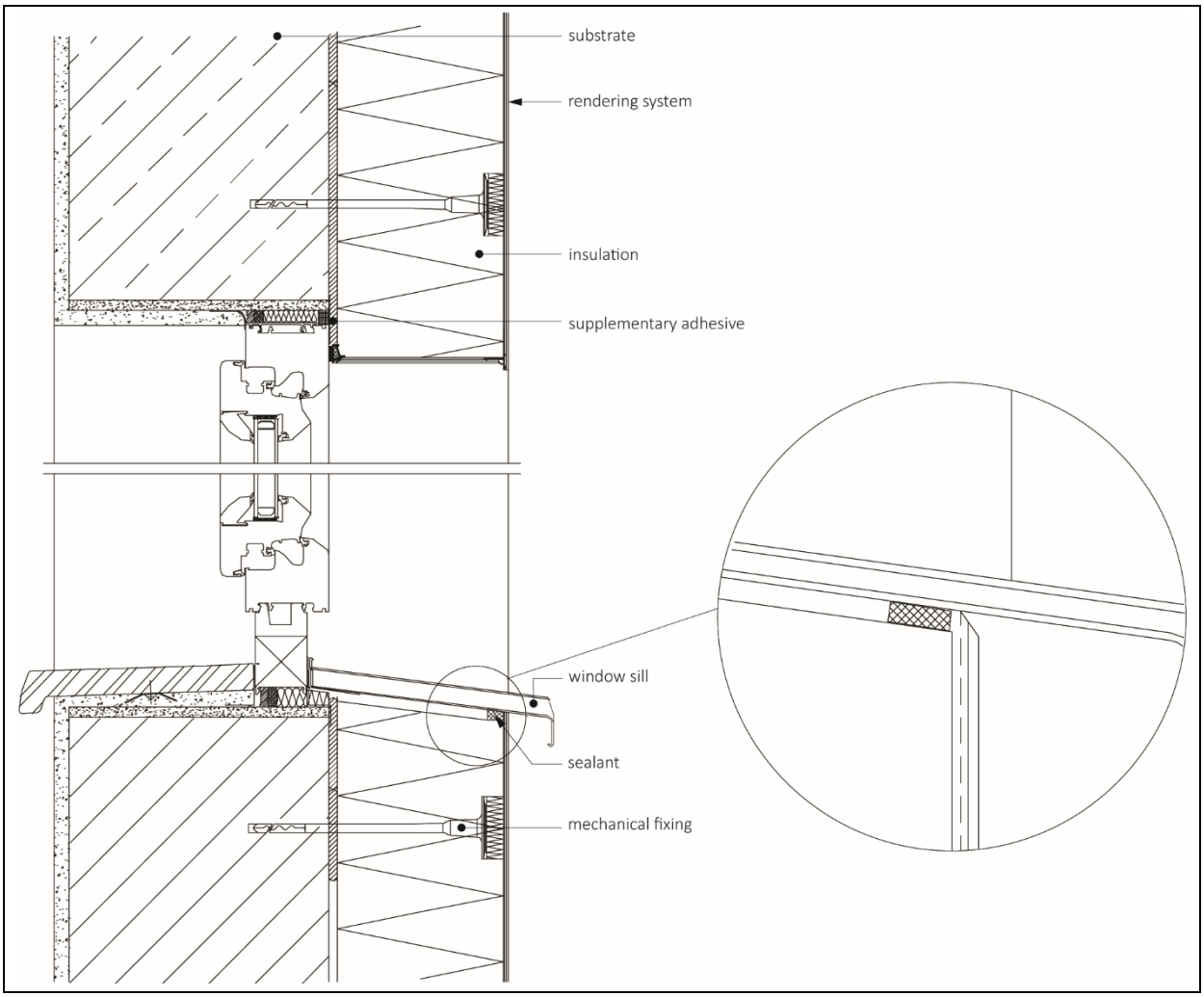


Figure 8 Window head detail

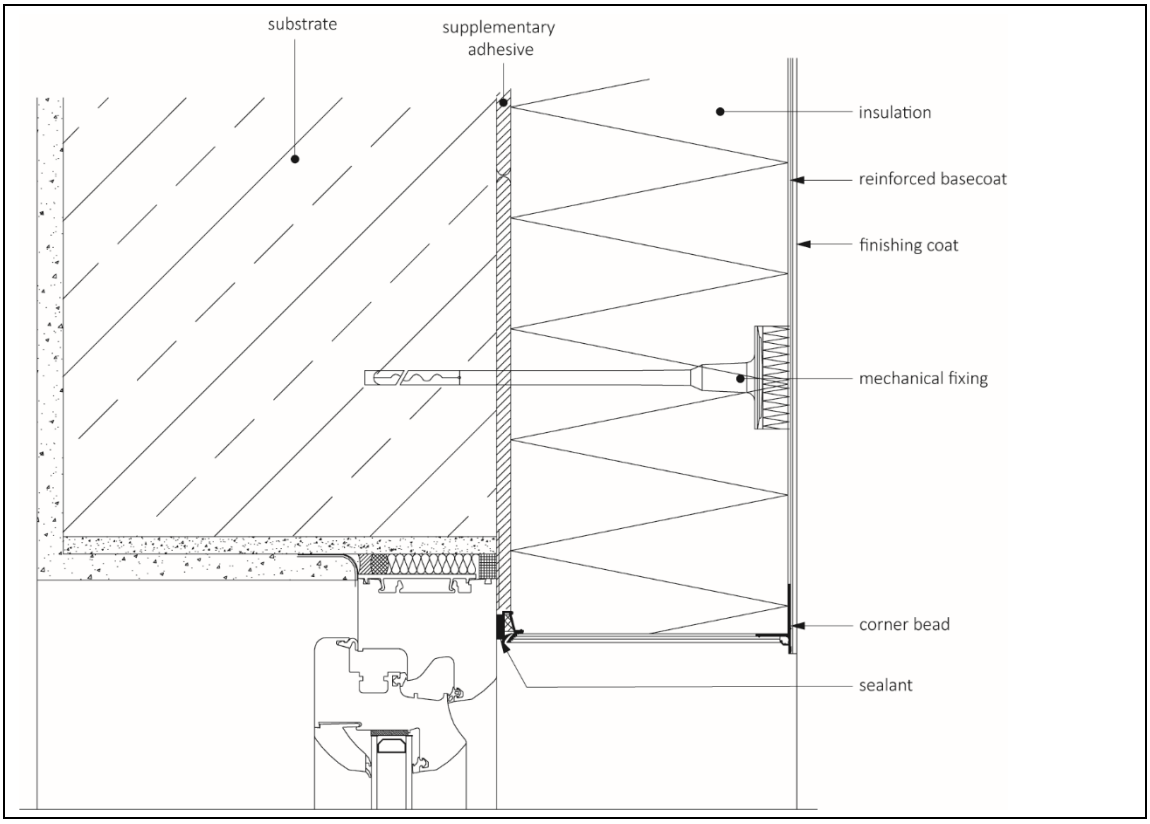
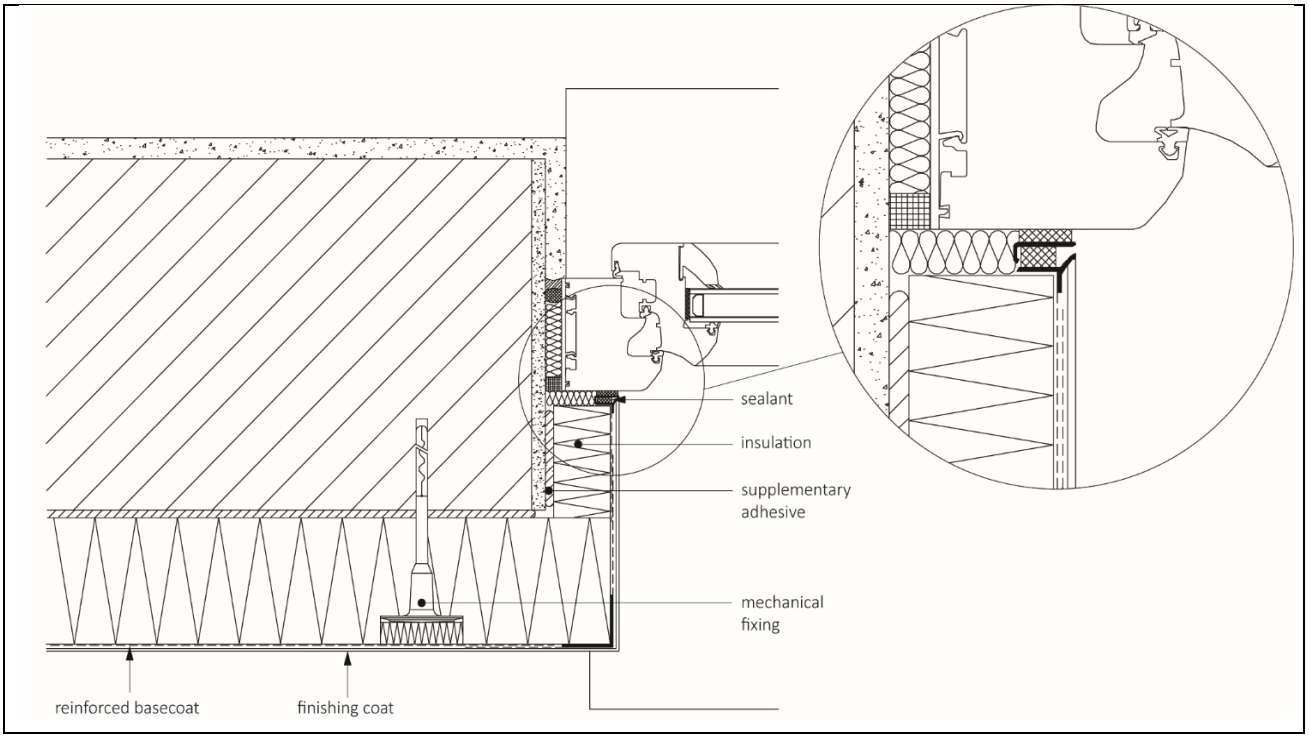


Figure 9 Insulated reveal detail



Technical Investigations

17 Tests

17.1 An examination was made of data relating to:

- component characterisation
- water vapour permeability
- water absorption
- bond strength
- reaction to fire
- pull-out strength of fixings
- durability of render finishes
- heat/spray cycling
- impact resistance.

17.2 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.

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

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

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BS 8000-2.2 : 1990 *Workmanship on building sites — Code of practice for concrete work — Sitework with in situ and precast concrete*
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EAD 040083-00-0404 *External Thermal Insulation Composite Systems (ETICS) with Renderings*

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

PD 6697 : 2019 *Recommendations for the design of masonry structures to BS EN 1996-1-1 and BS EN 1996-2*

Conditions

1. This Certificate:

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

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

3 This Certificate will be displayed on the BBA website, and the Certificate Holder is entitled to use the Certificate and Certificate logo, provided that the product and its manufacture and/or fabrication, including all related and relevant parts and processes thereof:

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

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

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

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

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

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