

ROCKWOOL Ltd

Pencoed - Bridgend
CF35 6NY
South Wales

Tel: 01656 862621 Fax: 01656 862302
email: CustomerSupportCentre@rockwool.co.uk
website: www.rockwool.co.uk



Agrément Certificate
15/5207
Product Sheet 1

REDART EXTERNAL WALL INSULATION SYSTEMS

REDART EXTERNAL WALL INSULATION SYSTEM

This Agrément Certificate Product Sheet⁽¹⁾ relates to the REDART External Wall Insulation System, comprising mineral wool insulation slabs, mechanically fixed with supplementary adhesive or without adhesive (Dry-Fix), with a reinforced basecoat and render finishes. It is suitable for use 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 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. The impact resistance is dependent on the finish chosen (see section 7).

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

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

Durability — when installed and maintained in accordance with the Certificate holder's recommendations and the terms of this Certificate, the system will remain effective for at least 30 years (see section 13).



The BBA has awarded this Certificate to the company named above for the system described herein. This system has been assessed by the BBA as being fit for its intended use provided it is installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

Simon Wroe
Head of Approvals — Engineering

Claire Curtis-Thomas
Chief Executive

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

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

British Board of Agrément
Bucknalls Lane
Watford
Herts WD25 9BA

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tel: 01923 665300
fax: 01923 665301
clientservices@bba.star.co.uk
www.bbacerts.co.uk

Regulations

In the opinion of the BBA, the REDArt External Wall Insulation System, if installed, used and maintained in accordance with the provisions of 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 section 7.4 of this Certificate.
Requirement: B4(1)	External fire spread
Comment:	The system can satisfy this Requirement. See section 8 of this Certificate.
Requirement: C2(b)	Resistance to moisture
Comment:	The system provides a degree of protection against rain ingress. See sections 4.5 and 10.1 of this Certificate.
Requirement: C2(c)	Resistance to moisture
Comment:	The system can contribute to minimising the risk of interstitial and surface condensation. See sections 11.1, 11.2 and 11.4 of this Certificate.
Requirement: L1(a)(i)	Conservation of fuel and power
Comment:	The system can contribute to satisfying this Requirement. See sections 6.2 and 6.3 of this Certificate.
Regulation: 7	Materials and workmanship
Comment:	The system is acceptable. See section 13.1 and the <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; however, compensating fabric/services measures may be required. See sections 6.2 and 6.3 of this Certificate.



The Building (Scotland) Regulations 2004 (as amended)

Regulation: 8(1)(2)	Durability, workmanship and fitness of materials
Comment:	The system can contribute to the construction satisfying this Regulation. See sections 12 and 13.1 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 section 7.4 of this Certificate.
Standard: 2.6	Spread to neighbouring buildings
Comment:	The external surface of the system is classified as 'low risk', with reference to clauses 2.6.4 ⁽¹⁾⁽²⁾ , 2.6.5 ⁽¹⁾ and 2.6.6 ⁽²⁾ . See section 8 of this Certificate.
Standard: 2.7	Spread on external walls
Comment:	The external surface of the system is classified as 'low risk', with reference to clauses 2.7.1 ⁽¹⁾⁽²⁾ and 2.7.2 ⁽¹⁾⁽²⁾ and Annex 2A ⁽¹⁾ . See section 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 4.5 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	Buildings insulation envelope
Comment:	The system can contribute to satisfying these Standards, with reference to clauses (or parts of) 6.1.1 ⁽¹⁾⁽²⁾ , 6.1.2 ⁽¹⁾⁽²⁾ , 6.1.3 ⁽¹⁾ , 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 Standards, 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 the system under Regulation 9, Standards 1 to 6, also apply to this Regulation, with reference to 0.12.1 ⁽¹⁾⁽²⁾ and Schedule 6 ⁽¹⁾⁽²⁾ . (1) Technical Handbook (Domestic). (2) Technical Handbook (Non-Domestic).



The Building Regulations (Northern Ireland) 2012

Regulation:	23	Fitness of materials and workmanship
Comment:		The system is acceptable. See section 13.1 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 4.5 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 section 7.4 of this Certificate.
Regulation:	36(a)	External fire spread
Comment:		The system can satisfy this Regulation. See section 8 of this Certificate.
Regulation:	39(a)(i)	Conservation measures
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 2007

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

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

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

Additional Information

NHBC Standards 2014

NHBC accepts the use of the REDArt⁽¹⁾ External Wall Insulation System, provided it is installed, used and maintained in accordance with this Certificate, in relation to *NHBC Standards, Part 6 Superstructure (excluding roofs), Chapter 6.9 Curtain walling and cladding*.

(1) REDArt is a registered trade mark.

Technical Specification

1 Description

1.1 The REDArt External Wall Insulation System consists of insulation slabs, mechanically fixed to the substrate wall, with supplementary adhesive or without adhesive, and with a glassfibre-mesh-reinforced-basecoat, key coat and render finishes (see Figure 1). It is made up of the following components.

Supplementary adhesive

- Rockwool Insulation Board Adhesive — a mixture of white Portland cement, quartz sand and additives. Supplied as a powder to which 5.5 litres of clean water is added per 25 kg bag.

Insulation

- Rockwool Dual Density Stone Wool insulation slabs — 1200 mm by 600 mm in a range of thicknesses from 50 mm to 250 mm, with a nominal density of 110 kg·m⁻³, a minimum compressive strength of 20 kN·m⁻² and a minimum tensile strength of 10 kPa. Slabs are manufactured to comply with the requirements of BS EN 13162 : 2012.

Mechanical fixings

Mechanical fixings⁽¹⁾ — anchors with adequate length to suit the substrate and insulation thickness and selected from:

- Ejot STR U — polyethylene, PE-HD ribbed or anchor sleeve and stainless steel or electro-galvanized screws
- Ejot NT U — polyethylene, PE-HD ribbed or anchor sleeve and stainless steel or electro-galvanized pins
- Koelner TFIX 8S, 8M — polypropylene, ribbed or anchor sleeve with polyamide screw/pin
- Thermoschraubdubel KEW TSD 8 and KEW TSDL-V — polypropylene, ribbed or anchor sleeve with a stainless steel or electro-galvanized steel pin or screw.

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

Basecoat

- Rockwool FS Mortar 2 — fibre-reinforced cement-based powder requiring the addition of 5 litres of clean water per 25 kg bag. Applied to a thickness of 5 mm to 6 mm for a one-layer application, and a thickness of 6 mm to 8 mm for a two-layer application.

Reinforcement

- Rockwool Universal Reinforcing Mesh — 1.1 m wide mesh (3.5 mm by 4.0 mm) of multi-stranded glassfibre with a polymer coating and nominal weight of 160 g·m⁻².

Primer

- REDArt Silicone Primer — ready-to-use pigmented universal primer, based on acrylic resin dispersion with mineral fillers.

Finishing coats

REDArt Silicone

- REDArt Silicone Topcoat — a ready-to-use paste, acrylic-styrene dispersion with oxosilane emulsion, mineral fillers and pigments. Available in 1.0 mm, 1.5 mm and 2.0 mm particle sizes, with the thickness regulated by particle size.

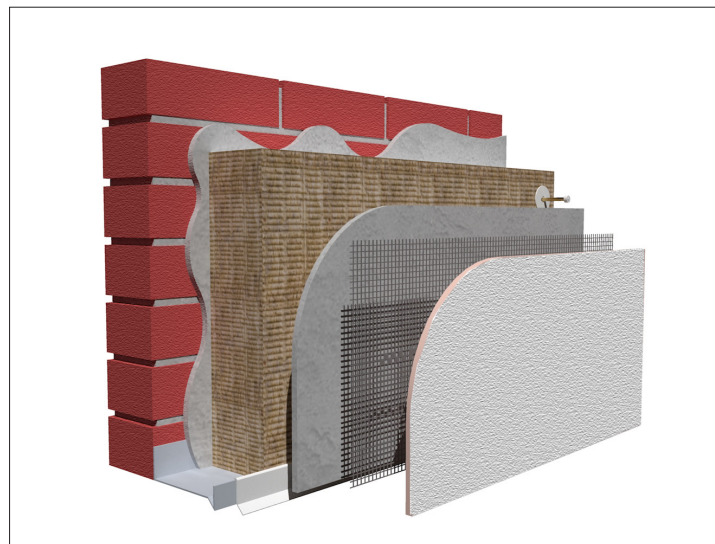
REDArt Dash

- REDArt Dash Receiver S and REDArt Dash Receiver P — polymer-modified, cement-based render. It should be prepared by thoroughly mixing a full bag of the specified colour with 4.5 to 5 litres of clean, cool water. Applied to a minimum thickness of 6 mm or 8 mm (depending on the specified aggregate size). Available in a range of colours
- REDArt Dash Aggregate — 3 mm to 8 mm aggregates. Applied to the REDArt Dash Receiver using a hawking trowel.

REDArt Brick Effect

- REDArt Brick Effect Basecoat — polymer-modified cement-based mortar. Applied to a minimum thickness of 6 mm to 8 mm
- REDArt Brick Effect Topcoat — cement-based, self-coloured dry power for pre-mixing with water. Applied to a minimum thickness of 3 mm to 5 mm.

Figure 1 REDArt External Wall Insulation System



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

- Range of aluminium, PVC-U or stainless steel profiles, comprising:
 - base profile
 - edge profile
 - corner profile with drip mesh
 - render stop profile
- connection plates, pipe and parapet capping and flashing sections
- movement joint
- expansion joint
- profile connectors and fixings
- sealants — silicone in accordance with BS EN ISO 11600 : 2003
- sealing tape
- fungicidal wash.

1.3 The insulation slabs are fixed to the external surface of the wall using mechanical fixings, with supplementary adhesive or without adhesive. When all the slabs have been secured to the wall, basecoat is applied to their surface to a uniform thickness and the reinforcing mesh immediately embedded (with its concave surface to the wall) and the surface smoothed with a trowel, working from the centre towards the edges. When dry, and after priming if necessary, the surface is ready for the application of the selected finish.

Table 1 REDArt System Summary

Components	Product Name
Supplementary adhesive	Rockwool Insulation Board Adhesive
Insulation	Rockwool Dual Density Stone Wool Slab
Basecoat	Rockwool FS Mortar 2
Reinforcement	Rockwool Universal Reinforcing Mesh
Primer	REDArt Silicone Primer
Finishing coats	REDArt Silicone
	REDArt Silicone Topcoat
	REDArt Dash
	REDArt Dash Receiver + REDArt Dash Aggregate
	REDArt Brick Effect
	REDArt Brick Effect Basecoat + REDArt Brick Effect Topcoat

2 Manufacture

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

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

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

2.3 The management system of Rockwool Ltd has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2008 by BSI (Certificate: FM 02262).

3 Delivery and site handling

3.1 The insulation 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 2. Each package carries the product identification and manufacturer's batch number.

Table 2 Component supply details

Components	Quantity and package
Rockwool Insulation Board Adhesive	25 kg bag
Rockwool FS Mortar 2	25 kg bag
Rockwool Universal Reinforcing Mesh	1.1 m x 50 m roll
REDArt Silicone Primer	16 kg plastic buckets
REDArt Silicone Topcoat	25 kg tub
REDArt Dash Receiver S	25 kg bags
REDArt Dash Receiver P	25 kg bags
REDArt Dash Aggregate	25 kg bags
REDArt Brick Effect Basecoat	25 kg bags
REDArt Brick Effect Topcoat	25 kg bags

3.3 The slabs 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 powder and paste components must be stored in a safe area, in dry conditions, off the ground and protected from excessive heat, moisture and frost. Contaminated materials should be discarded.

Assessment and Technical Investigations

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

4 General

4.1 The REDArt External Wall Insulation System, when installed in accordance with this Certificate, is effective 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 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 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.

4.4 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). Prior to the installation of the system, the wall surfaces should comply with section 14 of this Certificate.



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

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

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

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

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

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

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

5 Practicability of installation

The system should only be installed by specialised contractors who have successfully undergone training and registration by the Certificate holder (see section 14).

Note: The BBA operates a UKAS-Accredited Approved Installer Scheme for external wall insulation; 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 insulation manufacturer's declared thermal conductivity (λ_p) value of $0.036 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$. The insulation thickness range is between 50 mm and 250 mm.



6.2 The U value of a completed wall will depend on the selected 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 constructions in accordance with the national Building Regulations are given in Table 3, and are based on the thermal conductivity given in section 6.1 of this Certificate.

Table 3 Insulation thickness required to achieve U values⁽¹⁾⁽²⁾⁽³⁾

U value ⁽⁴⁾ (W·m ⁻² ·K ⁻¹)	Thickness of insulation (mm)	
	215 mm brickwork, $\lambda = 0.56 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$	200 mm dense blockwork, $\lambda = 1.75 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$
0.18	210	220
0.19	200	210
0.25	140	150
0.26	140	150
0.28	130	130
0.30	110	120
0.35	100	100

- (1) Wall construction inclusive of 13 mm plaster ($\lambda = 0.57 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$), 7 mm render ($\lambda = 1.0 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$), and 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_D) of insulation as per section 6.1. A 4 mm adhesive layer ($\lambda = 1 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$) covering 100% of the area is also included, plus 6 mm of external render ($\lambda = 1 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$).
- (2) Calculation based on a system that included 7 galvanized steel fixings per square metre, with 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.
- (3) Based upon incremental insulation thickness of 10 mm.
- (4) When applying the maximum available insulation thickness, these walls can achieve U values of 0.16 to 0.17 W·m⁻²·K⁻¹.

6.3 The system can maintain, or contribute to maintaining, continuity of thermal insulation at junctions between walls and other elements. Details shown in section 16 will allow use of the default ψ -values (Psi) for Accredited Construction Details in Emission Rate calculations to SAP 2009 or the Simplified Building Energy Model (SBEM). 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 bearing and compression of the render and insulation system.

7.3 Negative wind pressure is resisted by the bond between each component. The insulation slabs are retained by the external wall insulation system anchors.

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

7.5 Assessment of structural performance for individual installations should be carried out by a suitably qualified and experienced 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 itself
- the proposed system and associated fixing layout provides adequate resistance to negative wind loads, based on the results of site investigation and test results
- an appropriate number of site-specific pull-out tests are conducted on the substrate of the building to determine the minimum resistance to failure of the fixings. The characteristic pull-out resistance should be determined in accordance with the guidance given in ETAG 014 : 2011, Annex D.

7.6 The number and centres of fixings should be determined by the system designer. Provided the substrate wall is suitable and an appropriate fixing is selected, the mechanical fixings will adequately support and transfer the weight of the render insulation system to the substrate wall at the minimum spacing 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 4; however, these values are dependent on the substrate, and the fixing must be selected to suit the loads and substrate concerned.

Table 4 Fixings — typical characteristic pull-out strengths

Fixing type	ETA number	Substrate	Drill diameter (mm)	Effective anchorage depth (mm)	Typical pull out strength (kN)
KOELNER TFIX-8M	07/0336	Clay bricks	8	25	1.2
KOELNER TFIX-8S	11/0144	Concrete(C12/15)/ Brickwork (solid/clay)	8	25	1.2/1.2
Thermoschraubdubel KEW TSBD 8	08/0314	Concrete (C12/15)/ Brickwork (solid/clay)	8	30	1.5/1.5
Thermoschraubdubel KEW TSDL-V	12/0148	Concrete (C12/15)/ Brickwork (solid/clay)	8	30	1.2/1.5
Ejot NT U	05/0009	Concrete (C12/15)/ Brickwork (solid/clay)	8	25	1.2/1.5
Ejot STR U	04/0023	Concrete (C12/15)/ Brickwork (solid/clay)	8	65	1.5/1.5

7.8 The design pull-through resistance data given in Table 5 are the results of calculations based upon pull-through resistances determined by the BBA from tests on anchors with a 60 mm diameter plate.

Table 5 Design pull-through resistances

Factor (unit)	Mineral wool insulation 1200 mm x 600 mm
Fixings plate diameter (mm)	60
Fixings	See Table 4 of this Certificate
Insulation thickness (mm)	>100
Characteristic pull-through resistance ⁽¹⁾ per fixing (N)	488 ⁽³⁾
Factor of safety ⁽²⁾	2.5
Design pull-through resistance per fixing (N)	195

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

(2) The safety factor of 2.5 is based on the assumption that all insulation slabs are quality controlled and tested to establish tensile strength (perpendicular to the face of the slab), and failure mode.

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

Impact resistance

7.9 Hard body impact tests were carried out in accordance with ETAG 004 : 2013. The system can be classed as having Use Categories II to III, as listed in Table 6 of this Certificate.

Table 6 REDArt External Wall Insulation System impact resistance

Rendering System: (basecoat + finishing coats indicated below)	Use Category ⁽¹⁾	
	Single mesh	Double mesh
Rockwool FS Mortar 2 + REDArt Silicone Topcoat	Category III	Category III
Rockwool FS Mortar 2 + REDArt Brick Effect Basecoat + REDArt Brick Effect Topcoat	Category II	Category II
Rockwool FS Mortar 2 + REDArt Dash Receiver + REDArt Dash Aggregate	Category II	Category II

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

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

8 Behaviour in relation to fire



8.1 The reaction to fire classification for the system is A2-s1, d0 in accordance with BS EN 13501-1 : 2007.

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


8.3 The mineral wool insulation material is classified as non-combustible.

8.4 The system is considered suitable for use on or at any distance from the boundary without height restriction.

9 Proximity of flues and appliances

With this system, there are no provisions to be met.

10 Water resistance


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

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


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


10.4 At the tops of walls, the system should be protected by an 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 BR 262 : 2002.

Interstitial condensation


 11.4 Walls incorporating the system will adequately limit the risk of interstitial condensation when they are designed and constructed in accordance with BS 5250 : 2011 (section 4 and Annexes D and G).

11.5 The water vapour resistance factor (μ) for the insulation component may be taken as 1. The equivalent air layer thickness (S_d) for the render system is shown in Table 7.

Table 7 Equivalent air layer thickness (S_d) — reinforced basecoats and topcoats

		S_d (m)
Render system: basecoat + primer + reinforcement + finishes as indicated below:		
	REDArt Silicone Topcoat (maximum particle size 1.5 mm)	0.48
	REDArt Brick Effect Basecoat (8 mm thickness) + REDArt Brick Effect Topcoat (5 mm thickness)	0.31
Rockwool FS Mortar 2 (average thickness of 6 mm)	REDArt Dash Receiver S (6 mm thickness) + REDArt Dash Aggregate	0.35
	REDArt Dash Receiver P (6 mm thickness) + REDArt Dash Aggregate	0.67

12 Maintenance and repair


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

- 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 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.

13.2 Any render containing 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 less noticeable on lighter colours.

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

13.4 To maintain a high quality aesthetic appearance, it may be necessary to periodically overcoat the building using a suitable masonry coating (ie one covered by a valid BBA Certificate for this purpose). 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
- areas where flexible sealants must be used
- any alterations to external plumbing, where required.

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 All 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 20 mm, must be made good prior to installation, to ensure that the insulation slabs are installed with a smooth, in-plane finished surface.

14.5 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.

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

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

15 Approved installers

Application of the system, within the context of this Certificate, must be carried out by installers approved by the Certificate holder. A Certificate holder approved 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 Application is carried out in accordance with the Certificate holder's current installation instructions.

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

16.3 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.

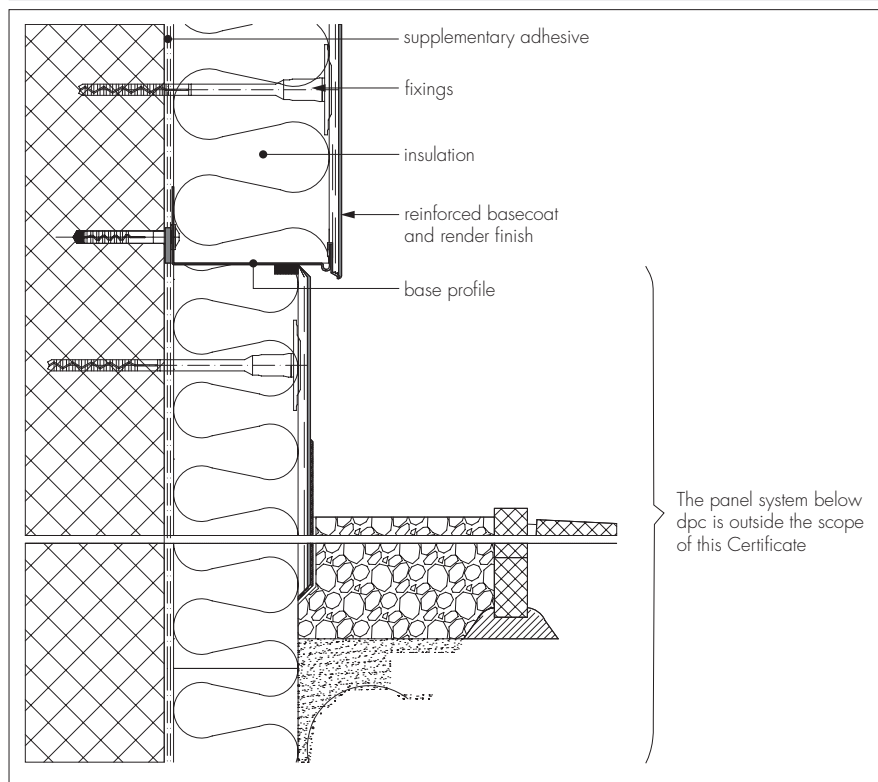
16.4 The planarity of the substrate must be checked, and any protrusions removed.

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

Positioning and securing of insulation slabs

16.6 The base profile is secured to the external wall above the dpc (see Figure 2) using the approved profile fixings at approximately 300 mm centres. Base rail connectors are inserted at all rail joints. Extension profiles are fixed to the front lip of the base rail or stop end channel where appropriate.

Figure 2 Typical section of base profile

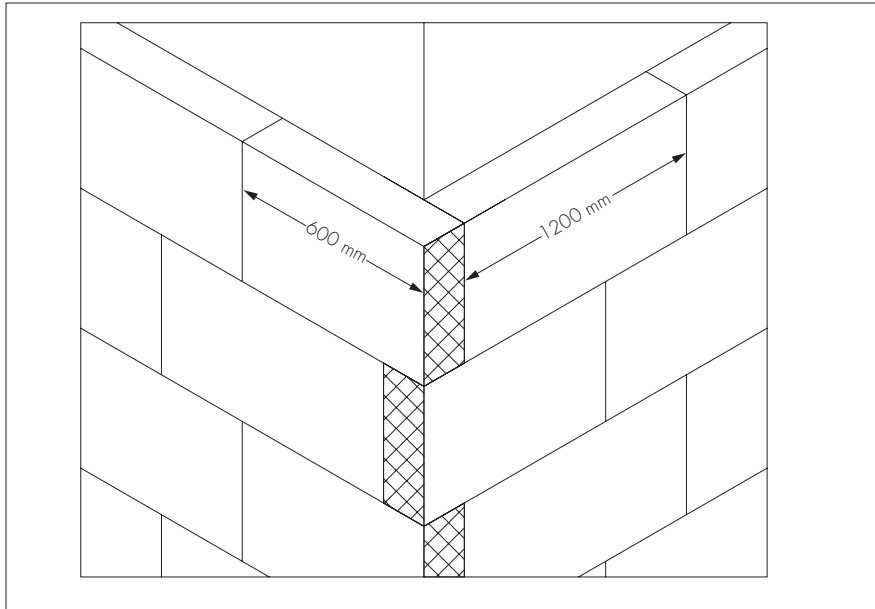


16.7 The insulation slabs can be fixed to the substrate wall by one of two methods: either mechanical fixing only (Dry-Fix) or mechanical fixing with supplementary adhesive.

16.8 The adhesive is prepared with the required amount of water (see section 1), and mixed with a paddle mixer until the desired consistency is achieved. After allowing the adhesive to rest for 5 minutes, it is stirred again. The adhesive is applied in a continuous line around the perimeter of the board with three additional dabs of adhesive distributed uniformly over the remaining surface — at least 40% of the board should be covered. Alternatively, it can be applied over the entire face of the insulation board using a notched trowel.

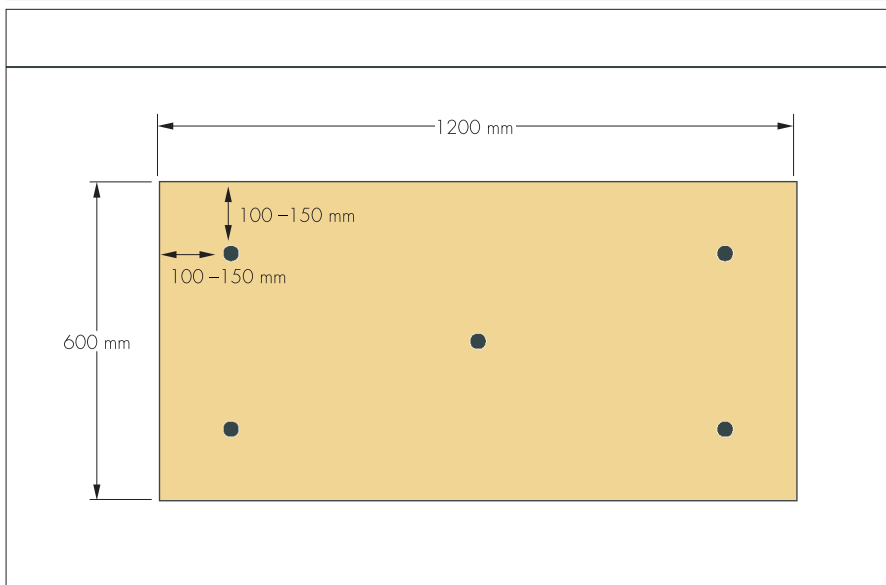
16.9 The first run of insulation slabs is positioned on the base profile, pressed firmly against the wall and butted tightly together, with the vertical joints staggered by at least 200 mm (see Figure 3). Joints between slabs greater than 2 mm should be filled with slivers of insulation board. Gaps greater than 10 mm should be closed by repositioning or, where appropriate, by cutting slabs to fit. Alignment should be checked as work proceeds.

Figure 3 Typical arrangement of insulation slabs



16.10 Holes are drilled into the substrate to the required depth through the insulation at the corners of each slab and at positions which allow a minimum of seven fixings per square metre (see Figure 4). Subsequent rows of insulation are positioned, ensuring vertical joints are staggered and overlapped at the building corners and slab joints do not occur within 200 mm of the corners of openings.

Figure 4 Typical fixing pattern



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

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

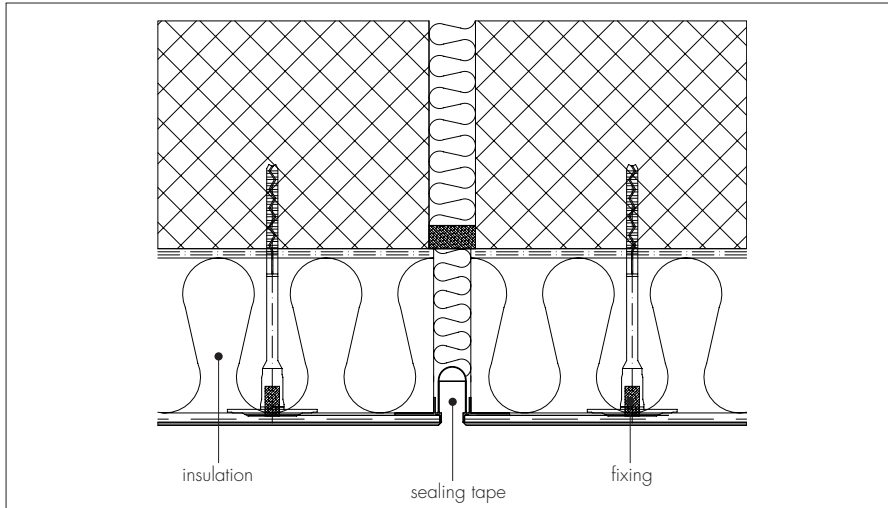
16.13 Periodic checks should be carried out as work proceeds. Where existing render is on the wall or dubbing out render has been used, care should be taken when aligning the slabs as the effective embedment will be reduced.

16.14 Building corners, doors and window heads and jambs are formed using corner beads bonded to the insulation in accordance with the manufacturer's instructions.

Movement joints

16.15 Generally, movement joints are not required in the REDArt External Wall Insulation System. If a movement joint is already incorporated in the substrate then a movement joint must be provided in the insulation system. In this case, movement joints in the substrate must be continued through the system. Each project should be considered on its own merits and the Certificate holder will take into account the construction format, building design and fenestration when determining the regularity and positioning of both vertical and horizontal expansion joints in the system (see Figure 5).

Figure 5 Vertical movement joint



Basecoat and reinforcement

16.16 The basecoat is mixed using an electrically-driven mixer and prepared with the addition of 5 litres of clean water per 25 kg bag (see section 1).

16.17 Additional pieces of reinforcing mesh (250 mm by 500 mm) should be used diagonally at the corners of openings as shown in Figure 6.

16.18 Corner beads are fixed to all building corners and to door and window heads and jambs.

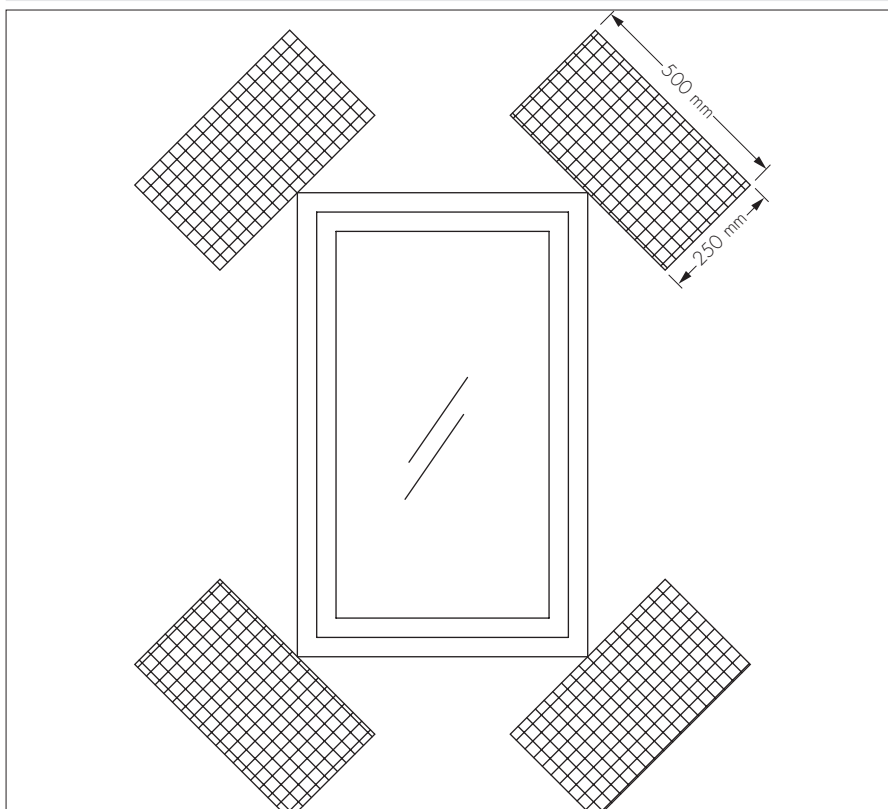
16.19 The basecoat is applied over the insulation slabs using a flat trowel at a depth of approximately 5 mm, ensuring the trowel is pressed into the insulation surface to improve adhesion, and working in 1 m sections in a vertical and horizontal direction. Using a 10 mm notched trowel, ridges are created in the base coat; any excess material must be removed.

16.20 While the basecoat is still wet, the reinforcement mesh is applied, which immediately embeds into the basecoat. It must be overlapped at all joints by no less than 100 mm.

16.21 It is important to ensure that the mesh is free of wrinkles and completely covered.

16.22 Whilst still wet, the base coat is drawn through the mesh with a flat trowel to ensure it is fully covered. The base coat should have a finished thickness of 5 mm to 6 mm, be left smooth and level with no trowel lines and with the reinforcing mesh in the outer third.

Figure 6 Additional reinforcement of openings



16.23 If two coats of basecoat are to be used, the first should be left to dry for at least 2 days before application of the second, ensuring the mesh is fully covered. The basecoat should have a total thickness of 6 mm to 8 mm.

16.24 The basecoat should be left to dry thoroughly before application of the primer. The drying time will depend upon the conditions, but between 24 hours and 48 hours should elapse before applying the primer.

Finishing

16.25 Before applying the decorative finish, a primer coat is applied by brush or roller and allowed to dry for a minimum of 24 hours. Primer is not required for dry dash and brick effect finishes.

16.26 The silicone finish should be applied to the surface in a uniform layer to the thickness of the grain size using a stainless float then, using a plastic float, the texture of the finish should be brought out by floating the applied mass in a circular or longitudinal motion.

16.27 For the spar dash aggregate finish, dash receiver is applied over the basecoat to a minimum thickness of 6 mm or 8 mm. While the dash receiver is still soft, 3 mm to 8 mm of spar dash aggregate is applied onto the receiver. 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.

16.28 For the brick effect application, Brick Effect Basecoat is applied with a metal trowel to a thickness of 6 mm to 8 mm, and with a level finish. After the basecoat has stiffened, the Brick Effect Finish Coat is applied to a thickness of 3 mm to 5 mm, with a level finish. Texture is created using a brush or roller. Once sufficiently hardened, joints are raked out to create the agreed brick effect pattern, ensuring that no more than 1 mm thickness of the Brick Effect Basecoat is removed during this process.

16.29 After the application of the render system, a bead of low modulus silicone sealant is gun-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.

16.30 Continuous surfaces should be completed without a break.

16.31 At the tops of walls, the system should be protected by an adequate overhang (see Figure 9) or by an adequately-sealed purpose-made flashing (see Figure 7).

16.32 Care should be taken in the detailing of the system around openings and projections (see Figures 8, 9 and 10).

16.33 On completion of the installation, external fittings, eg rainwater goods, are re-fixed through the system into the substrate in accordance with the Certificate holder's instructions.

Figure 7 Roof eaves details

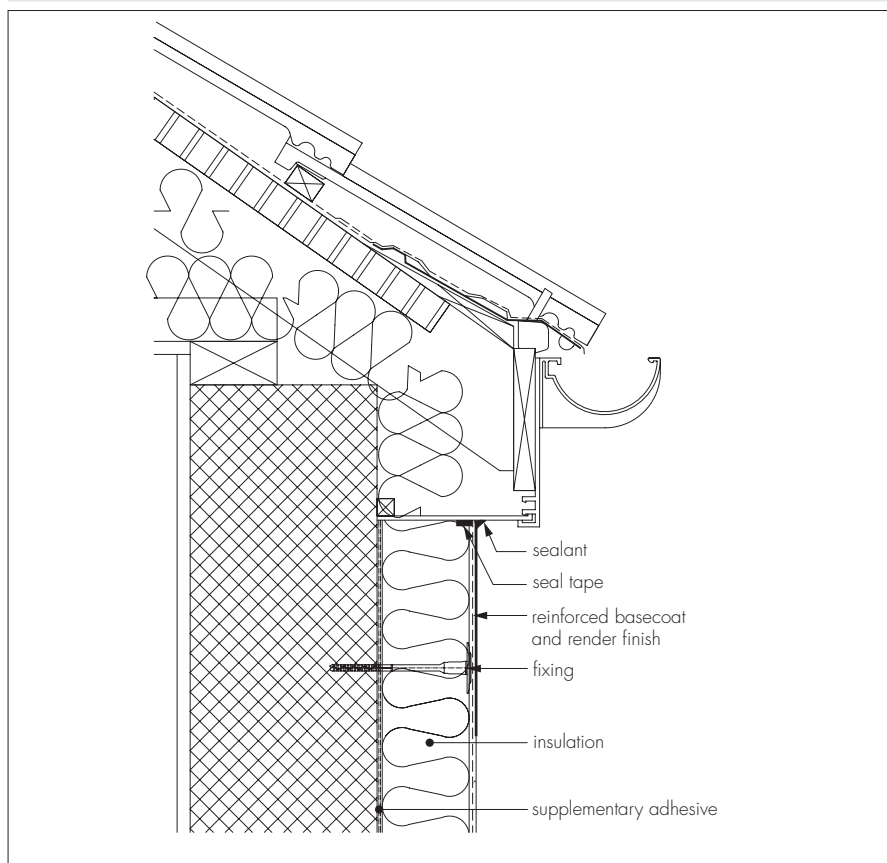


Figure 8 Typical window reveal details

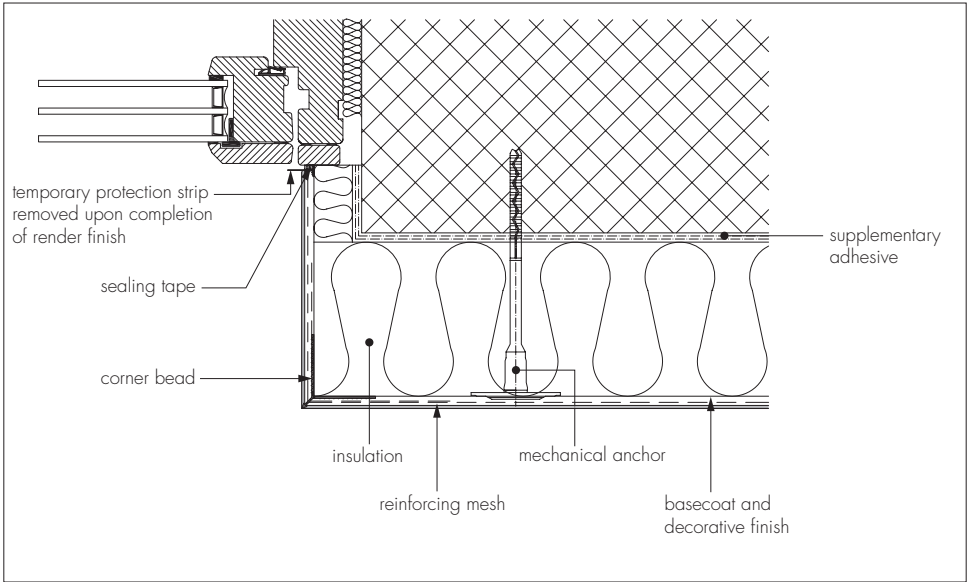


Figure 9 Typical insulated window head detail

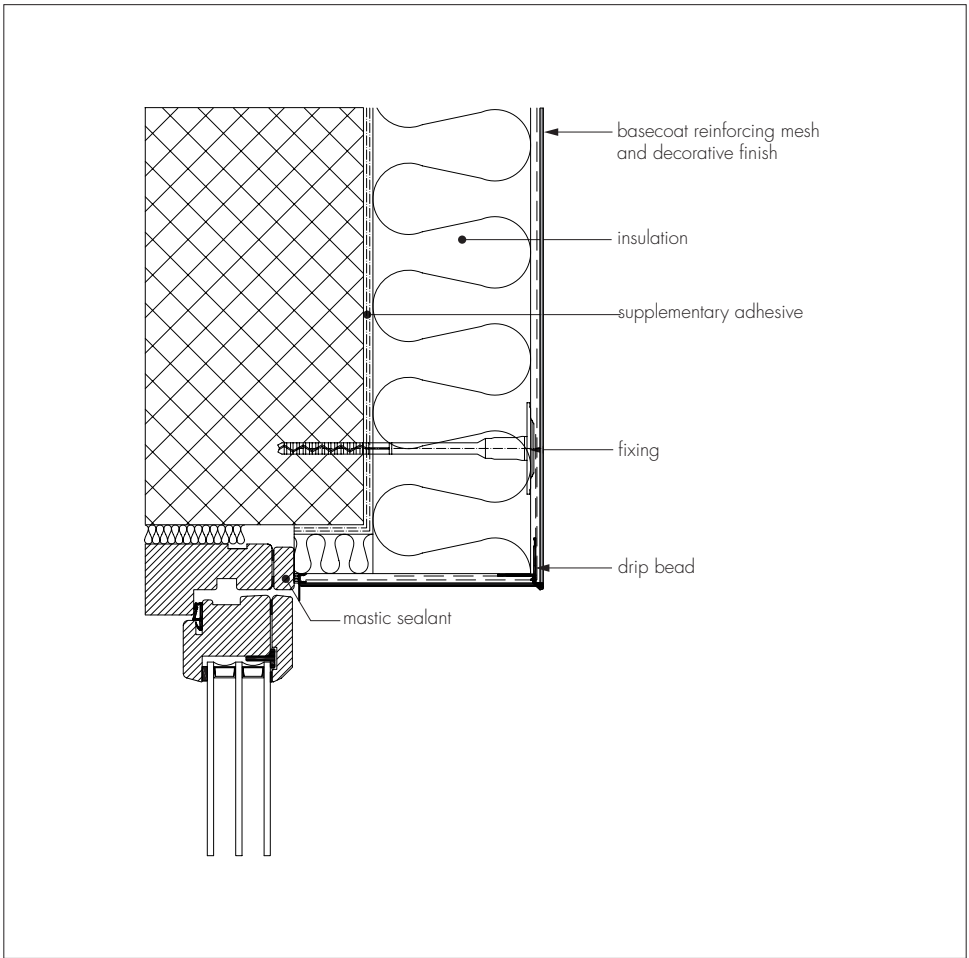
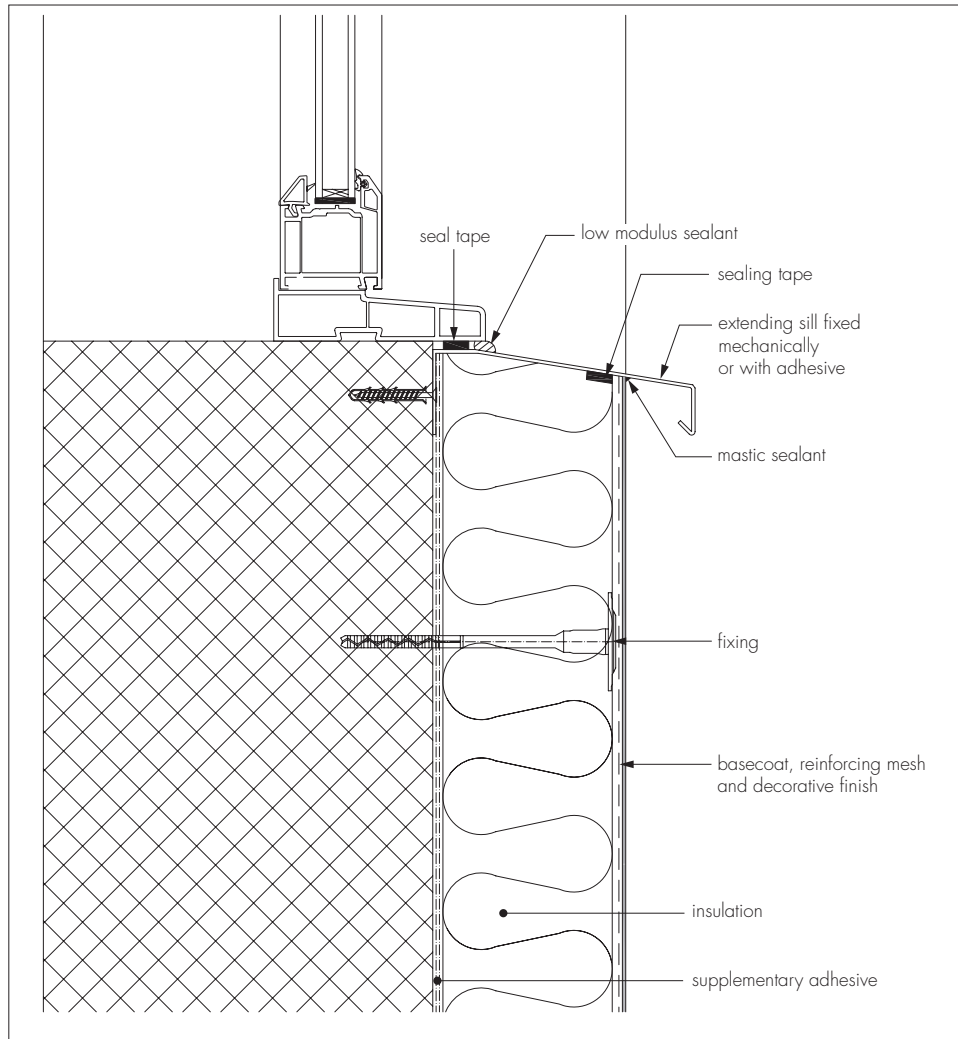


Figure 10 Window sill detail



Technical Investigations

17 Investigations

17.1 Tests were conducted on the system and the results were assessed to determine:

- resistance to pull-through
- fire performance
- bond strength
- hygrothermal performance
- resistance to freeze thaw
- resistance to impact
- water vapour permeability
- water absorption (capillarity test)
- risk of interstitial condensation
- thermal conductivity.

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

17.3 The practicability of the installation and the effectiveness of detailing were assessed.

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*
- BS EN 1990 : 2002 *Eurocode — Basis of structural design*
- BS EN 1991-1-4 : 2005 *Eurocode 1 : Actions on structures — General actions — Wind actions*
- BS EN 1996-2 : 2006 *Eurocode 6 : Design of masonry structures — Design considerations, selection of materials and execution of masonry*
- BS EN 13162 : 2012 *Thermal insulation products for buildings — Factory made mineral Wool (MW) products — Specification*
- BS EN 13501-1 : 2007 *Fire classification of construction products and building elements — Classification using test data from reaction to fire tests*
- BS EN 13914-1 : 2005 *Design, preparation and application of external rendering and internal plastering — External rendering*
- BS EN ISO 6946 : 2007 *Building components and building elements — Thermal resistance and thermal transmittance — Calculation method*
- BS EN ISO 9001 : 2008 *Quality management systems — Requirements*
- BS EN ISO 11600 : 2003 *Building construction — Jointing products — Classification and requirements for sealants*
- ETAG 004 : 2013 *Guideline for European Technical Approval of External Thermal Insulation Composite Systems with Rendering*
- ETAG 014 : 2011 *Guideline for European Technical Approval of Plastic Anchors for fixing of External Thermal Insulation Composite Systems with Rendering*
- BRE Report (BR 262 : 2002) *Thermal insulation: avoiding risks*
- BRE Report (BR 443 : 2006) *Conventions for U-value calculations*

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.