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BBA APPROVAL INSPECTION TESTING CERTIFICATION
TECHNICAL APPROVALS FOR CONSTRUCTION

Agrément Certificate
13/5000
Product Sheet 1

KNAUF MARMORIT WARM WALL EXTERNAL WALL INSULATION SYSTEMS

KNAUF MARMORIT WARM WALL EPS EXTERNAL WALL INSULATION SYSTEM

This Agrément Certificate Product Sheet(1) relates to the Knauf Marmorit Warm Wall EPS External Wall Insulation System, comprising expanded polystyrene (EPS) insulation boards or enhanced expanded polystyrene insulation boards, with a glassfibre reinforcing mesh and render finishes, and suitable for use on new or existing buildings of sound masonry and dense or no-fines concrete
The system is mechanically fixed with anchors and a supplementary adhesive.

(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 contribute to satisfying the Building Regulations (see section 6).

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

Behaviour in relation to fire — the system has either a Class B-s1, d0 or a B-s2, d0 surface spread of flame 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 — with appropriate care, the system should remain effective for at least 30 years (see section 13).

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

On behalf of the British Board of Agrément

Date of Second issue: 3 October 2013

John Albon — Head of Approvals
Energy and Ventilation

Claire Curtis Thomas
Chief Executive

Originally certificated on 20 May 2013

Certificate amended on 22 October 2013 to make minor change to text in Design Considerations *section.*

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

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

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Regulations

In the opinion of the BBA, the Knauf Marmorit Warm Wall EPS External Wall Insulation System, if installed, used and maintained in accordance with this Certificate, will 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 contribute to satisfying this Requirement. See sections 8.1, 8.2, 8.4, 8.6 and 8.7 of this Certificate.
Requirement:	C2(b)	Resistance to moisture
Comment:		The system provides a degree of protection against rain ingress. See sections 4.4 and 10.1 of this Certificate.
Requirement:	C2(c)	Resistance to moisture
Comment:		The system contributes to minimising the risk of interstitial and surface condensation. See sections 11.1, 11.2 and 11.4 of this Certificate.
Requirement:	L1(a)(i)	Conservation of fuel and power
Comment:		The system can contribute to satisfying this Requirement. See sections 6.2 and 6.3 of this Certificate.
Regulation:	7	Materials and workmanship
Comment:		The system is acceptable. See section 13.1 and the *Installation* part of this Certificate.
Regulation:	26	CO_2 emission rates for new buildings
Comment:		The system can contribute to satisfying this Regulation. See sections 6.2 and 6.3 of this Certificate.

The Building (Scotland) Regulations 2004 (as amended)

Regulation	8(1)(2)	Durability, workmanship and fitness of materials
Comment:		The system can contribute to a construction satisfying this Regulation. See sections 12.1, 12.2 and 13.1 and the *Installation* part of this Certificate.
Regulation:	9	Building standards applicable to construction
Standard:	1.1	Structure
Comment:		The system can sustain and transmit wind loads to the substrate wall. See section 7.4 of this Certificate.
Standard:	2.6	Spread to neighbouring buildings
Comment:		The external surface of the system has a 'low risk' surface spread of flame classification, with reference to clauses 2.6.4(1)(2), 2.6.5(1) and 2.6.6(2). See sections 8.1, 8.2, 8.5, 8.6 and 8.7 of this Certificate.
Standard:	2.7	Spread on external walls
Comment:		The system incorporates materials which would not be classed as 'non-combustible' as defined in this Standard, with reference to clauses 2.7.1(1)(2), 2.7.2(2) and Annex 2A(1). See sections 8.1, 8.2, 8.5, 8.6 and 8.7 of this Certificate.
Standard:	3.10	Precipitation
Comment:		The system will contribute to a construction satisfying this Standard, with reference to clause 3.10.1(1)(2) and 3.10.2(1)(2). See sections 4.4 and 10.1 of this Certificate.
Standard:	3.15	Condensation
Comment:		The system can satisfy 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), 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)(2), 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 a bronze level of sustainability as defined in this Standard. In addition the product can contribute to a construction meeting a higher level of sustainability as defined in this Standard with reference to clause 7.1.4(1)(2) [Aspects 1(1)(2) and 2(1)], 7.1.6(1)(2) [Aspects 1(1)(2) and 2(1)] and 7.1.7(1)(2) [Aspects 1(1)(2)]. See section 6.2 of this Certificate.
Regulation:	12	Building standards applicable to conversions
Comment:		All comments given for this system under Regulation 9, Standards 1 to 6, also apply to this Regulation, with reference to clause 0.12.1(1)(2) and Schedule 6(1)(2).

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

The Building Regulations (Northern Ireland) 2012

Regulation:	23	Fitness of materials and workmanship
Comment:		The system is acceptable. See section 13.1 and the *Installation* part of this Certificate.
Regulation:	28(b)	Resistance to moisture and weather
Comment:		The system will satisfy this Regulation. See sections 4.4 and 10.1 of this Certificate.
Regulation:	29	Condensation
Comment:		The system can contribute to minimising the risk of interstitial and surface condensation. See sections 11.2 and 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 external surface of the system has a 'low risk' surface and can satisfy this Regulation. See sections 8.1, 8.2, 8.4, 8.6 and 8.7 of this Certificate.
Regulation:	39(a)(i)	Conservation measures
Regulation:	40	Target carbon dioxide emission rate
Comment:		The system can contribute to satisfying these Regulations. See sections 6.2 and 6.3 of this Certificate.

Construction (Design and Management) Regulations 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 and 3.3) of this Certificate.

Additional Information

NHBC Standards 2013

NHBC accepts the use of the Knauf Marmorit Warm Wall EPS External Wall Insulation System, provided it is installed, used and maintained in accordance with this Certificate, in relation to *NHBC Standards*, Chapter 6.9 *Curtain walling and cladding*.

Technical Specification

1 Description

1.1 The Knauf Marmorit Warm Wall EPS External Wall Insulation System (see Figure 1) comprises:

Adhesive

- Knauf Marmorit SM700/SM700 PRO — a mixture of grey or white Portland cement, supplied as a powder to which clean water is added. Can be used as both the base render and adhesive
- Knauf Marmorit SM300 — hydrated lime, cement, limestone, quartz sand, special bonding agents and water repellents content, supplied as a powder to which clean water is added. Can be used as both the base render and adhesive.

Insulation

- Knauf Marmorit Warm Wall EPS and EEPS insulation boards —expanded polystyrene boards in accordance with BS EN 13163 : 2012 supplied as square-edge or tongue-and-groove with the characteristics given in Table 1. The thermal performance depends on the board type used (see section 6).

Table 1 Properties of insulation boards

Characteristic (unit)	EPS	EPS/EEPS	EEPS
	Square-edge	Tongue-and-groove	Square-edge
Size (mm)	1000 x 500	1000 x 485	1000 x 500
Thickness[1] (mm)	40 to 400	60 to 400	40 to 300
Density ($kg \cdot m^{-3}$)	15	15	15
Compressive strength[2] ($kN \cdot m^{-2}$) at 10% deformation	100	70	70
Tensile strength[3] ($kN \cdot m^{-2}$)	100	100	⩾100

(1) In increments of 10 mm.
(2) Minimum value given.
(3) Minimum value perpendicular to face.

Mechanical fixings

- Knauf Marmorit Warm Wall Mechanical fixings — anchors of adequate length to suit the substrate and insulation thickness, approved and supplied by the Certificate holder, and selected from:
  - — Ejotherm: ST U, NT U, NTK U
  - — Termoz: 8 U, 8 UZ, KS 8
  - — Koelner K18M.

Basecoat

- Knauf Marmorit SM700/SM700 PRO — see 'Adhesive'
- Knauf Marmorit SM300 — see 'Adhesive'.

Reinforcement

- Knauf Marmorit Reinforcement — a one-metre wide mesh of multi-stranded, alkali- and slide-resistant glassfibres with a polymer coating, weighing approximately 160 $g \cdot m^{-2}$, with a nominal mesh size 4 mm by 4 mm
- Knauf Marmorit Heavy Duty Reinforcement — used with, and with the same specification as, Knauf Marmorit Reinforcement but weighing approximately 200 $g \cdot m^{-2}$ with a nominal mesh size 5 mm by 5 mm.

Primers

- Knauf Marmorit Quarzgrund Primer — a white aqueous liquid emulsion with quartz sand.

Finishing coats

- Knauf Marmorit Noblo; Knauf Marmorit Mak 3— pre-mixed dry mortar with lime/cementitious binder, requiring the addition of about 25% to 30% water. Each available in three grain sizes: 1.5 mm, 2 mm and 3 mm
- Knauf Marmorit Rolls; Knauf Marmorit RP240; Knauf Marmorit Carrara; Knauf Marmorit Noblo Light — pre-mixed dry mortar with lime/cementitious binder, requiring the addition of 25% to 30% water. Each available in two grain sizes: 2 mm and 3 mm
- Knauf Marmorit Pico der Feine — pre-mixed dry mortar with lime/cementitious binder, requiring the addition of 25% to 30% water. Available in 0.6 mm grain size
- Knauf Marmorit SP260 — pre-mixed dry mortar with lime/cementitious binder, requiring the addition of 25% to 30% water. Available in three grain sizes: 2 mm, 3 mm and 5 mm.
- Knauf Marmorit Conni — a ready-mixed vinylic/siloxane binder giving a textured finish. Available in four grain sizes: 1 mm, 1.5 mm, 2 mm and 3 mm
- Knauf Marmorit Addi — a ready-mixed, acrylic, textured finish topcoat. Available in four grain sizes: 1 mm, 1.5 mm, 2 mm and 3 mm.

Ancillary materials/components

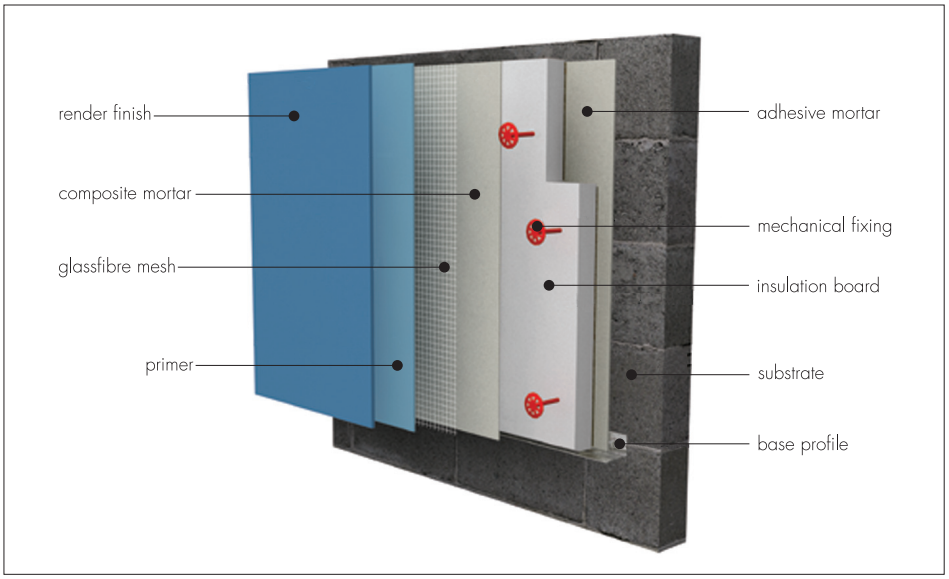
The following ancillary items are used to aid the installation of the system, but are outside the scope of this Certificate.

- wall profiles — a range of standard profiles for such details as wall base, end stop, corner mesh and expansion joints
- expansion profile (horizontal and vertical)
- sealant — silicone
- sills
- wall copings
- PU foam filler
- stainless steel fire fixings
- fire breaks
- fungicidal wash
- stabilising solution
- dubbing render.

1.2 The insulation boards are coated with adhesive mortar and mechanically fixed to the substrate. The composite mortar is trowel-applied to the external face of the board and the reinforcing mesh embedded and left to dry. The Quarzgrund Primer is applied to dry mortar and allowed to dry then finished with a proprietary finish coat (see section 16).

1.3 All components are subject to routine in-factory quality control.

Figure 1 Knauf Marmorit Warm Wall EPS External Wall Insulation System



2 Manufacture

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 non-conformities
- checked that equipment has been properly tested and calibrated
- undertaken to carry out the above measures on a regular basis as part of a surveillance process to verify that the specifications and quality control operated by the manufacturer are being maintained.

3 Delivery and site handling

3.1 The insulation boards are delivered to site wrapped in polythene. Each pack carries product identification and batch numbers.

3.2 Components are delivered to site in the packaging and quantities listed in Table 2. Each package carries the product identification, manufacturer's batch number and the BBA logo incorporating the number of this Certificate.

Table 2 Component supply details

Component	Quantity and package
Knauf Marmorit SM700 — adhesive/basecoat	30 kg bag
Knauf Marmorit SM700 PRO — adhesive/basecoat	25 kg bag
Knauf Marmorit SM300	25 kg bag
Knauf Marmorit Conni — finishing coat	25 kg plastic tub
Knauf Marmorit Rolls — finishing coat	30 kg bag
Knauf Marmorit RP240 — finishing coat	30 kg bag
Knauf Marmorit Carrara — finishing coat	30 kg bag
Knauf Marmorit Pico der Feine — finishing coat	30 kg bag
Knauf Marmorit Noblo Light — finishing coat	30 kg bag
Knauf Marmorit Mak 3 — finishing coat	30 kg bag
Knauf Marmorit Noblo — finishing coat	30 kg bag
Knauf Marmorit SP260 — finishing coat	30 kg bag
Knauf Marmorit Addi — finishing coat	25 kg plastic tub
Knauf Marmorit Quarzgrund Primer	15 kg plastic tub
Knauf Marmorit Reinforcement 160 g·m^{-2} Mesh	1 m wide, 50 m rolls
Knauf Marmorit Heavy Duty Reinforcement 200 g·m^{-2} Mesh	1 m wide, 50 m rolls
Knauf Marmorit mechanical fixings	boxed by manufacturer

3.3 Care must be taken when handling the insulation to avoid damage. It must be protected from prolonged exposure to sunlight, contact with solvents, bitumen or materials containing volatile organic components, and exposure to open flame or other ignition sources. In addition, it must be stored on a firm, clean, level base, off the ground and under cover until required.

3.4 The renders must be stored in dry conditions, off the ground, and protected from excessive heat, moisture and frost at all times.

Assessment and Technical Investigations

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

Design Considerations

4 General

4.1 When installed in accordance with this Certificate, the system is effective in reducing the thermal transmittance (U value) of 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. Only details approved by the Certificate holder must be used.

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

4.3 Existing buildings subject to national Building Regulations should have wall surfaces in accordance with section 14 of this Certificate.

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

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

4.5 Other new buildings, not subject to any of the previous requirements, should also be built in accordance with BS EN 1996-2 : 2006.

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

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

4.8 It is recommended that external plumbing be removed before installation and alterations made to underground drainage, where appropriate, to accommodate repositioning of the plumbing on the finished face of the system.

4.9 New buildings should be of sound masonry, dense or no-fines concrete construction.

4.10 It is essential that the 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.

Note: The BBA operates a UKAS Accredited Approved Installers 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_D *value*) of 0.038 $W \cdot m^{-1} \cdot K^{-1}$ (for EPS, board thickness range 60 to 400 mm) and 0.032 $W \cdot m^{-1} \cdot K^{-1}$ (for EEPS, board thickness range 40 to 300 mm).

6.2 The U value of a wall will depend on the selected insulation type and thickness the number and type of fixings and the insulating value of the substrate masonry and its internal finish. U values for typical design U values, calculated in accordance with section 6.1 are given in Table 3.

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

U value ($W \cdot m^{-2} \cdot K^{-1}$)	215 mm brickwork, λ = 0.56 $W \cdot m^{-1} \cdot K^{-1}$		200 mm brickwork, λ = 1.75 $W \cdot m^{-1} \cdot K^{-1}$	
	EPS	EEPS	EPS	EEPS
0.19	200	150	210	160
0.25	140	110	150	120
0.26	140	110	150	110
0.28	120	100	130	110
0.30	110	90	120	100
0.35	100	80	100	80

(1) Based upon incremental insulation thickness of 10 mm.
(2) Wall construction inclusive of 13 mm plaster (λ = 0.57 $W \cdot m^{-1} \cdot K^{-1}$), 5 mm render ($\lambda$ = 1.0 $W \cdot m^{-1} \cdot K^{-1}$), brickwork (protected) with 17% mortar or dense blockwork with 6.7% mortar (λ mortar = 0.88 $W \cdot m^{-1} \cdot K^{-1}$). EPS insulation as per section 6.1.
(3) Calculation based on a bonded system that included seven galvanised steel fixings, with 8 mm diameter and (χ_p = 0.004 $W \cdot K^{-1}$) per m^2. Use of other types of fixings should be calculated in accordance with BS EN ISO 6946 : 2007.

6.3 The systems can contribute to maintaining continuity of thermal insulation at junctions between elements and openings. For Accredited Construction Details, the corresponding ψ-values (Psi) in *BRE Information Paper IP 1/06*, Table 3, may be used in carbon emission calculations in Scotland and Northern Ireland. Detailed guidance for other junctions and on limiting heat loss by air infiltration can be found in:

England and Wales — Approved Documents to Part L and, for new thermal elements to existing buildings, Accredited Construction Details (version 1.0). See also SAP 2009, Appendix K, and the *iSBEM User Manual* for new-build

Scotland — Accredited Construction Details (Scotland)

Northern Ireland — Accredited Construction Details (version 1.0).

7 Strength and stability

7.1 When installed on masonry or concrete 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, adhesive and insulation.

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

7.4 The wind loads on the wall 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 insulation system
- the proposed system and associated fixing layout provides adequate resistance to negative wind loads [based on the results of site investigation and test results given in Table 5 (see section 7.7)].

7.6 Provided the substrate wall is suitable and an appropriate fixing is used, the mechanical fixings will transfer the weight of the render insulation system to the substrate wall. The number of fixings and the span between fixings should be determined by the system designer. The fixing must be selected to give adequate support to the weight of the system at the minimum spacing given in this Certificate. As a guide, typical characteristic pull-out strengths for the fixings 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. A minimum of one metal fixing per square metre is required to satisfy fire regulations (see section 8).

Table 4 Fixings — typical characteristic pull-out strengths on concrete substrate

Fixing type	Typical pull-out strength (N)[1]
Polyethylene, PE-HD with metal centre screw — Ejotherm ST U (ETA-02/0018)	1200
Polypropylene with metal centre pin — Termoz 8 U (ETA-02/0019)	1500
Polyethylene with metal centre screw — Termoz 8 UZ (ETA-02/0019)	1200
Polyamide with metal centre screw — Termoz KS 8 (ETA-04/0114)	500
Polyethylene, PE-HD with metal centre pin — Ejotherm NT U (ETA-05/0009)	400
Polypropylene with glass reinforced plastic (GRP) centre pin — Koelner K18M (ETA-06/0191)	1200
Polypropylene with glass reinforced plastic (GRP) centre pin — Ejotherm NTK U (ETA-07/0026)	900

(1) Values are determined in accordance with ETAG 014 : 2002 and are dependent on the substrate.

7.7 The resistance forces data given in Table 5 are the results of calculations based upon:

- fixings arranged in the pattern described and shown in section 16.9 and Figure 3
- pull-through resistances determined by the BBA from tests on anchors with 60 mm and 90 mm diameter plates (mean value of five tests with a factor of safety of 2.5 applied)
- an appropriate number of site-specific pull-out tests 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 : 2002, Annex D (ie by calculating the mean of the lowest five values and multiplying by 0.6). In accordance with this guideline, a safety factor of two is applied to this figure to establish the design value to resist ultimate loads.

Table 5 Characteristic values to establish ultimate wind load capacity

Factor	EPS[1]		EEPS
Thickness (mm)	≥60	≥60	≥60
Plate diameter of anchor (mm)	60	90	60
Characteristic pull-over resistance[2] (per anchor) (N)	415	450	421
Factor of safety	2.5	2.5	2.5
Design pull-over resistance[3] (N)	166	180	169

(1) Calculation based on insulation board 1200 mm by 600 m (total area 0.72 m^2) attached by six fixings.
(2) Pull-over resistance of insulation over the head of the fixing.
(3) The safety factor of 2.5 is based on the assumption that all insulation boards are quality control tested to establish tensile strength perpendicular to the face of the board.

Impact resistance

7.8 Hard body impact tests were carried out in accordance with ETAG 004 : 2000. The system is suitable for use in Categories I[1], II[2] and III[3] as given in Table 6.

Table 6 Impact resistance Categories

Rendering system: Base coat with finishing coat	Use Categories	
	Double mesh	Single mesh
Marmorit Noblo, Marmorit Noblo Light, Marmorit Addi, Marmorit Rolls, Marmorit SP260, Marmorit RP240, Marmorit Mak 3	Category II	Category III
Marmorit Carrara, Marmorit Pico der Feine, Marmorit Conni	Category I	Category II

(1) Use 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.
(2) Use Category II — a zone liable to impacts from thrown or picked objects, but in public location where the height of the system will limit the size of the impact; or at lowers levels where access to public is primarily to those with some incentive to exercise care.
(3) Use 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 surface spread of flame classifications for the system in accordance with BS EN 13501-1 : 2007 are given in Table 7.

Table 7 Surface spread of flame classification

Rendering system: Base coat with finishing coat	Class according to BS EN 13501-1 : 2007
Marmorit Noblo, Marmorit Rolls, Marmorit SP260, Marmorit Mak 3, Marmorit RP240, Marmorit Carrara, Marmorit Pico der Feine, Marmorit Noblo Light	B – s1,d0
Marmorit Conni, Marmorit Addi	B – s2,d0

8.2 The fire classifications apply to the full range of thicknesses covered by this Certificate.

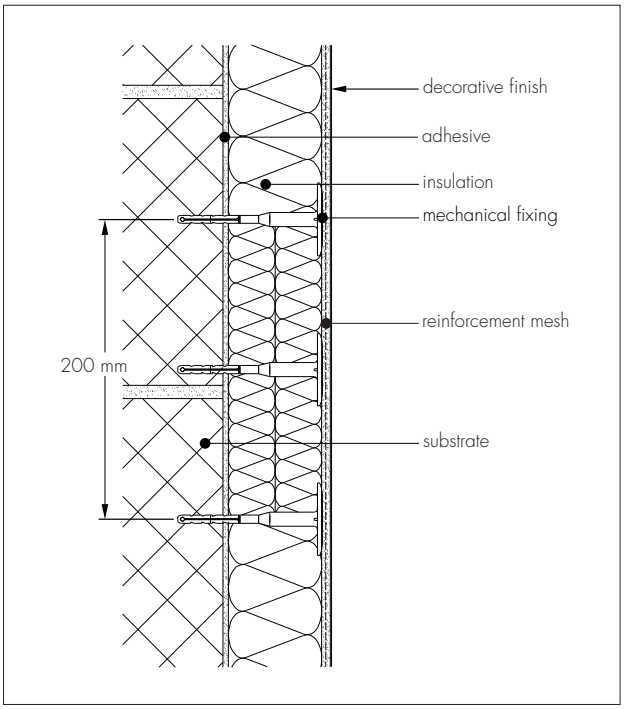
8.3 In multi-storey applications, a minimum of one stainless steel anchor per square metre is required above the first floor. The anchor is applied to prevent collapse should the insulation be lost to fire and must be designed to resist the bending and shear stresses resulting from the dead load from the render.

8.4 The system is suitable for use on or at any distance from the boundary in buildings up to 18 m in height.

8.5 The system is classified as 'low risk' combustible materials. It is suitable for use in buildings up to 18 m in height and cannot be used within 1 m of the boundary. Calculations for unprotected areas apply, with some minor exceptions.

8.6 Application to second storey walls and above should include fire barriers in line with compartment walls and each floor level (see Figure 2). For installation of fire barriers refer to the guidance given in *BRE Report BR 135 : 2013*.

Figure 2 Fire barrier



8.7 Designers must ensure that the completed wall provides any required period of fire resistance and refer to the documents supporting the national Building Regulations for detailed guidance.

9 Proximity of flues and appliances

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

England and Wales — Approved Document J

Scotland — Mandatory Standard 3.19, clause 3.19.4[1][2]

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

Northern Ireland — Technical Booklet L.

10 Water resistance

10.1 The system will provide a degree of protection against rain ingress. However, care should be taken to ensure that walls are adequately weathertight prior to its application. 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 rain ingress. 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 sections 16.24 and 16.25).

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.

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 ensure that condensation does not occur at the surface or within. The recommendations of the BS 5250 : 2011 should be followed.

Surface condensation

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

11.3 Walls will adequately limit the risk of surface condensation when the thermal transmittance (U value) does not exceed 1.2 $W \cdot m^{-2} \cdot K^{-1}$ at any point. Guidance may be obtained from BS 5250 : 2011 (Section 8 and Annex D) 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 this Certificate.

11.5 The render has an equivalent air layer thickness (S_d) of approximately 0.06 m. This corresponds to a water vapour resistance factor (μ) of approximately 20 for a render thickness of 6 mm.

11.6 The water vapour resistance factor (μ) for the EPS insulation boards, as taken from BS EN ISO 10456 : 2007, Table 4, is:

- adhesive 20
- EPS 60
- render 20.

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 should have a service life of at least 30 years, provided any damage to the surface finish is repaired immediately, and regular maintenance is undertaken. This includes checks on joints in the system and external plumbing fitments to prevent leakage of rainwater into the system, enabling steps to be taken to correct the defects (see section 12).

13.2 Any render 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.

Installation

14 Site survey and preliminary work

14.1 A pre-installation survey of the property is 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 the building indicating:

- the position of beads
- detailing around windows, doors and at eaves
- dpc level
- areas where additional reinforcement will be required

- exact position of expansion joints
- areas where flexible sealants must be used
- any alterations to external plumbing
- where required, the position of fire barriers.

14.2 Trial tests are conducted on the wall 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, the relevant wind speed data for the site and together with the Certificate holder's recommendations. It is recommended that the minimum layout of fixings (see Figure 3) as specified by the Certificate holder, should be followed. The advice of the Certificate holder should be sought to ensure the proposed fixing pattern is sufficient.

14.3 All modifications, such as provision for fire stopping (see sections 8 and 9) and necessary repairs to the building, are completed before installation commences.

14.4 Surfaces should be sound, clean and free from loose material. The flatness of surfaces must be checked; this may be achieved using a straight edge spanning the storey height. Any excessive irregularities, ie greater than 10 mm in 1 m, must be made good prior to installation to ensure that the insulation boards are installed with a smooth, in-plane finished surface.

14.5 Where surfaces are covered with an existing render, it is essential that the bond between the background and the render is adequate. All loose areas should be hacked off and reinstated. Further guidance is given in BS EN 13914-1 : 2005.

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

14.7 Internal wet work, eg 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, is carried out by approved installers recommended or recognised by the Certificate holder. Such an installer is a company:

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

16 Procedure

General

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

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

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

16.4 The adhesives and render must be mixed using a paddle mixer; conventional concrete mixers are unsuitable.

Positioning and securing insulation boards

16.5 The Knauf Marmorit Warm Wall base profile is secured to the external wall above the damp-proof course using the approved profile fixings at approximately 300 mm centres. Insulation boards are initially fixed to the external surfaces of the walls using adhesive mortar to secure the boards in place.

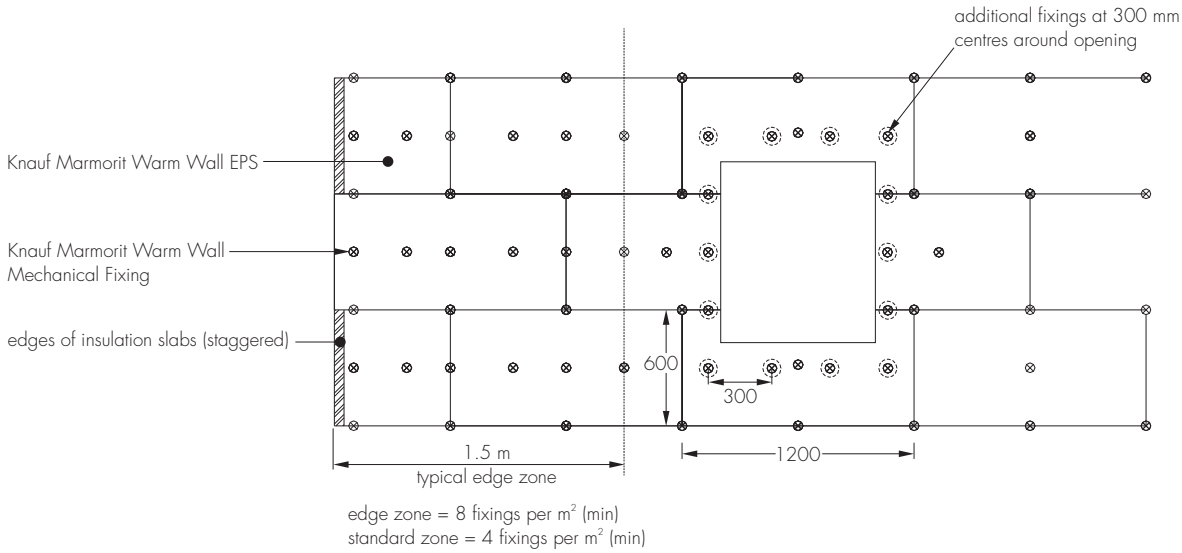
16.6 The board adhesive is prepared for use by mixing the contents of each 25 kg or 30 kg bag with approximately 5.8 litres of water using an electrically driven paddle mixer. The material is left to stand for approximately five minutes and mixed again with, if required, a small addition of water to give a smooth, workable consistency.

16.7 The board adhesive is applied to the back of the slabs either by notch trowel to achieve a full bond, or around the whole perimeter of the board and in six equal sized dabs distributed over the remaining area of the board for an uneven background.

16.8 The insulation slabs must be pressed firmly to the substrate immediately after application of the board adhesive and butted tightly together with the vertical joints staggered. Any delay may result in a weak bond. Joints in the system larger than 2 mm should be filled with slivers of EPS board or PU foam and any high spots or irregularities removed with a rasp over the whole surface.

16.9 The first run of insulation is positioned on the base profile. Holes are drilled into the substrate to the required depth through the insulation at the corners of each slab and at positions which will allow a minimum of eight fixings per square metre at edge zones and four fixings per square metre in the main area of the wall (see Figure 3). Around openings, additional fixings should be used at 300 mm centres. The mechanical fixings are inserted and tapped or screwed firmly into place, securing the insulation to the substrate. Subsequent rows of slabs are positioned so that the vertical board joints are staggered and overlapped at the building corners and so that the board joints do not occur within 200 mm of the corners of openings.

Figure 3 Insulation board fixing pattern



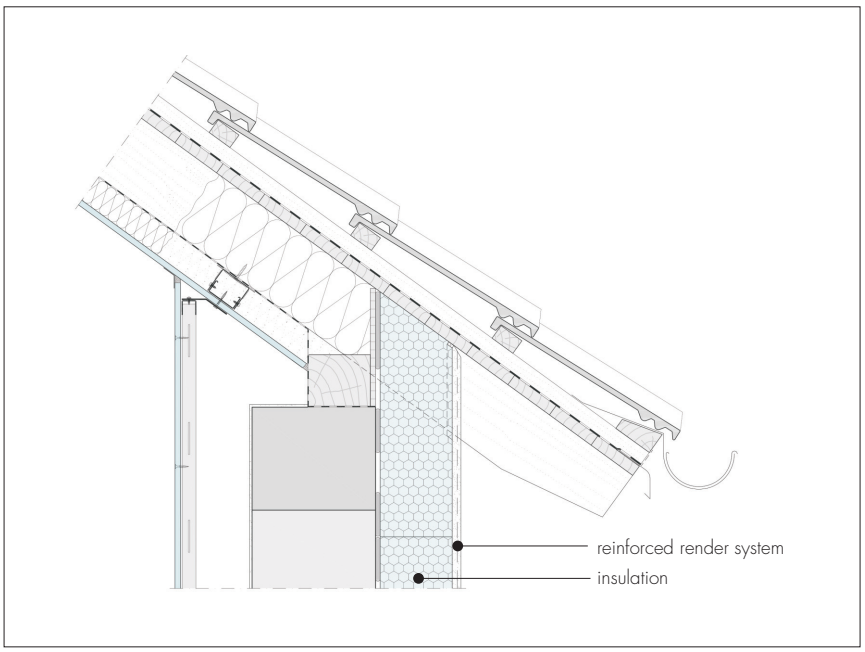
Note: The above fixing requiremens are standard, in areas of high windloads, please contact Certicicate Holder for further advice.

16.10 Care must be taken to ensure that all slab edges are butted tightly together, and alignment should be checked as work proceeds.

16.11 To fit around details such as doors and windows, insulation slabs may be cut with a sharp knife, fine-tooth saw or hot wire. If required, purpose-made Knauf Marmorit Warm Wall 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 and built up to the building soffits and eaves in new and existing buildings (see Figure 4).

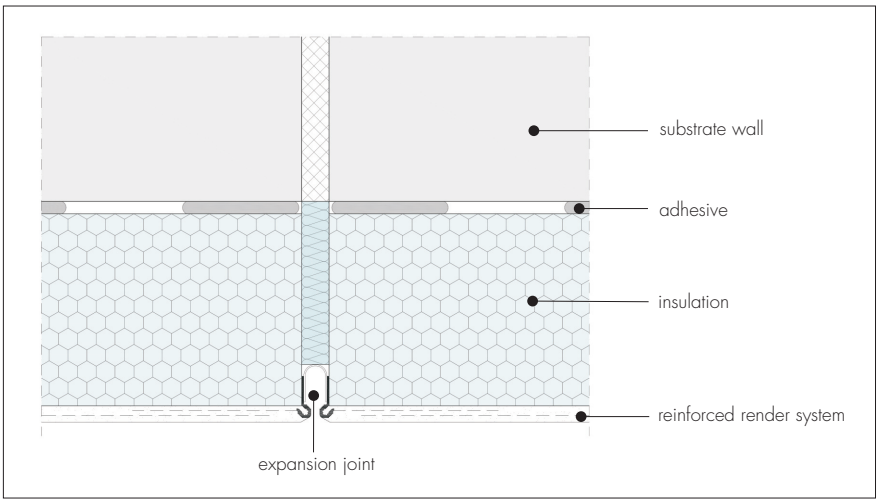
Figure 4 Typical roof eaves detail



Movement joints

16.13 Generally, movement joints are required in the system. If an expansion joint is incorporated in the substrate, it must be replicated through the system (see Figure 5).

Figure 5 Movement joint

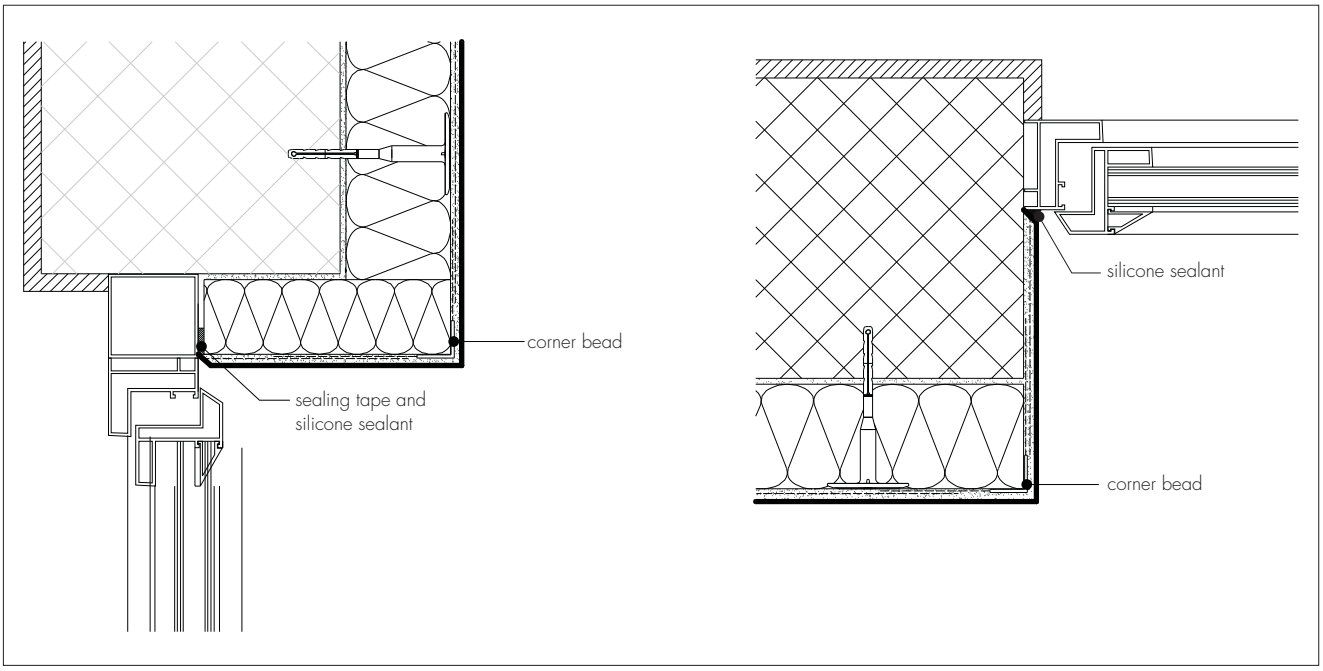


Reinforcing

16.14 The SM300 and SM700/SM700 PRO is prepared by mixing the contents of each 25 kg or 30 kg bag with 5.8 litres of clean water using the same method as for the adhesive (see section 16.7).

16.15 Prior to the render coat, a bead of low modulus silicone sealant with Knauf Marmorit Warm Wall Sealing Tape or a Knauf Marmorit Warm Wall APU Profile is installed at window and door frames, overhanging eaves, gas and electric meter boxes, wall vents or where the render abuts any other building material or surface. For non-insulated reveals, only a bead of low modulus silicone sealant is required (see Figure 6).

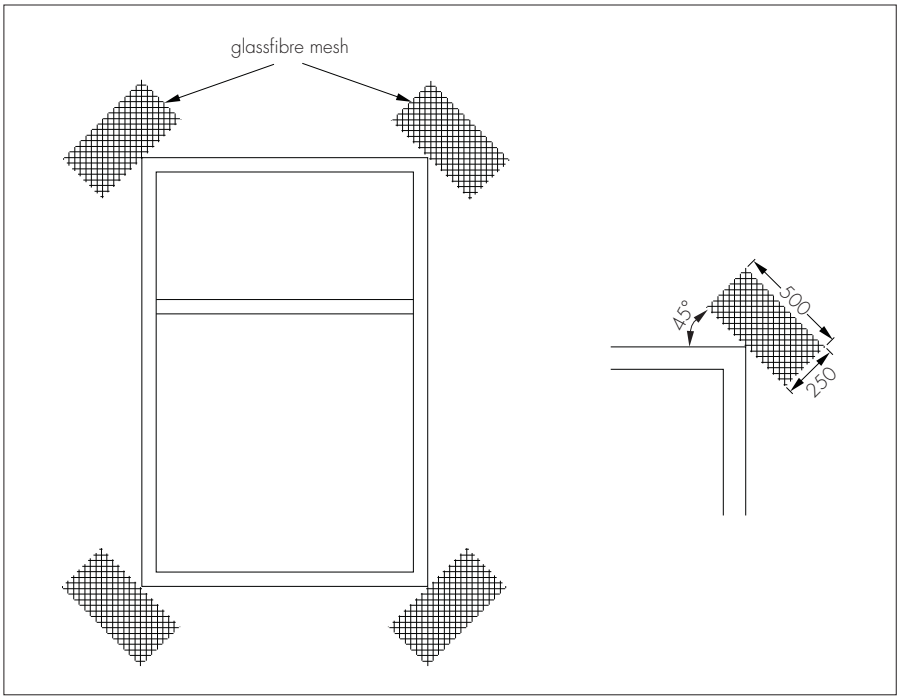
Figure 6 Detail around window and door frames



16.16 The basecoat render is applied either by spray equipment or stainless steel trowel to the surface of the dry insulation to a minimum thickness of 5 mm. The mesh is bedded immediately into the basecoat with 100 mm minimum overlap at joints, and must be in the upper third of the basecoat render. Additional pieces of reinforcing mesh (250 mm by 500 mm) are used diagonally at the corners of openings (see Figure 7).

16.17 Corner beads are fixed to the building corners, door and window heads and jambs. They are formed using an adhesive coat in accordance with the Certificate holder's instructions (see Figure 10).

Figure 7 Additional reinforcement at openings



16.18 Stop beads are positioned vertically, eg at party wall positions where the adjoining house does not require treatment.

Rendering and finishing

16.19 The drying period of any render will depend on the applied thickness and weather conditions; however, the basecoat must be left to harden for 3 to 5 days and any contaminants such as grease and chalking removed before the Quarzgrund Primer is applied by roller or brush. The Quarzgrund Primer is allowed to dry before application of the Conni, Addi, Noblo or SP260 finish coats.

16.20 The Noblo or SP260 is prepared by mixing the contents of each 30 kg bag with approximately 5.8 litres of cold, clean water, using the same method as for the SM300 and SM 700/SM 700 PRO mortar and adhesive. The Noblo or SP260 is applied by stainless steel trowel to the grain size: 1.5 mm, 2 mm and 3 mm. Conni and Addi are ready to use although a maximum of 2% clean water may be mixed into the 25 kg tub prior to application. Conni and Addi are applied by stainless steel trowel to the grain size: 1.0 mm, 1.5 mm, 2 mm or 3 mm. Conni, Addi, Noblo or SP260 are textured in a circular motion with a plastic trowel until the desired effect is achieved.

16.21 To prevent the render from drying too rapidly, it should not be applied in direct sunlight and continuous surfaces should be completed without a break.

16.22 Depending on the weather conditions, Noblo and SP260 should be allowed to dry for approximately 3 to 5 days before the application of the paint finish. Conni and Addi are through-coloured products which do not require an additional paint coat.

16.23 The decorative finish should not be applied in wet weather, at temperatures below 5°C or when frost is expected. Freshly coated work should be protected from rain and frost.

16.24 At the tops of walls, the system should be protected by an adequate overhang or by an adequately sealed purpose-made flashing (see Figures 4 and 8).

16.25 Care should be taken in the detailing of the system around openings and projections to prevent water ingress (see Figures 8 and 9).

16.26 On completion of the installation, external fittings, eg rainwater goods, are re-fixed through the system into the substrate (outside the scope of this Certificate).

Figure 8 Detail at tops of walls

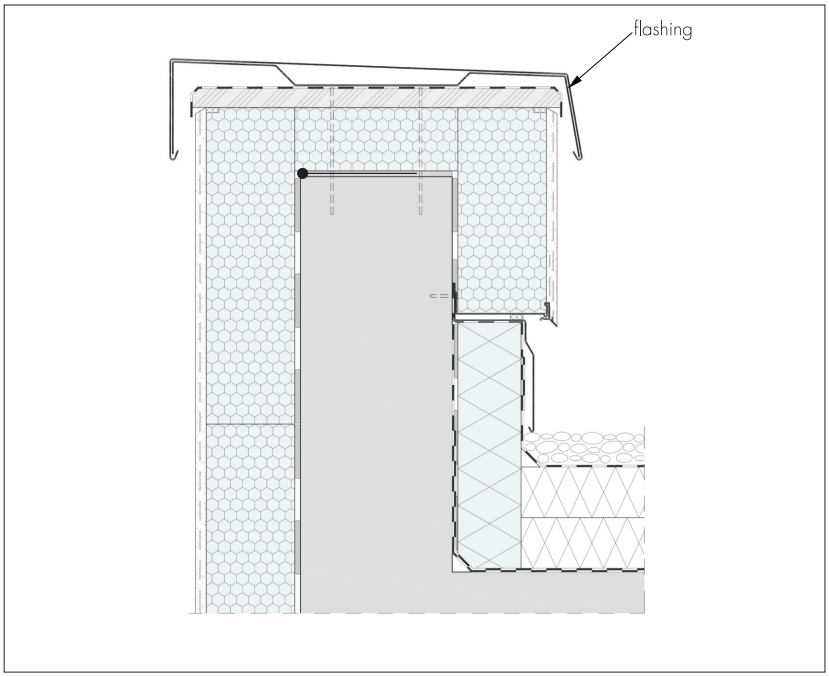


Figure 9 Window sill detail

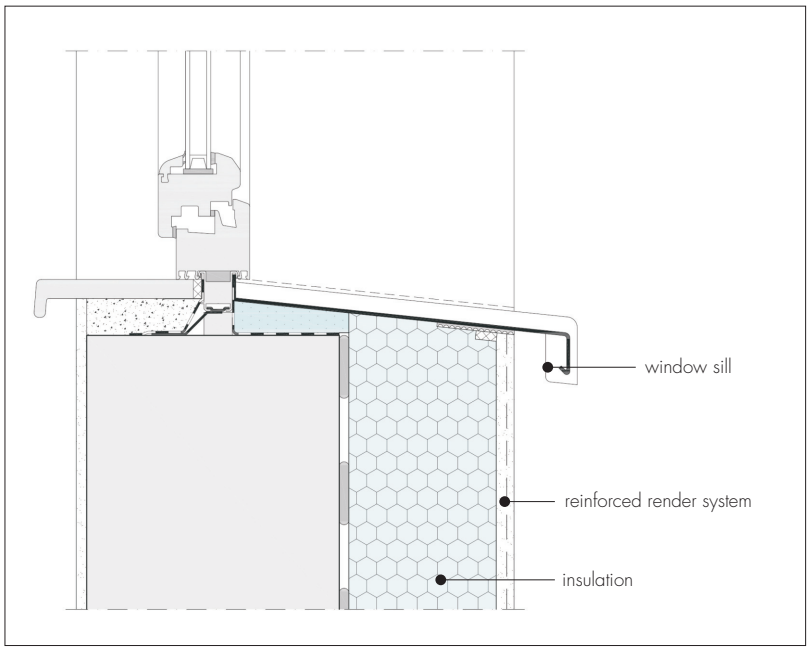
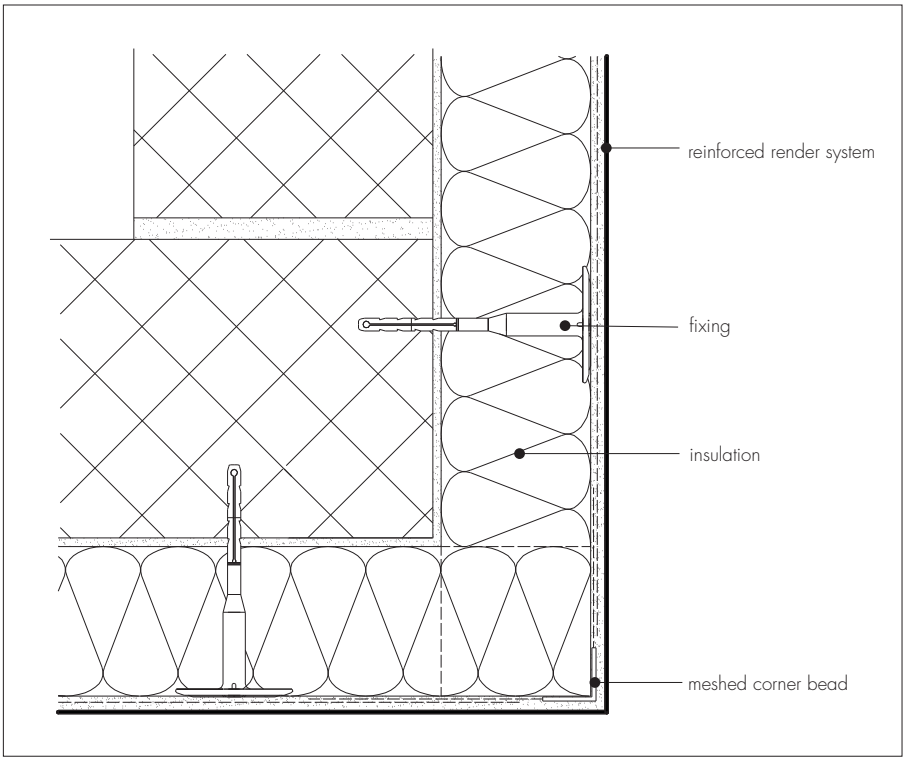


Figure 10 Corner detail



Technical Investigations

17 Tests

An examination was made of data relating to:

- component characterisation
- density of insulation slab
- heat/spray cycling
- resistance to freeze/thaw
- impact resistance
- water absorption of render
- water vapour permeability
- surface spread of flame tests to BS 476-7 : 1987, BS EN 1350-11 : 2007, BS EN 1328 : 1997, BS EN 11925-2 : 2007
- pull-out strength of fixings
- durability of finish
- thermal conductivity.

18 Investigations

18.1 The manufacturing process, the methods adopted for quality control of manufactured and bought-in components, and details of the quality and composition of the materials used, were examined.

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

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

Bibliography

BS 476-7 : 1987 *Fire tests on building materials and structures — Method of test to determine the classification of the surface spread of flame of products*

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 1328 : 1997 *Cement Bonded Particleboards - Determination of Frost Resistance*

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 11925-2 : 2007 *Reaction to fire tests — Ignitability of products subjected to direct impingement of flame — Single-flame source test*

BS EN 13163 : 2012 *Thermal insulation products for buildings — Factory made expanded polystyrene (EPS) 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 10456 : 2007 *Building materials and products — Hygrothermal properties - Tabulated design values and procedures for determining declared and design thermal values*

ETAG 004 : 2000 *Guideline for European Technical Approval of External Thermal Insulation Composite Systems with Rendering*

ETAG 014 : 2002 *Guideline for European Technical Approval of plastic anchors for fixing of external thermal insulation composite systems with rendering*

BRE Report BR 135 : 2013 *Fire Performance of External Insulation for Walls of Multistorey buildings*

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

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

19 Conditions

19.1 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.

19.2 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.

19.3 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.

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

19.5 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.

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

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