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Agrément Certificate
20/5767
Product Sheet 1

PROREND EIFS EXTERNAL WALL INSULATION SYSTEMS

PROREND EIFS (EPS) EXTERNAL WALL INSULATION SYSTEM

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

(1) Hereinafter referred to as 'Certificate'.

CERTIFICATION INCLUDES:

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

KEY FACTORS ASSESSED

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

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

Behaviour in relation to fire — the system can have a B-s2, d0 reaction to fire classification as defined in accordance with BS EN 13501-1 : 2007 and its use is restricted (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

Date of First issue: 23 June 2020

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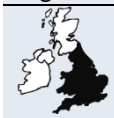
Regulations

In the opinion of the BBA, the ProRend EIFS (EPS) External Wall Insulation System, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements of the following Building Regulations (the presence of a UK map indicates that the subject is related to the Building Regulations in the region or regions of the UK depicted):



The Building Regulations 2010 (England and Wales) (as amended)

Requirement:	**A1**	**Loading**
Comment:		The system can sustain and transmit wind loads to the substrate wall. See sections 7.1 to 7.12 of this Certificate.
Requirement:	**B4(1)**	**External fire spread**
Comment:		The system is restricted by this Requirement. See sections 8.1 to 8.4 of this Certificate.
Requirement:	**C2(b)**	**Resistance to moisture**
Comment:		The system provides a degree of protection against rain ingress. See section 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(1)**	**Materials and workmanship**
Comment:		The system is acceptable. See section 13.1 and the *Installation* part of this Certificate.
Regulation:	**7(2)**	**Materials and workmanship**
Comment:		The system is restricted by this Regulation. See sections 8.1 to 8.4 of this Certificate.
Regulation:	**26**	**CO_2 emission rates for new buildings**
Regulation:	**26A**	**Fabric energy efficiency rates for new dwellings (applicable to England only)**
Regulation:	**26A**	**Primary energy consumption rates for new buildings (applicable to Wales only)**
Regulation:	**26B**	**Fabric performance values for new dwellings (applicable to Wales only)**
Comment:		The system can contribute to satisfying these Regulations. See sections 6.2 and 6.3 of this Certificate.

The Building (Scotland) Regulations 2004 (as amended)

Regulation:	**8(1)(2)**	**Durability, workmanship and fitness of materials**
Comment:		The system can contribute to a construction satisfying this Regulation. See sections 12 and 13.1 and the *Installation* part of this Certificate.
Regulation:	**9**	**Building standards applicable to construction**
Standard:	1.1	Structure
Comment:		The system can sustain and transmit wind loads to the substrate wall. See sections 7.1 to 7.12 of this Certificate.
Standard:	2.6	Spread to neighbouring buildings
Comment:		The system is restricted by this Standard, with reference to clauses 2.6.4[(1)(2)], 2.6.5[(1)] and 2.6.6[(2)]. See sections 8.1 to 8.3, 8.5 and 8.6 of this Certificate.
Standard:	2.7	Spread on external walls
Comment:		The system is restricted by this Standard, with reference to clauses 2.7.1[(1)(2)] and 2.7.2[(2)], and Annex 2A[(1)]. See sections 8.1 to 8.3, 8.5 and 8.6 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 section 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 11.1, 11.3 and 11.4 of this Certificate.
Standard:	6.1(b)	Carbon dioxide emissions
Standard:	6.2	Building insulation envelope
Comment:		The system can contribute to satisfying these Standards, with reference to clauses (or parts of) 6.1.1(1), 6.1.2(1)(2), 6.1.3(1)(2), 6.1.6(1), 6.1.10(2), 6.2.1(1)(2), 6.2.3(1), 6.2.4(2), 6.2.5(2), 6.2.6(1), 6.2.7(1), 6.2.8(2), 6.2.9(1)(2), 6.2.10(1), 6.2.11(1), 6.2.12(2) and 6.2.13(1)(2). See sections 6.2 and 6.3 of this Certificate.
Standard:	7.1(a)(b)	Statement of sustainability
Comment:		The system can contribute to satisfying the relevant requirements of Regulation 9, Standards 1 to 6, and therefore will contribute to a construction meeting the bronze level of sustainability as defined in this Standard. In addition, the system can contribute to a construction meeting a higher level of sustainability as defined in this Standard with reference to clauses 7.1.4(1)(2) [Aspect 1(1)(2) and 2(1)], 7.1.6(1)(2) [Aspect 1(1)(2) and 2(1)] and 7.1.7(1)(2) [Aspect 1(1)(2)]. See section 6.2 of this Certificate.
Regulation:	**12**	**Building standards applicable to conversions**
Comment:		All comments given for the system under Regulation 9, Standards 1 to 6, also apply to this Regulation, with reference to clause 0.12.1(1)(2) and Schedule 6(1)(2).

(1) Technical Handbook (Domestic).
(2) Technical Handbook (Non-Domestic).

The Building Regulations (Northern Ireland) 2012 (as amended)

Regulation:	**23**	**Fitness of materials and workmanship**
Comment:		The system is acceptable. See section 13.1 and the *Installation* part of this Certificate.
Regulation:	**28(b)**	**Resistance to moisture and weather**
Comment:		The system provides a degree of protection against rain ingress. See section 10.1 of this Certificate.
Regulation:	**29**	**Condensation**
Comment:		The system can contribute to minimising the risk of interstitial condensation. See section 11.4 of this Certificate
Regulation:	**30**	**Stability**
Comment:		The system can sustain and transmit wind loads to the substrate wall. See sections 7.1 to 7.12 of this Certificate.
Regulation:	**36(a)**	**External fire spread**
Comment:		The system is restricted by this Regulation. See sections 8.1 to 8.4 of this Certificate.
Regulation:	**39(a)(i)**	**Conservation measures**
Comment:		The system can contribute to satisfying this Regulation. See sections 6.2 and 6.3 of this Certificate.
Regulation:	**40**	**Target carbon dioxide emission rate**
Comment:		The system can contribute to satisfying this Regulation. See sections 6.2 and 6.3 of this Certificate.

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

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

See sections: 3 *Delivery and site handling* (3.2 and 3.4) and 12 *Maintenance and repair* of this Certificate.

Additional Information

NHBC Standards 2020

In the opinion of the BBA, the ProRend EIFS (EPS) External Wall Insulation System, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements in relation to *NHBC Standards* (1), Part 6 *Superstructure (excluding roofs),* Chapter 6.9 *Curtain walling and cladding*.

(1) There is a general requirement in *NHBC Standards* 2020, Chapter 6.9, for fire-retardant-treated insulation to be used with the system in accordance with BS EN 13163 : 2012.

Technical Specification

1 Description

1.1 The ProRend EIFS (EPS) External Wall Insulation System comprises white EPS or grey (graphite-enhanced) EPS insulation boards secured to the substrate wall with mechanical fixings and supplementary adhesive (ensuring a minimum 40% coverage), and glass-fibre-reinforced basecoat, primer (when required) and render finishes (see Table 1 and Figure 1).

1.2 After the insulation boards have been secured to the wall with the insulation adhesive and the required number of mechanical fixings, the basecoat is trowel-applied over the boards to a uniform thickness, followed by the reinforcing mesh, which is fully embedded within the basecoat. A further layer of basecoat render is applied over the embedded reinforcing mesh to achieve the required overall thickness. After the basecoat has fully cured, the primer and finishes are applied in accordance with the Certificate holder's installation instructions and this Certificate. Table 1, below, shows the system make up.

Table 1 System components options

Components	Option 1	Option 2
Adhesive	ProRend Lite	
Insulation	White EPS 70/grey enhanced EPS 70	
Basecoat	ProRend Lite	
Mesh	ProMesh Grade 3	
Primer	ProRend Colourtex Primer (Silicone)	No primer required
Finishes	ProRend Colourtex (Silicone)	ProRend Mineraltex (Variostar)

1.3 The system comprises:

Adhesive (supplementary)

- ProRend Lite — a cementitious mixture of lime, quartz sand and other additives, supplied as a powder which is prepared by mixing each bag with approximately 7.5 litres of clean water. Applied to a minimum thickness of 5 mm, at a coverage of 4 to 5 kg· m^{-2}

Insulation(1)

- White expanded polystyrene (EPS 70) insulation boards — 500 by 1000 mm in a range of thicknesses between 60(2) and 250 mm, with a nominal density of 14 to 17 kg·m^{-3}, a minimum compressive strength of 70 kPa and a minimum

nominal tensile strength perpendicular to the face of 100 kPa. The boards are manufactured to comply with the requirements of EPS Class E material to BS EN 13163 : 2012

- Grey, enhanced expanded polystyrene (EPS 70) insulation boards — 500 by 1000 mm in a range of thicknesses between 60[(2)] and 250 mm, with a nominal density of 15 to 17 kg·m^{-3}, a minimum compressive strength of 70 kPa and a minimum nominal tensile strength perpendicular to the face of 100 kPa. The boards are manufactured to comply with the requirements of EPS Class E material to BS EN 13163 : 2012

(1) For declared thermal conductivity (λ_D) values, see Table 2.
(2) Insulation thicknesses of 20, 30, 40 and 50 mm would generally be used in reveals.

Mechanical fixings

- mechanical fixings[(1)] — anchors with adequate length to suit the substrate and insulation thickness, approved and supplied by the Certificate holder, and selected from:
  - EJOT STR U[(2)] — high-density polyethylene (HDPE) anchor sleeve with a stainless steel or electro-galvanized steel screw
  - EJOT H1 eco — anchor sleeve with enlarged shaft, polyethylene insulation plate, polyamide mounting plug and galvanized steel pin.

(1) Other fixings may be used provided they can be demonstrated to have equal or higher pull-out strength, plate diameter and plate stiffness characteristics.
(2) When embedding the EJOT STR-U fixing with a 5 mm die, the minimum insulation thickness must be 80 mm; when using a 20 mm die, the minimum insulation thickness must be 100 mm.

Basecoat

- ProRend Lite — a cementitious mixture of lime, quartz sand and other additives, supplied as a powder which is prepared by mixing each bag with approximately 7.5 litres of clean water. Applied to a thickness of between 4 and 5 mm

Reinforcing mesh

- ProMesh Grade 3 — an alkali-resistant, vinyl-covered glass fibre mesh of grid size 4 by 4 mm, with a nominal weight of 165 g· m^{-2}

Primers

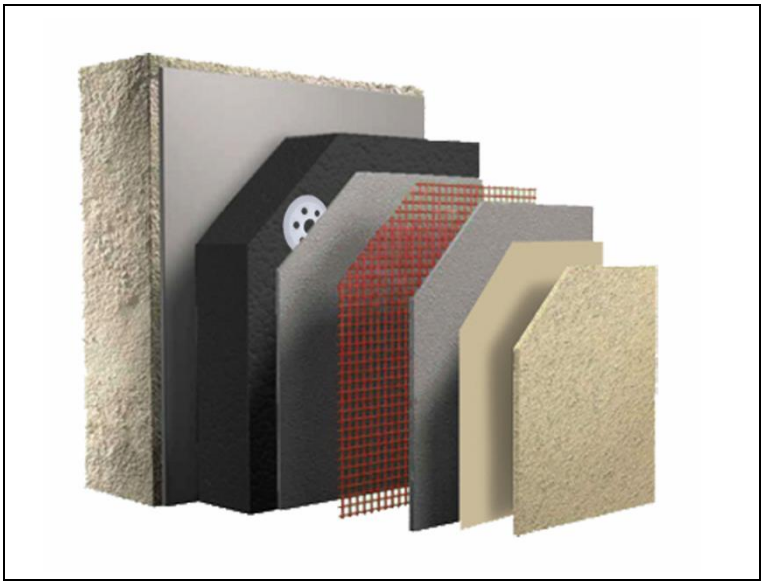
- ProRend Colourtex Primer (Silicone) — a resin-silicone-based, transparent, coloured primer, diluted with the addition of 5 to 10% clean water, and applied to the finished basecoat by brush, roller or spray

Finishing coats[(1)]

- ProRend Colourtex (Silicone) — a ready to use silicone-based render, with particle sizes of 1.5 and 3 mm
- ProRend Mineraltex (Variostar) — a cementitious powder requiring the addition of approximately 7.5 litres of water, with a particle size of 2 mm, and applied at a coverage of 3 kg.m^{-2}

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

Figure 1 The ProRend EIFS (EPS) External Wall Insulation System



1.3 Ancillary materials used with the system are:

- a range of aluminium, PVC-U or stainless-steel profiles, comprising
  - base profiles (starter track)
  - edge profiles
  - PVC corner bead with mesh, and drip beads
  - corner profiles with optional PVC-U nosing
  - profile connectors and fixings
  - render stop profiles.

1.4 Ancillary materials also used with the system, but outside the scope of this Certificate, are:

- movement joints
- expansion joints
- PVC clip-on starter track beads
- window frame seal beads
- aluminium insulated window sills with PVC end caps
- profile connectors and fixings
- fungicidal wash
- silicone sealants in accordance with BS EN ISO 11600 : 2003
- PU expansion foam – polyurethane foam used for filling gaps between insulation boards.

2 Manufacture

2.1 The system components are either 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 SAS (Europe) Ltd has been assessed and registered as meeting the requirements of BS EN ISO 9001: 2015 by QMS International Ltd (Certificate 14127288).

3 Delivery and site handling

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

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

Table 2 Component supply details

Component	Quality and package
insulation boards	Shrink-wrapped in polythene
ProRend Lite adhesive	20 kg bags
ProRend Lite basecoat	20 kg bags
ProMesh Grade 3	50 m rolls, 1 m wide
ProRend Colourtex Primer (Silicone)	16 kg plastic containers
ProRend Colourtex (Silicone) finish	17 kg containers
ProRend Mineraltex (Variostar) finish	25 kg bags
Mechanical fixings	Boxed by the manufacturer

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

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

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

Assessment and Technical Investigations

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

Design Considerations

4 General

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

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

4.3 The system is for application to the outside of external walls up to two storeys in height of masonry, normal weight concrete, lightweight concrete, autoclaved concrete and no-fines concrete construction, on new or existing domestic and non-domestic buildings (with or without existing render) with height restrictions (see section 8 of this Certificate). Prior to the installation of the system, wall surfaces should comply with section 14 of this Certificate.

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

- BS EN 1992-1-1 : 2004 and its UK National Annex
- PD 6697 : 2019 Recommendations for the design of masonry structures to BS EN 1996-1-1 and BS EN 1996-2
- BS 8000-0 : 2014
- BS 8000-2.2 : 1990
- BS 8000-3 : 2001.

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

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

4.7 The system will improve the weather resistance of a wall and provide a decorative finish. However, for existing buildings, 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.

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

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

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

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

4.12 It is essential that the 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 specialist contractors who have successfully undergone training and registration by the Certificate holder (see section 15).

Note: The BBA operates a UKAS-accredited Approved Installer Scheme for external wall insulation (non-mandatory); details of approved 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 : 2017 and BRE Report BR 443 : 2006, using the declared thermal conductivity (λ_D) value given in Table 3.

Table 3 Thermal conductivity values

Insulation	Thicknesses (mm)	Thermal conductivity ($W \cdot m^{-1} \cdot K^{-1}$)
White EPS 70	60 to 250	0.037
Grey enhanced EPS 70		0.030

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

Table 4 Insulation thickness required to achieve U value [(1)(2)(3)] using galvanized steel fixings

U-value[(4)] ($W \cdot m^{-2} \cdot K^{-1}$)	Insulation thickness requirement (mm)[(3)]			
	215 mm brickwork, $\lambda = 0.56\ W \cdot m^{-1} \cdot K^{-1}$		200 mm dense blockwork, $\lambda = 1.75\ W \cdot m^{-1} \cdot K^{-1}$	
	White EPS 70 (0.37)	Grey EPS 70 (0.30)	White EPS 70 (0.37)	Grey EPS 70 (0.30)
0.18	210	170	220	180
0.19	200	160	200	170
0.25	140	120	150	120
0.26	140	110	140	120
0.28	120	100	130	110
0.30	110	90	120	100
0.35	90	80	100	80

(1) Wall construction inclusive of 13 mm plaster ($\lambda = 0.57\ W \cdot m^{-1} \cdot K^{-1}$), brickwork (protected) with 17.1% mortar or dense blockwork with 6.7% mortar ($\lambda = 0.88\ W \cdot m^{-1} \cdot K^{-1}$). A 5 mm thick adhesive layer with $\lambda = 0.43\ W \cdot m^{-1} \cdot K^{-1}$ covering 40% of the area is also included, and a board emissivity of 0.9, together with an external render thickness of 6 mm with $\lambda = 1.0\ W \cdot m^{-1} \cdot K^{-1}$.

(2) Calculations based on a mechanically fixed system that included 10 fixings per m^2, with a point thermal transmittance (X_p) of 0.002 $W \cdot K^{-1}$ per pin. Use of other types of fixings should be calculated in accordance with BS EN ISO 6946 : 2017. A gap correction ($\Delta U''$) of zero is assumed.

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

(4) When applying the maximum available insulation thickness, these walls can achieve U values of 0.16 $W \cdot m^{-2} \cdot K^{-1}$.

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

7 Strength and stability

General

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

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

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

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

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

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

7.6 Negative wind load is transferred to the substrate wall via[1][2]:

- the bond between the insulation and render system (see section 7.7)
- the pull-out resistance of the fixing from the substrate wall (see section 7.8)
- the pull-through resistance of the fixing (see section 7.9).

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

7.7 The characteristic bond resistance between the insulation and render interface derived from test results was 80 $kN \cdot m^{-2}$. The design resistance of the bond between the insulation and render (N_{RD1}) should be taken as the characteristic bond resistance divided by a partial factor of 9.

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

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

Table 5 Fixings — typical characteristic pull-out resistances

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

(1) The minimum values for plate stiffness of fixings is 0.6 $kN \cdot mm^{-2}$ and the load resistance is 2.08 kN.
(2) Values are determined in accordance with EAD 330196-00-0604 : 2016 and are dependent on the substrate. The Use Categories are defined in the corresponding ETA.

7.9 The characteristic pull-through resistance of the fixings was determined from tests using a 60 mm diameter fixing plate and minimum insulation thickness of 60 mm. The design resistance per fixing (NRD3) is obtained by applying the partial factor shown in Table 6.

Table 6 Design pull-through resistances

Factor (unit)	Pull through Static foam block EPS boards: 1000 x 500 mm	
Tensile resistance of the insulation (kN·m^{-2})	≥ 100	
Fixing type[1]	EJOT STR U	
Fixing plate diameter (mm)	60	
Insulation thickness (mm)	≥ 60	
Characteristic pull-through resistance[2] (kN)	At panel	0.51
Partial factor[3]	2.5	
Design pull-through resistance per fixing (N_{RD3}) (kN)	At panel	0.204
Design pull-through resistance per board (kN) (based on minimum number of fixings)[4]	1.020	
Design pull-through resistance per board (kN) (based on maximum number of fixings)[5]	1.632	

(1) See Table 5 for typical characteristic pull-out resistance of the fixings.
(2) Characteristic pull-through resistance of insulation over the head of the fixing, in accordance with BS EN 1990: 2002, Annex D7.2 and its UK National Annex.
(3) The partial factor is based on the assumption that all insulation boards are quality controlled and tested to establish tensile strength perpendicular to the face of the board.
(4) The minimum design pull-through resistance per board is based on a minimum of 5 fixings per board (1000 x 500 mm), which equates to approximately 10 fixings per m^2. The design resistance for the minimum number of fixings is based on the fixing pattern provided in Figure 5 and minimum insulation thickness specified in this Table. The fixing pattern and interaction of the fixings should be considered when calculating the design resistance per board.
(5) The maximum design pull-through resistance per board is based on a maximum of 8 fixings per board (1000 x 500 mm), which equates to approximately 16 fixings per m^2. The design resistance for the maximum number of fixings is only applicable to the minimum insulation thickness tested and as specified in this Table. The fixing pattern, insulation thickness and interaction of the fixings should be considered when calculating the design resistance per board.

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

7.11 The data obtained from sections 7.7, 7.8 and 7.9 must be assessed against the design wind load and the following expression must be satisfied:

For safe design:
$Rd \geq W_e$

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

Where:

Rd	is the design ultimate resistance (kN·m^{-2}) taken as the minimum of $Rd_{b.ins/rend}$, $Rd_{pull\text{-}out}$ and $Rd_{pull\text{-}through}$
W_e	is the maximum design wind load (kN·m^{-2})
$Rd_{b.ins/rend}$	is the design bond resistance between the insulation and render (kN·m^{-2})
$Rd_{pull\text{-}out}$	is the design pull-out resistance of the insulation fixings per metre square (kN·m^{-2})
$Rd_{pull\text{-}through}$	is the design pull-through resistance of the insulation fixings per metre square (kN·m^{-2})
A_r	is the reinforced basecoat bond area (based on % area covered)
N_{RD1}	is the design adhesive bond resistance between the insulation and render, based on test (kN·m^{-2})
N	is the number of anchor fixings per m^2
N_{RD2}	is the design pull-out resistance per fixing based on test (kN)

$N_{RD3panel}$	is the design pull-through resistance per anchor not placed at the panel joint, based on test (kN)
$N_{RD3joint}$	is the design pull-through resistance per anchor placed at the panel joint, based on test (kN)
n_{panel}	is the number of internal anchors in a panel
n_{joint}	is the number of joint anchors in a panel
A_{board}	is the area of the board (m^2)

7.12 The system is mechanically fixed to the substrate wall with a minimum of 5 fixings per board or approximately 10 fixings per square metre, as per the fixing pattern shown in Figure 5, and in conjunction with 40% coverage of supplementary adhesive (see section 16). Additional fixings may be required, depending on the results of the calculations detailed above for the specific site.

Impact resistance

7.13 Hard body impact tests were carried out in accordance with ETAG 004 : 2013. The system is suitable for use in the Use Categories up to and including those specified in Table 7 of this Certificate.

Table 7 System impact resistance

Render systems: Basecoat + primer + finishing coats indicated below:	Use Category (1)
ProRend Lite basecoat + ProRend Colourtex Primer (Silicone) + ProRend Colourtex (Silicone) finish	II
ProRend Lite basecoat + ProRend Mineraltex (Variostar) finish	

(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(1) of the system with ProRend Colourtex (Silicone) finish is B-s2, d0 in accordance with BS EN 13501-1 : 2007.

(1) Efectis Nederland. ENL-17-000247.

8.2 The Certificate holder has not declared a reaction to fire classification for the system with the ProRend Mineraltex (Variostar) finish.

8.3 The insulation in isolation is not classified as 'non-combustible' or 'of limited combustibility'.

8.4 In England, Wales and Northern Ireland, the system may only be used on buildings with no storey more than 18 m above ground level and which are one metre or more from a boundary. Additional restrictions apply for assembly and recreation buildings. With minor exceptions, the system should be included in calculations of unprotected area. The system defined in section 8.1 of this Certificate may be used on buildings at any proximity to a boundary.

8.5 In Scotland, the system is not classified as 'non-combustible' and may be used on buildings more than 1 m from a boundary and, on houses, 1 m or less from a boundary. With minor exceptions, the system should be included in calculations of unprotected area.

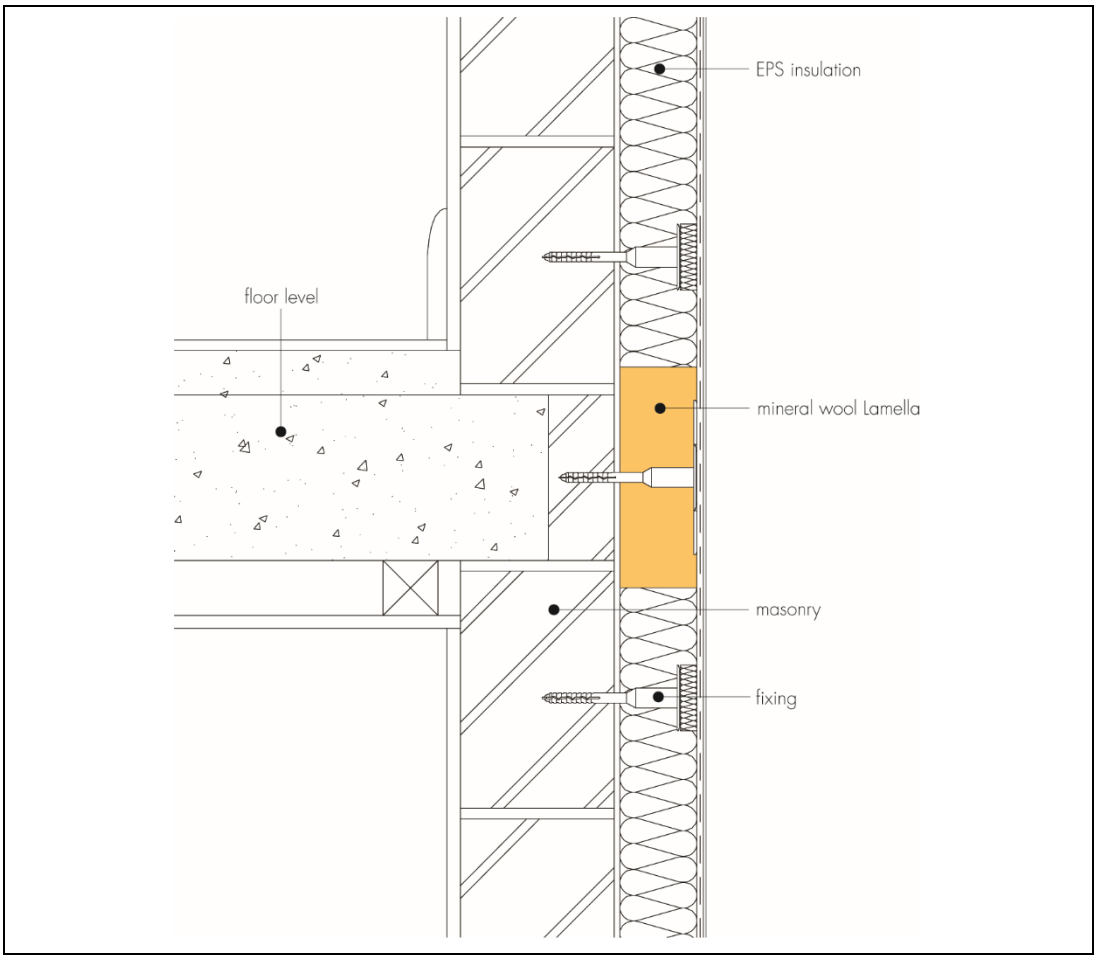
8.6 In Scotland, the system should not be used on any building with a storey more than 11 m above the ground, or on any entertainment or assembly building with a total storey area more than 500 m^2, or on any hospital or residential care building with a total storey area more than 200 m^2.

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

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

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

Figure 2 Fire barrier



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 satisfied:

England and Wales — Approved Document J

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

(1) Technical Handbook (Domestic).
(2) Technical Handbook (Non-Domestic).

Northern Ireland — Technical Booklet L.

10 Water resistance

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

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

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

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

11 Risk of condensation

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

Surface condensation

11.2 Walls will adequately limit the risk of surface condensation when the thermal transmittance (U value) does not exceed 0.7 $W \cdot m^{-2} \cdot K^{-1}$ 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 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 boards) and equivalent air layer thickness (S_d) (for the render systems) is shown in Table 8.

Table 8 Water vapour resistance factors and equivalent air layer thicknesses

Components	Thickness (mm)	μ	S_d (m)
White EPS and grey (enhanced) EPS Insulations	60 to 250	20 to 40(1)	—
Rendering system : basecoat(1) + primer (if required) + finish coat:			
ProRend Lite basecoat + ProRend Colourtex Primer (Silicone) + ProRend Colourtex (Silicone) finish	7	—	0.27(2)
ProRend Lite basecoat + ProRend Mineraltex (Variostar) finish	8	—	0.09(2)

(1) It is recommended that the 20 value is used when assessing interstitial condensation risk. Values obtained from BS EN ISO 10456 : 2007.
(2) Values obtained with 2 mm particle sizes. For other particle sizes, seek advice from the Certificate holder.

12 Maintenance and repair

12.1 An initial inspection should be made within 12 months and regularly thereafter to include:

- 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 : 2016.

13 Durability

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

13.2 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 less noticeable on lighter colours.

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

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) compatible with the decorative or finishing coats. 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 and 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.

14.2 The survey should include tests conducted on the walls of the building by the Certificate holder or their approved installers (see section 15) to determine the pull-out resistance of the 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 modifications, such as alterations to external plumbing and necessary repairs to the building structure, must be completed before installation of the system commences.

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

14.5 Where surfaces are covered with an existing 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 (see Figure 10).

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

15 Approved installers

Application of the system, within the context of this Certificate, must be carried out by installers approved, recommended or recognised by the Certificate holder. Such an installer is a company:

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

16 Procedure

General

16.1 Installation of the system must be carried out in accordance with the Certificate holder's installation instructions and this Certificate.

16.2 Weather conditions should be monitored to ensure correct application and curing conditions. Application of coating materials must not be carried out at temperatures below 5°C or above 30°C, or if exposure to frost is likely, and the coating must be protected from rapid drying.

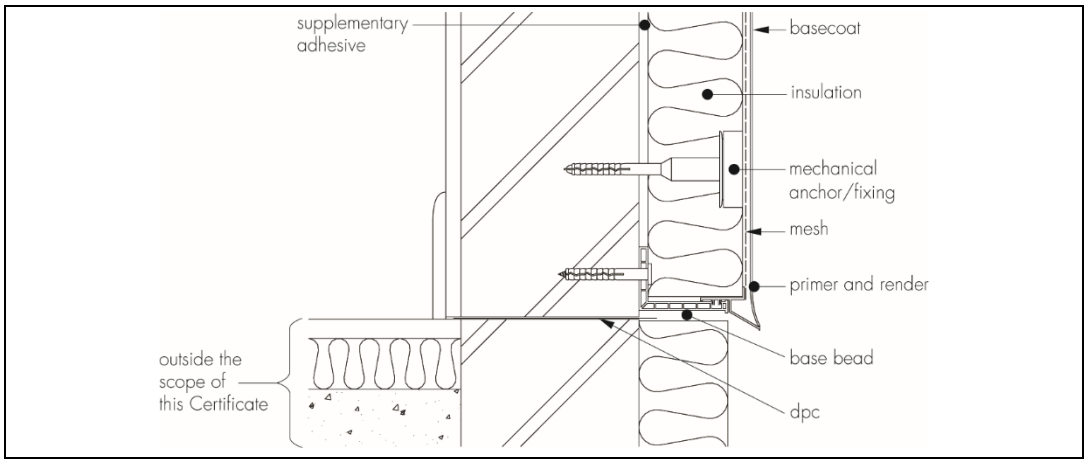
16.3 Where required, a fungicidal wash is applied to the entire surface of the external wall using a brush, roller or spray.

16.4 All rendering should be in accordance with the relevant recommendations of BS EN 13914-1 : 20016

Positioning and securing insulation boards

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

Figure 3 Typical section of base profile



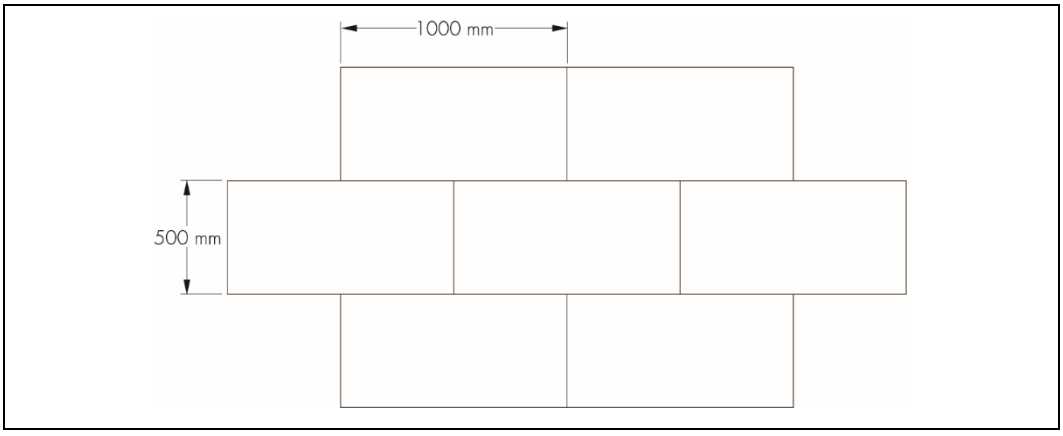
16.6 The adhesive is prepared by mixing 7.5 litres of clean water with each 20 kg bag. The adhesive is mixed with clean water using a paddle mixer for at least 5 minutes, until the desired consistency is achieved. After allowing it to rest for 5 minutes, it is stirred again and applied over the rear face of the insulation board (with a minimum 40% coverage), using a notched trowel to achieve a full bond, to a minimum thickness of 5 mm.

16.7 The first run of insulation boards is positioned on the base profile, and pressed firmly against the wall and butted tightly together. Where existing render is on the wall or dubbing out render has been used, care should be taken when aligning the boards as the effective embedment will be reduced. Joints in the system greater than approximately 2 mm should be filled with slivers of insulation board or PU expansion foam, and any irregularities removed.

16.8 Care should be taken to ensure that all board edges are butted tightly together; alignment must be checked as work proceeds, to achieve a flush finish.

16.9 Subsequent rows of insulation boards are positioned, ensuring vertical joints are staggered and overlapped at the building corners and that board joints do not occur within 200 mm of the corners of openings (see Figure 4).

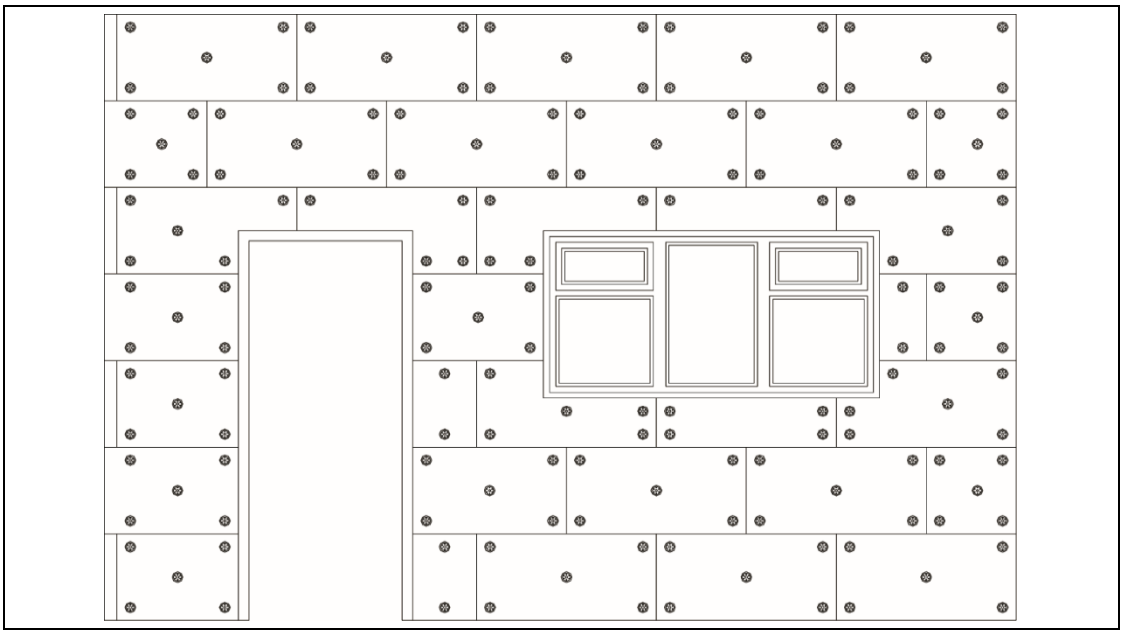
Figure 4 Positioning of the boards



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

16.11 After the adhesive has been left to harden for 24 to 48 hours (depending on the prevailing temperature and weather conditions), the mechanical fixings are fixed through the insulation into holes drilled into the substrate to the required depth at the corners of each board, and at positions which allow a minimum of 10 fixings per square metre (see Figure 5). The fixings are inserted and tapped or screwed firmly into place, securing the insulation to the substrate.

Figure 5 Typical arrangement of insulation boards and fixing pattern(1)



(1) The additional stainless steel fixing recommended in section 8.6 has been omitted for clarity.

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

16.13 Building corners, door and window heads, and jambs are formed using corner profiles, in accordance with the Certificate holder's instructions. Corner profiles are fixed to all building corners.

16.14 Installation continues until the whole wall is completely covered.

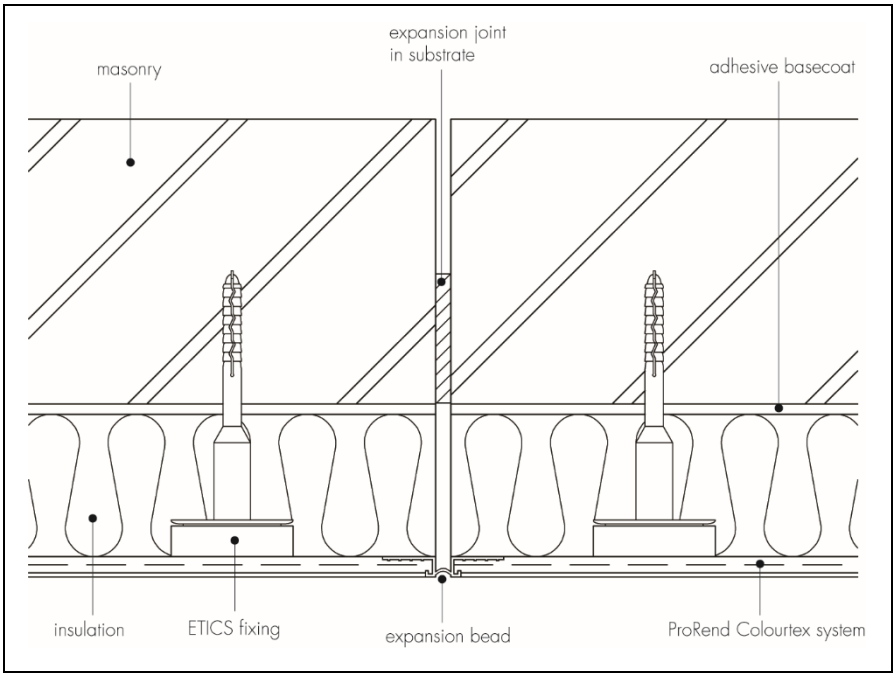
16.15 Prior to the application of the basecoat and reinforcement, a bead of silicone sealant is applied at window and door frames, overhanging eaves, gas and electric meter boxes, and wall vents, or where the render abuts any other building material or surface. Alternatively, an appropriate sealing tape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

16.16 The system is ready for the application of the basecoat (including the reinforcing mesh).

Movement joints

16.17 Generally, movement joints are not required in the system but, if such a joint is incorporated in the substrate, then movement joints must be carried through the insulation system (see Figure 6).

Figure 6 Movement joint detail



Application of basecoat and reinforcement

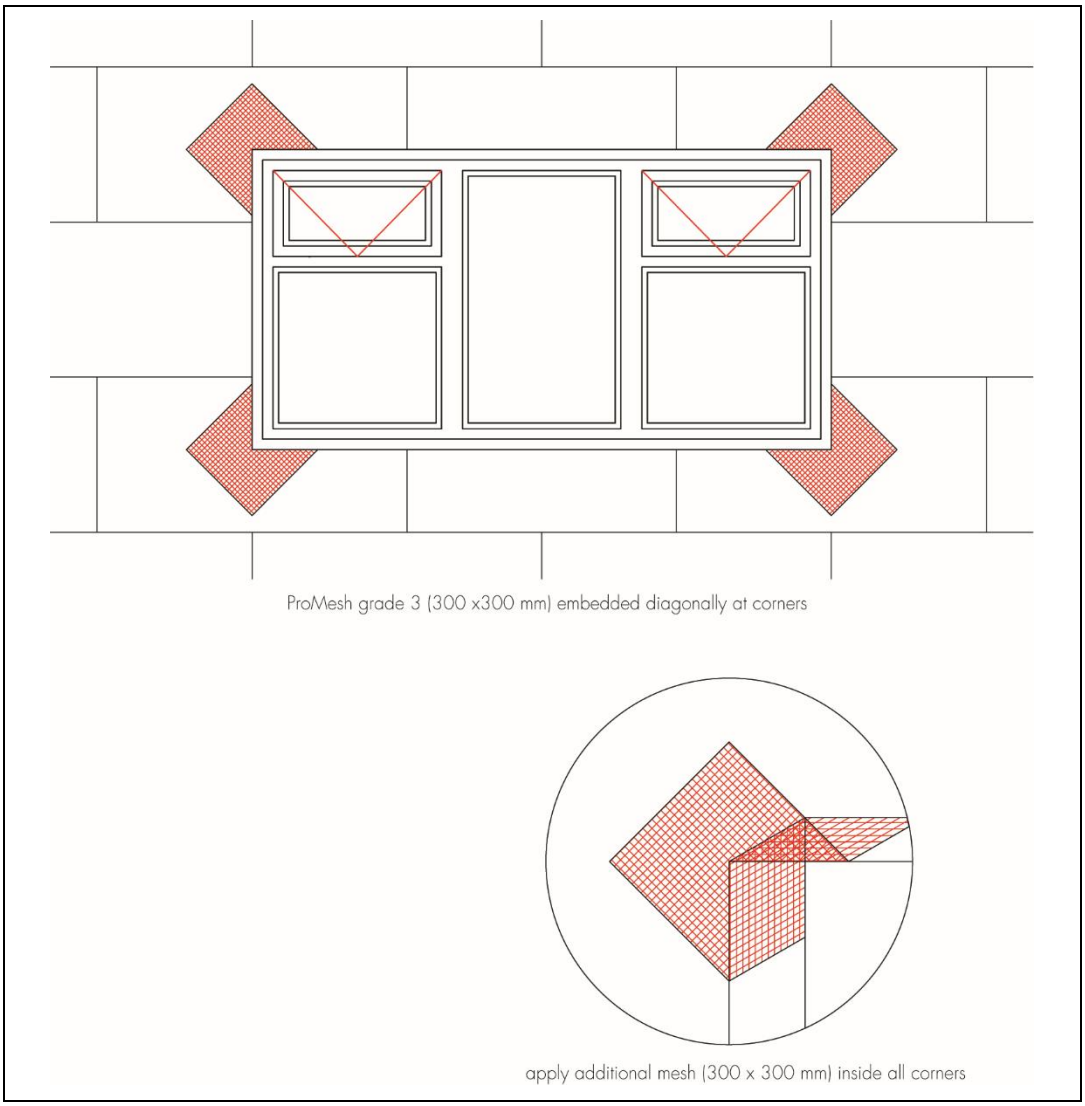
16.18 The basecoat is prepared with the required amount of clean water (see section 1.3) using a suitable drill with a whisk attachment, for at least five minutes after the addition of the last bag of render, to allow an even dispersion of the resins. This is then allowed to stand for at least three minutes then re-mixed.

16.19 The basecoat is sprayed or trowel-applied to the surface of the dry insulation boards, initially to an approximate thickness of 5 mm. It is applied progressively, working in 1 m sections in vertical or horizontal directions.

16.20 The reinforcement glass fibre mesh is immediately applied and embedded into the basecoat, with 100 mm overlap at joints, then a further coat of basecoat is applied. The overall basecoat thickness must be approximately 4 to 5 mm. Additional pieces of mesh, 300 by 300 mm, are used diagonally at the corners of openings, as shown in Figure 7. Corner details are reinforced using PVC mesh angle beads.

16.21 The mesh should be free of wrinkles and fully embedded in the base coat with no visible mesh pattern on the finish surfaces.

Figure 7 Additional reinforcement of openings and corners



16.22 The basecoat must be left to harden for between 24 and 48 hours depending on the prevailing temperature and weather conditions, and any contaminants such as grease and chalking removed, before application of the finish (or primer, when necessary).

Primer

16.23 ProRend Colourtex Primer (Silicone), when required, is applied by brush, roller or spray after the basecoat has dried, first making sure the basecoat is free from any irregularities (trowel-marks, exposed mesh, etc). The primer is diluted with 5 to 10% of clean water. The primer must be left for 24 hours before application of the finish coat.

Finishing coat

16.24 Prior to the application of the finishing coat, sealant should be applied as required. The finishes should be mixed gently, and spread out evenly over the surface using a stainless steel trowel.

16.25 The finishing coat is applied to the required thickness (see section 1.3) and finished with a plastic trowel to create the desired texture.

16.26 Continuous surfaces must be completed without a break, and the coating must always be applied to a wet edge. Care should be taken to prevent the finishing coats from either drying too rapidly or freezing.

16.27 Finishing coats should be allowed to dry thoroughly (the drying time is dependent on conditions but will typically be 24 hours).

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

16.29 It is imperative that weather conditions are suitable for the application and curing of the finishing coats. In wet weather, the finished walls should be protected to prevent wash-off. It is also advisable that protective covers remain in place until required.

16.30 Care should be taken in the detailing of the system around openings and projections and at eaves (see Figures 8 to 10) to ensure adequate protection against water ingress and to limit the risk of water penetrating the system.

Figure 8 Roof eaves detail

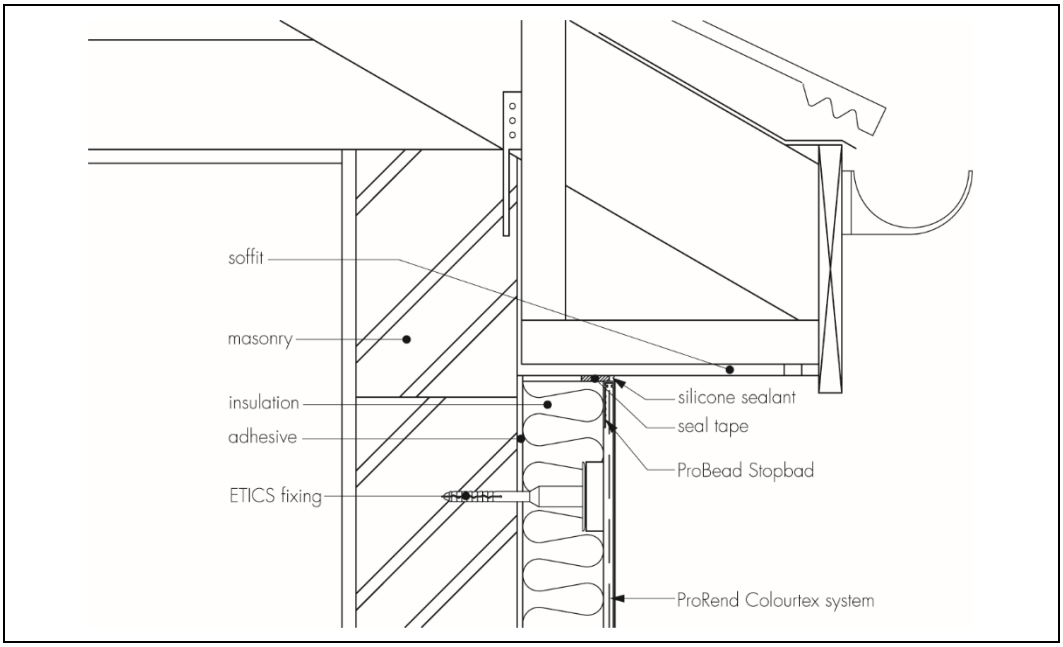


Figure 9 Window reveal/head detail

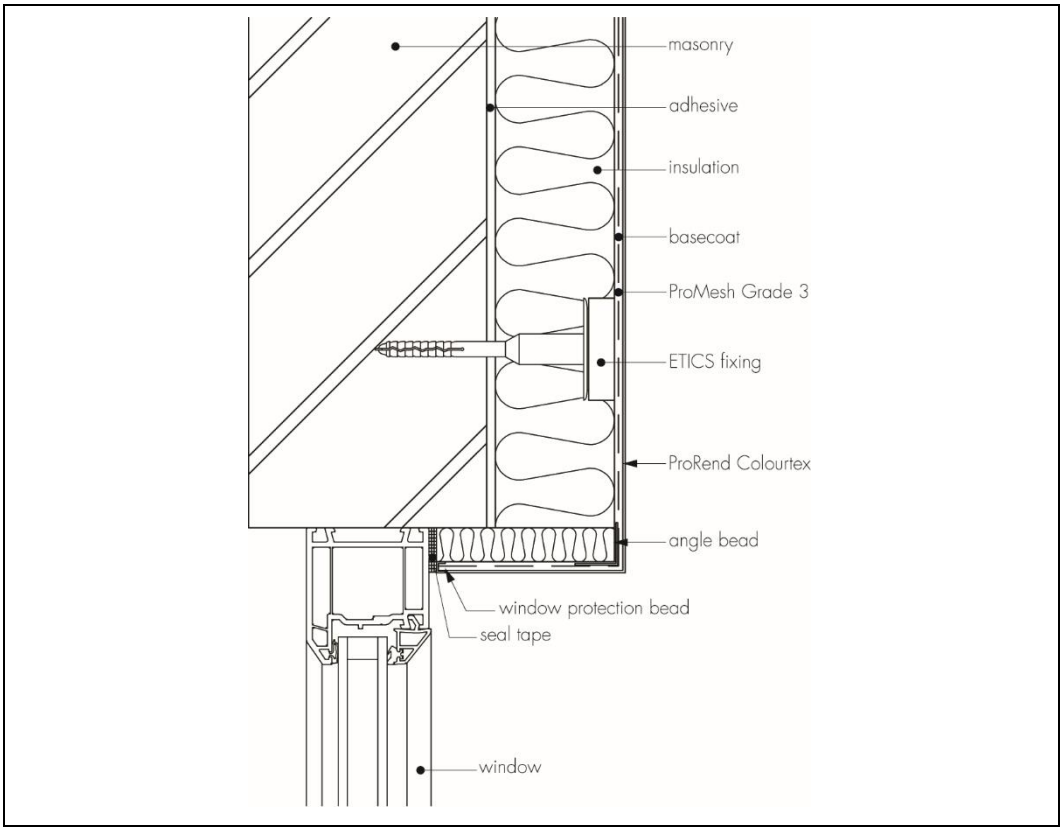
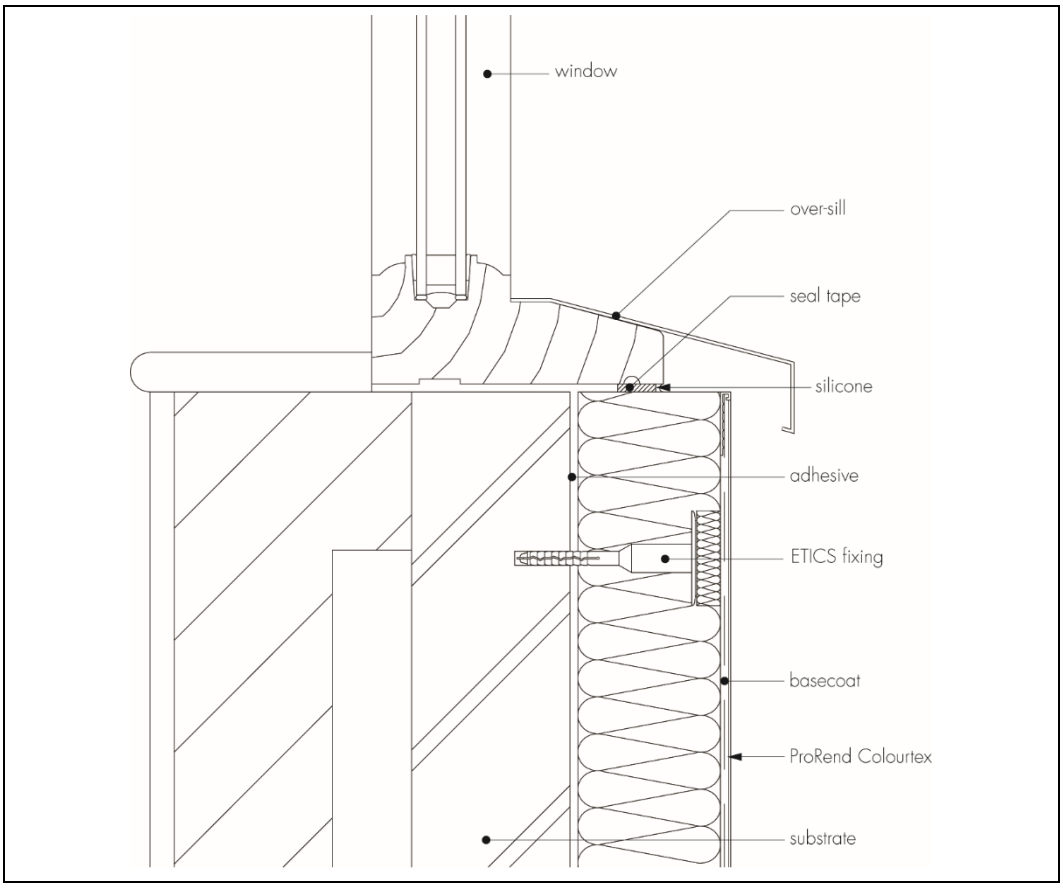


Figure 10 Window sill detail



Technical Investigations

17 Tests

Results of tests were assessed to determine:

- reaction to fire classification
- hygrothermal performance (heat/spray cycling)
- render/insulation bond strength
- bond strength
- pull-through of fixing over insulation
- resistance to hard body impact
- water vapour permeability
- water absorption.

18 Investigations

18.1 An examination was made of data relating to:

- durability
- adequacy of the fixings
- the risk of interstitial condensation
- thermal conductivity and example U values
- system wind load resistance.

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

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

Bibliography

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BS EN 1990 : 2002 + A1: 2005 *Eurocode — Basis of structural design*
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NA + A2: 14 to BS EN 1992-1-1 : 2004 + A1: 2014 UK National Annex to *Eurocode 2 — Design of concrete structures — General rules and rules for buildings*

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NA to BS EN 1996-1-1 : 2005 + A1: 2012 UK National Annex to *Eurocode 6 — Design of masonry structures — General rules for reinforced and unreinforced masonry structures*

BS EN 13163 : 2012 *Thermal insulation products for buildings — Factory made products of expanded polystyrene (EPS) — 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 : 2016 *Design, preparation and application of external rendering and internal plastering — External rendering*

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BS EN ISO 9001 : 2015 *Quality management systems — Requirements*

BS EN ISO 10456 : 2007 *Building materials and products — Hygrothermal properties — Tabulated design values and procedures for determining declared and design thermal values*

BS EN ISO 11600 : 2003 + A1 : 2011 *Building construction — Jointing products — Classification and requirements for sealants*

EAD 330196-00-0604 : 2016 *Plastic anchors made of virgin or non-virgin material for fixing of external thermal insulation composite systems with rendering*

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

ETAG 004 : 2013 *Guideline for European Technical Approval of Plastic Anchors for fixing of External Thermal Composite Systems with Rendering*

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

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.