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Agrément Certificate  
**14/5101**  
Product Sheet 1

### JOHNSTONE'S STORMSHIELD EXTERNAL WALL INSULATION SYSTEMS

### JOHNSTONE'S STORMSHIELD WHITE/GREY EPS EXTERNAL WALL INSULATION SYSTEM

This Agrément Certificate Product Sheet<sup>(1)</sup> relates to Johnstone's Stormshield White/Grey EPS External Wall Insulation System, comprising mechanically fixed (with supplementary adhesive) white/grey expanded polystyrene (EPS) insulation boards and glassfibre reinforcement mesh and render finishes, and suitable for use on 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 national Building Regulations (see section 6).

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

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

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

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



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

On behalf of the British Board of Agrément

Date of First issue: 27 February 2014

John Albon — Head of Approvals  
Energy and Ventilation

Claire Curtis-Thomas  
Chief Executive

*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](http://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, Johnstone's Stormshield White/Grey EPS External Wall Insulation System, if installed, used and maintained in accordance with this Certificate, will 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)

<b>Requirement:</b>	<b>A1</b>	<b>Loading</b>
<b>Comment:</b>		The system can sustain and transmit wind loads to the substrate wall. See section 7.4 of this Certificate.
<b>Requirement:</b>	<b>B4(1)</b>	<b>External fire spread</b>
<b>Comment:</b>		The system can satisfy or contribute to satisfying this Requirement. See sections 8.1 to 8.4 of this Certificate.
<b>Requirement:</b>	<b>C2(b)</b>	<b>Resistance to moisture</b>
<b>Comment:</b>		The system provides a degree of protection against rain ingress. See sections 4.4 and 10.1 of this Certificate.
<b>Requirement:</b>	<b>C2(c)</b>	<b>Resistance to moisture</b>
<b>Comment:</b>		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.
<b>Requirement:</b>	<b>L1(a)(i)</b>	<b>Conservation of fuel and power</b>
<b>Comment:</b>		The system can contribute to satisfying this Requirement. See sections 6.2 and 6.3 of this Certificate.
<b>Regulation:</b>	<b>7</b>	<b>Materials and workmanship</b>
<b>Comment:</b>		The system is acceptable. See section 13.1 and the <i>Installation</i> part of this Certificate.
<b>Regulation:</b>	<b>26</b>	<b>CO<sub>2</sub> emission rates for new buildings</b>
<b>Comment:</b>		The system will enable, or contribute to enabling, a wall to satisfy the U value requirement. See sections 6.2 and 6.3 of this Certificate.



## The Building (Scotland) Regulations 2004 (as amended)

<b>Regulation:</b>	<b>8(1)(2)</b>	<b>Durability, workmanship and fitness of materials</b>
<b>Comment:</b>		The system can contribute to a construction satisfying this Regulation. See sections 12.1 and 13.1 and the <i>Installation</i> part of this Certificate.
<b>Regulation:</b>	<b>9</b>	<b>Building standards applicable to construction</b>
<b>Standard:</b>	<b>1.1</b>	<b>Structure</b>
<b>Comment:</b>		The system can sustain and transmit wind loads to the substrate wall. See section 7.4 of this Certificate.
<b>Standard:</b>	<b>2.6</b>	<b>Spread to neighbouring buildings</b>
<b>Comment:</b>		The system is regarded as 'low risk' and, therefore, can satisfy this Standard, with reference to clauses 2.6.4 <sup>(1)(2)</sup> , 2.6.5 <sup>(1)</sup> and 2.6.6 <sup>(2)</sup> . See sections 8.1 to 8.6 of this Certificate.
<b>Standard:</b>	<b>2.7</b>	<b>Spread on external walls</b>
<b>Comment:</b>		The system can satisfy the requirements of this Standard, with reference to clauses 2.7.1 <sup>(1)(2)</sup> and 2.7.2 <sup>(2)</sup> . See sections 8.1 to 8.6 of this Certificate.
<b>Standard:</b>	<b>3.10</b>	<b>Precipitation</b>
<b>Comment:</b>		The system will contribute to a construction satisfying this Standard with reference to clauses 3.10.1 <sup>(1)(2)</sup> and 3.10.2 <sup>(1)(2)</sup> . See sections 4.4 and 10.1 of this Certificate.
<b>Standard:</b>	<b>3.15</b>	<b>Condensation</b>
<b>Comment:</b>		The system will satisfy the requirements of this Standard, with reference to clauses 3.15.1 <sup>(1)(2)</sup> , 3.15.4 <sup>(1)(2)</sup> and 3.15.5 <sup>(1)(2)</sup> . See sections 11.3 and 11.4 of this Certificate.
<b>Standard:</b>	<b>6.1(b)</b>	<b>Carbon dioxide emissions</b>
<b>Standard:</b>	<b>6.2</b>	<b>Buildings insulation envelope</b>
<b>Comment:</b>		The system can contribute to satisfy these Standards, with reference to clauses (or parts of) 6.1.1 <sup>(1)</sup> , 6.1.2 <sup>(1)(2)</sup> , 6.1.3 <sup>(1)(2)</sup> , 6.1.6 <sup>(1)</sup> , 6.1.10 <sup>(2)</sup> , 6.2.1 <sup>(1)(2)</sup> , 6.2.3 <sup>(1)</sup> , 6.2.4 <sup>(2)</sup> , 6.2.5 <sup>(2)</sup> , 6.2.6 <sup>(1)</sup> , 6.2.7 <sup>(1)</sup> , 6.2.8 <sup>(2)</sup> , 6.2.9 <sup>(1)(2)</sup> , 6.2.10 <sup>(1)</sup> , 6.2.11 <sup>(1)</sup> , 6.2.12 <sup>(2)</sup> and 6.2.13 <sup>(1)(2)</sup> . See sections 6.2 and 6.3 of this Certificate.
<b>Standard:</b>	<b>7.1(a)(b)</b>	<b>Statement of sustainability</b>
<b>Comment:</b>		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 system can contribute to a construction meeting a higher level of sustainability as defined in this Standard with reference to clauses 7.1.4 <sup>(1)(2)</sup> [Aspect 1 <sup>(1)(2)</sup> and 2 <sup>(1)</sup> ], 7.1.6 <sup>(1)(2)</sup> [Aspect 1 <sup>(1)(2)</sup> and 2 <sup>(1)</sup> ] and 7.1.7 <sup>(1)(2)</sup> [Aspect 1 <sup>(1)(2)</sup> ]. See sections 6.2 and 6.3 of this Certificate.
<b>Regulation:</b>	<b>12</b>	<b>Building standards applicable to conversions</b>
<b>Comment:</b>		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 <sup>(1)(2)</sup> and Schedule 6 <sup>(1)(2)</sup> . (1) Technical Handbook (Domestic). (2) Technical Handbook (Non-Domestic).



## The Building Regulations (Northern Ireland) 2012

<b>Regulation:</b>	<b>23</b>	<b>Fitness of materials and workmanship</b>
<b>Comment:</b>		The system is acceptable. See section 13.1 and the <i>Installation</i> part of this Certificate.

Regulation:	28(b)	Resistance to moisture and weather
Comment:		The system provides a degree of protection against rain ingress. 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 system can satisfy or contribute to satisfying this Regulation. See sections 8.1 to 8.4 of this Certificate.
Regulation:	39(a)(i)	Conservation measures
Regulation:	40	Target carbon dioxide emission rate
Comment:		The system can contribute to satisfying these Regulations. See sections 6.2 and 6.3 of this Certificate.

## Construction (Design and Management) Regulations 2007

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

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

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

## Additional Information

### NHBC Standards 2014

NHBC accepts the use of Johnstone's Stormshield White/Grey EPS External Wall Insulation System, provided it is installed, used and maintained in accordance with this Certificate, in relation to *NHBC Standards, Part 6 Superstructure (excluding roofs)*, Chapter 6.9 *Curtain walling and cladding*.

## Technical Specification

### 1 Description

1.1 Johnstone's Stormshield White/Grey EPS External Wall Insulation System comprises white or grey EPS boards mechanically fixed (with supplementary adhesive) to the substrate wall, and glassfibre reinforcement mesh with render finishes.

1.2 The system, from the inside to the outside (see Figure 1) comprises:

#### Adhesive (supplementary)

- Johnstone's Stormshield Adhesive — a polymer-modified cement binder system containing limestone aggregate and fillers produced in powder form.

#### Insulation

- White expanded polystyrene (EPS) insulation boards — 1200 mm by 600 mm available in a range of thicknesses between 20 mm and 240 mm, with a nominal density of 15 kg·m<sup>-3</sup>. The boards are manufactured to comply with the requirements for EPS 70, Class E material to BS EN 13163 : 2012 and have a minimum tensile strength of  $\geq 100 \text{ kN}\cdot\text{m}^{-2}$  and a minimum compressive strength of 70 kN·m<sup>-2</sup>. Boards of 20 mm thickness are available for use in window reveals
- Grey EPS — enhanced expanded polystyrene (EPS) insulation boards — 1200 mm by 600 mm available in a range of thicknesses between 20 mm and 240 mm, with a nominal density of 16 kg·m<sup>-3</sup>. The boards are manufactured to comply with the requirements for EPS 70, Class E materials to BS EN 13163 : 2012 and have a minimum tensile strength of  $\geq 100 \text{ kN}\cdot\text{m}^{-2}$  and a minimum compressive strength of 70 kN·m<sup>-2</sup>. Boards of 20 mm thickness are available for use in window reveals.

#### Mechanical fixings

- mechanical fixings<sup>(1)</sup> — proprietary external wall insulation fixings of adequate length to suit the substrate and insulation thickness, and supplied by the Certificate holder:
  - Ejot H1 Eco — polyethylene, PE-HD with steel or electro-galvanized nails
  - Ejot Ejotherm STR U — polyethylene, PE-HD with stainless steel or electro-galvanized screws
  - Ejot Ejotherm NT U — polyethylene, PE-HD with stainless steel or electro-galvanized nails.

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

#### Basecoat

- Johnstone's Stormshield Basecoat — a polymer-modified cement binder system containing limestone aggregate and fillers produced in powder form.

## Reinforcement

- standard reinforcement mesh — 1.1 metre wide alkali-resisting glassfibre mesh with a nominal weight of  $160 \text{ g}\cdot\text{m}^{-2}$ , and with an aperture size of approximately 4 mm by 4 mm.

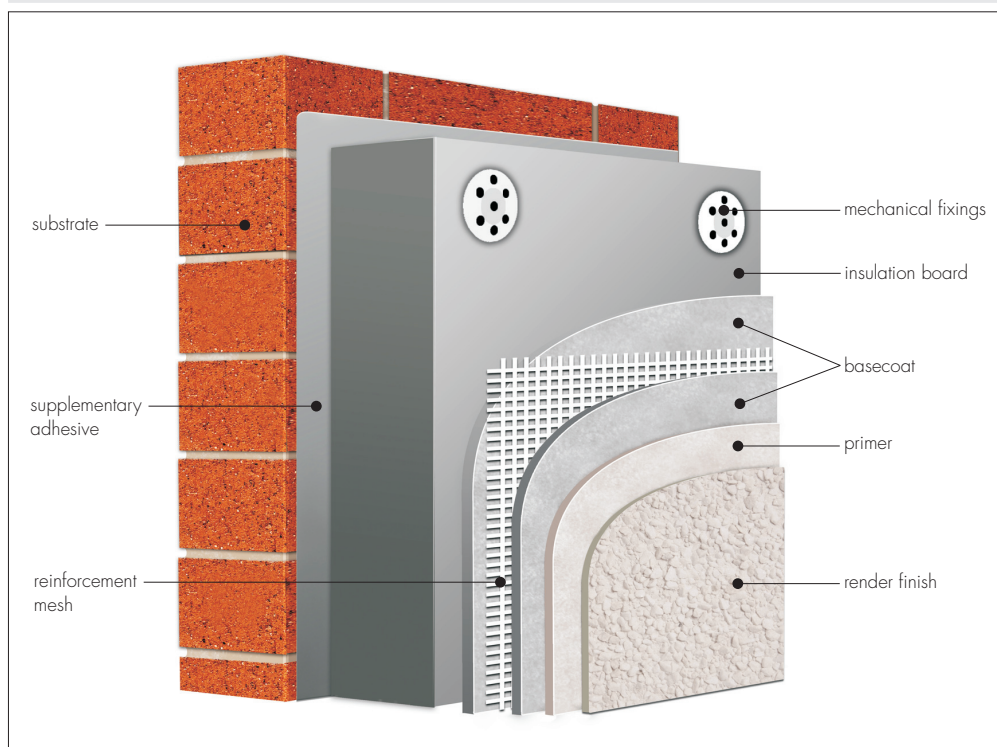
## Primer

- Johnstone's Stormshield Silicone Primer — a polymer-based system applied over the basecoat and in conjunction with Stormshield Silicone Render Finishes. The product is available in a range of colours.

## Finishes

- Johnstone's Stormshield Full Silicone Render — a polymer-modified, silicone coating system, produced in paste form
- Johnstone's Stormshield Silicone Enhanced Render — a polymer-modified, silicone coating system, produced in paste form
- Johnstone's Stormshield Brick Effect Render — a polymer-modified cement binder system containing fillers, produced in powder form
- Johnstone's Stormshield Dash Receiver — a polymer-modified cement binder system containing fillers, produced in powder form. The product is dashed with aggregates, and is available in a range of sizes and colours.

Figure 1 Johnstone's Stormshield EPS External Wall Insulation System



1.3 Ancillary materials, outside the scope of this Certificate, include:

- profiles — a range of standard PVC, aluminium, stainless steel and galvanized steel profiles for use at wall base, stop ends and movement joints
- profile fixings — a range of fixings available to suit insulation thickness and substrate type, including stainless steel screws, polypropylene plug type with steel expansion pins or plastic expansion sleeves
- joint seal — compressible waterproofing sealing tape
- sealant.

1.4 The insulation boards are primarily fixed with mechanical fixings and bonded to the substrate using supplementary adhesive. Basecoat render is trowel-applied to the board face in two passes, the first pass to include a layer of embedded mesh, the render to have an approximate final thickness of 6 mm. When dry, the primer is applied, if necessary, followed by the application of the decorative finish coat.

## 2 Manufacture

As part of the assessment and ongoing surveillance of the quality of the system components, the BBA has:

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

### 3 Delivery and site handling

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

3.2 Components are delivered in the quantities and packages listed in Table 1 of this Certificate. Each package carries the manufacturer's and product identification and batch number.

*Table 1 Component supply details*

Component	Quantity and package
Insulation boards	Polythene shrink-wrapped package
Johnstone's Stormshield Adhesive/Johnstone's Stormshield Basecoat	25 kg bag
Standard reinforcement mesh	1.1 m x 50 m roll
Johnstone's Stormshield Silicone Primer	25 kg bucket
Johnstone's Stormshield Silicone Renders	25 kg bucket
Johnstone's Stormshield Brick Effect Render	25 kg bag
Johnstone's Stormshield Dash Receiver	25 kg bag
Mechanical fixings	Boxed by manufacturer

3.3 The insulation boards should be stored on a firm, clean, level base, off the ground and protected from prolonged exposure to sunlight, either by storing opened packs under cover in dry conditions or re-covering with opaque polythene sheeting.

3.4 Care must be taken when handling the insulation boards to avoid damage. Boards that become damaged, soiled or wet should be discarded.

3.5 The powder components should be stored in dry conditions, off the ground and protected from frost at all times. Bags of unopened render will have a shelf-life of 12 months when stored correctly.

3.6 Primers and synthetic paste render finishes should be stored in dry conditions, off the ground and protected from frost at all times. Damaged, wet or contaminated products should not be used and must be discarded.

## Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Johnstone's Stormshield White/Grey EPS External Wall Insulation System.

## Design Considerations

### 4 General

4.1 Johnstone's Stormshield White/Grey EPS Wall External Wall Insulation System, when installed in accordance with this Certificate, is effective in reducing the thermal transmittance (U value) of the external masonry walls of new and existing buildings. It is essential that the detailing techniques specified in this Certificate are carried out to a high standard if the ingress of water into the insulation is to be avoided and the full thermal benefit obtained from the system. Only details specified by the Certificate holder should 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 there are no signs of dampness on the inner surface of the wall, other than those caused solely by condensation.

4.3 The system is applied to the outside of external walls of masonry and dense or no-fines concrete construction and is suitable for use on new or existing domestic or non-domestic buildings up to 18 metres in height. Prior to installation of the system, the wall surfaces should comply 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 and its UK National Annex — 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 regulatory requirements should also be built in accordance with the standards identified in section 4.4 of this Certificate.

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 External plumbing should 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 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 be installed only by specialised contractors who have successfully undergone training and registration by the Certificate holder.

Note: The BBA operates a UKAS accredited Approved Installer Scheme for external wall insulation; details of approved installer companies are included on the BBA's website ([www.bbacerts.co.uk](http://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 thermal conductivity ( $\lambda_D$  value) of the insulation material given in Table 2 of this Certificate.

Table 2 Thermal conductivity values

Insulation	$\lambda_D$ value ( $\text{W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$ )
White EPS	0.038
Grey EPS	0.030



6.2 The U value of a completed wall will depend on the selected insulation thickness and fixing method, the insulation value of the substrate masonry and its internal finish. Figures for typical design U values, calculated in accordance with section 6.1, are given in Table 3 of this Certificate.

Table 3 Insulation thickness required to achieve U value<sup>(1)(2)(3)</sup>

U value ( $\text{W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}$ )	Thickness of insulation <sup>(4)</sup> (mm)			
	215 mm brickwork, $\lambda = 0.56 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$		200 mm dense blockwork, $\lambda = 0.56 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$	
	White EPS	Grey EPS	White EPS	Grey EPS
0.19	190	150	200	160
0.25	140	110	150	120
0.26	140	110	140	110
0.28	120	100	130	110
0.30	110	90	120	100
0.35	100	80	100	80

(1) Wall construction inclusive of 13 mm plaster ( $\lambda = 0.57 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$ ), 5 mm render ( $\lambda = 1.0 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$ ). Brickwork (protected) with 17.1% mortar or dense blockwork with 6.7% mortar ( $\lambda = 0.88 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$ ). Insulation  $\lambda_D$  as per Table 2 of this Certificate.

(2) Calculation based on a system that included 7 fixings per  $\text{m}^2$  with a point thermal transmittance  $X_p = 0.002 \text{ W}\cdot\text{K}^{-1}$ . Use of other types of fixings should be calculated in accordance with BS EN ISO 6946 : 2007.

(3) Based on calculations in accordance with BS EN ISO 6946 : 2007.

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



6.3 The system can maintain, or contribute to maintaining, continuity of thermal insulation at junctions between external walls and junctions. Details shown in section 16 will allow use of the default  $\psi$ -values (Psi) for Accredited Construction Details in Emission Rate calculations to SAP 2009 or the Simplified Building Energy Model (SBEM). Guidance on limiting heat loss at junctions 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). For new-build, see also SAP 2009, Appendix K, and the *iSBEM User Manual*

**Scotland** — Accredited Construction Details (Scotland)

**Northern Ireland** — Accredited Construction Details (version 1.0).

## 7 Strength and stability

7.1 When installed on suitable walls, the system can adequately transfer to the wall the self-weight and negative (suction) and positive (pressure) wind loads normally experienced in the United Kingdom.

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

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 and its UK National Annex. 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 and its UK National Annex, 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 buildings must be carried out by a suitably qualified and experienced person to confirm that:

- the substrate wall has adequate strength to resist additional loads that may be applied as a result of installing the system, ignoring any positive contribution that may occur from the system
- the proposed system and associated fixing layout provides adequate resistance to negative wind loads based on the results of the site investigation and test results
- an appropriate number of site-specific pull-out tests are conducted on the substrate of the building to determine the minimum resistance to failure of the fixings. The characteristic pull-out resistance should be determined in accordance with the guidance given in ETAG 014 : 2002, Annex D.

7.6 The number and centres of fixings should be determined by the system designer. Provided the substrate wall is suitable and an appropriate fixing is selected, the mechanical fixings will adequately support and transfer the weight of the render insulation system to the substrate wall.

7.7 Typical characteristic pull-out strengths for the fixings taken from the corresponding European Technical Approval (ETA) are given in Table 4 of this Certificate; however, these values are dependent on the substrate and the fixing must be selected to suit the loads and substrate concerned.

*Table 4 Fixings — typical characteristic pull-out strengths<sup>(1)</sup>*

Fixing type	ETA number	Substrates	Drill diameter (mm)	Effective anchorage depth (mm)	Typical pull-out strength (kN) <sup>(1)</sup>
Ejot H1 Eco	11/0192	Concrete C12/15/clay brickwork	8	25	0.9/0.9
Ejothrm STR U	04/0023	Concrete C12/15/clay brickwork	8	25	1.5
Ejothrm NT U	04/0023	Concrete C12/15/clay brickwork	8	25	1.2/1.2

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

7.8 The pull-through resistance determined by the BBA from tests on anchors are given in Table 5 of this Certificate.

*Table 5 Insulation pull-through resistances*

Factor (unit)	White EPS	Grey EPS
Insulation thickness (mm)	100	60
Plate diameter of anchor (mm)	60	60
Characteristic pull-through resistance <sup>(1)</sup> (per anchor) (N)	729	510
Factor of safety	2.5	2.5
Design pull-through resistance <sup>(2)</sup> (N)	292	204

(1) Characteristic value in accordance with BS EN 1990 : 2002, Annex D7.2.

(2) The safety factor of 2.5 is applied and 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

7.9 Hard body impact tests were carried out in accordance with ETAG 004 : 2000 (amended 2013). The system is suitable for use in the categories listed in Table 6. See section 7.10 of this Certificate.

*Table 6 Impact resistance*

Render system (basecoat with finish coat)	Impact resistance Use Category
White EPS + Johnstone's Stormshield Dash Receiver	Category I
Grey EPS + Johnstone's Stormshield Dash Receiver	
White EPS + Johnstone's Stormshield Silicone Renders	Category II
White EPS + Johnstone's Stormshield Brick Effect Render	
Grey EPS + Johnstone's Stormshield Brick Effect Render	Category III
Grey EPS + Johnstone's Stormshield Silicone Renders	

7.10 These Use Categories are defined in ETAG 004 : 2000 (amended 2013) as:

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

## 8 Behaviour in relation to fire



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

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

8.3 The system is restricted for use in buildings up to 18 metres in height.

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

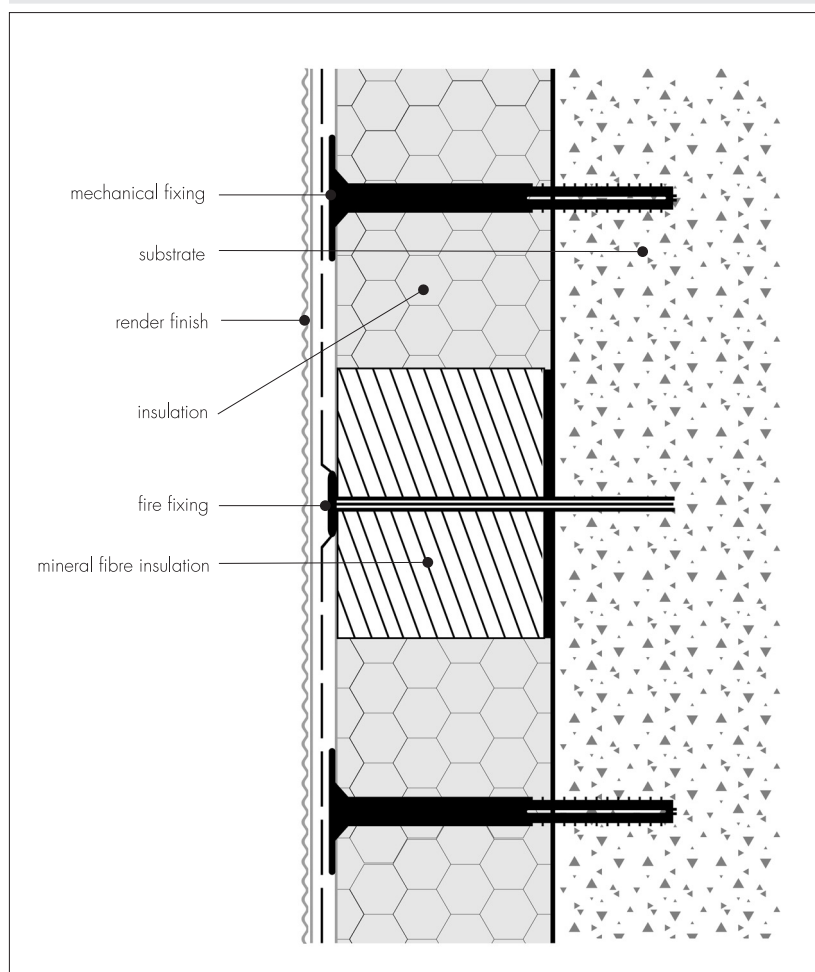


8.5 For flats and maisonettes and non-domestic buildings in Scotland, the system is suitable only for use more than one metre from the boundary.

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

8.7 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).

Figure 2 Fire barrier



## 9 Proximity of flues

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<sup>(1)(2)</sup>

(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 application of the insulation system. It may 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. Only details approved by the Certificate holder should be used.

10.3 The 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 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 these types 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 construction, including openings and penetrations at junctions between the insulation system, to minimise the risk of condensation. The recommendations given in BS 5250 : 2011 should be followed.

### Surface condensation



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



11.3 Walls will adequately limit the risk of surface condensation when the thermal transmittance (U value) does not exceed  $1.2 \text{ W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}$  at any point. Guidance may be obtained from BS 5250 : 2011 (Section 8, 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 renders used with the system have an equivalent air layer of thickness ( $S_d$ ) as given in Table 7 of this Certificate.

Table 7 Water vapour resistance factor and equivalent air layer thickness

Render System description	Water vapour air layer thickness, $S_d$ (m)	Water vapour resistance factor ( $\mu$ )
Johnstone's Stormshield Full Silicone Renders	2.18	227
Johnstone's Stormshield Silicone Enhanced Render	1.00	120
Johnstone's Stormshield Dash Receiver	0.86	62
Johnstone's Stormshield Brick Effect Render	0.99	70

11.6 The water vapour resistance factors ( $\mu$ ) for white/grey EPS insulation boards is 60, as taken from BS EN ISO 10456 : 2007, Table 4.

## 12 Maintenance and repair



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

- visual inspection of the render for signs of damage. Cracks in the render exceeding 0.2 mm must be repaired
- examination of the sealant around openings and service entry points
- visual inspection of architectural details designed to shed water to confirm that they are performing properly
- visual inspection to ensure that water is not leaking from external downpipes or gutters; such leakage could penetrate the rendering
- necessary repairs effected immediately and the sealant joints at window and door frames replaced at regular intervals
- maintenance schedules, which should include the replacement and resealing of joints, for example between the insulation system and window and door frame.

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

## 13 Durability



13.1 The system will have a service life of at least 30-years, provided any damage to the surface finish is repaired immediately, and regular maintenance is undertaken as described in section 12.

13.2 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.

13.3 The finishes may break up the flow of water on the surface and reduce the risk of discoloration by water runs. The finish may become discoloured with time, the rate depending on locality, 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 system compatible coatings recommended by the Certificate holder and in accordance with BS EN 1062-1 : 2004. Care should be taken not to adversely affect the water vapour transmission or fire characteristics of the system. The advice of the Certificate holder should be sought as to the suitability of a particular product.

## Installation

### 14 Site survey and preliminary work

14.1 A pre-installation survey of the property must be carried out to determine suitability for treatment and the need for any necessary repairs to the building structure before application of Johnstone's Stormshield White/Grey EPS External Wall Insulation System. A specification is prepared for each elevation of the building indicating:

- the position of beads
- detailing around windows, doors and at eaves
- damp-proof course (dpc) level
- exact position of expansion beads
- where required, additional corner mesh and reinforcement
- areas where flexible sealants must be used
- any alterations to external plumbing
- where required, the positions of fire barriers.

14.2 The survey should include tests conducted on the walls of the building by the Certificate holder or their approved installers (see section 15) to determine the pull-out resistance of the 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 relevant wind speed data for the site and the pull-out resistances (see section 7).

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

14.4 On existing buildings, purpose-made window sills must be fitted to extend beyond the finished face of the system (see section 16.10). New buildings should incorporate suitably deep sills.

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

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

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

### 15 Approved Installers

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

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

## 16 Procedure

### General

16.1 Application of the system is carried out in accordance with the Certificate holder's current installation instructions.

16.2 Weather conditions should be monitored to ensure correct application and curing conditions. The insulation board adhesive, adhesive basecoat and rendering must not be applied when exposure to frost is likely, in damp/wet conditions or at temperatures below 5°C or above 25°C, or where these temperatures are likely to be exceeded during the curing period. 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.

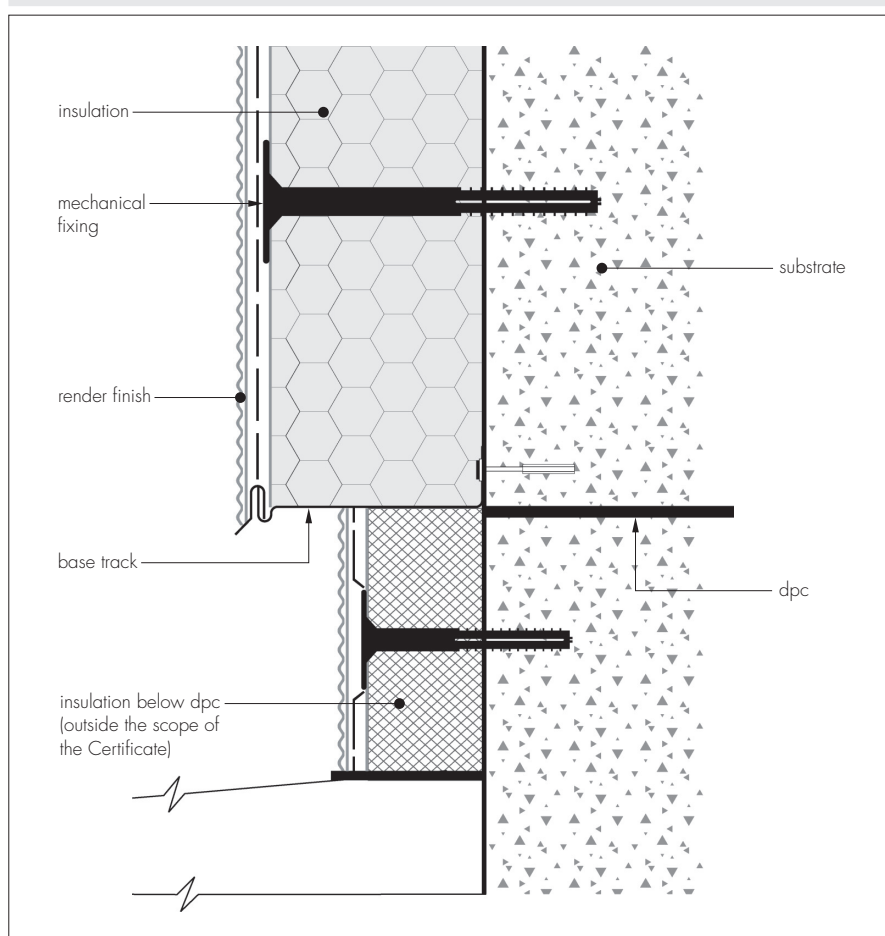
16.4 All Johnstone's Stormshield powdered products require mixing with an electric hand mixer or horizontal mixer. The material should be allowed to stand for five minutes before remixing for use.

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

### Positioning and securing insulation boards

16.6 The base profile is secured to the external wall above the dpc using the profile fixings at a maximum of 300 mm centres (see Figure 3). Base track clips are inserted at all base profile joints with a thermal expansion gap of 2 mm between each base profile.

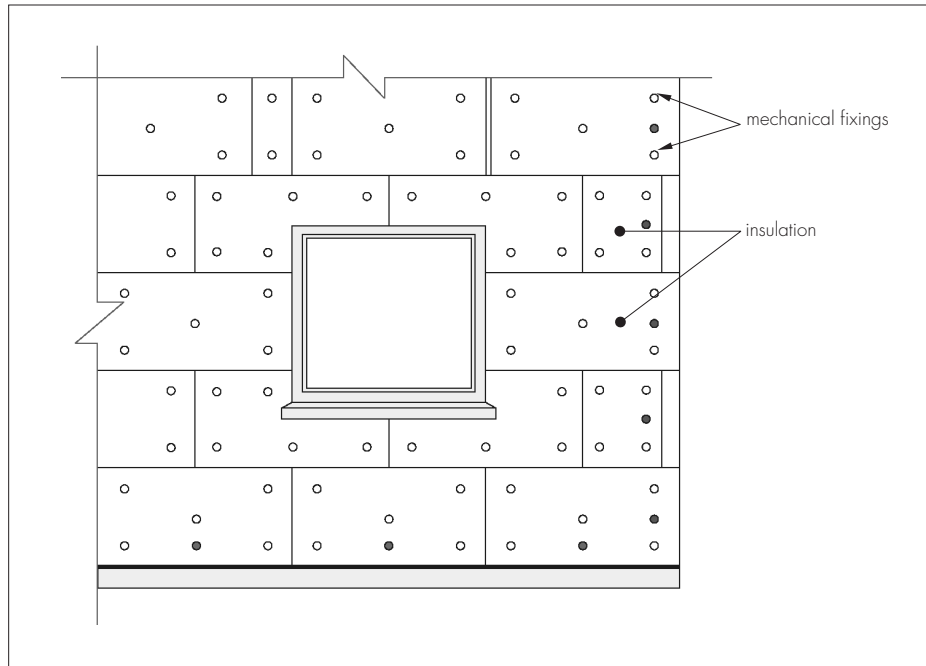
Figure 3 Typical section at base



16.7 Johnstone's Stormshield Adhesive or Johnstone's Stormshield Basecoat is prepared by mixing each 25 kg bag with 4.5 to 5.5 litres of clean water. The adhesive is applied to the insulation boards using stainless steel tools.

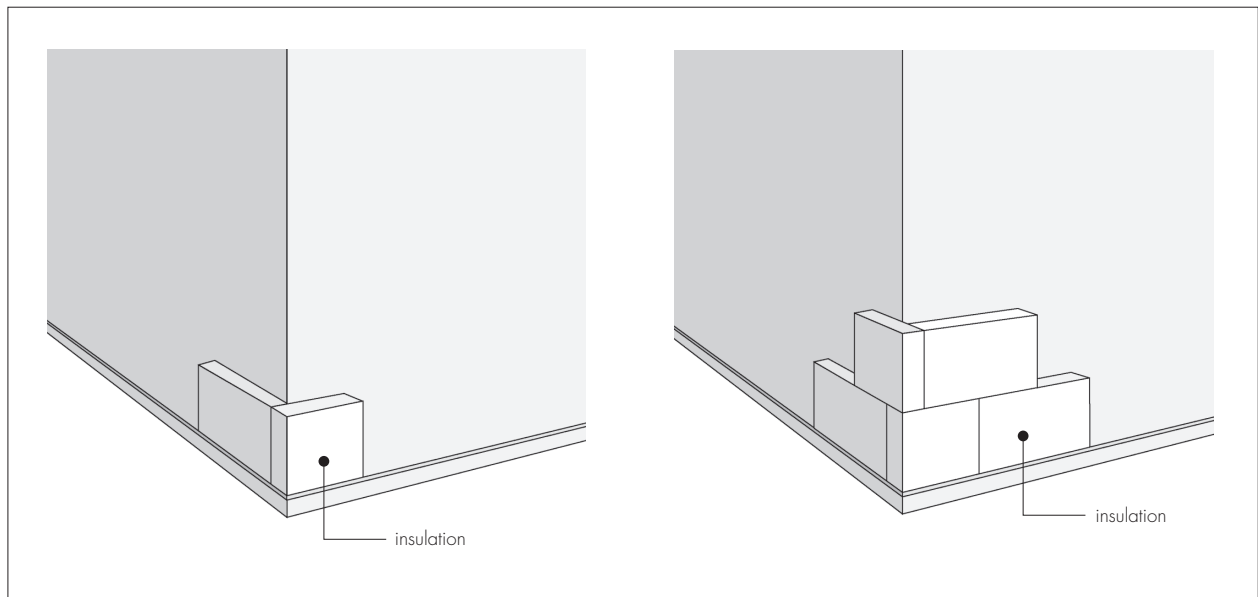
16.8 The first run of insulation boards is positioned on the base profile. Holes are drilled into the substrate to the required depth through the insulation equidistantly at the corners of each board and at positions which will allow a minimum of five fixings per insulation board (eight fixings per square metre) in the main area of the wall (see Figure 4). Around openings, additional fixings should be used at 300 mm centres. The primary mechanical fixings are inserted and tapped or screwed firmly into place, securing the insulation to the substrate. Subsequent rows of boards are positioned so that the vertical board joints are staggered and overlapped at the building corners, and the board joints do not occur within 250 mm of the corners of openings.

Figure 4 Insulation board fixing pattern



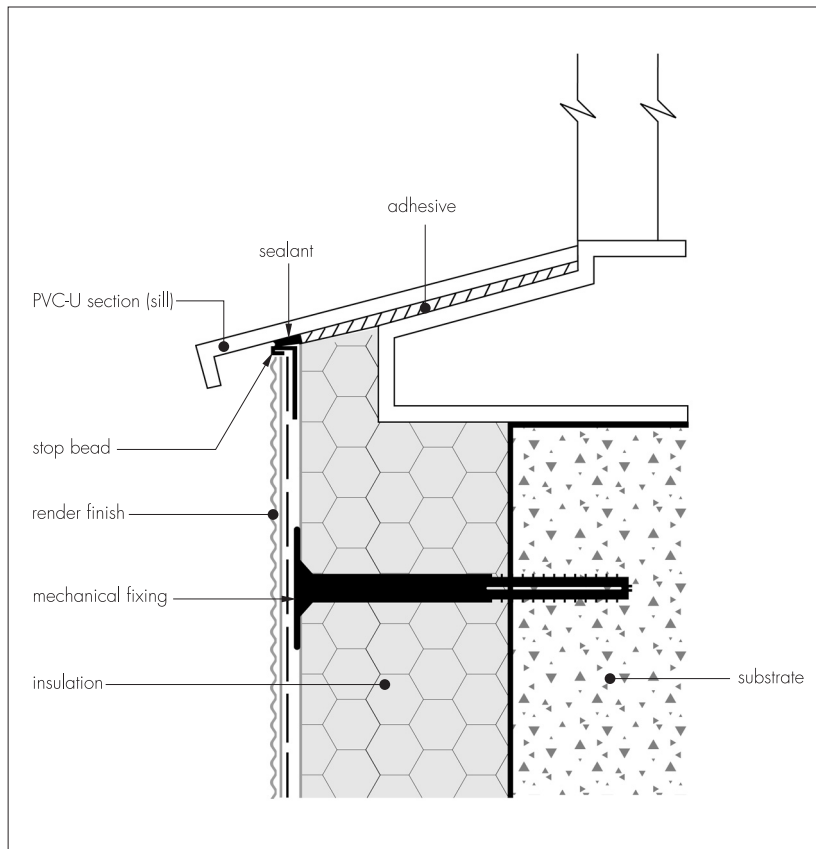
16.9 The insulation boards must be pressed firmly against the wall and butted tightly together with the vertical joints staggered by at least 250 mm (see Figure 5). Alignment should be checked as work proceeds.

Figure 5 Typical arrangement at external corner



16.10 To fit around details such as doors and windows, the boards may be cut with a sharp knife or a fine-tooth saw, and positioned so that the board joints do not occur within 250 mm of the corners of the opening. If required, purpose-made window sills are fitted (see Figure 6). They are designed to prevent water ingress and incorporate drips to shed water clear of the system.

Figure 6 Typical sill detail



16.11 Insulation continues until the whole wall is completely covered in insulation panels as specified.

16.12 Prior to the render coat, a bead of joint sealant is gun-applied at window and door frames, overhanging eaves, gas and electric meter boxes, wall vents, or where the insulation abuts any other building material or surface.

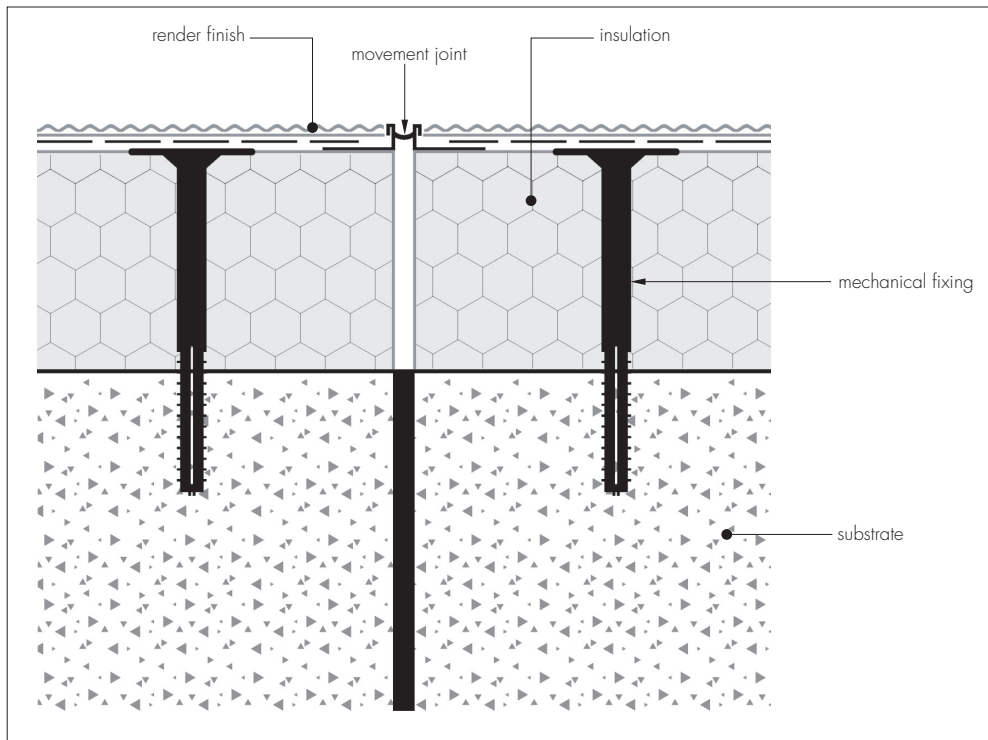
16.13 Specified beads are fixed to all building corners and to door and window heads and jambs, and can be fixed in place using the basecoat render or suitable fir tree fixings.

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

#### **Movement joints**

16.15 Movement joints are fixed vertically in agreed positions, depending upon the individual requirements of each job. Where a movement joint is incorporated into the substrate, an expansion joint must be provided in the insulation system (see Figure 7).

Figure 7 Typical movement joint



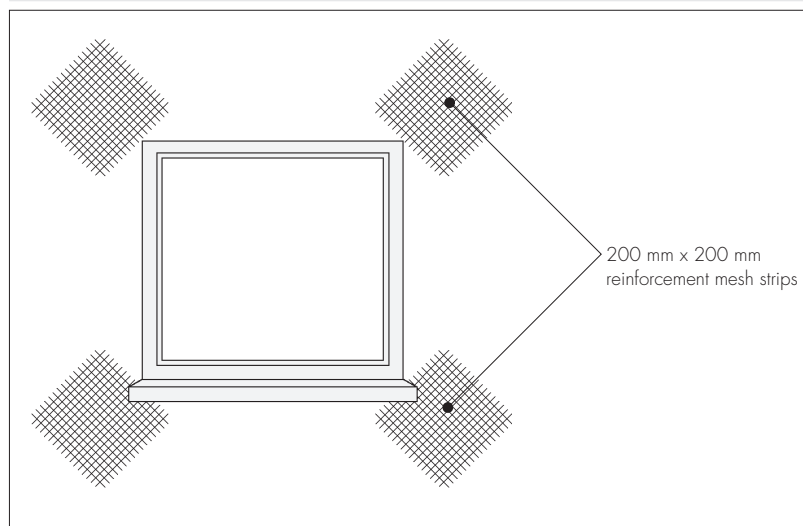
### Reinforcement

16.16 Johnstone's Stormshield Basecoat render is applied over the insulation boards, using a stainless steel trowel and floated to an approximate minimum thickness of 3 mm to 4 mm. The reinforcement mesh is immediately embedded and a further minimum thickness of 3 mm of basecoat is applied whilst the surface is still wet and smoothed off using a stainless steel float. After application and smoothing the overall thickness should be a minimum of 6 mm.

16.17 Overlaps at all mesh joints should not be less than 100 mm.

16.18 Additional pieces of reinforcement mesh, minimum size 200 mm by 200 mm, are used diagonally at the corners of openings as shown in Figure 8.

Figure 8 Additional reinforcement at openings



16.19 The mesh should be free of wrinkles and fully embedded in the basecoat.

16.20 The basecoat should be left to dry thoroughly before application of the finish coat. Depending on conditions, the drying time should be at least 24 hours before application of the finish coats.

### Johnstone's Stormshield Silicone Renders

16.21 If the chosen finish is Johnstone's Stormshield Full Silicone/Silicone Enhanced Render, the basecoat should be prepared with a suitable sponge float to ensure a lightly textured flat finish.

16.22 Johnstone's Stormshield Silicone Primer is applied by brush, roller or spray depending on the size of the job. The primer is available in a range of colours to complement the finished silicone render.



16.23 Once the silicone primer has been applied and allowed to dry for at least 12 hours the silicone render can be applied.

16.24 Silicone render is supplied as a ready mixed paste in 25 kg containers. The product is mixed thoroughly before application. Multiple containers should be mixed together to ensure consistency of colour when working on a continuous surface.

16.25 The render is applied by stainless steel float to the thickness of the chosen silicone render aggregate. See Table 7 of this Certificate.

16.26 Once the render has been applied it is finished with a plastic float working the material in small circular motions to remove excess material and create a natural random finish.

#### **Johnstone's Stormshield Dash Receiver**

16.27 If Johnstone's Stormshield Dash Receiver is being applied, the basecoat is lightly scratched with a spiked float or comb before it sets, to provide a key.

16.28 The dash receiver is prepared by mixing each 25 kg bag with 4.5 to 5.5 litres of clean water. The product is mixed thoroughly to the specified consistency.

16.29 Stormshield Dash Receiver is applied to a depth of 6 mm, to achieve an even coat using straight edges and spatulas if necessary. A thicker coat of dash receiver may be necessary when using a larger aggregate size to ensure it fully beds into the dash receiver.

16.30 Aggregates should be clean and damp before dashing onto the dash receiver.

#### **Johnstone's Stormshield Brick Effect Render**

16.31 If Johnstone's Stormshield Brick Effect Render is being applied the basecoat is lightly scratched with a spiked float or comb before it sets, to provide a key.

16.32 Brick Effect Render is prepared by mixing each 25 kg bag with 5 to 6 litres of clean water and mixed thoroughly to the specified consistency.

16.33 The first (mortar) coat is applied to a thickness of 5 mm to 6mm in a flat, even coat.

16.34 The chosen second (brick face) coat is then prepared as described in section 16.32 of this Certificate.

16.35 When the first (mortar) coat has 'firmed-up', the second brick face coat is applied to a thickness of 2 mm to 3 mm to achieve a flat, even coat.

16.36 The second (brick face) coat is allowed to firm up before cutting out the brick face coat to the desired brick pattern, taking care not to damage the face coat.

16.37 After all joints have been formed, and when the surface is partially cured, all traces of cut out material should be removed by brushing with a soft bristled brush.

#### **All render finishes**

16.38 The finish coats are applied to the thicknesses specified by the Certificate holder (and notional thin-coat thicknesses as indicated by the grain size for each specific finish), using a stainless steel trowel and float and finished with a plastic float to create the required finish texture. See Table 8 of this Certificate.

*Table 8 Thickness of finish coats*

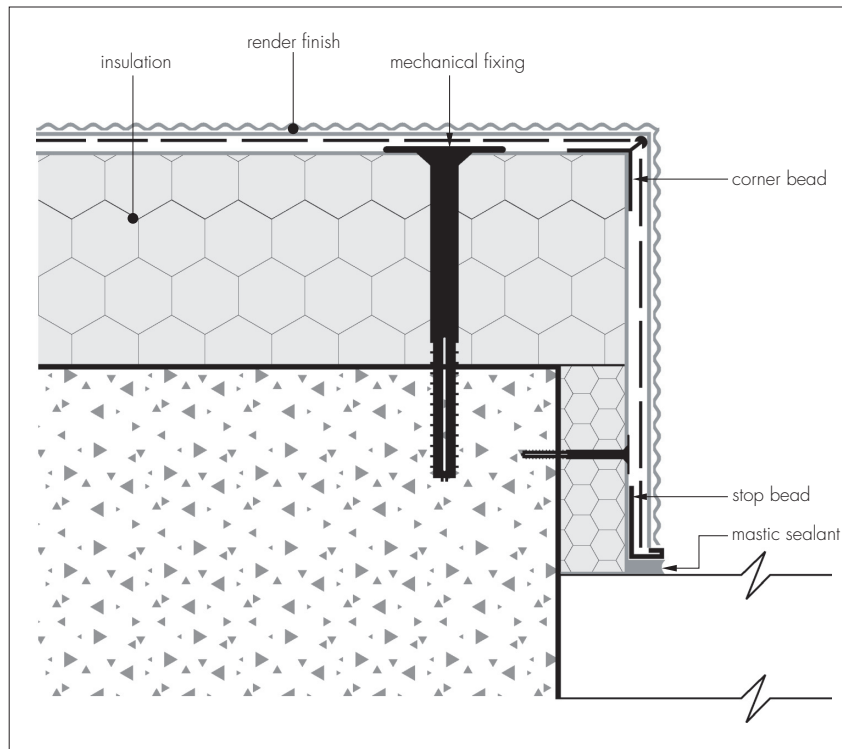
Finish coat	Thickness range or minimum thickness (mm) <sup>(1)</sup>
Johnstone's Stormshield Silicone Renders	1 to 3
Johnstone's Stormshield Dash Receiver	4 to 7
Johnstone's Stormshield Brick Effect Render	7 to 9

(1) Thickness gauged by grain size.

16.39 Continuous surfaces should be completed without a break.

16.40 Care should be taken in the detailing of the system around openings and projections (see Figure 9). At the tops of walls, the system should be protected by an adequate overhang or by an adequately sealed purpose made flashing.

Figure 9 Typical detail at window reveal and window head



16.41 On completion of the installation, external fittings, eg rainwater goods, are securely fixed to timber grounds or extended fixings that have been built in to the system during installation.

16.42 Following the system installation, a final bead of joint sealant is gun-applied at window and door frames, overhanging eaves, gas and electric meter boxes, wall vents, fixings or where the render abuts any other building material or surface.

## Technical Investigations

### 17 Investigations

17.1 The system was examined and assessed to determine:

- fire performance
- water absorption
- hygrothermal behaviour
- freeze/thaw behaviour
- impact resistance
- water vapour permeability
- bond strength.

17.2 An examination was made of data relating to:

- surface spread of flame classification
- thermal conductivity.

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

## Bibliography

- BS 5250 : 2011 *Code of practice for control of condensation in buildings*
- BS 8000-3 : 2001 *Workmanship on building sites — Codes of practice for masonry*
- BS EN 1062-1 : 2004 *Paints and varnishes — Coating materials and coating systems for exterior masonry and concrete — Classification*
- BS EN 1990 : 2002 *Eurocode — Basis of structural design*
- NA to BS EN 1990 : 2002 *UK National Annex to Eurocode — Basis of structural design*
- BS EN 1991-1-4 : 2005 *Eurocode 1 : Actions on structures — General actions — Wind actions*
- NA to BS EN 1991-1-4 : 2005 *UK National Annex to 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*
- NA to BS EN 1996-2 : 2006 *UK National Annex to Eurocode 6 : Design of masonry structures — Design considerations, selection of materials and execution of masonry*
- 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 data from reaction to fire tests*
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- 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*
- 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*
- ETAG 004 : 2000 (amended 2013) *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*

## 18 Conditions

18.1 This Certificate:

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

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

18.3 This Certificate will remain valid for an unlimited period provided that the product/system and its manufacture and/or fabrication, including all related and relevant parts and processes thereof:

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

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

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

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

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