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## Agrément Certificate

98/3548

Product Sheet 5

### DRYVIT EXTERNAL WALL INSULATION SYSTEMS

### DRYSULATION AND DRYSULATION 60 EXTERNAL WALL INSULATION SYSTEMS

This Agrément Certificate Product Sheet<sup>(1)</sup> relates to Drysulation and Drysulation 60 External Wall Insulation Systems, comprising white or grey expanded polystyrene (EPS) insulation boards, mechanically fixed with supplementary adhesive, and reinforced basecoat and finishes. They are suitable for use, with height restriction, on the outside of masonry external walls in new and existing domestic and non-domestic buildings.

(1) Hereinafter referred to as 'Certificate'.

#### CERTIFICATION INCLUDES:

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



#### KEY FACTORS ASSESSED

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

**Strength and stability** — the systems can adequately resist wind loads and impact damage. The resistance to impact is dependent on the finish chosen (see section 7).

**Behaviour in relation to fire** — the systems' reaction to fire classifications in accordance with BS EN 13501-1 : 2007 are dependent on the system chosen and their use is restricted (see section 8).

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

**Durability** — when installed and maintained in accordance with the Certificate holder's recommendations and the terms of this Certificate, the systems will remain effective for at least 30 years. The durability can be extended to 60 years by using certain fixings and by following a planned inspection and an effective maintenance schedule (see sections 12 and 13).



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

On behalf of the British Board of Agrément

Date of First issue: 29 August 2018

John Albon – Head of Approvals  
Construction Products

Claire Curtis-Thomas  
Chief Executive

*Certificate amended on 13 January 2020 to include new regulatory guidance for fire in Scotland and Wales.*

*Certificate amended on 10 September 2020 to update section 8.*

*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 MUST check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA directly.*

*Any photographs are for illustrative purposes only, do not constitute advice and should not be relied upon.*

#### British Board of Agrément

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## Regulations

In the opinion of the BBA, Drysulation and Drysulation 60 External Wall Insulation Systems, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements of the following Building Regulations (the presence of a UK map indicates that the subject is related to the Building Regulations in the region or regions of the UK depicted):



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

<b>Requirement:</b>	<b>A1</b>	<b>Loading</b>
Comment:	The systems can sustain and transmit wind loads to the substrate wall. See sections 7.1 to 7.12 of this Certificate.	
<b>Requirement:</b>	<b>B4(1)</b>	<b>External fire spread</b>
Comment:	The systems are restricted by this Requirement. See sections 8.1 to 8.3 and 8.6 of this Certificate.	
<b>Requirement:</b>	<b>C2(b)</b>	<b>Resistance to moisture</b>
Comment:	The systems can provide a degree of protection against rain ingress. See section 10.1 of this Certificate.	
<b>Requirement:</b>	<b>C2(c)</b>	<b>Resistance to moisture</b>
Comment:	The systems 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>
Comment:	The systems can contribute to satisfying this Requirement. See sections 6.2 and 6.3 of this Certificate.	
<b>Regulation:</b>	<b>7(1)</b>	<b>Materials and workmanship</b>
Comment:	The systems are acceptable. See section 13.1 and the <i>Installation</i> part of this Certificate.	
<b>Regulation:</b>	<b>7(2)</b>	<b>Materials and workmanship</b>
Comment:	The systems are restricted by this Regulation. See sections 8.1 to 8.3 and 8.6 of this Certificate.	
<b>Regulation:</b>	<b>26</b>	<b>CO<sub>2</sub> emission rates for new buildings</b>
<b>Regulation:</b>	<b>26A</b>	<b>Fabric energy efficiency rates for new dwellings (applicable to England only)</b>
<b>Regulation:</b>	<b>26A</b>	<b>Primary energy consumption rates for new buildings (applicable to Wales only)</b>
<b>Regulation:</b>	<b>26B</b>	<b>Fabric performance values for new dwellings (applicable to Wales only)</b>
Comment:	The systems can contribute to satisfying these Regulations. 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>
Comment:	The systems can contribute to a construction satisfying this Regulation. See sections 12, 13.1 and 13.2 and the <i>Installation</i> part of this Certificate.	
<b>Regulation:</b>	<b>9</b>	<b>Building standards applicable to construction</b>
Standard:	<b>1.1</b>	<b>Structure</b>
Comment:	The systems can sustain and transmit wind loads to the substrate wall. See sections 7.1 to 7.12 of this Certificate.	
Standard:	<b>2.6</b>	<b>Spread to neighbouring buildings</b>
Comment:	The systems are restricted by 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, 8.2, 8.4, 8.5, 8.7 and 8.8 of this Certificate.	

Standard:	2.7	Spread on external walls
Comment:		The systems are restricted by this Standard, with reference to clauses 2.7.1 <sup>(1)(2)</sup> and 2.7.2 <sup>(2)</sup> and Annex 2B <sup>(1)</sup> . See sections 8.1, 8.2, 8.4, 8.5, 8.7 and 8.8 of this Certificate.
Standard:	3.10	Precipitation
Comment:		The systems can contribute to a construction satisfying this Standard, with reference to clauses 3.10.1 <sup>(1)(2)</sup> and 3.10.2 <sup>(1)(2)</sup> . See section 10.1 of this Certificate.
Standard:	3.15	Condensation
Comment:		The systems can contribute to satisfying this Standard, with reference to clauses 3.15.1 <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.
Standard:	6.1(b)	Carbon dioxide emissions
Standard:	6.2	Building insulation envelope
Comment:		The systems can contribute to satisfying these Standards, with reference to clauses (or parts of) 6.1.1 <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.
Standard:	7.1(a)(b)	Statement of sustainability
Comment:		The systems can contribute to satisfying the relevant requirements of Regulation 9, Standards 1 to 6, and therefore will contribute to a construction meeting the bronze level of sustainability as defined in this Standard. In addition, the systems can contribute to a construction meeting a higher level of sustainability as defined in this Standard with reference to clauses 7.1.4 <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 section 6.2 of this Certificate.
Regulation:	12	<b>Building standards applicable to conversions</b>
Comment:		All comments given for the systems under Regulation 9, Standards 1 to 6, also apply to this Regulation, with reference to clause 0.12.1 <sup>(1)(2)</sup> and Schedule 6 <sup>(1)(2)</sup> .
<p>(1) Technical Handbook (Domestic). (2) Technical Handbook (Non-Domestic).</p>		



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

Regulation:	23	<b>Fitness of materials and workmanship</b>
Comment:		The systems are acceptable. See sections 13.1 and 13.2 and the <i>Installation</i> part of this Certificate.
Regulation:	28(b)	<b>Resistance to moisture and weather</b>
Comment:		The systems provide a degree of protection against rain ingress. See section 10.1 of this Certificate.
Regulation:	29	<b>Condensation</b>
Comment:		The systems can contribute to minimising the risk of interstitial condensation. See section 11.4 of this Certificate.
Regulation:	30	<b>Stability</b>
Comment:		The systems can sustain and transmit wind loads to the substrate wall. See sections 7.1 to 7.12 of this Certificate.
Regulation:	36(a)	<b>External fire spread</b>
Comment:		The systems are restricted by this Regulation. See sections 8.1 to 8.3 and 8.6 of this Certificate.
Regulation:	39(a)(i)	<b>Conservation measures</b>
Regulation:	40	<b>Target carbon dioxide emission rate</b>
Comment:		The systems can contribute to satisfying these Regulations. 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 section: 3 *Delivery and site handling* (3.2 and 3.4) of this Certificate.

### Additional Information

#### NHBC Standards 2018

In the opinion of the BBA, Drysulation and Drysulation 60 External Wall Insulation Systems, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements in relation to *NHBC Standards*<sup>(1)</sup>, Part 6 *Superstructure (excluding roofs)*, Chapter 6.9 *Curtain walling and cladding*.

(1) There is a general requirement in *NHBC Standards* 2018, Chapter 6.9, for fire-retardant-treated insulation to be used in accordance with BS EN 13163 : 2012.

### Technical Specification

#### 1 Description

1.1 Drysulation and Drysulation 60 External Wall Insulation Systems consist of grey and white EPS insulation boards, mechanically fixed with supplementary adhesive (ensuring a minimum of 40% coverage of adhesive is achieved after the boards have been pressed against the substrate), reinforced basecoat and finish.

1.2 The systems can be designed to achieve either a 30 or 60 year service life (see Figure 1). Mechanical fixings are applied through the insulation boards for 30-year systems or through the reinforcing mesh and insulation boards for 60-year systems, to the external surface of the substrate wall, see sections 1.3 and 1.4.

##### 30 year durability (see Figure 1a)

1.3 After the boards have been secured to the wall with mechanical fixings and supplementary adhesive, the basecoat (see section 1.6) is trowel-applied to the specified thickness, followed by the reinforcing mesh, which is fully embedded within the basecoat. After the reinforced basecoat has cured, primer is applied followed by the finish and, if required, a decorative coat (described in sections 1.6 and 16).

##### 60 year durability (see Figure 1b)

1.4 After the boards have been secured to the wall with adhesive, the basecoat (see section 1.6) is trowel-applied to the specified thickness, followed by the reinforcing mesh, which is fully embedded within the basecoat. While the basecoat is still wet, mechanical fixings are applied through the mesh and insulation boards into the substrate, before mesh patches are applied over the fixing heads and fully embedded. A further layer of basecoat is applied to achieve a level surface, providing a minimum 2 mm coverage over each fixing head. After the reinforced basecoat has cured, primer is applied followed by the finish and, if required, a decorative coat (described in sections 1.6 and 16).

1.5 Additionally, for 60 year durability systems, the requirements of sections 1.6 (*Mechanical fixings*) and 4.12 must be satisfied.

1.6 The systems comprise:

##### Adhesives (supplementary)

- Dryvit Dryhesive Plus — a polymer-modified, cement-based adhesive powder requiring the addition of 5.5 to 6.0 litres of clean water per 25 kg bag, applied at a coverage of 3.5 to 4 kg·m<sup>-2</sup>
- Dryvit Primus M — a polymer-modified, cement-based adhesive powder requiring the addition of 5.5 to 6.0 litres of clean water per 25 kg bag, applied at a coverage of 3.5 to 4 kg·m<sup>-2</sup>

- Dryvit Primus M (white) — a polymer-modified, cement-based adhesive powder requiring the addition of 5.5 to 6.0 litres of clean water per 25 kg bag, applied at a coverage of  $3.5$  to  $4 \text{ kg}\cdot\text{m}^{-2}$

### Insulation<sup>(1)</sup>

- EPS 70 (white or grey) insulation boards — EPS boards, 1200 by 600 mm, in a range of thicknesses between 50<sup>(2)</sup> and 300 mm in 10 mm increments, with boards available in nominal densities of 15 and  $17 \text{ kg}\cdot\text{m}^{-3}$ , with a minimum compressive strength of  $70 \text{ kN}\cdot\text{m}^{-2}$  and nominal tensile strength of  $\geq 100 \text{ kN}\cdot\text{m}^{-2}$ . The boards are manufactured to comply with the requirements for EPS 70, Class E material to BS EN 13163 : 2012

(1) For declared thermal conductivity ( $\lambda_D$ ) values, see Table 2.

(2) Insulation thicknesses less than 50 mm are used to line reveals.

### Mechanical fixings

Mechanical fixing<sup>(1)(2)(3)</sup> — anchors of adequate length to suit the substrate and insulation thickness, approved by the BBA and supplied by the Certificate holder, and selected from:

- Ejotharm NT U — a polyethylene, high-density polyethylene (HDPE) anchor sleeve with a stainless steel<sup>(3)</sup> or electro-galvanized<sup>(4)</sup> centre pin
- Ejotharm STR U — a polyethylene, HDPE anchor sleeve with a stainless steel<sup>(3)</sup> or electro-galvanized<sup>(4)</sup> centre screw
- Ejotharm STR U 2G — a polyethylene, HDPE anchor sleeve with a stainless steel<sup>(3)</sup> or electro-galvanized<sup>(4)</sup> centre screw
- Ejotharm H1 eco — a polyethylene, HDPE anchor sleeves with a polyamide PA GF 50<sup>(4)</sup> centre pin
- Koelner KI-10N — a polypropylene anchor sleeve with an electro-galvanized<sup>(4)</sup> centre pin (with head coating of polyamide PA6)
- Koelner TFIK-8M — a polypropylene anchor sleeve with an electro-galvanized<sup>(4)</sup> centre pin (with head coating of polyamide PA6)
- KOELNER TFIK-8S — a polypropylene anchor sleeve with a stainless steel<sup>(3)</sup> or electro-galvanized<sup>(4)</sup> centre screw (with head coating of polyamide PA6)
- Bravoll PTH-KZ — a polypropylene anchor sleeve with a stainless steel<sup>(4)</sup> or electro-galvanized<sup>(4)</sup> centre pin (with head coating of polyamide)
- Bravoll PTH-SX — a polypropylene anchor sleeve with a polyamide<sup>(4)</sup> centre screw
- Bravoll PTH-S — a polypropylene anchor sleeve with a stainless steel<sup>(4)</sup> or electro-galvanized<sup>(4)</sup> centre screw (with head coating of polyamide)

(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) The fixings must be surface mounted only

(3) Polyethylene (HDPE), polyamide or polypropylene anchor sleeve with a stainless steel pin or screw to grades 1.4301 or 1.4401 to BS EN 10088-2 : 2014 are required in order to achieve a 60 year durability performance.

(4) These versions are only suitable for 30 year durability applications.

### Basecoat

- Dryvit Primus M — a polymer-modified, cement-based powder adhesive requiring the addition of 5.5 to 6.0 litres of clean water per 25 kg bag. The basecoat is applied to a thickness of between 2 and 6 mm, at a coverage of approximately  $3$  to  $3.5 \text{ kg}\cdot\text{m}^{-2}$
- Dryvit Primus M (white) — a polymer-modified, cement-based powder adhesive requiring the addition of 5.5 to 6.0 litres of clean water per 25 kg bag. The basecoat is applied to a thickness of between 2 and 6 mm, at a coverage of approximately  $3$  to  $3.5 \text{ kg}\cdot\text{m}^{-2}$

### Reinforcement

- Dryvit Detail — 0.24 m wide alkali-resistant glassfibre mesh with a nominal weight of  $150 \text{ g}\cdot\text{m}^{-2}$  and 4.6 by 3.6 mm grid size
- Dryvit Plus 150 — 1.0 m or 1.22 m wide alkali-resistant glassfibre mesh with a nominal weight of  $150 \text{ g}\cdot\text{m}^{-2}$  and 4.6 by 3.6 mm grid size
- Dryvit Standard Plus 160 — 1.0 m wide alkali-resistant glassfibre mesh with a nominal weight of  $160 \text{ g}\cdot\text{m}^{-2}$  and 3.8 by 3.6 mm grid size
- Dryvit Standard Plus 200 — 1.22 m wide alkali-resistant glassfibre mesh with a nominal weight of  $200 \text{ g}\cdot\text{m}^{-2}$  and 4.0 by 4.0 mm grid size

- Dryvit Panzer 260 — 1.0 m wide alkali-resistant glassfibre mesh with a nominal weight of 260 g·m<sup>-2</sup> and 6.0 by 6.0 mm grid size. The mesh is applied to a maximum height of 2 metres
- Dryvit Panzer 500 — 1.0 m wide alkali-resistant glassfibre mesh with a nominal weight of 522 g·m<sup>-2</sup> and 4.0 by 3.3 mm grid size. The mesh is applied to a maximum height of 2 metres
- Dryvit Panzer 700 — 1.0 m wide alkali-resistant glassfibre mesh with a nominal weight of 700 g·m<sup>-2</sup> and 4.3 by 4.3 mm grid size. The mesh is applied to a maximum height of 2 metres
- Dryvit Intermediate — 1.22 m wide alkali-resistant glassfibre mesh with a nominal weight of 376 g·m<sup>-2</sup> and 2.5 by 3.0 mm grid size

## Primers

- Dryvit Color Prime — a ready-to-use water-based acrylic primer, for optional use with the acrylic, silicone and siloxane finishing coats and mandatory use with the Dryvit Drytex Wood Effect finishing coat
- Dryvit Color Prime S — a ready-to-use water-based acrylic primer, for optional use with the acrylic, silicone and siloxane finishing coats
- Dryvit Primesil — a ready-to-use water-based silicate primer, for optional use with the Dryvit SLK finishing coat

## Finishing coats<sup>(1)</sup>

### *Acrylic finishing coats*

- Dryvit Stonemist and Dryvit Stonemist T — acrylic-based emulsions containing aggregate (Dryvit Stonemist T additionally contains mica). Available in grain sizes from 0.6 to 0.8 mm, and with a coverage of 2.6 to 3.5 kg·m<sup>-2</sup>
- Dryvit Ameristone — an acrylic-based emulsion containing aggregate. Available in grain sizes from 0.8 to 2.5 mm, and with a coverage of 3 to 4.5 kg·m<sup>-2</sup>
- Dryvit TerraNeo — an acrylic-based emulsion containing aggregate and mica. Available in grain sizes from 0.8 to 2.5 mm, and with a coverage of 3 to 4.5 kg·m<sup>-2</sup>
- Dryvit PMR — an acrylic-based emulsion containing aggregate and coalescing and thickening agents. Available in eight textures, with grain sizes of: 2.0 mm (Quarzputz), 2.0 mm (Sandpebble 2), 1.6 mm (Sandpebble), 1.2 mm (Sandpebble Fine), 1.2 mm (Sandblast), 0.6 mm (Freestyle) and 0.6 mm (Limestone), and with a coverage of 2 to 3.8 kg·m<sup>-2</sup>
- Dryvit FD PMR — an acrylic-based emulsion with drying accelerator containing aggregate and coalescing and thickening agents. Available in five textures, with grain sizes of: 2.0 mm (Quarzputz), 1.6 mm (Sandpebble), 1.2 mm (Sandpebble Fine), 1.2 mm (Sandblast) and 0.6 mm (Freestyle), and with a coverage of 1 to 2.8 kg·m<sup>-2</sup>

### *Silicone finishing coats*

- Dryvit TR — an acrylic-based emulsion containing silicone resin. Available in eight textures, with grain sizes of: 2.0 mm (Quarzputz), 2.0 mm (Sandpebble 2), 1.6 mm (Sandpebble), 1.2 mm (Sandpebble Fine), 1.2 mm (Sandblast), 0.6 mm (Freestyle) and 0.6 mm (Limestone), and with a coverage of 1 to 3.8 kg·m<sup>-2</sup>
- Dryvit HDP — a silicone emulsion with hydrophobic additives and aggregate. Available in six textures, with grain sizes of: 2.0 mm (Quarzputz), 1.6 mm (Sandpebble), 1.2 mm (Sandpebble Fine), 1.2 mm (Sandblast), 0.6 mm (Freestyle) and 0.6 mm (Limestone), and with a coverage of 1 to 2.8 kg·m<sup>-2</sup>

### *Silicate finishing coat*

- Dryvit SLK — a silicate based emulsion containing aggregate. Available in three textures, with grain sizes of: 2.0 mm (Quarzputz), 1.6 mm (Sandpebble) and 1.2 mm (Sandblast), and with a coverage of 2.2 to 2.8 kg·m<sup>-2</sup>

### *Mineral finishing coats*

- Dryvit Drytex — a polymer-modified mineral finishing coat, requiring the addition of 5.0 to 6.0 litres of clean water per 25 kg bag. Available in three textures, with grain sizes of: 2.0 mm (Quarzputz), 1.6 mm (Sandpebble) and 1.2 mm (Sandblast) sizes, and with a coverage of 2.2 to 2.8 kg·m<sup>-2</sup>
- Dryvit Drytex Wood Effect — a polymer-modified mineral finishing coat, requiring the addition of 6.5 litres of clean water per 25 kg bag. Available in grain size 0.5 mm and is over coated with the Wood Glaze or Wood Glaze Matt decorative coats. The product is applied to a thickness of approximately 5 mm, and with a coverage of 4.5 to 5 kg·m<sup>-2</sup>

#### *Brick effect render finishing coat*

- Dryvit Brick Effect — a polymer-modified cementitious render used to create a brick effect finish. The product is applied to a thickness between 4.5 and 5 mm, and with a coverage of  $8.1 \text{ to } 9 \text{ kg}\cdot\text{m}^{-2}$

#### *Dash Receiver finishing coat*

- Dryvit Dash Receiver — a polymer-modified self-coloured one coat cementitious dry dash render supplied in powder form requiring the addition of 5 to 6 litres of clean water per 25 kg of render. To be used with Dryvit Dash Aggregate. The product is applied to a thickness between 6 and 10 mm, and with a coverage of  $9.6 \text{ to } 16 \text{ kg}\cdot\text{m}^{-2}$

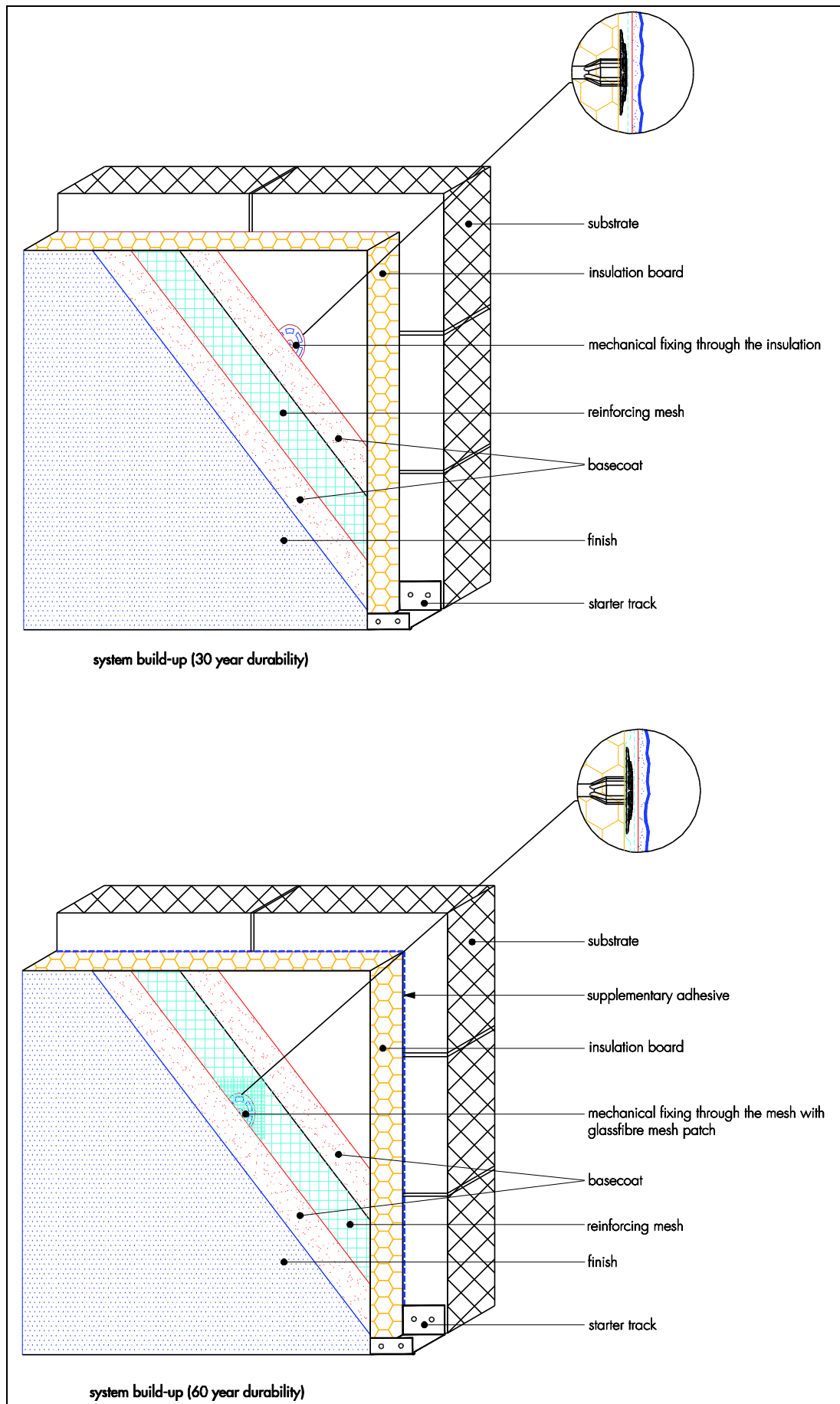
#### **Aggregates**

- Dryvit Dash Aggregate — available in 4 to 8 mm particle sizes and available in a range of colours to suit the Dryvit Dash Receiver with a coverage of  $10 \text{ to } 15 \text{ kg}\cdot\text{m}^{-2}$

#### **Decorative coats**

- Dryvit Demandit Smooth — an acrylic emulsion containing pigments, available in a range of colours and for use with mineral finishing coats
- Dryvit Colorsil — a silicate resin emulsion containing pigments, available in a range of colours and for use with mineral finishing coats
- Dryvit Silstar — a silicone resin emulsion containing pigments, available in a range of colours and for use with mineral finishing coats
- Dryvit HyDroPhobic — a silicone resin emulsion with hydrophobic additives and pigments, available in a range of colours and for use with mineral finishing coats
- Dryvit Wood Glaze and Dryvit Wood Glaze Matt — acrylic emulsions containing pigments, available in a range of colours and for use with the Dryvit Drytex Wood Effect finishing coat
- Dryvit Weatherlastic Smooth — an acrylic emulsion containing pigments, available in a range of colours and for use with any finishing coat (excluding the dash receiver finish and the brick effect finish)
- Dryvit Demandit Sanded — an acrylic emulsion containing pigments, available in a range of colours and for use with acrylic finishing coats only.

Figure 1 Drysulation and Drysulation 60 External Wall Insulation Systems





1.7 Ancillary materials used with the systems are:

- a range of aluminium, PVC-U or stainless steel profiles<sup>(1)</sup>, comprising:
  - base profile
  - edge profile
  - corner profile with optional PVC-U nosing
  - render stop profile.

(1) For the 60 year durability system, these profiles must be made of stainless steel (see section 13.2).

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

- a range of aluminium, PVC-U or stainless steel profiles<sup>(1)</sup>, comprising:
  - movement joint
  - expansion joint
- profile connectors and fixings
- fungicidal wash
- sealants
- expansion foam — polyurethane foam used for filling gaps between insulation boards.

(1) For the 60 year durability system, these profiles must be made of stainless steel (see section 13.2).

## 2 Manufacture

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

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

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

2.3 The management system of the manufacturer has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2008 by Zakład Systemów Jakości Zarządzania (ZSJZ) (Certificate 24/S/2013) and by UK Accreditation Service (UKAS) (Certificate 8832).

## 3 Delivery and site handling

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

3.2 The other components are delivered in the quantities and packaging listed in Table 1. Each package carries the product identification and manufacturer's batch number.

**Table 1 Component supply details**

<b>Component</b>	<b>Quantity and packaging</b>
Dryvit Primus M Dryvit Dryhesive Plus Dryvit Drytex Dryvit Drytex Wood Effect Dryvit Brick Effect Dryvit Dash Receiver Dryvit Dash Aggregate	25 kg bag
Dryvit Stonemist Dryvit Stonemist T	23 kg pail
Dryvit PMR Dryvit FD PMR Dryvit HDP Dryvit TR Dryvit SLK	24.72 kg pail
Dryvit Ameristone	24 kg pail
Dryvit TerraNeo	22 kg pail
Dryvit Color Prime Dryvit Color Prime S Dryvit Primesil Dryvit Colorsil Dryvit Demandit Sanded Dryvit Demandit Smooth Dryvit Silstar	17.36 kg pail
Dryvit HyDroPhobic	21.7 kg pail
Dryvit Wood Glaze and Dryvit Wood Glaze Matt	12.7 kg pails
Dryvit Weatherlastic Smooth	18.96 kg/pail
Dryvit Detail mesh	Roll, 240 mm wide, by 45.7 m length
Dryvit Plus 150 mesh	Roll, 1.00 m wide by 50 m length and Roll, 1.22 m wide by 45.7 m length
Standard Plus 160 mesh	Roll, 1.00 m wide by 50 m length
Dryvit Standard Plus 200 mesh	Roll, 1.22 m wide by 45.7 m length
Dryvit Panzer 260 mesh	Roll, 1.00 m wide by 50 m length
Dryvit Panzer 500 mesh	Roll, 1.00 m wide by 2.9 m length
Dryvit Panzer 700 mesh	Roll, 1.00 m wide by 22.9 m length
Dryvit Intermediate 370 mesh	Roll, 1.22 m by 22.9 m length
Mechanical fixings	Boxed by manufacturer
Dryvit EPS (white and grey) insulation	Wrapped in plastic film

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

3.4 The boards should 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.

3.6 Any powder products (including adhesive, mineral renders, dash receiver, etc) must be stored in dry conditions, off the ground, and protected from moisture in accordance with the Certificate holder's recommendations. Contaminated materials should be discarded.

3.7 The primers and finishes must be stored in tightly closed original packaging in cool dry conditions and protected from excessive heat and frost at all times.

3.8 Bagged aggregate should be stored in a dry location.

## Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Drysulation and Drysulation 60 External Wall Insulation Systems.

### Design Considerations

#### 4 General

4.1 Drysulation and Drysulation 60 External Wall Insulation Systems, when installed in accordance with this Certificate, are satisfactory for use in reducing the thermal transmittance (U value) of external masonry or concrete walls of new and existing buildings. It is essential that the detailing techniques specified in this Certificate are carried out to a high standard if the ingress of water into the insulation is to be avoided and the full thermal benefit obtained from treatment with the systems (eg the insulation must be protected by an overhang, and window sills should be designed and installed so as to direct water away from the building).

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

4.3 The systems are for application to the outside of external walls of masonry, normal weight concrete, lightweight concrete, autoclaved concrete and no-fines concrete construction, on new or existing domestic and non-domestic buildings (with or without existing render) up to 18 metres in height (11 metres in Scotland). Prior to installation of the systems, wall surfaces should comply with section 14.

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

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

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

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

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

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

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

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

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

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

4.13 The Dryslution 60 External Wall Insulation System can achieve a service life of 60 years. The difference between 30 and 60 year durability system is covered in sections 1.2 to 1.5, with the detailed installation procedure covered in section 16.

4.14 For the 60 year durability system, the insulation board adhesive must be used and the mechanical fixings must be applied through the reinforcing mesh. Additionally, the following components must be constructed from stainless steel grade 1.4301 or 1.4401 to BS EN 10088-2 : 2014:

- base profile and render stop end including the fixings. In addition, any other profile component which would remain exposed after the application of the finishing coat
- corner profile (if exposed after application of the system)
- pin or screw for mechanical fixings.

## 5 Practicability of installation

The systems should only be installed by specialist contractors who have successfully undergone training and registration by the Certificate holder (see section 15).

Note: The BBA operates a UKAS accredited Approved Installer Scheme for external wall insulation (non-mandatory); details of approved 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 : 2017 and BRE Report BR 443 : 2006, using the declared thermal conductivity ( $\lambda_D$ ) values of the insulations given in Table 2.

**Table 2 Thermal conductivity of the insulation ( $\lambda_D$  value)**

Insulation type	Thickness (mm)	Thermal conductivity ( $\text{W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$ )
EPS 70 white 038	50 to 300	0.038
EPS 70 grey 031	50 to 250	0.031
EPS 70 grey 032	50 to 250	0.032



6.2 The U value of a completed wall will depend on the insulation thickness, the type and number of fixings, and the insulating value of the substrate masonry and its internal finish. Calculated U values for sample construction in accordance with the national Building Regulations are given in Table 3, and are based on the thermal conductivities given in Table 2.

**Table 3 Insulation thickness required to achieve design U values<sup>(1)(2)(3)</sup> given in the national Building Regulations**

U value <sup>(4)</sup> ( $\text{W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}$ )	Thickness of Insulation (mm)					
	215 mm brickwork, $\lambda = 0.56 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$			200 mm dense blockwork, $\lambda = 1.75 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$		
	EPS 70 white 038	EPS 70 grey 032	EPS 70 grey 031	EPS 70 white 038	EPS 70 grey 032	EPS 70 grey 031
0.18	200	170	170	210	180	180
0.19	190	160	160	200	170	170
0.25	140	120	120	150	130	120
0.26	130	110	110	140	120	120
0.28	120	100	100	130	110	110
0.30	110	100	90	120	100	100
0.35	90	80	80	100	90	90

(1) Wall construction inclusive of 13 mm plaster ( $\lambda = 0.57 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$ ), brickwork (protected) with 17.1% mortar or dense blockwork with 6.7% mortar ( $\lambda = 0.88 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$ ). Declared thermal conductivity ( $\lambda_D$ ) value of the insulation is as shown in Table 2. An adhesive layer, 3 mm thick with  $\lambda = 0.43 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$  covering 40% of the area is also included, and a board emissivity of 0.9, together with an external render thickness of 4 mm with  $\lambda = 1 \text{ W}\cdot\text{m}^{-1}\cdot\text{K}^{-1}$ .

(2) Calculations based on a bonded system that included 6.9 polyethylene fixings per square metre with a point thermal transmittance ( $X_p$ ) of  $0.002 \text{ W}\cdot\text{K}^{-1}$  per steel pin. Use of other types of fixings should be calculated in accordance with BS EN ISO 6946 : 2017. A gap correction ( $\Delta U''$ ) of zero is assumed.

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

(4) When applying the maximum available insulation thickness, these walls can achieve U values of  $0.13$  to  $0.14 \text{ W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}$  depending on insulation type and wall type.

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

## 7 Strength and stability

### General



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

- the wind loads on the different zones of the building's elevation for the specific geographical location have been calculated correctly (see section 7.3)
- the systems 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 systems to the ground in a satisfactory manner. The adequacy of the substrate and supporting structure must be verified by the person or party responsible for the global stability of the building to which the systems are applied. Any defects should be made good prior to the systems being installed.

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

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

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

7.6 Negative wind load is transferred to the substrate wall via<sup>(1)(2)</sup>:

- 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](http://www.bbacerts.co.uk)).

7.7 The characteristic bond resistance between the insulation and render interface derived from test results was  $80 \text{ kN}\cdot\text{m}^{-2}$ . 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 4; 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<sup>(1)</sup>, the characteristic pull-out resistance must be established from site-specific pull-out tests conducted on the substrate of the building to ascertain the minimum resistance to pull-out failure of the fixings, and determined in accordance with the guidance given in EOTA TR051 : 2016 (minimum test characteristic value =  $0.6 \times \text{mean of 5 lowest test results}$ ). 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 4.

(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 4 Fixings – typical characteristic pull-out strengths**

Fixing type <sup>(1)</sup>	ETA number	Substrate	Drill diameter (mm)	Effective anchorage depth (mm)	Characteristic pull-out resistance (kN) <sup>(2)</sup>	Partial factor
Ejotherm NT U	05/0009	Concrete C12/15/ Clay bricks	8	25	1.2 1.5	2
Ejotherm STR U	04/0023	Concrete C12/15/ Clay brickwork	8	25 <sup>(3)</sup>	1.5	2
Ejotherm STR U 2G	04/0023	Concrete C12/15/ Clay brickwork	8	25 <sup>(3)</sup>	1.5	2
Ejotherm H1 eco	11/0192	Concrete C12/15/ Clay brickwork	8	25	0.9	2
Koelner KI-10N	07/0221	Clay brickwork	10	60	0.75	2
Koelner TFIX-8M	07/0336	Concrete C12/15/ Clay brickwork	8	25	1.2	2
KOELNER TFIX-8S	11/0144 <sup>(5)</sup>	Concrete C12/15/ Clay brickwork	8	25 <sup>(3)</sup>	1.2	2
Bravoll PTH-KZ 60/8	05/0055	Concrete C12/15/ Clay brickwork	8	25	0.70 0.90	2
Bravoll PTH-SX	10/0028	Concrete C12/15/ Clay brickwork	8	35 <sup>(3)(4)</sup>	1.2	2
Bravoll PTH-S	08/0267	Concrete C12/15/ Clay brickwork	8	25 <sup>(3)(4)</sup>	1.5	2

- (1) The minimum anchor plate stiffness of  $0.6 \text{ kN}\cdot\text{mm}^{-2}$  and anchor plate load resistance of 1.4 kN relates to the fixings which achieved a design pull through resistance value of 159N. The minimum anchor plate stiffness of  $0.5 \text{ kN}\cdot\text{mm}^{-2}$  and anchor plate load resistance of 1.75 kN relates to the fixings which achieved a design pull through resistance value of 163 (see Table 5).
- (2) Values are determined in accordance with EAD 330196-00-0604 : 2016 and are dependent on the substrate. The Use Categories are defined in the corresponding ETA.
- (3) The fixing ETA references the effective anchorage depth for other substrates.
- (4) Value quoted relates to the overall embedment depth ( $h_{\text{nom}}$ ).
- (5) ETA 11/0144 is valid for the fixing with a electro-galvanized centre screw.

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 50 or 60 mm (see Table 5). The design resistance per fixing ( $N_{\text{RD3}}$ ) is obtained by applying an appropriate partial factor as shown in Table 4.

**Table 5 Design pull-through resistances**

Factor (unit)	EPS Insulation 1200 x 600 mm		
	Pull-through		
Tensile resistance of the insulation (kPa)	≥ 100		
Fixing types <sup>(1)</sup>	Ejotherm H1-ECO, Bravoll PTH-SX, Koelner TFIX-8M, Koelner TFIX-8S		Ejotherm STR-U, Ejotherm STR-U 2G, Ejotherm NT U, Koelner KI-10, Bravoll PTH-KZ 60/8
Fixing plate diameter (mm)	60		60
Insulation thickness (mm)	≥ 60		≥ 50
Characteristic pull through resistance <sup>(2)</sup> per fixing (kN)	At panel	0.398	0.408
Partial material factor <sup>(3)</sup>	2.5		
Design pull-through resistance per fixing (N <sub>RD3</sub> ) (kN)	0.159		0.163
Design pull-through resistance per board (kN), based on the minimum number of fixings <sup>(4)</sup>	0.797		0.817
Design pull-through resistance per board (kN), based on maximum number of fixings <sup>(5)</sup>	1.912		1.961

(1) See Table 4 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 material factor of 2.5 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 (1200 x 600 mm), which equates to approximately 6.94 fixings per m<sup>2</sup>. The design resistance for the minimum number of fixings is based on the fixing pattern provided in Figure 6 and the minimum insulation thickness specified in Table 5. 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 12 fixings per board (1200 x 600 mm), which equates to approximately 16.6 fixings per m<sup>2</sup>. The design resistance for the maximum number of fixings is only applicable to the minimum insulation thickness tested and as specified in Table 5. 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 systems and the fixings should be symmetrically positioned and evenly distributed about the centre of the board both vertically and horizontally, except at openings and building corners.

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

For safe design:

$$R_d \geq W_e$$

$$R_{d,b,ins/render} = A_r * N_{RD1}$$

$$R_{d,pull-out} = n * N_{RD2}$$

$$R_{d,pull-through} = (N_{RD3,panel} * n_{panel}) + (N_{RD3,joint} * n_{joint}) / A_{board}$$

Where:

**R<sub>d</sub>** is the design ultimate resistance (kN·m<sup>-2</sup>) taken as the minimum of **R<sub>d,b,ins/render</sub>**, **R<sub>d,pull-out</sub>** and **R<sub>d,pull-through</sub>**

**W<sub>e</sub>** is the applied ultimate wind load (kN·m<sup>-2</sup>)

**R<sub>d,b,ins/render</sub>** is the design bond resistance between the insulation and render (kN·m<sup>-2</sup>)

**R<sub>d,pull-out</sub>** is the design pull-out resistance of the insulation fixings per metre square (kN·m<sup>-2</sup>)

**R<sub>d,pull-through</sub>** is the design pull-through resistance of the insulation fixings per metre square (kN·m<sup>-2</sup>)

**A<sub>r</sub>** is the reinforced basecoat bond area (based on % area covered)

**N<sub>RD1</sub>** is the design adhesive bond resistance between the insulation and render, based on test (kN·m<sup>-2</sup>)

**n** is the number of anchor fixings per m<sup>2</sup>

**N<sub>RD2</sub>** is the design pull-out resistance per fixing based on test (kN)

**N<sub>RD3,panel</sub>** is the design pull-through resistance per anchor not placed at the panel joint, based on test (kN)

**N<sub>RD3,joint</sub>** is the design pull-through resistance per anchor placed at the panel joint, based on test (kN)

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

7.12 The systems are mechanically fixed to the substrate wall with a minimum of 5 fixings per board or approximately 6.94 fixings per square metre (5.5 per square metre for the 60 year durability system), as per the fixing patterns shown in Figures 6 and 7, and in conjunction with a minimum 40 per cent 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 systems are suitable for use in the Use Categories up to and including those specified in Table 6 of this Certificate.



Table 6 System impact resistance

Finishing coats	Category <sup>(1)</sup>		
	Any basecoat + Dryvit Plus 150 mesh	Any basecoat + Dryvit Plus 150 mesh and Dryvit Panzer 260 mesh	Any basecoat + Standard Plus 160 mesh
Dryvit Stonemist and Dryvit Stonemist T	III		
Dryvit Ameristone and Dryvit TerraNeo	II		
Dryvit PMR 2.0 mm (Quarzputz), 1.6 mm (Sandpebble, 1.2 mm (Sandblast), 0.6 mm (Freestyle) and 0.6 mm (Limestone)	III		
Dryvit TR 2.0 mm (Quarzputz), 1.6 mm (Sandpebble, 1.2 mm (Sandblast), 0.6 mm (Freestyle) and 0.6 mm (Limestone)	III		
Dryvit SLK 2.0 mm (Quarzputz)	II		
Dryvit SLK 1.6 mm (Sandpebble) and 1.2 mm (Sandblast)	III		
Dryvit Drytex 2.0 mm (Quarzputz), 1.6 mm (Sandpebble), 1.2 mm (Sandblast) and 0.5 mm Dryvit Drytex Wood Effect	III		
Dryvit FD PMR 2.0 mm (Quarzputz), 1.6 mm (Sandpebble), 1.2 mm (Sandpebble Fine), 1.2 mm (Sandblast) and 0.6 mm (Freestyle).	II		
Dryvit HDP 2.0 mm (Quarzputz), 1.6 mm (Sandpebble), 1.2 mm (Sandpebble Fine), 1.2 mm (Sandblast), 0.6 mm (Freestyle) and 0.6 mm (Limestone)	II		
Dryvit Brick Effect Render	II		
Dryvit Dash Receiver + Dryvit Dash Aggregate	I		
Dryvit Ameristone, Dryvit TerraNeo, Dryvit Stonemist and Dryvit Stonemist T		II	
Dryvit PMR — 2.0 mm (Quarzputz), 1.6 mm (Sandpebble), 1.2 mm (Sandblast) and 0.6 mm (Freestyle)		II	
Dryvit PMR — 0.6 mm (Limestone)		III	
Dryvit TR 2.0 mm (Quarzputz), 1.6 mm (Sandpebble, 1.2 mm (Sandblast), 0.6 mm (Freestyle) and 0.6 mm (Limestone)		III	
Dryvit Drytex 2.0 mm (Quarzputz), 1.6 mm (Sandpebble) and 1.2 mm (Sandblast)		II	
Dryvit SLK 2.0 mm (Quarzputz), SLK 1.6 mm (Sandpebble) and 1.2 mm (Sandblast)		I	
Dryvit Stonemist and Dryvit Stonemist T			II
Dryvit PMR — 2.0 mm (Quarzputz), 1.6 mm (Sandpebble), 1.2 mm (Sandblast), 0.6 mm (Freestyle) and 0.6 mm (Limestone)			II
Dryvit TR 2.0 mm (Quarzputz), 1.6 mm (Sandpebble), 1.2 mm (Sandblast), 0.6 mm (Freestyle) and 0.6 mm (Limestone)			II
Dryvit FD PMR 2.0 mm (Quarzputz), 1.6 mm (Sandpebble), 1.2 mm (Sandpebble Fine), 1.2 mm (Sandblast) and 0.6 mm (Freestyle)			II
Dryvit HDP 2.0 mm (Quarzputz), 1.6 mm (Sandpebble), 1.2 mm (Sandpebble Fine), 1.2 mm (Sandblast), 0.6 mm (Freestyle) and 0.6 mm (Limestone)			III
Dryvit SLK 2.0 mm (Quarzputz), SLK 1.6 mm (Sandpebble) and 1.2 mm (Sandblast)			II
Dryvit Drytex 2.0 mm (Quarzputz), 1.6 mm (Sandpebble), 1.2 mm (Sandblast) and 0.5 mm Dryvit Drytex Wood Effect			III

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

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

## 8 Behaviour in relation to fire



8.1 The reaction to fire classification for specific configurations of the systems in accordance with BS EN 13501-1 : 2007<sup>(1)</sup> are given in Table 7.

(1) ITB Warszawa Test Report Numbers 1167.1/15/R64NP, 1167.2/15/R64NP, 1167.3/15/R64NP, 1167.4/15/R64NP, 1167.5/15/R64NP, 1167.6/15/R64NP, 1167.7/15/R64NP and 1167.8/15/R64NP and BRE Global. Test report 280572-1C.

Table 7 Fire classifications

Configuration	Classification according to BS EN 13501-1 : 2007
EPS Dryhesive Plus, Primus M, Primus M (white) Standard Plus 150 or Standard Plus 160 Quarzputz TR, Quarzputz PMR (with relevant key coats: Color Prime, Color Prime S)	C-s2, d0
EPS Dryhesive Plus, Primus M, Primus M (white) Standard Plus 150 or Standard Plus 160 Quarzputz HDP, Sandpebble HDP, Sandpebble Fine HDP, Sandblast HDP, Freestyle HDP, Limestone HDP (with relevant key coats: Color Prime, Color Prime S, Weatherlastic Smooth)	B-s2, d0
EPS Dryhesive Plus, Primus M, Primus M (white) Standard Plus 150 or Standard Plus 160 Ameristone/TerraNeo, Stonemist/Stonemis T (with relevant key coats: Color Prime, Color Prime S, Weatherlastic Smooth, Demandit Sanded)	B-s2, d0
EPS Dryhesive Plus, Primus M, Primus M (white) Standard Plus 150 or Standard Plus 160 Quarzputz FD PMR, Sandpebble FD PMR, Sandpebble Fine FD PMR, Sandblast FD PMR, Freestyle FD PMR (with relevant key coats: Color Prime, Color Prime S, Weatherlastic Smooth, Demandit Sanded)	B-s2, d0
EPS Dryhesive Plus, Primus M, Primus M (white) Standard Plus 150 or Standard Plus 160 Sandpebble PMR, Sandpebble 2 PMR, Sandpebble Fine PMR, Sandblast PMR, Freestyle PMR, Limestone PMR, Sandpebble TR, Sandpebble 2 TR, Sandpebble Fine TR, Sandblast TR, Freestyle TR, Limestone TR, (with relevant key coats: Color Prime, Color Prime S, Weatherlastic Smooth, Demandit Sanded (for use with the PMR finishes only)	B-s2, d0
EPS Dryhesive Plus, Primus M, Primus M (white) Standard Plus 150 Drytex Quarzputz, Drytex Sandpebble, Drytex Sandblast Demandit Smooth, Silstar, Colorsil, Hydrophobic, Weatherlastic Smooth, HyDroPhobic	B-s1, d0
EPS Dryhesive Plus, Primus M, Primus M (white) Standard Plus 150 Quarzputz SLK, Sandpebble SLK, Sandblast SLK (with key coat Primesil), Weatherlastic Smooth, Colorsil	B-s2, d0
EPS Dryhesive Plus, Primus M, Primus M (white) Standard Plus 150 Drytex Wood Effect (with key coat Color Prime) Wood Glaze, Wood Glaze Matt, Weatherlastic Smooth	B-s1, d0
EPS Dryhesive Plus (adhesive) Primus M, Primus M white (basecoats) Standard Plus 200 Dryvit Brick Effect ('brick red' colour only) Dryvit Dash Receiver ('buff cream' colour only) + Dash Aggregate	B-s1, d0

8.2 The fire classifications apply to the full range of insulation thicknesses and colours of the finish coats covered by this Certificate, excluding the Dryvit Brick Effect render which was tested in 'brick red' colour and the Dryvit Dash Receiver which was tested in 'buff cream' colour. The classification of other colours of the system should be confirmed by reference to the documents supporting the national Building Regulations.

#### System with a B-s1, d0 or B-s2, d0 classification



8.3 For all buildings in England, Wales and Northern Ireland, the systems are considered suitable for use on, or at any distance from, the boundary, and the systems are restricted for use in buildings with no storey more than 18 m above the ground.



8.4 In Scotland, the systems are 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 systems should be included in calculations of unprotected area, except on houses where the external wall behind has the appropriate fire resistance.

8.5 In Scotland, the systems 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<sup>2</sup>, or on any hospital or residential care building with a total storey area more than 200 m<sup>2</sup>.

#### Systems with a C-s2, d0 classification



8.6 In England, Wales and Northern Ireland, the system is not classified as non-combustible or of limited combustibility and may be used on buildings with no storey more than 18 m above the ground and 1 m or more from a boundary. With minor exceptions, the panels should be included in calculations of unprotected area.

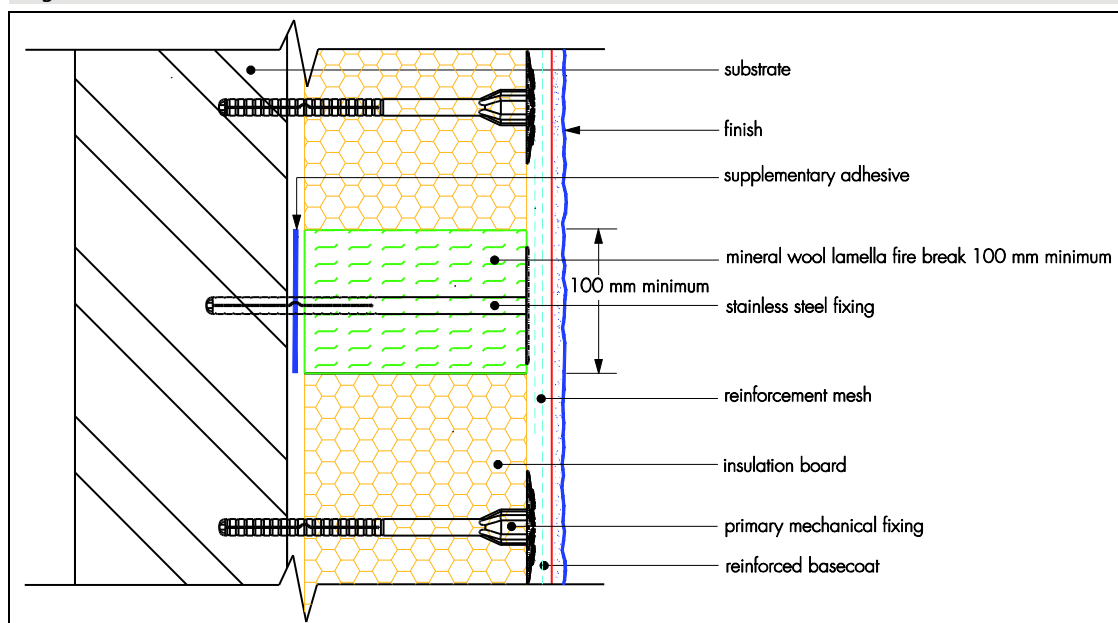


8.7 In Scotland, the system is not classified as non-combustible and may be used on buildings more than 1 m from a boundary. With minor exceptions, the panels should be included in calculations of unprotected area.

8.8 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<sup>2</sup>, or on any hospital or residential care building with a total storey area more than 200 m<sup>2</sup>.

8.9 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 of this Certificate).

Figure 2 Fire barrier details



## 9 Proximity of flues and appliances

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

**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 systems will provide a degree of protection against water ingress. However, care should be taken to ensure that walls are adequately watertight prior to application of the systems. The systems must only be installed where there 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 tops of walls, the systems should be protected by an adequate coping, overhang or other detail designed for use with these types of systems (see section 16).

## 11 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 systems and windows, to minimise the risk of condensation. The recommendations of BS 5250 : 2011 should be followed.

## Surface condensation



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



11.3 Walls will adequately limit the risk of surface condensation when the thermal transmittance (U value) does not exceed  $1.2 \text{ W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}$  at any point. Guidance may be obtained from BS 5250 : 2011 Section 4 and Annex G, and BRE Report BR 262 : 2002.

## Interstitial condensation



11.4 Walls incorporating the systems will adequately limit the risk of interstitial condensation when they are designed and constructed in accordance with BS 5250 : 2011 Section 4, Annexes D and G, and Table 6.

11.5 The water vapour resistance ( $\mu$ ) factor 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 factor and equivalent air layer thickness**

	<b>S<sub>d</sub> (m)</b>	<b>(μ)</b>
Expanded polystyrene – insulation thickness 50 mm to 250 mm (white and grey EPS 70)	—	20 to 40 <sup>(1)</sup>
Dryvit Demandit Smooth	0.12	—
Dryvit Silstar	0.12	—
Dryvit Colorsil	0.07	—
Dryvit Weatherlastic Smooth	0.02	—
Dryvit HyDroPhobic	0.02	—
Dryvit Demandit Sanded	0.07	—
Rendering system : Any basecoat <sup>(2)</sup> + primer + finish coat (specific particle size) + Decorative coats, as indicated below		
Dryvit Color Prime + Dryvit Ameristone (particle size 0.8 mm)	0.65	—
Dryvit Color Prime + Dryvit TerraNeo (particle size 0.8 mm)	0.66	—
Dryvit Color Prime + Dryvit Stonemist (particle size 2.5 mm)	0.60	—
Dryvit Color Prime + Dryvit Stonemist T (particle size 2.5 mm)	0.60	—
Dryvit PMR Quarzputz (particle size 2.0 mm)	0.40	—
Dryvit Color Prime + Dryvit PMR Quarzputz (particle size 2.0 mm)	0.37	—
Dryvit Color Prime S + Dryvit PMR Quarzputz (particle size 2.0 mm)	0.46	—
Dryvit PMR Sandpebble (particle size 1.6 mm)	0.37	—
Dryvit Color Prime + Dryvit PMR Sandpebble 2 (particle size 2.0 mm)	0.25	—
Dryvit FD PMR Quarzputz (particle size 2.0 mm)	0.25	—
Dryvit TR Quarzputz (particle size 2.0 mm)	0.32	—
Dryvit Color Prime + Dryvit TR Quarzputz (particle size 2.0 mm)	0.39	—
Dryvit Color Prime S + Dryvit TR Quarzputz (particle size 2.0 mm)	0.45	—
Dryvit TR Sandpebble (particle size 1.6 mm)	0.38	—
Dryvit Color Prime + Dryvit TR Sandpebble 2 (particle size 2.0 mm)	0.25	—
Dryvit SLK Quarzputz (particle size 2.0 mm)	0.31	—
Dryvit Primesil + Dryvit SLK Sandpebble (particle size 1.6 mm)	0.15	—
Dryvit Drytex Sandpebble (particle size 1.6 mm) + Dryvit Silstar	0.17	—
Dryvit Drytex Quarzputz (particle size 2.0 mm) + Dryvit HyDroPhobic	0.16	—
Dryvit Drytex Quarzputz (particle size 2.0 mm) + Dryvit Silstar	0.20	—
Dryvit Color Prime + Dryvit Drytex Wood Effect (particle size 0.5 mm) + Dryvit Wood Glaze	0.51	—
Dryvit Color Prime + Dryvit Drytex Wood Effect (particle size 0.5 mm) + Dryvit Wood Glaze Matt	0.23	—
Dryvit Color Prime + Dryvit HDP Quarzputz (particle size 2.0 mm)	0.21	—
Dryvit brick effect (4.5 mm)	0.26	—
Dryvit Dash Receiver (6 mm)	0.63	—
Dryvit Dash Receiver (10 mm)	1	—

(1) It is recommended that the lower figure is used when assessing the interstitial condensation risk.

(2) The basecoat was applied to a thickness between 2 and 3 mm.

## 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 For a 60 year durability, a detailed maintenance plan must be prepared and provided to the building manager/owner on completion. As a minimum, this should include an inspection for evidence of defects twelve months after the application and subsequently every five years. This plan should include full details of the required inspection regime and a record of these inspections should be retained.

12.3 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 systems 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 of this Certificate.

13.2 The systems' service life can be extended to 60 years provided a planned inspection and maintenance programme is introduced in accordance with section 12. An extended 60 years' service life requires the use of insulation board adhesive, stainless steel base and corner profiles, stainless steel fixings or centre pin Grades 1.4301 or 1.4401 and plastic anchor sleeve material such as polyamide (PA6 and PA6.6), polyethylene (PE) or polypropylene (PP) and the following of an appropriate repair and maintenance schedule as covered by the Certificate holder's Repair and Maintenance Manual. In order to achieve this, and depending on the building's location, degree of exposure and detailing, it may be necessary to repair or replace isolated areas. Any damage to the surface finish must be repaired within a time period agreed in the Certificate holder's Maintenance Manual.

13.3 Finishes containing cement may be subject to lime bloom. The occurrence of this may be reduced by avoiding application in adverse weather conditions. The effect is transient and is less noticeable on lighter colours.

13.4 The finishes and coatings 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.

13.5 To maintain a high quality aesthetic appearance, it may be necessary to periodically overcoat the systems using a suitable coating (ie one covered by a valid BBA Certificate for this purpose). Care should be taken not to adversely affect the water vapour transmission or fire characteristics of the systems. The advice of the Certificate holder should be sought as to the suitability of a particular product.

## Installation

### 14 Site survey and preliminary work

14.1 A pre-installation survey of the property must be carried out to determine suitability for treatment and the need for any necessary repairs to the building structure before application of the systems. A specification is prepared for each elevation of the building indicating:

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

14.2 The survey should include tests conducted on the walls of the building by the Certificate holder or their approved installers (see section 15) to determine the pull-out resistance of the specified mechanical fixings for the appropriate substrate. 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). The advice of the Certificate holder should be sought to ensure the proposed bonding pattern (insulation board adhesive) is sufficient.

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

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

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

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

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

## **15 Approved Installers**

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

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

## **16 Procedure**

### **General**

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

16.2 Weather conditions should be monitored to ensure correct application and curing conditions. The systems should not be applied at temperatures below 5°C or above 25°C, except for the following:

- Dryvit FD PMR should be applied at temperatures from 5 to 20°C
- Dryvit Ameristone and Dryvit TerraNeo should be applied at temperatures from 10 to 25°C
- Dryvit SLK and Dryvit Colorsil should be applied at temperatures from 7 to 25°C.

If exposure to frost is likely or in damp/wet conditions, the render must be protected from rapid drying.

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

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

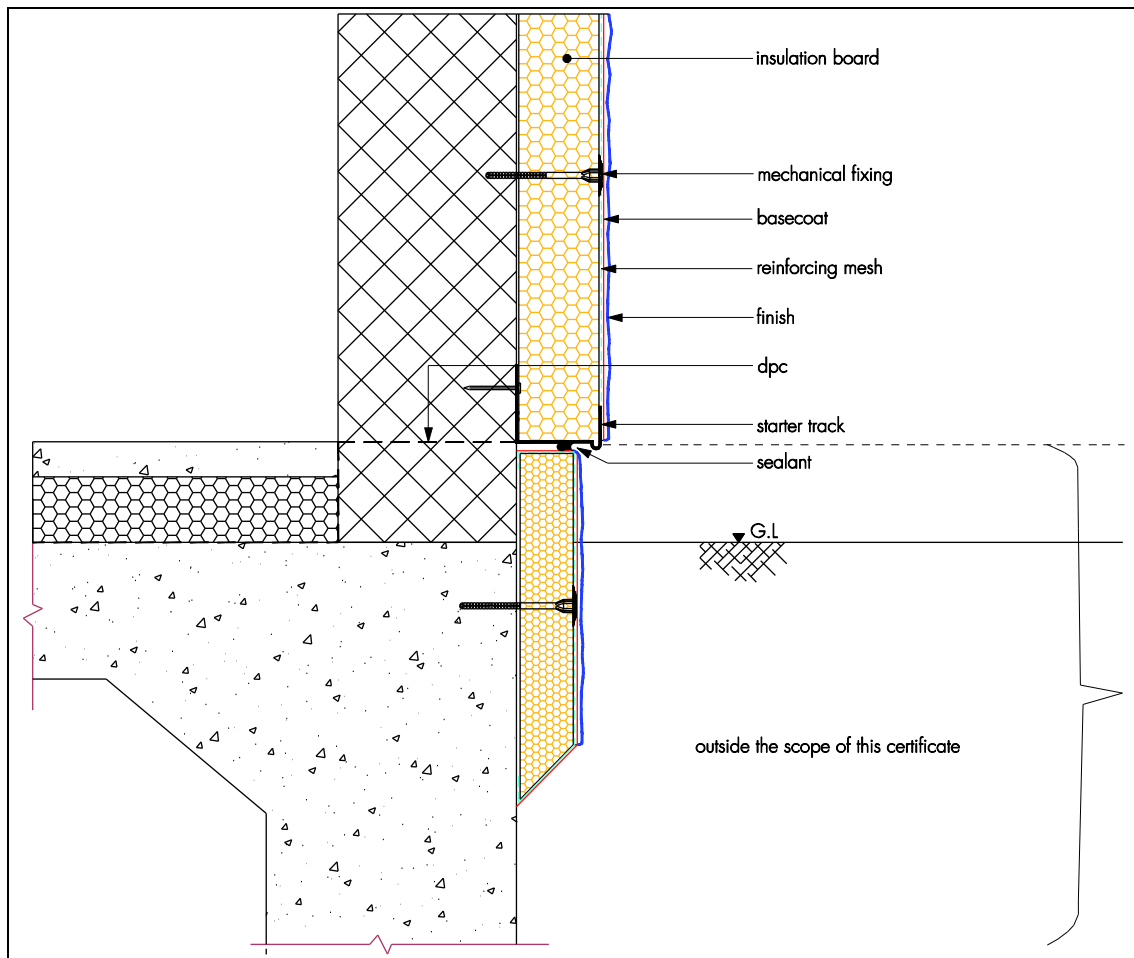
16.5 Before installation takes place, the building designer must confirm where items such as rainwater goods, satellite dishes, clothes lines and hanging baskets will be placed. The fixing points for these items must be specifically designated and built into the systems as the insulation is installed.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

### **Positioning and securing insulation boards**

16.6 The base profile is secured to the external wall above the dpc using mechanical fixings at approximately 300 mm centres. Profiles and expansion joints are fitted as specified (see Figure 3).



Figure 3 Typical section of base profile

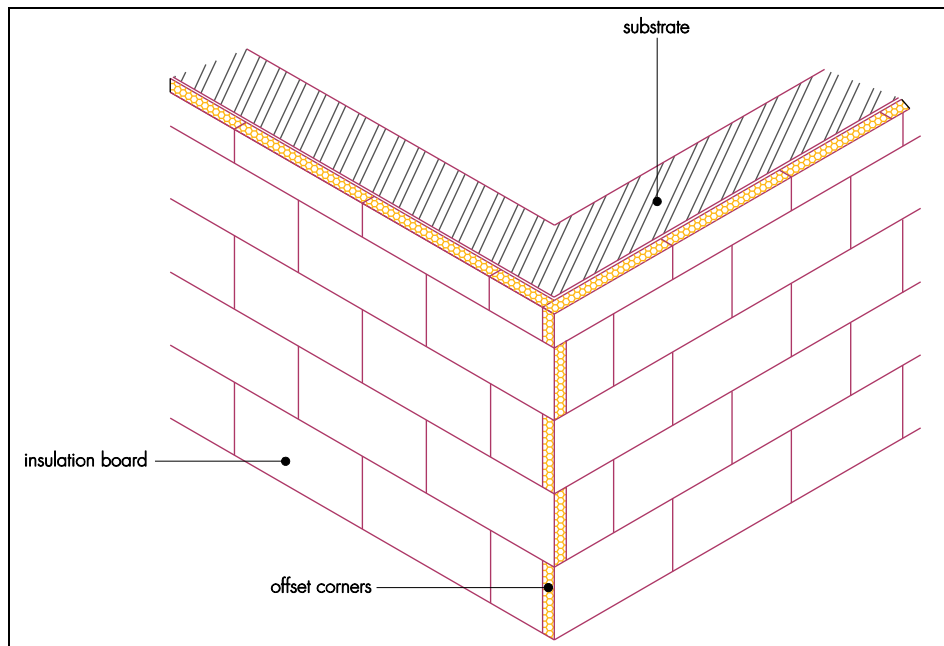


16.7 The adhesive is mixed in a suitable container using potable water and a high power drill and paddle to create a paste-like mortar, ensuring there are no lumps in the mixed material in accordance with the Certificate holder instructions (see section 1.2). The material must rest for 5 minutes before being mixed again to the required consistency. For the ribbon and dab method, a ribbon of adhesive (50 mm wide and 10 mm thick) is applied around the perimeter of the insulation board. Eight adhesive dabs (100 mm diameter and 10 mm thick) are positioned at approximately 200 mm centres to the interior area of the insulation board, to ensure a minimum of 40% adhesive contact area can be achieved with the substrate when the board is pushed into position (see Figure 3). For the notched trowel method, adhesive is scrape-trowelled to achieve adhesive ribbons spaced at 10 mm wide and 13 mm deep and at a maximum of 45 mm centres.

16.8 The first run of insulation boards is positioned on the base profile and pressed firmly against the wall. Care should be taken to ensure that all insulation board edges are butted tightly together, and alignment checked as work proceeds (to achieve a flush finish).

16.9 Subsequent rows of boards are positioned so that the vertical board joints are staggered and overlapped at the building corners (see Figure 4); the alignment should be constantly checked as work proceeds. Any joints in the systems greater than approximately 1.5 mm but less than 7 mm should be filled with expansion foam. Joints above 7 mm should be filled with slivers of insulation board. High spots or irregularities should be removed by lightly rasping the entire area.

*Figure 4 Typical arrangement of insulation boards*



16.10 When required, at least 1 fixings per board should be installed to maintain the board's position while the adhesive sets.

16.11 To fit around details such as doors and windows, boards may be cut with a sharp knife or a finetooth saw. Purpose-made window sills, seals and deflection channels designed to prevent or manage water ingress and allow water to be shed clear of items bridging the cavity should be fitted. The performance of these components is outside the scope of this Certificate.

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

16.13 Building corners, door and window heads and jambs are formed using corner profiles, in accordance with the Certificate holder's instructions. Corner profiles are fixed to all building corners. For a 60 year durability system, any portion of the corner profile that remains exposed after the application of the finishing coat must be constructed from stainless steel.

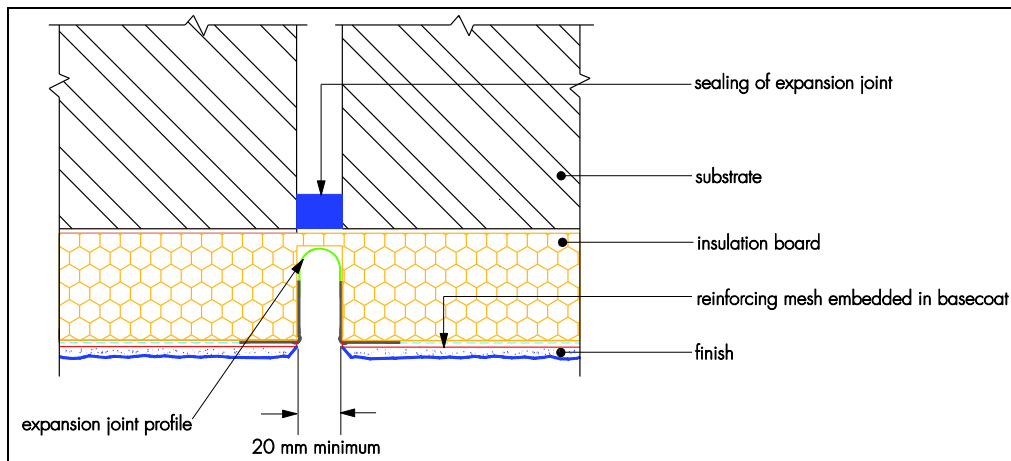
16.14 Installation continues until the whole wall is completely covered including, where appropriate, the building soffits.

16.15 After sufficient stabilisation of the installed insulation (during which time the insulation should be protected from exposure to extreme weather conditions to prevent degradation), the wall is ready for the application of the basecoat.

### **Movement joints**

16.16 Movement joints should be incorporated where required. Existing structural expansion joints should be extended through to the surface of the insulation systems (see Figure 5).

**Figure 5 Movement joint detail**



### Application of basecoat and reinforcing mesh

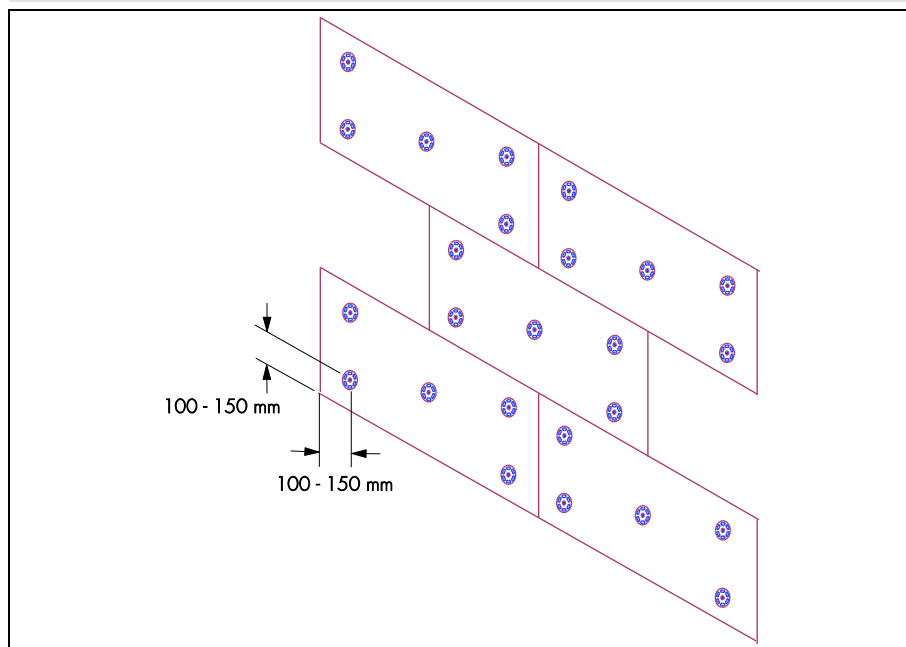
16.17 The basecoat is mixed in a suitable container using potable water and a high power drill and mixer spiral to create a paste-like mortar, ensuring there are no lumps in the mixed material in accordance with the Certificate holder instructions (see section 1.2). The material must rest for 5 minutes before being mixed again to the required consistency.

16.18 Installation procedures specific to 30 and 60 year durability systems are described in sections 16.19 to 16.29.

### Application of 30-year durability system — mechanical fixings through the insulation boards

16.19 Holes are drilled through the insulation board into the substrate wall and mechanical fixings (6.9 per square metre) are inserted and tapped or screwed firmly into place, following the fixing pattern shown in Figure 6.

**Figure 6 Typical arrangement of insulation boards and fixing pattern for 30 year durability (6.9 fixings per square metre)**



16.20 The basecoat is applied over the insulation boards using a steel trowel, to a uniform thickness of approximately 1.5 to 2 mm. The reinforcing mesh is applied and immediately embedded into the coat, ensuring the mesh is overlapped at joints by a minimum coverage of 65 mm. A second coat (approximately 1 to 1.5 mm thick) is applied, to obtain a smooth and uniform surface for any rendering that will be applied. Diagonal patches of mesh, approximately 330 by 300 mm, should also be installed at the corners of window/door openings (see Figure 8).

16.21 In situations where the heavy duty Dryvit Panzer mesh is required, a layer of basecoat, approximately 3.2 mm thick, is applied over the surface of the boards. The mesh should not be overlapped but fitted with closely butted joints. The drying period for any render will depend on weather conditions; however, the basecoat (with the heavy duty mesh embedded) should be allowed to dry for at least 24 hours. The Dryvit Standard mesh or the Dryvit Standard Plus mesh should then be applied in the manner described in section 16.20.

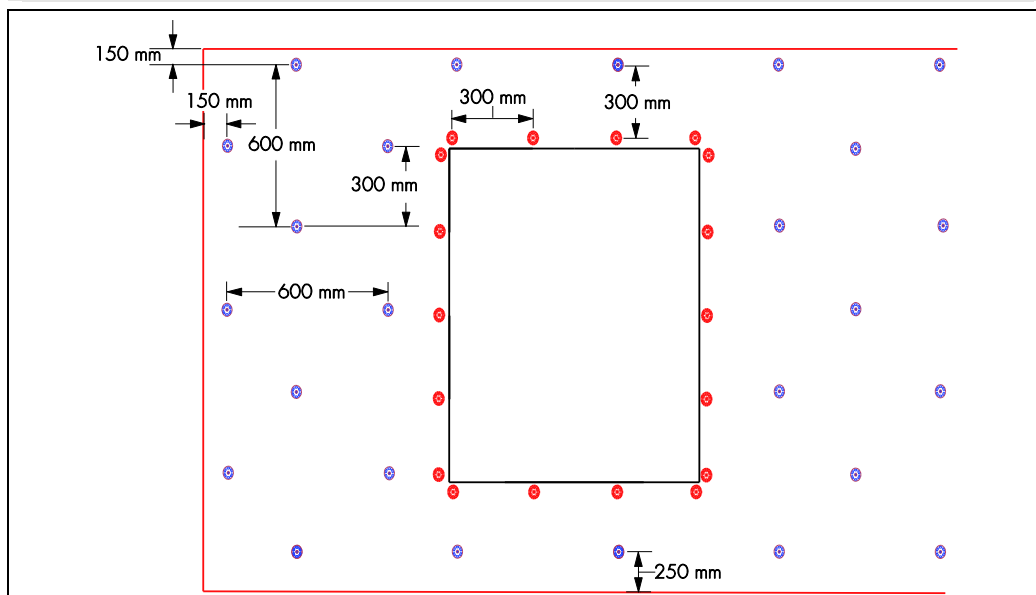
#### Application of 60 year durability system — mechanical fixings through the reinforcing mesh

16.22 After the insulation adhesive has set, the system is ready for the application of basecoat and reinforcing mesh.

16.23 The basecoat is applied over the insulation boards using a steel trowel, to a uniform thickness approximately 1.5 to 2 mm. The reinforcing mesh is applied and immediately embedded into the coat, ensuring the mesh is overlapped at joints by a minimum coverage of 65 mm.

16.24 While the basecoat is still wet, holes are drilled through the reinforcing mesh and insulation boards into the substrate wall to the required depth at the specified frequency and pattern, but not less than 5.5 fixings per square metre (see Figure 7). The mechanical fixings are inserted and tapped or screwed firmly into place, securing the mesh and insulation boards to the substrate wall. The fixings are slightly overdriven into the substrate wall in order to allow the fixing plate to partially penetrate through the face of the insulation boards. The fixing plate is deliberately overdriven into the insulation to reduce the protrusion of the plate from the surface of the insulation board.

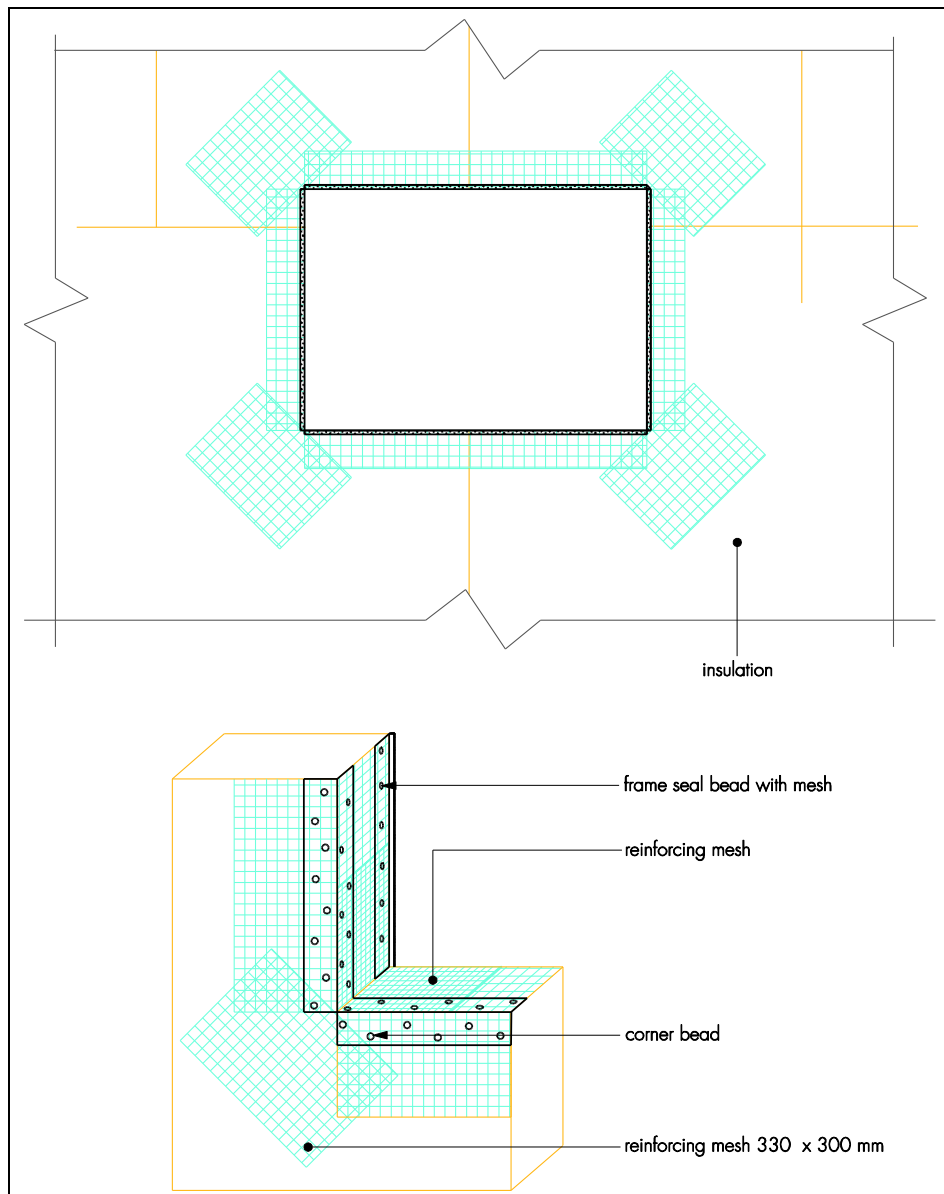
*Figure 7 Typical arrangement of the fixing pattern through the mesh for 60 year durability (5.5 fixings per square metre)*



16.25 While the basecoat is still wet, 140 by 140 mm stress patches of reinforcing mesh are applied over the mechanical fixing heads and fully embedded within the basecoat.

16.26 Once the first coat has partially dried (between 1 and 4 hours), a second coat (approximately 2 to 3 mm thick) is applied to obtain a smooth and uniform surface for any finishes that will be applied.

*Figure 8 Additional reinforcement at openings*



### Rendering and finishing

16.27 Prior to applying the finishes, the relevant seals are positioned and installed at all openings (eg windows and doors), overhanging eaves, gas and electric meter boxes, wall vents or where the render abuts any other building material or surface.

16.28 The basecoat must be allowed to dry/cure (minimum 24 hours) before the application of the primer/finishing coat. Prior to the application of the finishing coat, sealant should be applied as required, as defined in the project-specific site package in accordance with the Certificate holder's instructions.

16.29 Primers (see section 1.1 for list of primers and their compatibility with the finishing coats) are applied and allowed to dry in accordance with the Certificate instructions. The drying time is dependent on ambient conditions, but will typically be 2 hours for Dryvit Color Prime, 4 hours for Color Prime S and 5 hours for Dryvit Primesil.

16.30 Once the primer is dry, the render finishes and decorative coats are applied, using the methods described for the specific finishing coats.

## **Dryvit Dash Receiver**

16.31 Dryvit Dash Receiver is applied to the required thicknesses (see section 1.1 *Finishing coats*), using a stainless steel trowel. While the render is still soft, Dryvit Dash Aggregate of the appropriate size is thrown onto the surface and lightly tapped with a timber float to ensure that a good bond is achieved. On completion, the surface must be checked to ensure an even coverage of Dryvit Dash Aggregate has been achieved.

## **Brick effect render**

16.32 An initial coat of 3 mm is applied, using a stainless steel trowel. A second coat of 2 mm is applied before the initial coat sets and the surface is immediately lightly textured with a dry, soft bristle brush. The render is left to partially set for approximately 30 to 120 minutes before mortar lines are formed with a spirit level and a suitable cutter. Once all cuts have been made, any excess material is removed with a soft brush.

## **Dryvit Stonemist and Dryvit Stonemist T**

16.33 An initial thin coat is applied, using a stainless steel trowel. A second coat is then applied to the wet initial coat with a suitable spray machine. Alternatively, to achieve a flatter texture finish, the product may be applied with a stainless steel trowel.

## **Dryvit Ameristone**

16.34 The product is applied with a suitable spray machine

## **Dryvit Drytex Wood Effect**

16.35 Dryvit Drytex Wood Effect render is applied to the required thickness (see section 1.1 *Finishing coats*), using a stainless steel float to create a smooth finish and is left to dry for approximately 20 to 30 minutes. The imprint surface of a Dryvit Wood Mould is coated with a clean food grade cooking oil and gently pressed onto the surface of the render, and then pressed with a 150 mm rubber roller to create the desired wood effect. The mould is immediately removed, and the process repeated until the entire wall area is covered. After 24 hours, shallow grooves are cut between the wood-effect imprints using a handheld narrow-bladed electric precision mini circular saw, to create the panel effect. The render is left to dry for a minimum of 48 hours; any oil is removed with a warm mild detergent, before over coating with two coats of Dryvit Wood Glaze or Dryvit Wood Glaze Matt, using a brush.

16.36 The other finishes are applied to the required thicknesses (see section 1.1 *Finishing coats*) using a stainless steel trowel, and finished with a plastic float when required to create the desired finish. The drying time is dependent on conditions and can be over coated with a compatible decorative coat when required, using a brush, roller or a suitable spray machine. However, Dryvit Weatherlastic Smooth and Dryvit Demandit Sanded must not be applied with a brush or spray machine respectively.

16.37 Care should be taken in the detailing of the systems around features such as openings, 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 systems. To achieve a 60 year service life, the system is finished against a stainless steel stop bead at reveals, to allow for replacement of windows.

16.38 The systems should be allowed to dry thoroughly before painting any of the surrounding features.

16.39 At the tops of walls, the systems must be protected by a coping, adequate overhang or adequately sealed, purpose-made flashing.

Figure 9 Typical roof eaves detail

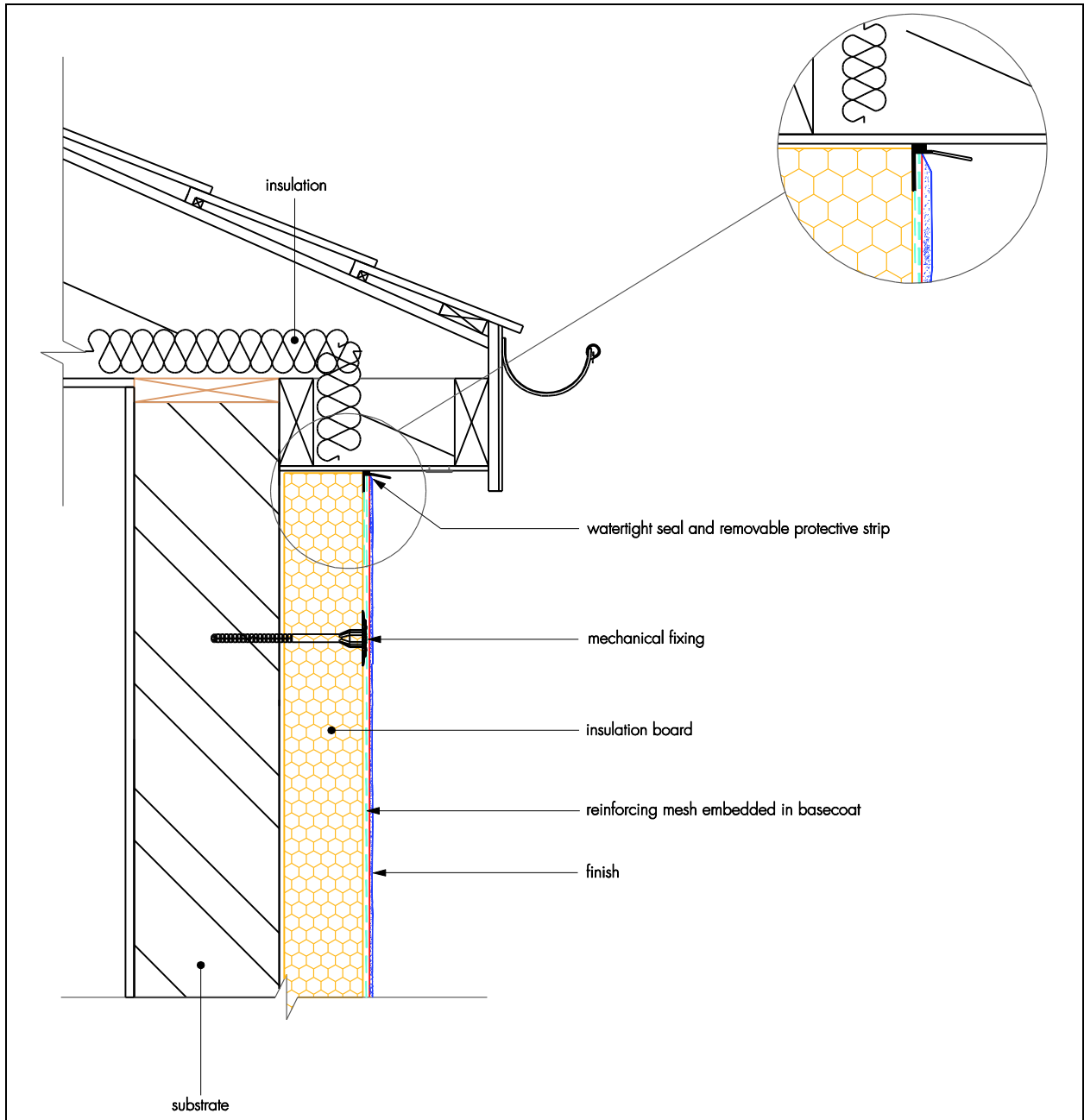


Figure 10 Insulated reveal detail

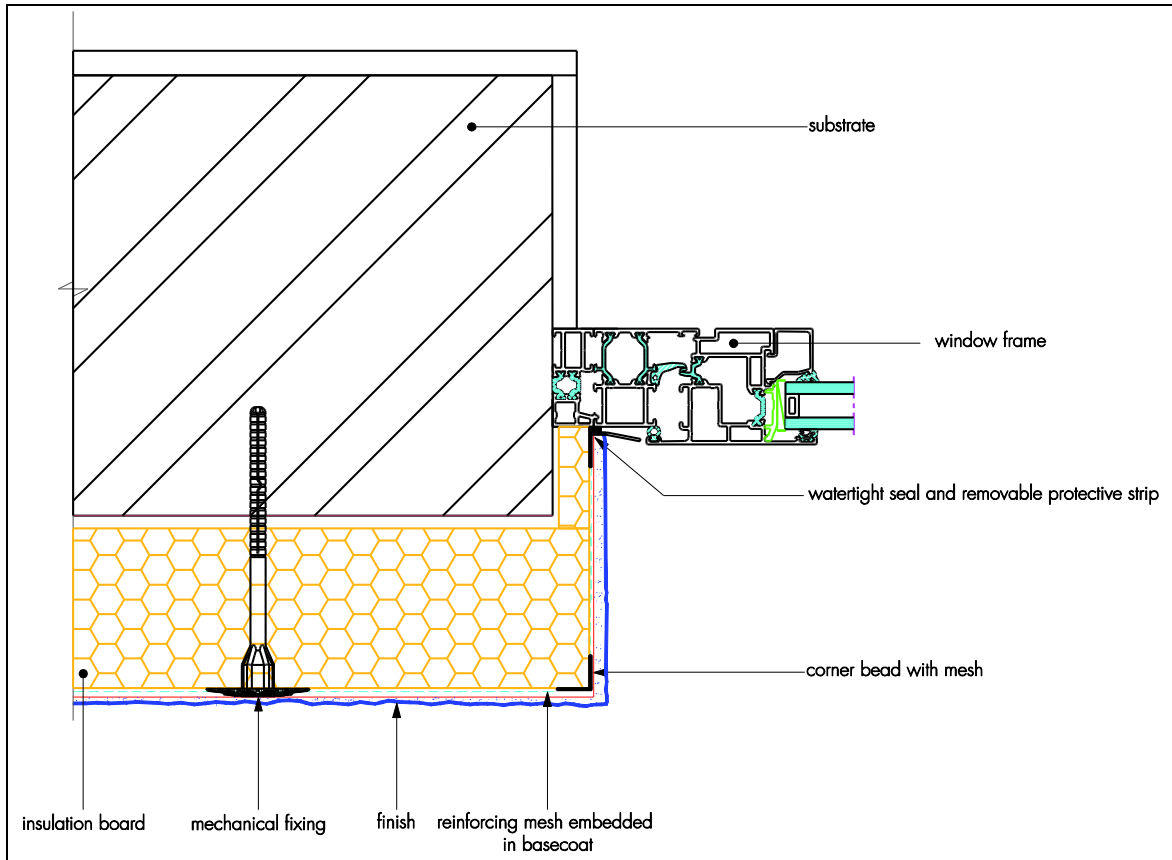


Figure 11 Insulated window head detail

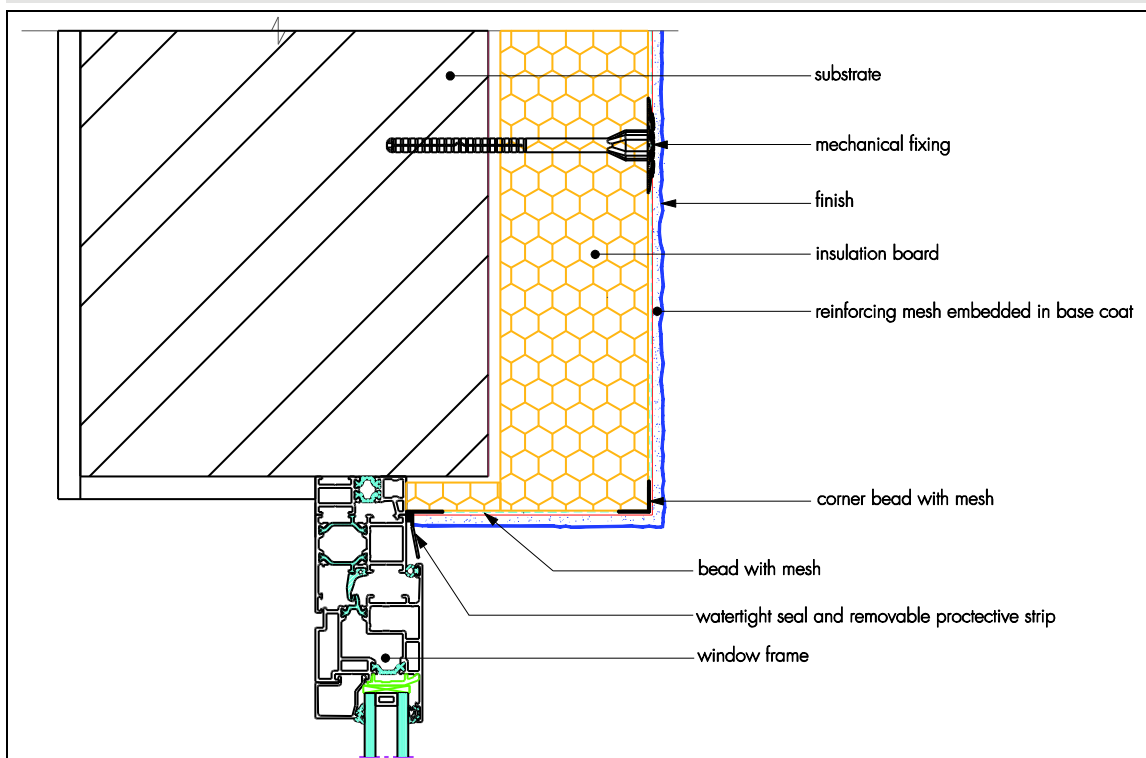
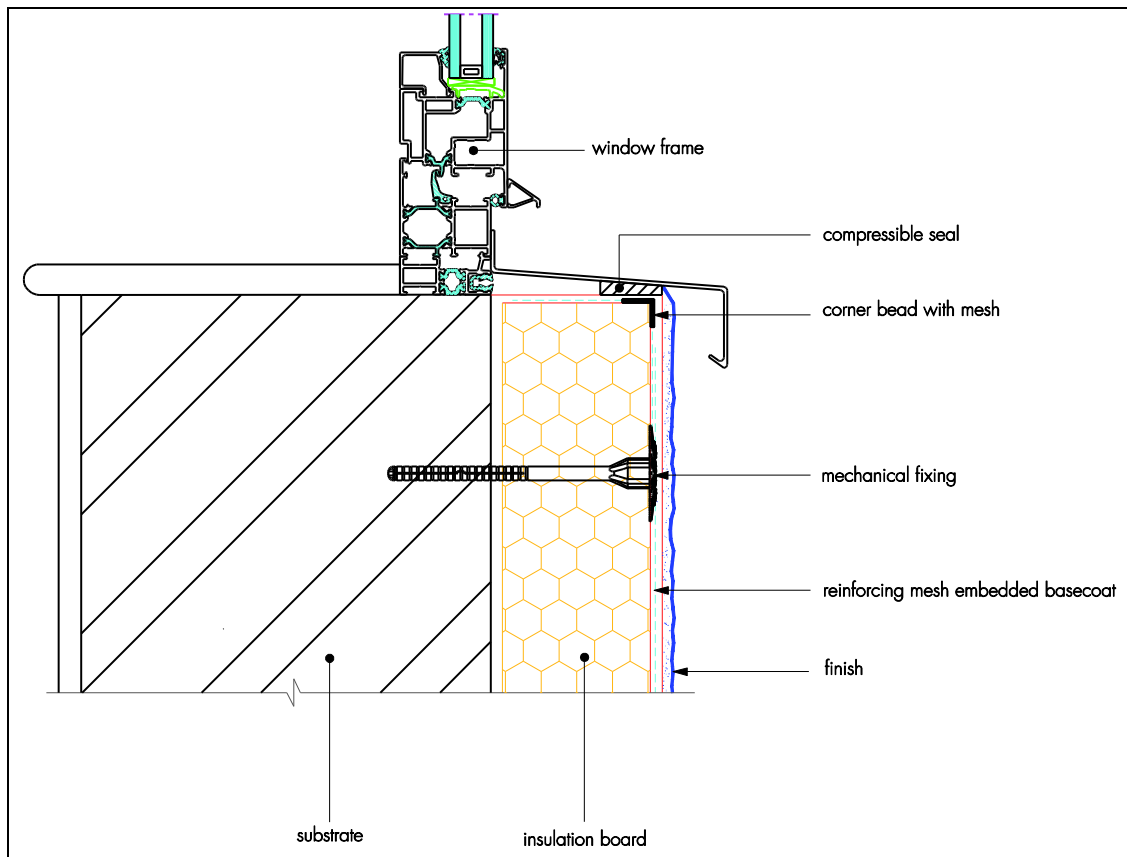




Figure 12 Window sill detail



## Technical Investigations

### 17 Tests

17.1 An examination was made of data relating to:

- component characterisation
- water vapour permeability
- water absorption
- bond strength
- reaction to fire
- durability of finish coatings
- heat/spray cycling
- impact resistance.

17.2 An examination was made of data relating to:

- reaction to fire
- thermal conductivity
- the risk of interstitial condensation.

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

17.4 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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- BRE Report BR 262 : 2002 *Thermal insulation : avoiding risk*
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- BS 5250 : 2011 + A1 : 2016 *Code of practice for control of condensation in buildings*
- BS 8000-0 : 2014 *Workmanship on construction sites — Introduction and general principles*
- BS 8000-2.2 : 1990 *Workmanship on building sites — Code of practice for concrete work — Sitework with in situ and precast concrete*
- BS 8000-3 : 2001 *Workmanship on building sites — Code of practice for masonry*
- BS EN 1990 : 2002 + A1 : 2005 *Eurocode — Basis of structural design*
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- BS EN 1991-1-4 : 2005 + A1 : 2010 *Eurocode 1 — Actions on structures — General actions — Wind actions*
- NA to BS EN 1991-1-4 : 2005 + A1 : 2010 UK National Annex to *Eurocode 1 — Actions on structures — General actions — Wind actions*
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- BS EN 13914-1 : 2016 *Design, preparation and application of external rendering and internal plastering — External rendering*
- BS EN ISO 6946 : 2017 *Building components and building elements — Thermal resistance and thermal transmittance — Calculation method*
- BS EN ISO 9001 : 2008 *Quality management systems — Requirements*
- 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 Insulation composite systems (ETICS) 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.