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Agrément Certificate
20/5758
Product Sheet 1

FORTERRA BRICK SLIP FAÇADE SYSTEMS

SUREBRICK BRICK SLIP FAÇADE SYSTEM

This Agrément Certificate Product Sheet(1) relates to the SureBrick Brick Slip Façade System comprising brick slips mechanically retained into horizontally or vertically oriented SureBrick Rails, to create a protective and decorative masonry façade for use on steel frame, timber frame, masonry or concrete substrate backing 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

Strength and stability — the system can be designed to resist the wind actions normally encountered in the UK (see section 6).
Behaviour in relation to fire — the brick slip, rail and mortar components of the system are non-combustible (see section 7).
Air and water penetration — the system is not watertight but will resist the passage of water entering the cavity. Any water collecting in the cavity will be removed by drainage and ventilation (see section 8).
Durability — when used in normal exposure conditions, the system will have a design life in excess of 35 years (see section 10).

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.

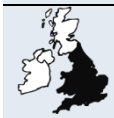
On behalf of the British Board of Agrément

Date of First issue: 21 May 2020

Hardy Giesler
Chief Executive Officer

Regulations

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



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

Requirement: **A1** **Loading**
Comment: The system is acceptable. See sections 4.3 and 6 of this Certificate.

Requirement: **B4(1)** **External fire spread**
Comment: The system is unrestricted by this Requirement. See section 7 of this Certificate.

Requirement: **C2(b)(c)** **Resistance to moisture**
Comment: The system is not watertight but will resist the passage of rainwater to the supporting structure. See sections 8.1 to 8.4 of this Certificate.

Regulation: **7(1)** **Materials and workmanship**
Comment: The system is acceptable. See sections 7 and 10 and the *Installation* part of this Certificate.

The Building (Scotland) Regulations 2004 (as amended)

Regulation: **8(1)(2)** **Durability, workmanship and fitness of materials**
Comment: The system can contribute to a construction satisfying this Regulation. See sections 9 and 10 and the *Installation* part of this Certificate.

Regulation: **9** **Building standards applicable to construction**
Standard: 1.1(a)(b) Structure
Comment: The system is acceptable, with reference to clause 1.1.1[(1)(2)] of this Standard. See sections 4.3 and 6 of this Certificate.

Standard: 2.4 Cavities
Comment: The system, when used in conjunction with fire-resistant materials, can satisfy this Standard, with reference to clauses 2.4.1[(1)(2)], 2.4.2[(1)(2)] and 2.4.9[(2)]. See section 7 of this Certificate.

Standard: 2.6 Spread to neighbouring buildings
Standard: 2.7 Spread on external walls
Comment: The system can contribute to satisfying these Standards, with reference to clauses 2.6.4[(1)(2)] and 2.7.1[(1)(2)]. See section 7 of this Certificate.

Standard: 3.10 Precipitation
Comment: The system is not watertight but will resist the passage of rainwater to the supporting structure, with reference to clauses 3.10.1[(1)(2)] and 3.10.2[(1)(2)] of this Standard. See sections 8.1 to 8.4 of this Certificate.

Standard: 7.1 Statement of sustainability
Comment: The system can contribute to meeting 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.

Regulation: **12** **Building standards applicable to conversions**
Comment: Comments in relation to the system under Regulation 9, Standards 1 to 6 also apply to this Regulation, with reference to clause 0.12.1[(1)(2)] and Schedule 6[(1)(2)].

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

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

Regulation:	**23(a)(i)**	**Fitness of materials and workmanship**
Comment:	**(iii)(b)(i)**	The system is acceptable. See section 10 and the *Installation* part of this Certificate.
Regulation:	**28**	**Resistance to moisture and weather**
Comment:		The system is not watertight but will resist the passage of rainwater to the supporting structure. See sections 8.1 to 8.4 of this Certificate.
Regulation:	**30**	**Stability**
Comment:		The system is acceptable. See sections 4.3 and 6 of this Certificate.
Regulation:	**36(a)**	**External fire spread**
Comment:		The system can contribute to satisfying this Regulation. See section 7 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* (3.1, 3.2 and 3.6) of this Certificate.

Additional Information

NHBC Standards 2020

In the opinion of the BBA, the SureBrick Brick Slip Façade System, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements in relation to *NHBC Standards*, Part 6 *Superstructure (excluding roofs)*, Chapter 6.9 *Curtain walling and cladding*.

Technical Specification

1 Description

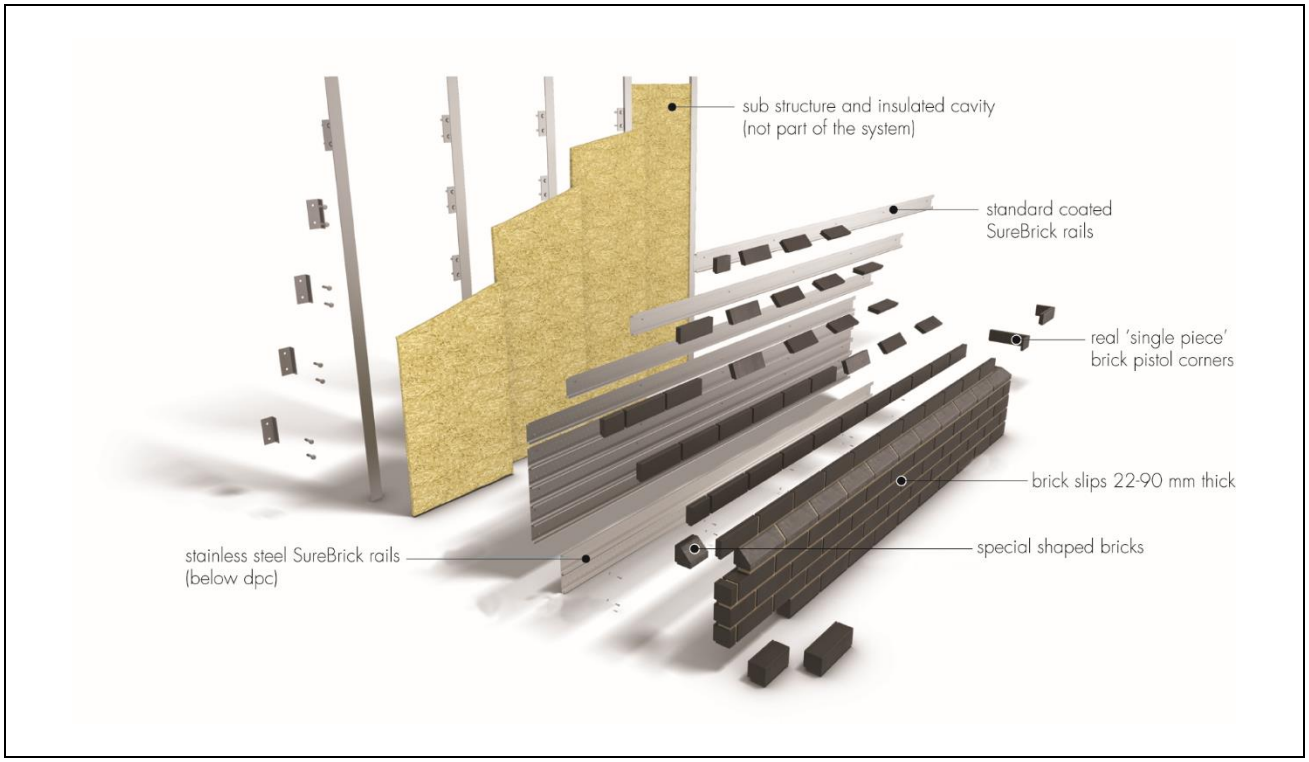
1.1 The SureBrick Brick Slip Façade System consists of profiled brick slips which are mechanically retained into SureBrick Rails. The profile of the rails suits the coursing height and they can be mounted orientated horizontally or vertically. The SureBrick Rails are mechanically fixed to a secondary support system to create a drained (and vented) cavity (see Figure 1) when applied on an external façade. The SureBrick Brick Slip Façade System can be used internally without a drained (and vented) cavity but a condensation risk analysis must be conducted to ensure its suitability for internal use. The horizontal and vertical joints between the profiled brick slips are pointed with traditional hydrated lime, sand and Ground Granulated Blast-furnace Slag (GGBS) mortar. The SureBrick Brick Slip Façade System has a nominal dry mass per unit area of approximately 42 to 56 kg.m^{-2} based on a 22 mm thick brick slip.

1.2 The system comprises:

- SureBrick Rails — 2400 mm long, 87 mm high and 0.7 mm thick profiled metal rails comprising of either S220GD + ZM310 hot dip zinc-magnesium coating to BS EN 10346 : 2015, stainless steel (grade 304 2B) or stainless steel (grade 316)
- Profiled brick slips — 215 mm in length, 65 mm in height and thicknesses ranging from 22 to 90 mm, available in a range of colours and textures. Other heights less than 65 mm and other lengths are available and are covered by this Certificate. The brick slips must be frost resistant and classified as durability rating F2 in accordance with BS EN 771-1 : 2011. L-shaped pistol bricks for external corners and opening returns, together with special shaped units for architectural detailing, are also available.
- SureBrick Pointing Mortar — traditional hydrated lime, sand and ground granulated blast-furnace slag (GGBS). For areas with possibility of severe exposure to chemicals, such as locations near the sea, or for use of the system below

DPC, only pointing mortar, which has a durability declaration suitable for constructions subjected to "Severe Exposure" in accordance with EN 998-2 or equivalent, can be used.

Figure 1 The SureBrick Brick Slip Façade System



1.3 Ancillary components for use with the system, but outside the scope of this Certificate, are:

- fixings — A2 stainless steel fixings, with washers (where appropriate), which are tailored to suit the substrate material, ie timber, lightweight steel or aluminium
- breather membranes
- insulation
- secondary support system — minimum 40 mm wide
- compressible joint filler for use in movement joints
- fire barrier
- perpend weep vents
- sealant and membranes
- mesh to protect ventilation openings
- cavity tray
- flashing and trims
- substrate backing walls.

2 Manufacture

2.1 The S220GD+ZM310 zinc-magnesium coating is applied to the mild steel on a continuous hot dip galvanising line. The 304 and 316 Stainless Steel are austenitic grades. The SureBrick Rail profile is formed from cold rolled galvanized and stainless thin gauge strip through a series of rollers.

2.2 Brick slips are either purpose made or cut from standard forms of brick manufacture, ie extruded, water struck, pressed, thrown, handmade or moulded. The brick slips are then profiled to create the distinctive grooves and shape which allow them to interlock into the SureBrick rails.

2.3 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.

2.4 The management system of Forterra Building Products Ltd has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2015 by Construction Products Certification (Certificate CP00213).

3 Delivery and site handling

3.1 SureBrick rails are delivered to site, banded in a pack (90 no. rails, 16.2 m^2) or bundle (2 x 2 packs, 360 no. rails or 64.8 m^2) or on pallets. They should be stacked horizontally on sufficient bearers to prevent distortion, to a maximum height of six packs or three bundles high. Packs or bundles can have ancillary items stacked in separate cardboard boxes on top. Care must be taken to ensure packs or bundles are stable when starting to remove rails during the installation process.

3.2 Care should be exercised when handling SureBrick Rails to avoid injury from sharp edges. Cut rails should be cleaned to remove swarf, rails checked and debris removed prior to the installation of the brick slips. Protective clothing should be worn, and all Health and Safety rules should be observed. SureBrick rails should not be exposed to any organic solvents, ie solvent-based cleaning fluids.

3.3 Brick slips are delivered on pallets, wrapped in plastic. These should be stored on dry, level ground and must not be stacked. Brick slips should be protected from the weather during storage onsite and care must be taken when handling brick slips to avoid damage.

3.4 Fixings are boxed and delivered on separate pallets wrapped in plastic or combined on rail packs - these should be stored on dry, level ground and must not be stacked. Fixings should be protected from the weather and stored in a secure location onsite.

3.5 Pointing mortar is packed in paper sacks (25 kg) bearing the batch number, date of production and application instructions. It must be stored in dry conditions, protected from frost and excessive heat and used as stated on the material packaging.

3.6 Protective clothing should be worn at all times, and all Health and Safety rules should be observed.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on the SureBrick Brick Slip Façade System.

Design Considerations

4 General

4.1 The system is satisfactory for use on steel frame, timber frame, masonry or concrete substrate backing walls in new and existing buildings, to provide a protective and decorative masonry façade above and below damp proof course (DPC) level (see sections 10.3 and 12.5 of this Certificate for further details). Timber battens are used when installing the system on timber-frame substrate walls.

4.2 It is important for designers, planners, contractors and/or installers to ensure that the installation of the system is in accordance with the Certificate holder's instructions and the information given in this Certificate. All design aspects should be checked by a suitably qualified and experienced engineer in accordance with the requirements of the relevant national Building Regulations and Standards.

4.3 The substrate wall, to which the system is to be fixed, must be structurally sound and satisfy the requirements of the relevant national Building Regulations and Standards with regard to weathertightness, heat and sound transmission.

- timber-frame walls must be designed and constructed in accordance with PD 6693-1 : 2019 and BS EN 1995-1-1 : 2004 and its UK National Annex, and preservative-treated in accordance with BS EN 351-1 : 2007
- steel-frame substrates must be structurally sound, and designed and constructed in accordance with BS EN 1993-1-1 : 2005 and BS EN 1993-1-3 : 2006, and their UK National Annexes
- masonry walls must be designed and constructed in accordance with the relevant recommendations of BS EN 1996-1-1 : 2005, BS EN 1996-1-2 : 2005, BS EN 1996-2 : 2006 and BS EN 1996-3 : 2006, and their UK National Annexes, PD 6697 : 2019, BS 8000-0 : 2014 and BS 8000-3 : 2001
- concrete walls must be designed and constructed in accordance with the relevant recommendations of BS EN 1992-1-1 : 2004 and its UK National Annex.

4.4 Ventilation and drainage must be provided behind the system when applied externally. All ventilation openings around the sides and top of the system should be suitably protected with mesh to prevent the ingress of birds, vermin and insects.

4.5 There must be a minimum 38 mm drained and vented cavity provided. A minimum ventilation area of 500 mm^2 per metre run should be incorporated, ie the equivalent of one open perpend per 1.5 m. Timber battens must be made of appropriately preserved and treated timber based on the location and exposure and be a minimum of 38 mm thick to ensure embedment depth for the SureBrick System fixings.

4.6 Thermal and moisture movement must be considered and accommodated by the inclusion of movement joints. Movement joints should be detailed by an appropriately qualified design engineer in accordance with the structural movement of the building, the appropriate Codes and Standards and Certificate holder's recommendations.

4.7 SureBrick Rails are installed horizontally to a secondary support system, however in order to achieve architectural detailing, ie solider courses and different brick bonds, SureBrick Rails can be installed vertically to allow a maximum height of vertically orientated SureBrick Rails of 675 mm or 3 bricks. Application of the system to soffits is outside the scope of this Certificate.

4.8 The substrate wall to which the SureBrick System is fixed must be watertight. External fixtures, ie rainwater goods, air conditioning units, satellite dishes, signs, hanging baskets and other similar items, should be fixed directly back to the main sub-frame. The SureBrick System should accept no load from such fixtures. Where potential loading can be transferred back to the SureBrick System, the system should not pass behind such fixtures, only butt up to them. This is outside the scope of this certificate.

4.9 The system transfers its self-weight and design wind actions through the supporting subframe to the substrate wall. The substrate wall and supporting subframe must be capable of resisting the associated loads. Particular care is required around window and door openings to ensure that the structure is capable of sustaining the additional weight of the system. The maximum spacing between vertical subframe supports must not exceed 600 mm centres (horizontally). Additional subframe vertical supports may be required at changes in direction, openings, movement joints or stop ends etc, or to maintain cantilevers designed in line with this certificate.

4.10 Vertical expansion joints to allow for horizontal movement should be provided through brick slip, mortar and SureBrick rails at a maximum of 12 m centres in the façade system. The actual spacing and position of the joints should coincide with movement joints in the substrate wall and allow for the same degree of movement. They should extend throughout the full height of the building including parapets etc. Movement joints in the structure of the building should be carried through to the face of the cladding.

4.11 Horizontal movement joints should be located in the SureBrick façade system to suit the movement requirements of the building, substrate wall and secondary support system.

5 Practicability of installation

The system should only be installed by installers and general builders experienced with this type of construction.

6 Strength and stability

Wind loading

6.1 Design wind loads should be calculated in accordance with BS EN 1991-1-4 : 2005 and its UK National Annex. Due consideration should be given to the higher pressure coefficients applicable to corners of the building as recommended in this Standard. In accordance with BS EN 1990 : 2002 and its UK National Annex, it is recommended that a partial load factor of 1.5 is used to determine the design wind load to be resisted by the system.

6.2 The supporting substrate wall must have sufficient strength to resist on its own the loads imparted directly by the cladding system and the wind actions normally experienced in the UK, as well as any racking loads. No contribution from the cladding system may be assumed in this respect.

6.3 The designer must ensure that:

- the design of the sub-frame is in accordance with the relevant codes and Standards, and such as to limit mid-span deflections to span/200 and cantilever deflections to span/150
- SureBrick rails are mechanically fixed to the supporting sub-frame using the specified fixings
- the proposed system and associated fixing layout provide adequate resistance to dead and wind actions
- fixing of the support brackets to the supporting wall has adequate tensile pull-out and corrosion resistance (outside the scope of this Certificate). Site-specific tests should be conducted on the substrate of the building to determine the minimum pull-out resistance to failure of the fixings. An appropriate number of site-specific pull-out tests must be conducted on the substrate wall to determine the minimum pull-out resistance to failure of the fixings. The characteristic pull-out resistance should be determined in accordance with the guidance given in EOTA TR055, using 50% of the mean value of the five smallest measured values at the ultimate load.

6.4 Wind load tests were carried out to Centre for Window and Cladding Technology (CWCT) test specifications on a 5.4 m x 6.6 m (height x length) wall comprising the SureBrick Brick Slip Façade System fixed to vertical steel-frame supports spaced at 600 mm centres horizontally, using 4.9 x 35 mm (diameter x length) stainless steel self-drilling screws with Torx T20 or T25 recess head for fixing SureBrick horizontal rails to vertical subframe support rails and 5.5 x 22 mm (diameter x length) stainless steel self-drilling screws for fixing vertical rails to wall brackets. The ultimate wind pressure achieved in the tests is divided by a partial material factor of 1.5 to derive 2.40 $kN.m^{-2}$ design wind resistance of the system. The design wind resistance achieved for the system mounted onto metal supports also applies to the system mounted onto timber battens for use on timber frame structures. For build-ups utilising any fixings other than those stated for this CWCT test, the Certificate holder's instructions must be sought.

Impact resistance

6.5 When tested for Retention of Performance and Safety to Persons impacts in accordance with CWCT test specifications with different support configurations, the system achieved adequate resistance for use in impact Category B as defined in CWCT specifications as "readily accessible to the public and others with little incentive to exercise care. Chance of accident occurring and of misuse".

6.6 Hard and soft body impact tests were carried out with both coated and stainless steel rail sections on a 2.6 x 3.2 m (height x length) wall comprising the SureBrick Brick Slip Façade System with Chelsea Smoked Red brick slips, fixed to vertical steel-frame supports spaced at 600 mm centres horizontally. The system achieved adequate impact resistance for use in Use Categories I to IV, as defined in EAD 090062-00-0404 : 2018, Table G.2, an extract of which is shown in Table 1 of this Certificate.

Table 1 Definition of the impact use categories (from EAD 090062-00-0404 : 2018)

Use Category	Description
I	A zone readily accessible at ground level to the public and vulnerable to hard body impacts but not subjected to abnormally rough use.
II	A zone liable to impacts from thrown or kicked objects, but in public locations where the height of the kit 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.
III	A zone not likely to be damaged by normal impacts caused by people or by thrown or kicked objects.
IV	A zone out of reach from ground level.

7 Behaviour in relation to fire

7.1 The full range of brick slips and SureBrick Rails are classified as 'non-combustible' as defined in the national Building Regulations and are not subject to any restriction on building height or proximity to boundaries.

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

7.3 The resistance to fire of the installed system depends on the performance of the wall on which the system has been installed. This can only be determined by tests from a suitably accredited laboratory and therefore is outside the scope of this Certificate.

7.4 To limit the risk of fire spread between floors in buildings subject to the national Building Regulations, fire barriers must be incorporated in the cavity behind the system as required under these Regulations, but should not block essential ventilation pathways. Guidance on fire barriers can be found in BRE Report BR 135 : 2013.

7.5 The timber subframe and substrate walls are not classified as 'non-combustible' or 'of limited combustibility' and so the system is restricted for use in buildings up to 18 metres in height for use in England, Wales and Northern Ireland and 11 metres in height for Scotland, when used onto timber substrates.

8 Air and water penetration

8.1 Brick slips should have a mean water absorption of between 7 and 25% to BS EN 771-1 : 2011.

8.2 The system is not airtight or watertight, but will minimise water entering the cavity. Any water passing through the system and collecting in the cavity due to rain or condensation will be removed by drainage and ventilation.

8.3 All gaps between the brick slips are fully filled with mortar or sealant.

8.4 Consideration should be given to providing a breather membrane to protect the inner wall or insulation from precipitation.

8.5 The substrate wall onto which the system is installed must be resistant to water ingress (watertight) and satisfy the requirements of the relevant national Building Regulations and Standards for airtightness.

8.6 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 (these are outside the scope of the Certificate other than those shown in Figure 2).

9 Maintenance

9.1 The brick slips do not require regular cleaning, but should this become necessary, before cleaning it is essential to identify the type of stain or deposit and the nature of the material to be cleaned. Once this has been confirmed please contact the Certificate holder for further advice.

9.2 Checks should be carried out periodically to ensure that ventilation and drainage pathways remain clear; blockages should be cleared promptly. During the lifetime of the cladding, it will also be necessary to reapply all sealants and pointing mortar at regular intervals to maintain the performance and aesthetic of the façade.

9.3 Damaged brick slips and pointing mortar should be replaced as soon as practicable and in accordance with the Certificate holder's instructions (see section 14.2).

10 Durability

10.1 Freeze/thaw tests on clay products indicate that there will be no significant change in the physical properties of the brick slips on ageing.

10.2 The brick slips will have a design life commensurate with SureBrick rails, provided regular checks and a maintenance regime are carried out (see section 9.3).

10.3 SureBrick Rails will have a design life in excess of 35 years, provided regular checks and a maintenance regime are carried out (see section 9.2). In areas where exposure to chemicals is severe, such as coastal areas, only stainless steel grade 316 must be used, below or above the DPC level. Stainless steel grade 304 2B rails can only be used above or below DPC level in areas with non-severe exposure to chemicals. S220GD+ZM310 zinc-magnesium coated SureBrick rails can only be used above the DPC level in areas with non-severe exposure to chemicals

10.4 When used below DPC, reference should be made to PD 6697 : 2019 for assessing suitable brick slip and mortar specifications to resist sulphates. Only F2 (Durability) with S2 (Active Soluble Salt Content) designation bricks, in accordance with BS EN 771-1 and pointing mortar with a durability declaration suitable for constructions subjected to "Severe Exposure" in accordance with EN 998-2 or equivalent, can be used.

10.5 If the system is designed, manufactured, installed and maintained in accordance with this Certificate, the service life of the system will be in excess of 35 years.

11 Reuse and recyclability

The steel rails can be recycled.

Installation

12 General

12.1 The system must be installed in accordance with the Certificate holder's recommendations, the requirements of this Certificate and the specification laid down by the design engineer.

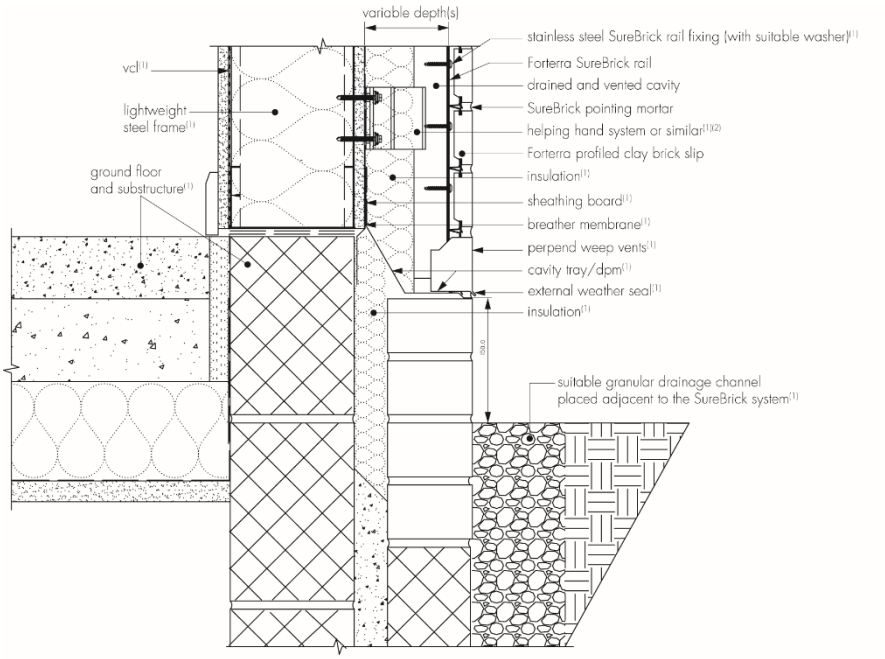
12.2 Installers must be trained in the installation of the system. The Certificate holder can provide technical assistance and training at the design stage.

12.3 If significant colour variations between batches are likely, it may be necessary to mix brick slips from different pallets so as to obtain a uniform shade over the whole façade.

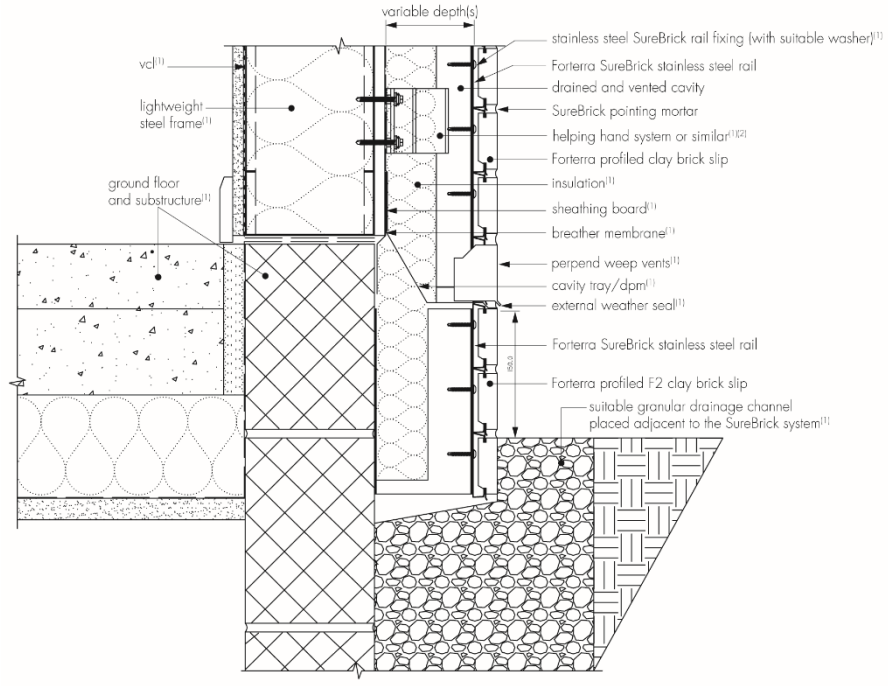
12.4 Due to manufacturing tolerances, some unevenness on the façade surface may occur, but this is not normally excessive or obtrusive. However, to minimise this effect, installation quality should be carefully monitored.

12.5 Typical installation details are given in Figure 2.

Figure 2 Typical installation details (all dimensions in mm)



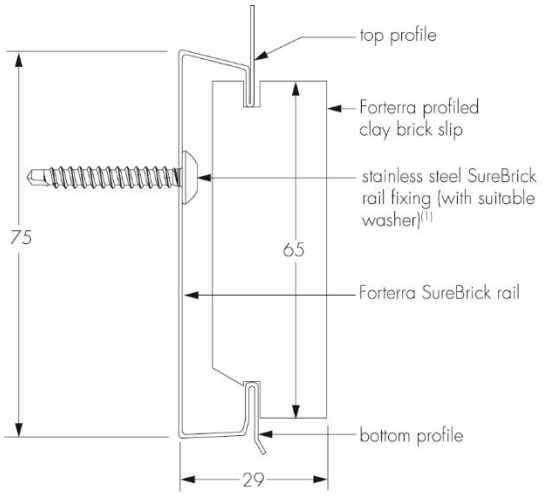
(a) Typical ground floor junction detail (installation above DPC)



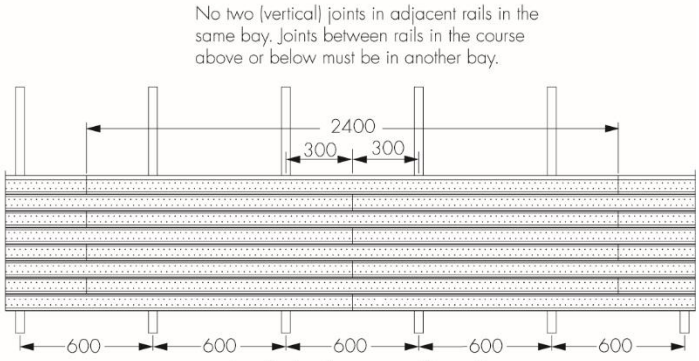
(b) Typical ground floor junction detail (installation below DPC)

(1) Outside the scope of this Certificate
(2) Minimum 40 mm fixing rail face width

Figure 2 Typical installation details (all dimensions in mm) Continued

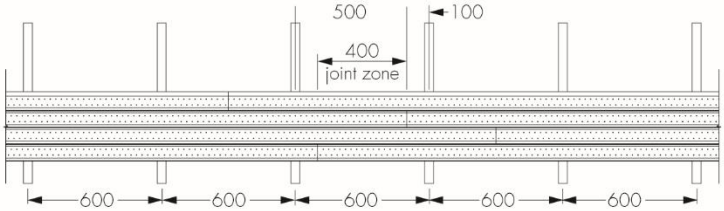


Generic details for a 65mm high profiled brick slip

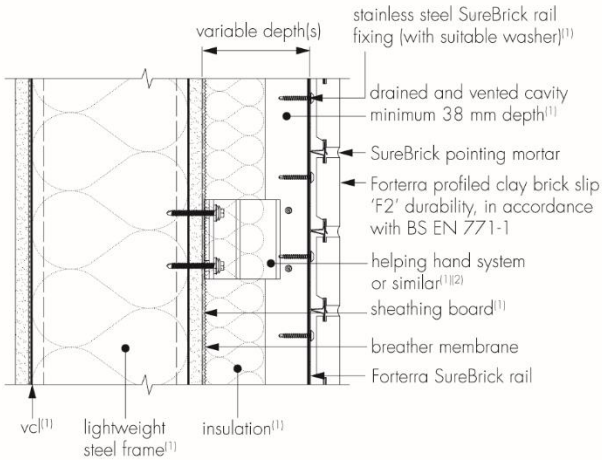


Standard rail setting out (flat wall)

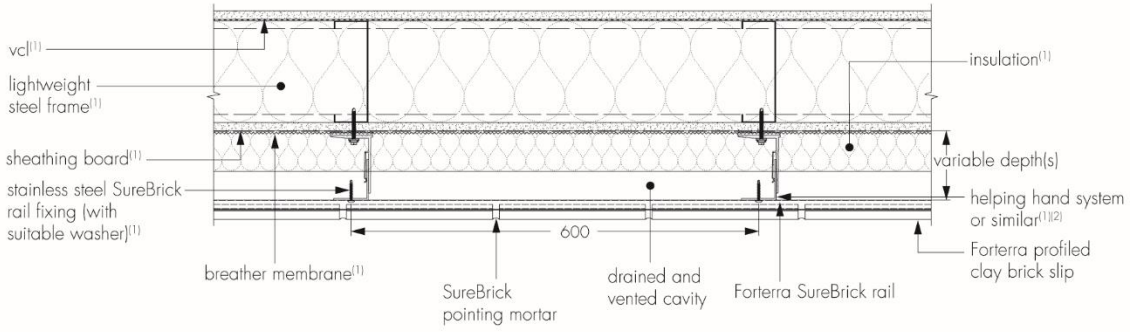
Joints between adjacent SureBrick rails can be a maximum of 500 mm past the centre line of the vertical support ie joints between SureBrick rails must occur within a 400 mm zone between vertical support (based on vertical support at 600 mm centres).



Vertical joint location between adjacent rails (flat wall)



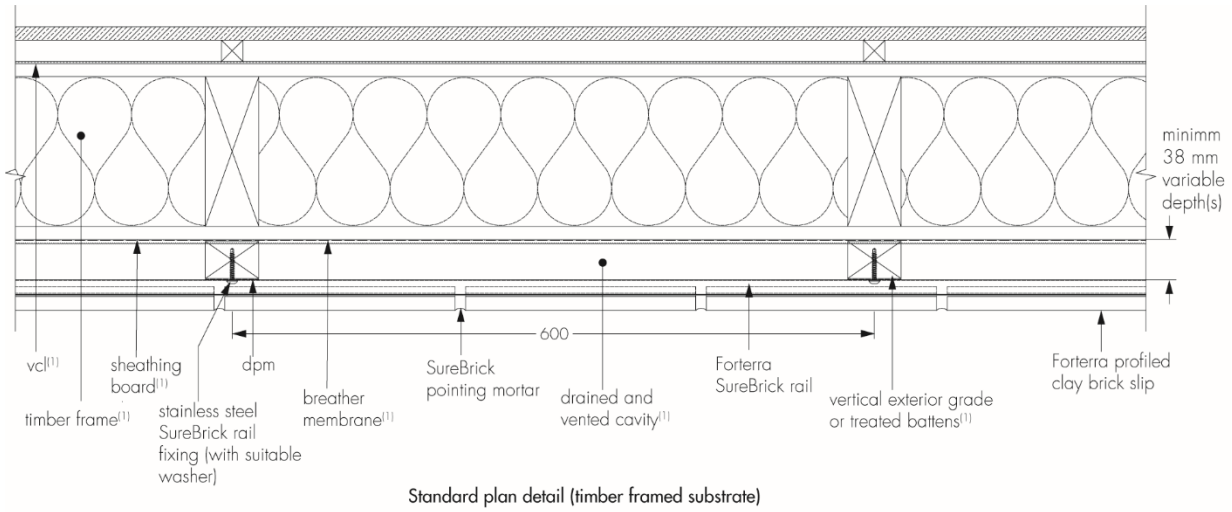
Standard section detail (steel framed substrate)



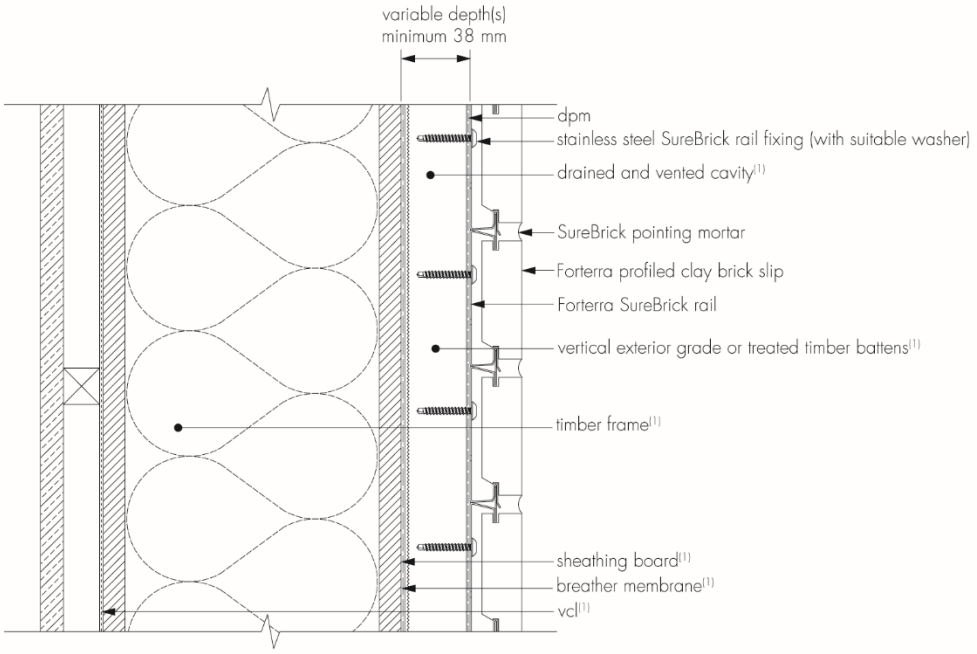
Standard plan detail (steel framed substrate)

(1) Outside the scope of the Certificate
(2) Minimum 40mm fixing rail face width

Figure 2 Typical installation details (all dimensions in mm) Continued

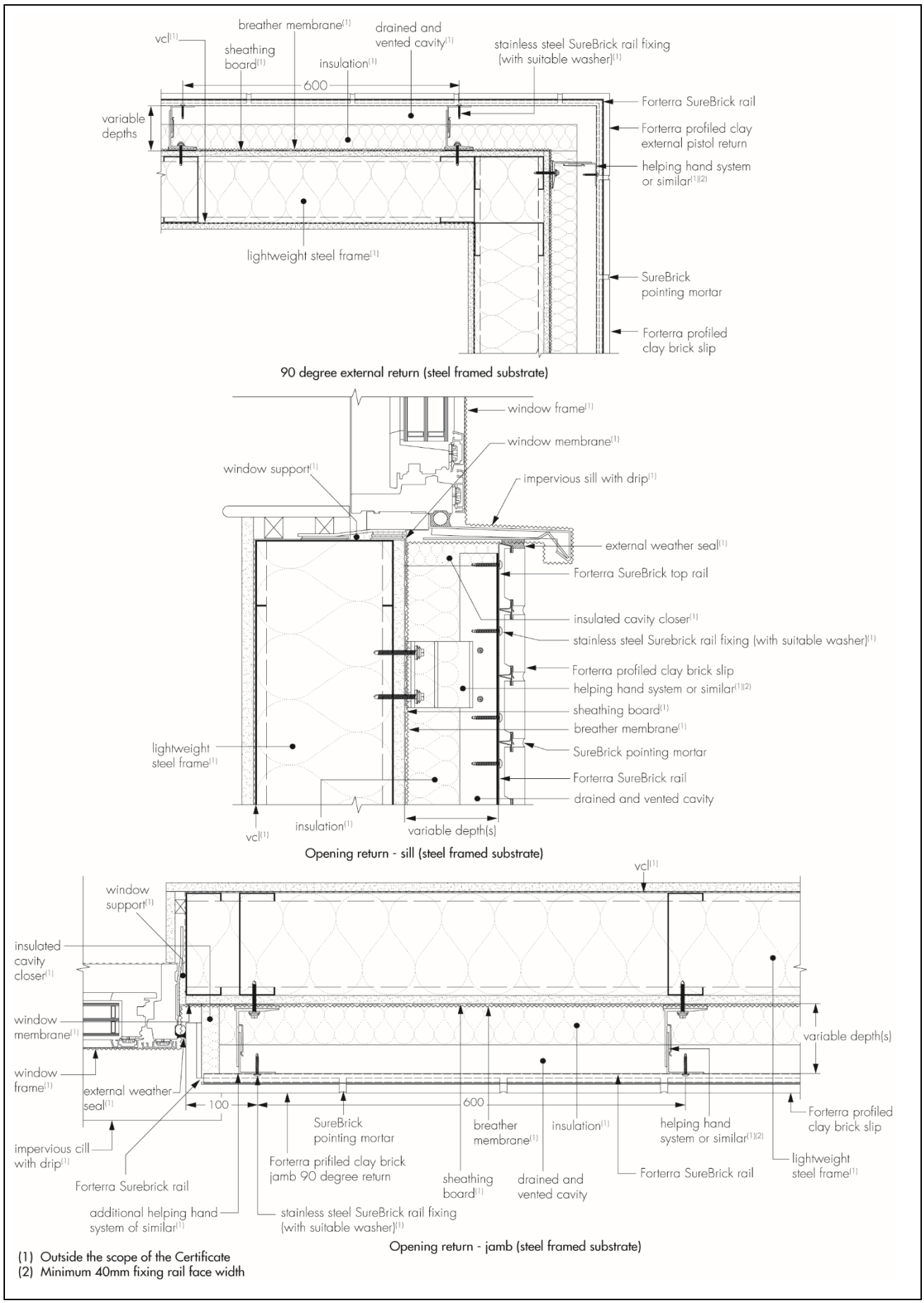


Standard plan detail (timber framed substrate)



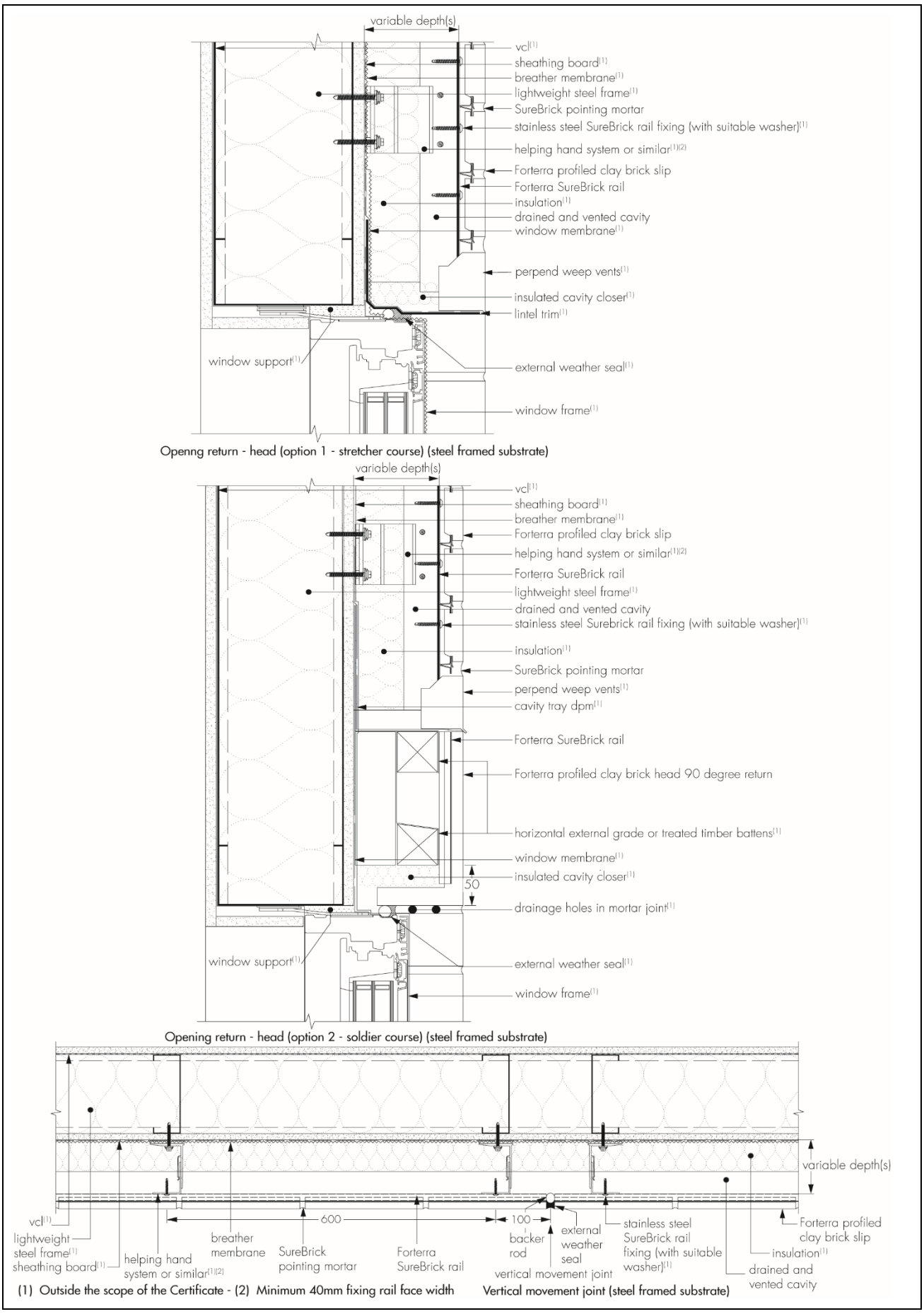
Standard section detail (timber framed substrate)

Figure 2 Typical installation details (all dimensions in mm) Continued



(1) Outside the scope of the Certificate
(2) Minimum 40mm fixing rail face width

Figure 2 Typical installation details (all dimensions in mm) Continued



13 Procedure

Rails

13.1 The datum points for the position of the first SureBrick Rail should be set carefully, taking into account the final position of the brick slip when installed on the rail.

13.2 SureBrick Rails should be positioned on the datum point ensuring that the rail is horizontal for horizontal installation of the system or vertical for vertical installation of the system using a spirit or laser level.

13.3 SureBrick Rails must be fixed to the sub-frame using A2 stainless-steel fixings (with washer where appropriate) specified by the project specific design details, fixing through one of the pre-punched holes in the SureBrick Rail. Fixings must be positioned at a maximum horizontal spacing of 650 mm. The installation must satisfy the following requirements:

- Joints between adjacent rails can be a maximum of 500 mm past the centre line of the vertical support, ie joints between rails must occur within a 400 mm zone centred between vertical supports (based on vertical support at 600 mm centres)
- SureBrick Rails must not cantilever more than 100 mm past the sub-frame support at movement joints, stop ends or openings in the system.

13.4 No two (vertical) joints in adjacent rails should occur in the same bay. Joints between rails in the course above or below must be in another bay.

13.5 SureBrick Rails can be stacked a maximum of five courses high before fixings need to be inserted, provided that they are self-supporting and weather conditions permit this. Alternatively, fixings can be inserted as each rail is interlocked into position. Where perpend weep vents are required, joints between two adjacent rails are opened to allow perpend weep vents to be slotted in between the rails. Top rails may be required where the inclusion of membranes, cavity trays or DPCs are brought through the brick slip system. Rail interlocks can be opened up by a maximum of 2 mm for construction tolerances (up to 27 mm per metre).

13.6 At changes in direction, SureBrick Rails must be butt jointed, every alternate SureBrick Rail is bent around the return and fixed to both elevations to provide rigidity. This is achieved by cutting through the top and bottom profiles of the SureBrick rail up to the front face of the rear section and bent to the appropriate angle. Any angle of corner can be achieved using this method.

13.7 In order to achieve architectural detailing, ie solider courses and different bonded effects, SureBrick Rails can be installed vertically to allow a maximum height of vertically orientated SureBrick Rails of 675 mm or 3 bricks. Where SureBrick rails are installed vertically, additional sub-frame horizontal supports will be required to fix the vertical SureBrick rails to. Where SureBrick rails are installed vertically, fixings must be positioned at a maximum vertical spacing of 650mm.

Brick slips

13.8 The groove in the top of the brick slips must be slotted carefully into the SureBrick Rails upper tab. The brick slip must be rotated so that the bottom of the slip rests against the SureBrick Rails' lower tab.

13.9 The bottom arise of the brick slip must be hit at an approximate 45-degree angle in one single upward and backwards motion with a rubber mallet. It must be ensured that the brick slip is fully clipped into the rail tabs.

13.10 The brick slip can be moved horizontally within the rail if required by carefully tapping the perpend arise of the brick slip with a rubber mallet. External corner pistols are slotted into the rails.

Pointing

13.11 Joints must be fully filled with the traditional hydrated lime, sand and GGBS mortar. If the brick slips have a high-water absorption (>10%), joints should be wetted down prior to pointing to prevent excessive suction.

13.12 The mortar should be tooled off after it has formed a semi-dry surface skin and has lost its initial sheen. The time this takes is dependent on the absorbency of the brick slips and the weather.

13.13 Pointing should only take place between the temperatures of 5 and 35°C. Pointing should not be conducted whilst raining or if rain has been forecast. Pointing should be installed in accordance with the Certificate holder's recommendations.

Finishing

13.14 The top of the system must be protected by an adequate overhang (min. 40 mm with drip) or by an adequately sealed purpose made flashing or trim.

14 Repair

14.1 In the event of damage to the system, an initial inspection must be conducted to confirm the structural stability of the system, and the system must be removed immediately where potential injury could be sustained to contractors or the public.

14.2 Where localised damage to the pointing mortar or brick slips only has occurred, remedial work can be conducted. The pointing mortar surrounding the damaged brick slip should be carefully cut out taking care not to damage the rail. The damaged brick slip can be cut along its length (mid-point in height), taking care not to damage the rail, and then easily removed from the rails. A new brick slip should be carefully positioned in the correct location and clipped into the rail. The pointing mortar should then be replaced.

Technical Investigations

15 Tests

Tests were carried out and the results assessed to determine:

- wind load resistance
- pull-through resistance
- hard and soft body impact
- reaction to fire
- hygrothermal behaviour
- freeze/thaw resistance
- weathertightness
- corrosion assessment
- brick pull out.

16 Investigations

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

BRE Report BR 135 : 2013 *Fire performance of external thermal insulation for walls of multi-storey buildings*

BS 8000-0 : 2014 *Workmanship on construction sites — Introduction and general principles*

BS 8000-3 : 2001 *Workmanship on building sites — Code of practice for masonry*

BS EN 351-1 : 2007 *Durability of wood-based products — Preservative treated solid wood — Classification of preservative penetration and retention*

BS EN 771-1 : 2011 + A1 : 2015 *Specification for masonry units. Clay masonry units*

BS EN 1990 : 2002 + A1 : 2005 *Eurocode. Basis of structural design.*
NA to BS EN 1990 : 2002 + A1 : 2005 *UK National Annex for Eurocode. Basis of structural design*

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*

BS EN 1992-1-1:2004 + A1 : 2014 *Eurocode 2: Design of concrete structures. General rules and rules for buildings*
NA + A2 : 14 to BS EN 1992-1-1 : 2004 + A1 : 2014 *UK National Annex to Eurocode 2. Design of concrete structures. General rules and rules for buildings*

BS EN 1993-1-1 : 2005 + A1 : 2014 *Eurocode 3 — Design of steel structures — General rules and rules for buildings*
NA + A1 : 2014 to BS EN 1993-1-1:2005 + A1 : 2014 *National Annex to Eurocode 3 — Design of steel structures — General rules and rules for buildings*

BS EN 1993-1-3 : 2006 *Eurocode 3 — Design of steel structures — General rules — Supplementary rules for cold-formed members and sheeting*
NA to BS EN 1993-1-3 : 2006 *National Annex to Eurocode 3 — Design of steel structures — General rules — Supplementary rules for cold-formed members and sheeting*

BS EN 1995-1-1 : 2004 + A2 : 2014 *Eurocode 5 — Design of timber structures — General — Common rules and rules for buildings*
NA to BS EN 1995-1-1 : 2004 + A2 : 2014 *National Annex to Eurocode 5 — Design of timber structures — General — Common rules and rules for buildings*

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

BS EN 1996-1-2 : 2005 *Eurocode 6 — Design of masonry structures — General rules — Structural fire design*
NA to BS EN 1996-1-2 : 2005 *National Annex to Eurocode 6 — Design of masonry structures — General rules — Structural fire design*

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 *National Annex to Eurocode 6 — Design of masonry structures — Design considerations, selection of materials and execution of masonry*

BS EN 1996-3 : 2006 *Eurocode 6 — Design of masonry structures — Simplified calculations methods for unreinforced masonry structures*
NA + A1 : 2014 to BS EN 1996-3 : 2006 *National Annex to Eurocode 6 — Design of masonry structures — Simplified calculations methods for unreinforced masonry structures*

BS EN 10346 : 2015 *Continuously hot-dip coated steel flat products for cold forming — Technical delivery conditions*

BS EN ISO 9001 : 2015 Quality management systems. Requirements

EAD 090062-00-0404 : 2018 *Kits for external wall claddings mechanically fixed*

PD 6693-1 : 2019 *Recommendations for the design of timber structures to Eurocode 5: Design of timber structures. General. Common rules and rules for building*

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

Technical Report TR055, *Design of fastenings based on EAD 330232-00-0601, EAD 330499-00-0601 and EAD 330747-00-0601*

17 Conditions

17.1 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
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- is subject to English Law.

17.2 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.

17.3 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.

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

17.5 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:

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- 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
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- any claims by the manufacturer relating to CE marking.

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