

## ACS Stainless Steel Fixing Ltd

1 Cross Green Approach  
Leeds  
West Yorkshire  
LS9 0SG



Tel: 0113 3918200 Fax: 0113 3918209

e-mail: [info@acsstainless.co.uk](mailto:info@acsstainless.co.uk)

website: [www.acsstainless.co.uk](http://www.acsstainless.co.uk)

**Agrément Certificate**

**19/5650**

Product Sheet 2

### ACS AZURE BRICK SLIP MASONRY SUPPORT SYSTEMS

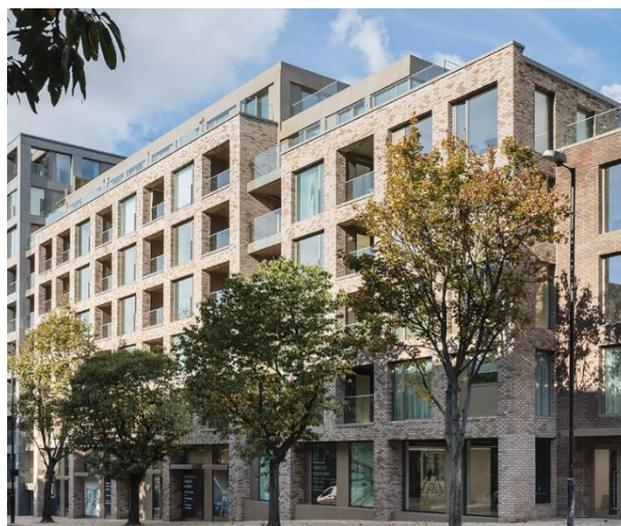
#### ACS AZURE BRICK FACED SOFFIT UNITS

This Agrément Certificate Product Sheet<sup>(1)</sup> relates to ACS Azure Brick Faced Soffit Units, comprising a stainless steel profile with a factory bonded brick slip façade using a specific adhesive, for use in external masonry cavity wall constructions to provide functional cover and for aesthetic purposes.

(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

**Structural performance** — the systems are non-structural and are suitable for use in masonry walls (see Tables 1 to 7 and section 6).

**Behaviour in relation to fire** — the stainless steel profiles and brick slips are 'non-combustible' in accordance with the national Building Regulations; the adhesive is not classified as 'non-combustible', and the systems' use is restricted in some cases (see section 7).

**Hygrothermal properties** — suitably designed junctions incorporating the product can adequately limit heat loss and the risk of condensation (see sections 8 and 9).

**Durability** — provided that the systems are designed, installed and used in accordance with the Certificate, they will have a service life of at least 50 years, when used in the normal climatic conditions found in the UK (see section 11).



The BBA has awarded this 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: 4 June 2019

Paul Valentine  
Technical Excellence Director

Claire Curtis-Thomas  
Chief Executive

*The BBA is a UKAS accredited certification body – Number 113.*

*The schedule of the current scope of accreditation for product certification is available in pdf format via the UKAS link on the BBA website at [www.bbacerts.co.uk](http://www.bbacerts.co.uk)  
Readers are advised to check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA direct.*

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

#### British Board of Agrément

Bucknalls Lane  
Watford  
Herts WD25 9BA

©2019

tel: 01923 665300  
[clientservices@bbacerts.co.uk](mailto:clientservices@bbacerts.co.uk)  
[www.bbacerts.co.uk](http://www.bbacerts.co.uk)

## Regulations

In the opinion of the BBA, ACS Azure Brick Faced Soffit Units, 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 contribute to satisfying this Requirement as set out in section 6 of this Certificate.
<b>Requirement:</b>	<b>B4(1)</b>	<b>External fire spread</b>
Comment:		In England, the systems can be incorporated in a construction satisfying this Requirement. See section 7 of this Certificate.
<b>Regulation:</b>	<b>7</b>	<b>Materials and workmanship (applicable to Wales only)</b>
	<b>7(1)</b>	<b>Materials and workmanship (applicable to England only)</b>
Comment:		The systems are acceptable. See section 11 and the <i>Installation</i> part of this Certificate.
<b>Regulation:</b>	<b>7(2)</b>	<b>Materials and workmanship (applicable to England only)</b>
Comment:		The systems are restricted by this Regulation. See sections 7.1, 7.2 and 7.5 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 are acceptable. See sections 11 and 12 and the <i>Installation</i> part of this Certificate.
<b>Regulation:</b>	<b>9</b>	<b>Building standards applicable to construction</b>
Standard:	1.1(a)(b)	Structure
Comment:		The systems are acceptable, with reference to clauses 1.1.1 <sup>(1)(2)</sup> and 1.1.2 <sup>(1)(2)</sup> of this Standard. See section 6 of this Certificate.
Standard:	2.7	Spread on external walls
Comment:		The systems can satisfy the requirements of this Standard, with reference to clauses 2.7.1 <sup>(1)(2)</sup> and 2.7.2 <sup>(2)</sup> . See sections 7.1 to 7.4 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 a bronze level of sustainability as defined in this Standard.
<b>Regulation:</b>	<b>12</b>	<b>Building standards applicable to conversions</b>
Comment:		All comments given in relation to 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> .
		(1) Technical Handbook (Domestic).
		(2) Technical Handbook (Non-Domestic).



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

<b>Regulation:</b>	<b>23(a)(i)</b>	<b>Fitness of materials and workmanship</b>
Comment:	<b>(iii)(b)(i)</b>	The systems are acceptable. See section 11 and the <i>Installation</i> part of this Certificate.

<b>Regulation:</b>	<b>30</b>	<b>Stability</b>
Comment:		The systems are acceptable as set out in section 6 of this Certificate.
<b>Regulation:</b>	<b>36(a)</b>	<b>External fire spread</b>
Comment:		The systems can satisfy or contribute to satisfying this Regulation. See sections 7.1 to 7.4 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* (3.3) of this Certificate.

### Additional Information

#### NHBC Standards 2019

In the opinion of the BBA, ACS Azure Brick Faced Soffit Units, 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), 6.1 External masonry walls*.

### Technical Specification

#### 1 Description

1.1 ACS Azure Brick Faced Soffit Units are one-piece external wall soffit units, prefabricated from stainless steel profile with factory-bonded brick slips, using a specific adhesive. See Figures 1 to 7.

The systems comprise:

##### Lightweight stainless steel profiles

- The steel profiles are manufactured from high grade 1.4301 or grade 1.4404 austenitic stainless steel to BS EN 10028-7 : 2016 with a profile thickness of 2 mm. The steel sections of the soffit units are CE marked in accordance with BS EN 845-2 : 2013 and manufactured in accordance with BS EN 1090-1 : 2009.

##### Adhesive

- Brick-Fix 3-1 adhesive is a solvent-free, two-component epoxy adhesive covered by BBA Certificate 16/5328. A 3 mm thickness is used to bond the brick slips to the profiles under factory controlled conditions covered by BBA Certificate 17/5475.

##### Brick slips

- Brick slips are 25 mm thick, and cut from bricks manufactured in accordance with BS EN 771-1 : 2011 and BS 4729 : 2005.

##### Fixings

- The bolts, nuts and washers used with the soffit units are manufactured from stainless steel of grade 1.4301, M12 size. Bolts and nuts conform to BS EN ISO 3506-1 and washers to BS 4320 : 1968. Horse shoe packing shims with 50 x 50 x 3 mm dimensions made of GRP (glass-reinforced plastic) material are used with the fixings when required.

1.2 The systems are available in seven standard profiles with three different brick slip bonds. Further details are given in Tables 1 to 7, and shown in the Figures below.

- Soffit Unit 1 – 215 x 65 mm with stretcher bond (Figure 1)
- Soffit Unit 2 – 102.5 x 65 mm with stretcher bond (Figure 2)
- Soffit Unit 3 – 102.5 x 215 mm with soldier bond (Figure 3)
- Soffit Unit 4 – 215 x 65 mm with header bond (Figure 4)
- Soffit Unit 5 – 215 x 102.5 mm with rowlock header bond (Figure 5)
- Soffit Unit 6 – 327 x 65 mm with stretcher bond (Figure 6)
- Soffit Unit 7 – 440 x 65 mm with stretcher bond (Figure 7)

1.3 Ancillary items that must be used with the products, but which are outside the scope of this Certificate, are ACS T1 and T2 Masonry Support Systems. These are stainless steel bracket systems comprising cold form angles, support brackets, shims and anchor bolts. All components are CE marked to BS EN 1090-1: 2009 and BS EN 845-2 : 2013

Figure 1 Soffit Unit 1 – 215 x 65 mm with stretcher bond

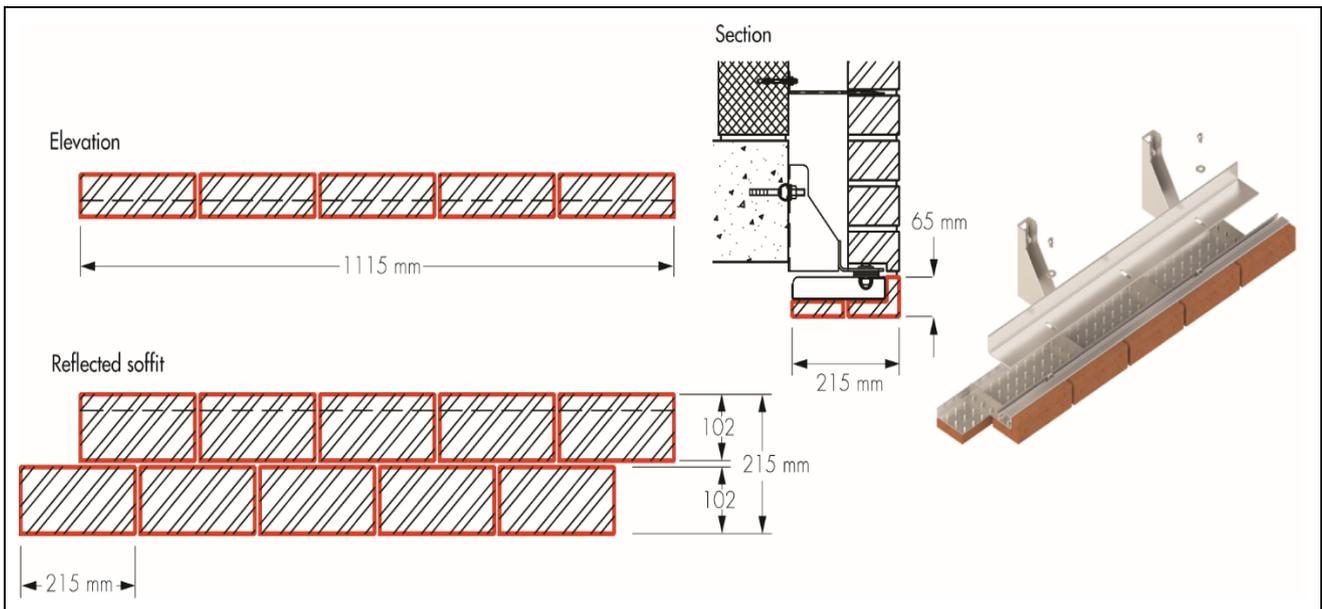


Figure 2 Soffit Unit 2 – 102.5 x 65 mm with stretcher bond

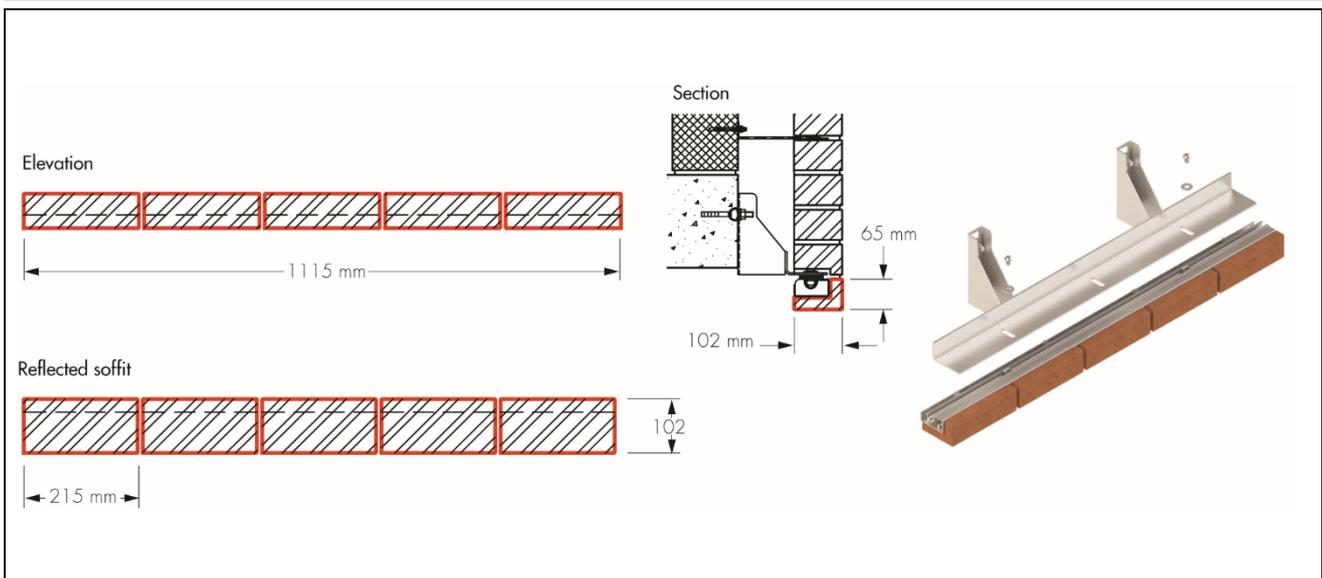


Figure 3 Soffit Unit 3 – 102.5 x 215 mm with soldier bond

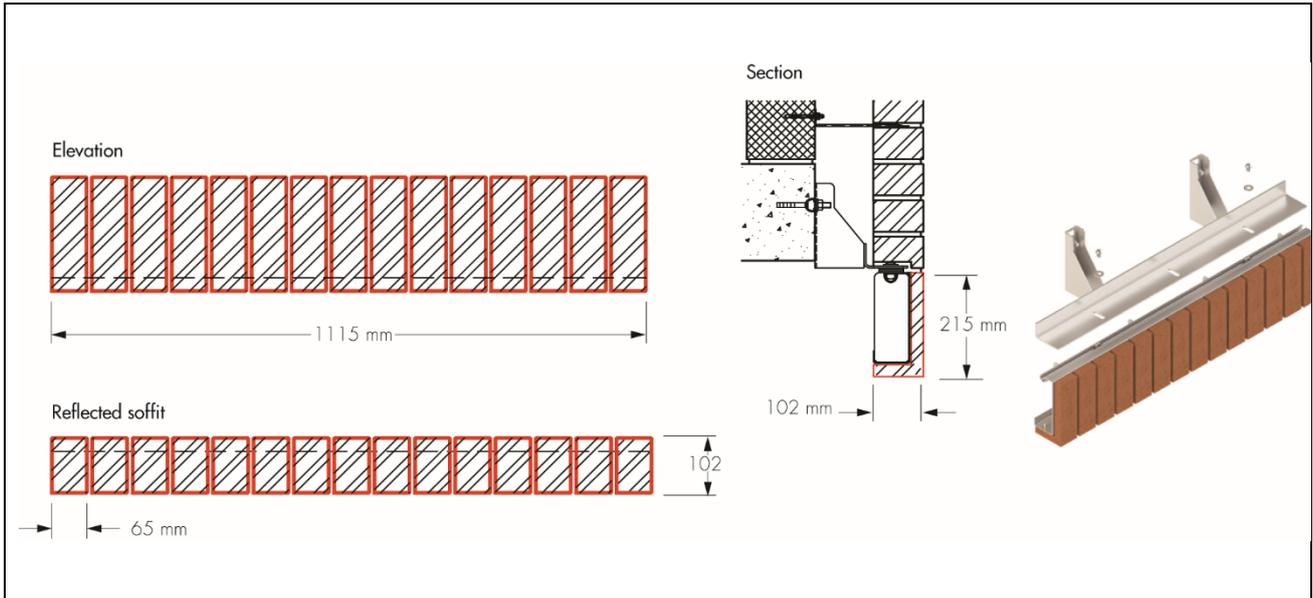


Figure 4 Soffit Unit 4 – 215 x 65 mm with header bond

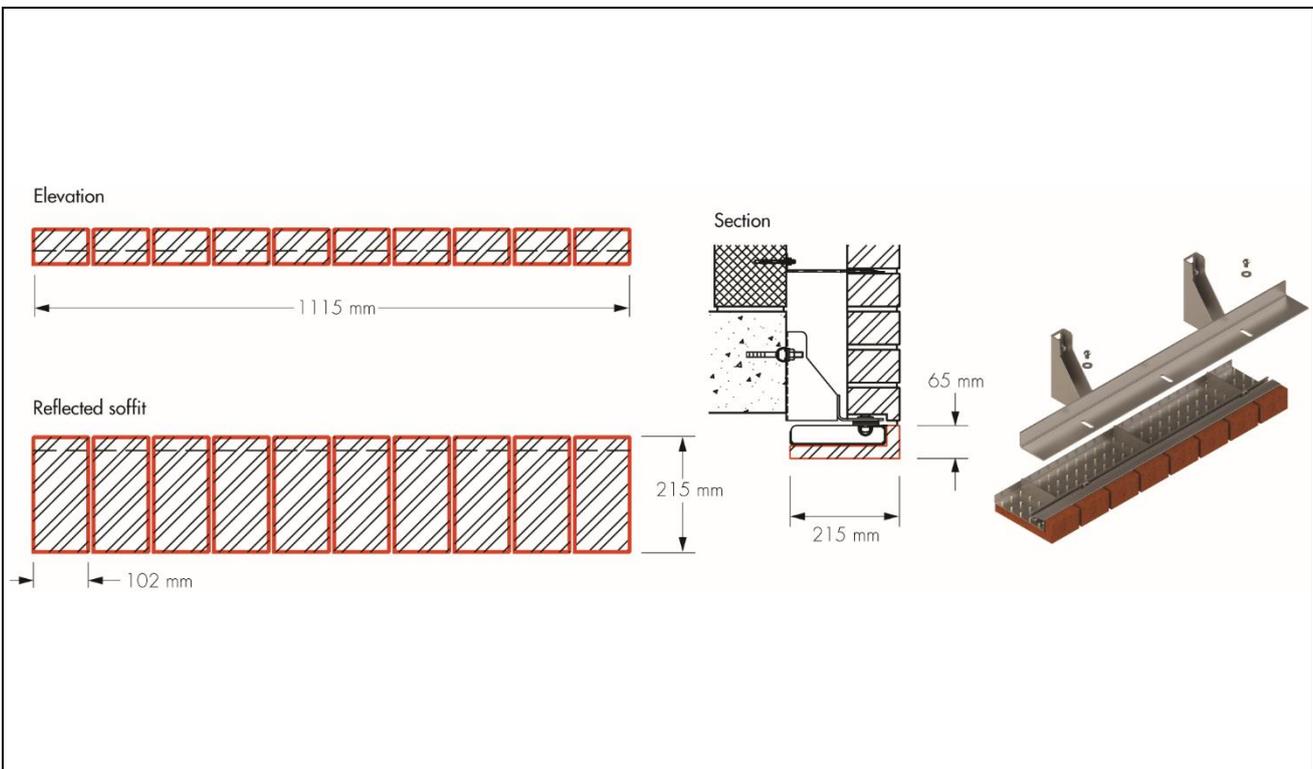


Figure 5 Soffit Unit 5 – 215 x 102.5 mm with rowlock header bond

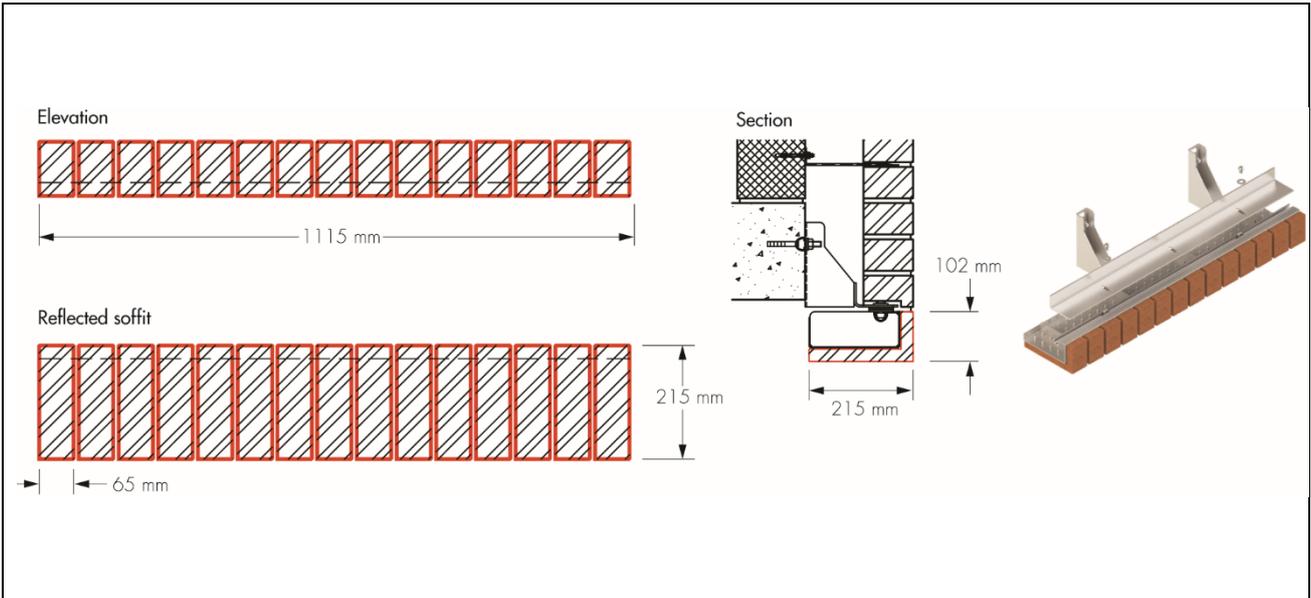
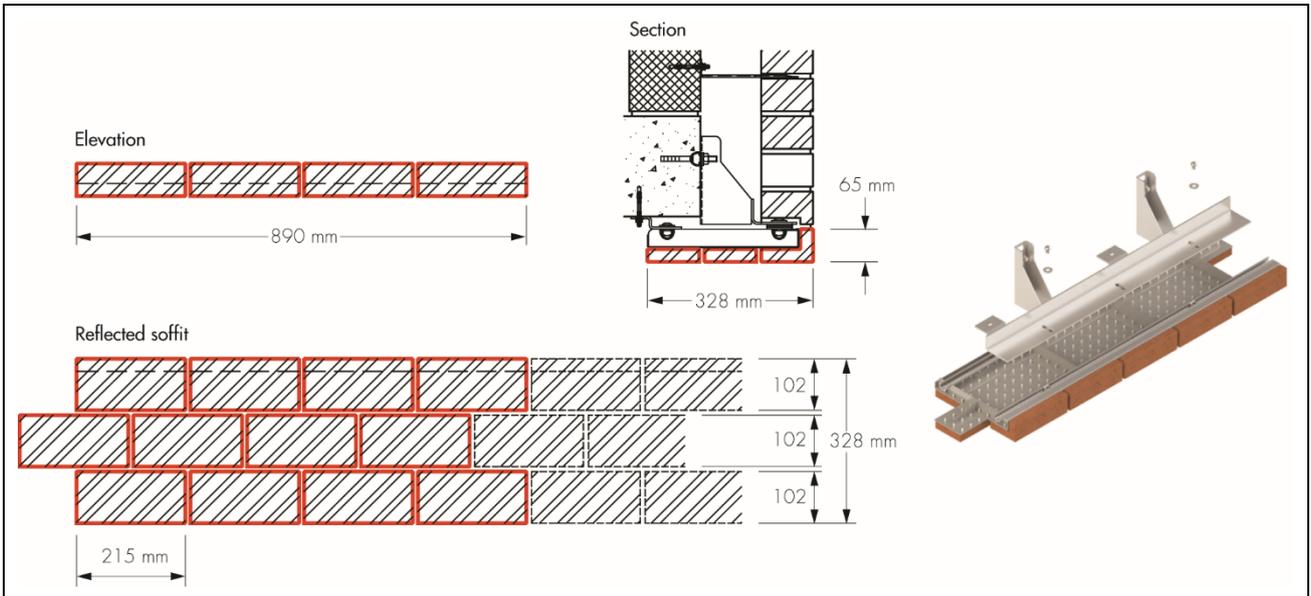
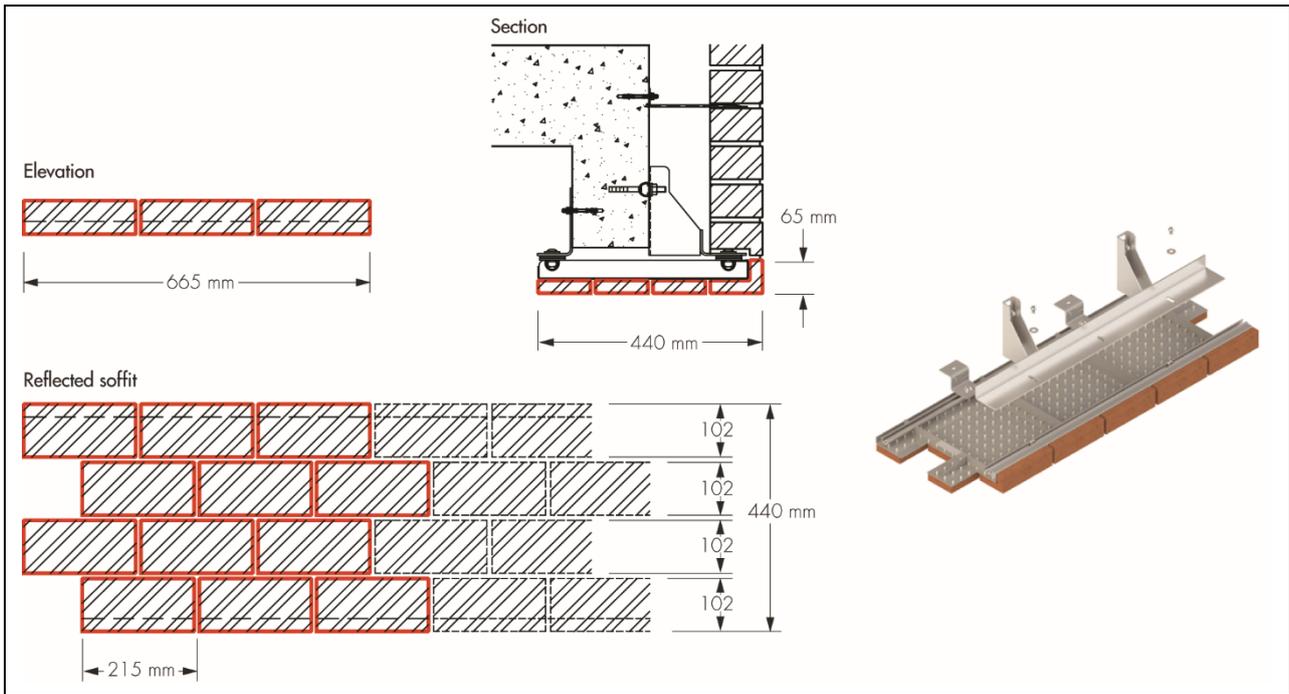


Figure 6 Soffit Unit 6 – 327 x 65 mm with stretcher bond



**Figure 7 Soffit Unit 7 – 440 x 65 mm with stretcher bond**



**Table 1 Soffit Unit 1 – 215 x 65 mm with stretcher bond**

Maximum overall length of soffit profile (mm)	1120
Height of soffit profile (mm)	65
Width of soffit profile (mm)	215
Thickness of steel profile (mm)	2.0
Mass with brick slip (kg·m <sup>-1</sup> )	12.97

**Table 2 Soffit Unit 2 – 102.5 x 65 mm with stretcher bond**

Maximum overall length of soffit profile (mm)	1120
Height of soffit profile (mm)	65
Width of soffit profile (mm)	102.5
Thickness of steel profile (mm)	2.0
Mass with brick slip (kg·m <sup>-1</sup> )	7.88

**Table 3 Soffit Unit 3 – 102.5 x 215 mm with soldier bond**

Maximum overall length of soffit profile (mm)	1120
Height of soffit profile (mm)	215
Width of soffit profile (mm)	102.5
Thickness of steel profile (mm)	2.0
Mass with brick slip (kg·m <sup>-1</sup> )	16.17

*Table 4 Soffit Unit 4 – 215 x 65 mm with header bond*

Maximum overall length of soffit profile (mm)	1120
Height of soffit profile (mm)	65
Width of soffit profile (mm)	215
Thickness of steel profile (mm)	2.0
Mass with brick slip (kg·m <sup>-1</sup> )	17.08

*Table 5 Soffit Unit 5 – 215 x 102.5 mm with rowlock header bond*

Maximum overall length of soffit profile (mm)	1120
Height of soffit profile (mm)	102.5
Width of soffit profile (mm)	215
Thickness of steel profile (mm)	2.0
Mass with brick slip (kg·m <sup>-1</sup> )	16.30

*Table 6 Soffit Unit 6 – 327 x 65 mm with stretcher bond*

Maximum overall length of soffit profile (mm)	895
Height of soffit profile (mm)	65
Width of soffit profile (mm)	327
Thickness of steel profile (mm)	2.0
Mass with brick slip (kg·m <sup>-1</sup> )	21.22

*Table 7 Soffit Unit 7 – 440 x 65 mm with stretcher bond*

Maximum overall length of soffit profile (mm)	670
Height of soffit profile (mm)	65
Width of soffit profile (mm)	440
Thickness of steel profile (mm)	2.0
Mass with brick slip (kg·m <sup>-1</sup> )	26.92

## 2 Manufacture

2.1 The soffit units comprise stainless steel profiles and fixed brick faced units. The stainless steel profiles are manufactured from sheet material which is folded and formed in the factory. The profiles are fabricated by welding. The brick slips are cut from bricks and adhered with the specific adhesive (see section 1.1) to the steel soffit profile at the factory.

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 ACS Stainless Steel Ltd has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2015 by the Steel Certification Scheme (Certificate Registration 2370407)

### 3 Delivery and site handling

3.1 The soffit units are delivered to site or to builders' merchants at specified lengths, each carrying a label bearing the Certificate holder's name. The BBA logo incorporating the number of this Certificate is marked on each soffit unit.

3.2 Reasonable care must be taken during unloading and storage of soffit units, to avoid impact and abrasion or damage to their surface or integrity.

3.3 The systems can generally be handled manually, except for the longer span soffit units, which incorporate lifting lugs for mechanical handling equipment. Protective gloves should be worn when handling the systems.

3.4 The soffit units must be stored off the ground on well-drained, puddle-free hardstanding. The soffit units are delivered on pallets and must not be stacked.

## Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on ACS Azure Brick Faced Soffit Units.

## Design Considerations

### 4 Use

4.1 ACS Azure Brick Faced Soffit Units are satisfactory for use in cavity walls of brickwork and/or blockwork.

4.2 Designers, planners, contractors and/or installers must ensure that the installation of the soffit units is in accordance with the Certificate holder's instructions and the information given in this Certificate.

4.3 As with any form of cavity wall construction where buildings need to comply with *NHBC Standards 2019*, specifiers should observe the requirements of these Standards and include cavity trays and weep-holes.

### 5 Practicability of installation

The systems are designed to be installed by a competent general builder, or a contractor, experienced with these types of systems.

### 6 Structural performance



6.1 ACS Azure Brick Faced Soffit Units have adequate strength and stiffness to sustain their own weight, providing the substructure (stainless steel T1 and T2 Masonry Support Bracket System) is designed and installed by appropriately qualified individuals to withstand the loads and limit the deflections. The systems are not designed to take any load and must be separated from the walling above by the expansion joint mastic sealant.

6.2 The characteristic wind loads on the systems should be calculated in accordance with BS EN 1991-1-4 : 2005. Special consideration should be given to locations with high wind-load pressure coefficients. In accordance with BS EN 1990: 2002, a partial factor of 1.5 should be used to determine the design wind load to be resisted by the system.

6.3 An assessment of the structural performance for the specific building must be carried out by a suitably qualified and experienced individual to confirm that the proposed system provides adequate resistance to design wind loads.

6.4 The characteristic bond resistance between the steel soffit plate and brick slip interface derived from test results is  $80.26 \text{ kN}\cdot\text{m}^{-2}$ .

6.5 In addition to the requirements specifically referred to in this Certificate, structures of brickwork or blockwork in which the soffit units are incorporated must be designed and constructed in accordance with BS EN 1996-1-1 : 2005 and BS EN 1996-1-2 : 2005 and their UK National Annexes. Reference should also be made to PD 6697 : 2010, and the following technical specifications of the Approved Documents to the national Building Regulations as appropriate:

**England and Wales** — Approved Document A1/2, Part C, Section 1

**Scotland** — Section 1, Small Building Guide

**Northern Ireland** — Technical Booklet D *Structure*, Section 3.

## 7 Behaviour in relation to fire



7.1 The stainless steel profiles and brick slips are non-combustible and classified as Class A1 in accordance with national Building Regulations.

7.2 Brick-Fix 3-1 adhesive is not classified as non-combustible or of limited combustibility.

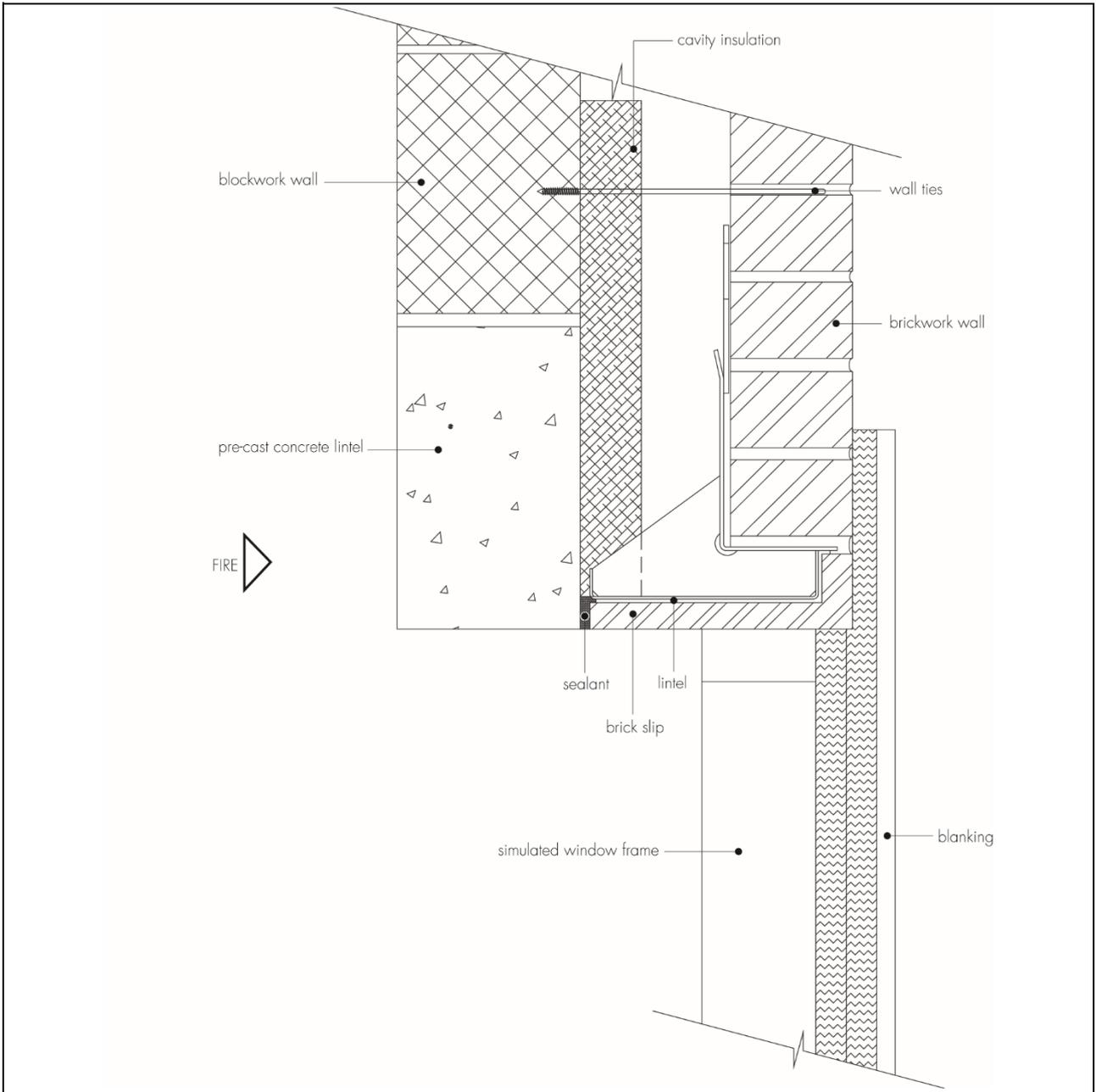
7.3 Soffit units are constructed with the same components as the Azure Brick Slip Lintels (Product Sheet 1 of this Certificate), which were tested utilising heating conditions in accordance with BS EN 1363-1 : 2012, and no debonding was recorded for 104 minutes. Therefore, the soffit units can equally satisfy the requirements of BS EN 1996-1-2 and the national Building Regulations; designers should refer to the EXOVA Warrington fire Test Report No. 388403, Issue 3 (available from the Certificate holder for additional details).

7.4 The fire test construction shown in Figure 8 is not subject to any restriction on proximity to boundaries and height, except those described in section 7.5 below.



7.5 The systems should not be used on buildings in England that have a storey at least 18 m above ground level and contain: one or more dwellings, an institution, a room for residential purposes (excluding any room in a hostel, hotel or boarding house), student accommodation, care homes, sheltered housing, hospitals or dormitories in boarding schools.

Figure 8 Fire resistance test construction



## 8 Thermal performance

8.1 Typical example details containing the systems, based on the construction details shown in Figures 2, 3 and 7, were analysed numerically to determine their likely hygrothermal performance.

8.2 If designed appropriately, exposed floor junctions with insulated soffits will adequately limit excessive heat loss and allow use of the following psi ( $\Psi$ ) values in carbon emission rate calculations (see Table 8, below). Detailed guidance in this respect and on limiting heat loss by air infiltration can be found in the documents referred to in section 9.2.

**Table 8 Linear thermal transmittance,  $\psi$ -values, for exposed floor (normal) junctions**

Soffit Unit	Example $\Psi$ value <sup>(1)</sup> ( $W \cdot m^{-1} \cdot K^{-1}$ )	Default $\Psi$ value <sup>(5)</sup> ( $W \cdot m^{-1} \cdot K^{-1}$ )
Unit 2: 102.5 x 65 mm with stretcher bond <sup>(2)</sup> (Figure 2)	0.18	
Unit 3: 102.5 x 215 mm with soldier bond <sup>(3)</sup> (Figure 3)	0.16	0.32
Unit 7: 440 x 65 mm with stretcher bond <sup>(2)(4)</sup> (Figure 7)	0.30	

1) Assumed wall build-up: 102.5 mm brickwork ( $\lambda = 0.77 W \cdot m^{-1} \cdot K^{-1}$ ), 50 mm low-E vented cavity ( $R = 0.66 m^2 \cdot K \cdot W$ ) 75 mm PUR insulation ( $\lambda = 0.027 W \cdot m^{-1} \cdot K^{-1}$ ), 100 mm blockwork/mortar ( $\lambda = 0.162 W \cdot m^{-1} \cdot K^{-1}$ ), 15 mm service cavity ( $R = 0.17 m^2 \cdot K \cdot W$ ), 12.5 mm plasterboard ( $\lambda = 0.25 W \cdot m^{-1} \cdot K^{-1}$ )

(2) Assumed insulated soffit construction: 10 mm brick slips ( $\lambda = 0.77 W \cdot m^{-1} \cdot K^{-1}$ ), 80 mm phenolic insulation ( $\lambda = 0.021 W \cdot m^{-1} \cdot K^{-1}$ ) and 300 mm dense reinforced concrete slab ( $\lambda = 2.5 W \cdot m^{-1} \cdot K^{-1}$ )

(3) Assumed insulated soffit construction: 10 mm brick slips ( $\lambda = 0.77 W \cdot m^{-1} \cdot K^{-1}$ ), 230 mm mineral wool insulation ( $\lambda = 0.037 W \cdot m^{-1} \cdot K^{-1}$ ) and 300 mm dense reinforced concrete slab ( $\lambda = 2.5 W \cdot m^{-1} \cdot K^{-1}$ )

(4) Loose-fill insulation within soffit unit ( $\lambda = 0.040 W \cdot m^{-1} \cdot K^{-1}$ )

(5) Where a junction detail has not been calculated in accordance with BS EN ISO 10211 and BR 497 : 2007, the default value from column 3 must be used

8.3 For other junction details, the linear thermal transmittance and temperature factor should be calculated in accordance with BS EN ISO 10211 : 2017, following the guidance in BRE Report BR 497 : 2007.

## 9 Condensation risk

9.1 The construction described in section 8.1 will achieve a surface temperature factor,  $f_{Rsi}$ , in excess of 0.80, which can be compared to the critical temperature factors,  $f_{CRsi}$ , in BRE Information Paper IP 1/06 for the relevant building type. The risk of surface condensation is low when the  $f_{Rsi}$  is equal to or greater than the  $f_{CRsi}$ . The systems can therefore contribute to limiting the risk of surface condensation in some building types. For other constructions, the  $f_{Rsi}$ , must be established by numerical modelling (see section 8.3).

9.2 Further guidance on limiting the risk of surface condensation can be found in:

**England and Wales** — Limiting thermal bridging and air leakage: Robust construction details for dwellings and similar buildings or Accredited Construction Details (version 1.0)

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

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

9.3 External soffits can adequately limit the risk of interstitial condensation when they are designed and constructed in accordance with BS 5250 : 2011 (section F.5.3), including having an AVCL (Air Vapour Control Layer) on the warm side of the insulated soffit and a ventilated 50 mm air cavity between the insulation and the soffit panel.

## 10 Maintenance



10.1 If the brick finish becomes damaged or stained, the advice of the Certificate holder should be sought.

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

- visual inspection of the brick-slips for signs of disbondment. Dislodged slips must be re-fixed using brick-slip adhesive
- 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 behind the brick slips
- removal and replacement of damaged brick slips, using the adhesive as supplied by the Certificate holder

10.3 Damaged areas must be repaired using the appropriate components and procedures detailed in the Certificate holder's installation instructions. Direct jet cleaning of the brick slips should be avoided; if brick slips are stained, the advice of the Certificate holder should be sought.

## 11 Durability



11.1 Provided that ACS Azure Brick Faced Soffit Units are designed, installed and used in accordance with this Certificate, they will have a service life of at least 50 years.

11.2 The brick slips will have an equivalent durability to the bricks from which they were cut (see section 1.1).

11.3 The stainless steel profiles of the soffit units will have adequate durability for a service life of at least 50 years (see section 1.2 and Table 2 of PD 6697 : 2010).

## 12 Reuse and recyclability

The stainless steel profiles and the brick slips (which contain fired clay) can be recycled.

### Installation

## 13 General

13.1 Weep-holes should be provided in the outer leaf above the soffit units to drain moisture from the cavity. A minimum of two weep-holes should be provided per unit. For fair-faced masonry, weep-holes should be provided at centres not greater than 450 mm.

13.2 Brick slips should be pointed using the same mortar as the rest of the brickwork, but only after removal of the temporary propping. Pointing of soffit units should be conducted using a pointing gun. Pointing should not take place in wet weather or in temperatures below 3°C.

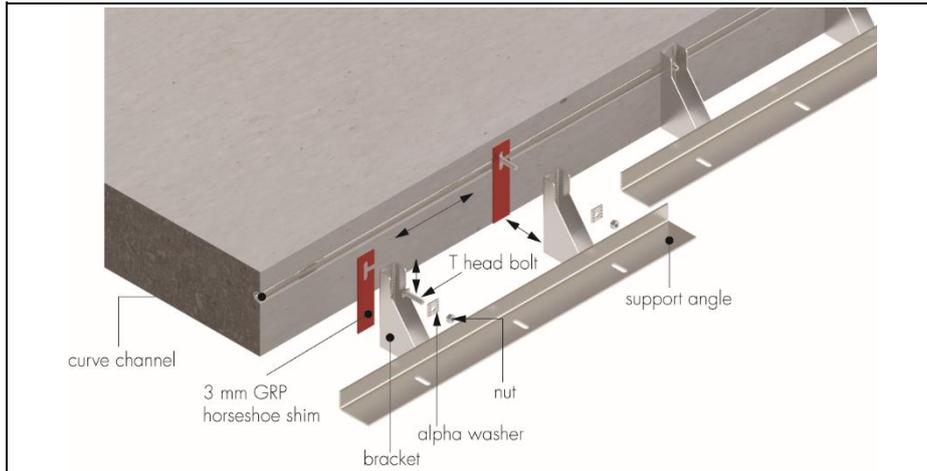
## 14 Procedure

14.1 ACS Azure Brick Faced Soffit Units must be used in conjunction with the ACS Masonry Support System (T1 and T2). The soffit units are typically fixed to the underside of a masonry support shelf angle. Slots are provided in the horizontal projecting member of the masonry support system to allow fixings to be installed through the angle and into the integrated ACS 31/21 curve channel in the bolt-up carrier. Fixings will either be the ACS 31/21 T-headed bolt or the ACS button-head socket screw and square nut (1.4301 A2, Class 70), as required. A minimum of two fixings per channel should be used, at a maximum spacing of 500 mm. Fixings should be tightened using a calibrated torque wrench to a setting of 25 Nm. The system is a bespoke item; fixing type, number and spacing may vary dependent upon the specific project details. Specific connection details are provided with each system, as necessary.

### Installation of the ACS T1 and T2 Masonry Support System (outside the scope of this Certificate)

14.2 The ACS Masonry Support System should be fixed to the primary structure. T-head bolts are installed into the channel and turned clockwise through 90 degrees to engage and anchor into the channel. The thermal shim, bracket, serrated Alpha washer and nut are positioned and loosely hand-tightened. The cast-in channel provides horizontal adjustment. Cavity deviations can be accommodated for by using ACS thermal or stainless-steel shims up to a maximum of 12 mm. Vertical adjustments are achieved using the castellated Alpha feature in the back of the bracket to accommodate +/- 30mm of adjustment. The system is then levelled, and bolts are tightened using a calibrated torque wrench (see Figures 9 and 10). To ensure the correct function of the masonry support system, wall ties must be installed in the masonry above the support angle within 300 mm vertically and at a maximum of 450 mm horizontal centres. A minimum of two-thirds masonry bearing must be achieved on the shelf angle, and the bracket bearing area must be fully bearing against the structure.

Figure 9 Installation of ACS Masonry Support System



### Installation of soffits

14.3 The soffits can be installed once the correct levelling is accomplished. This can be done by setting a string or laser line that corresponds to the transition edge between the face and soffit of the brick, checking the line and level against a known datum or to the facing brickwork adjacent to the soffit opening where relevant.

14.4 The soffit unit's square nuts should be installed into the ends of the channel and be positioned so as to generally correspond to the slots in the masonry support angle. At least two fixings must be installed in each length of channel.

14.5 The soffit unit can then be lifted into position to the underside of the masonry support angle; hand clamps can be used to help the installers keep the unit in place while installing the screws. Care must be taken not to damage the brick slips of the soffit units during handling and clamping.

14.6 Once positioned, the M12 x 25 mm button-head screws with a Form B washer are used to fix (hand-tighten at this point) through the slots in the angle, into the square nuts located in the channel.

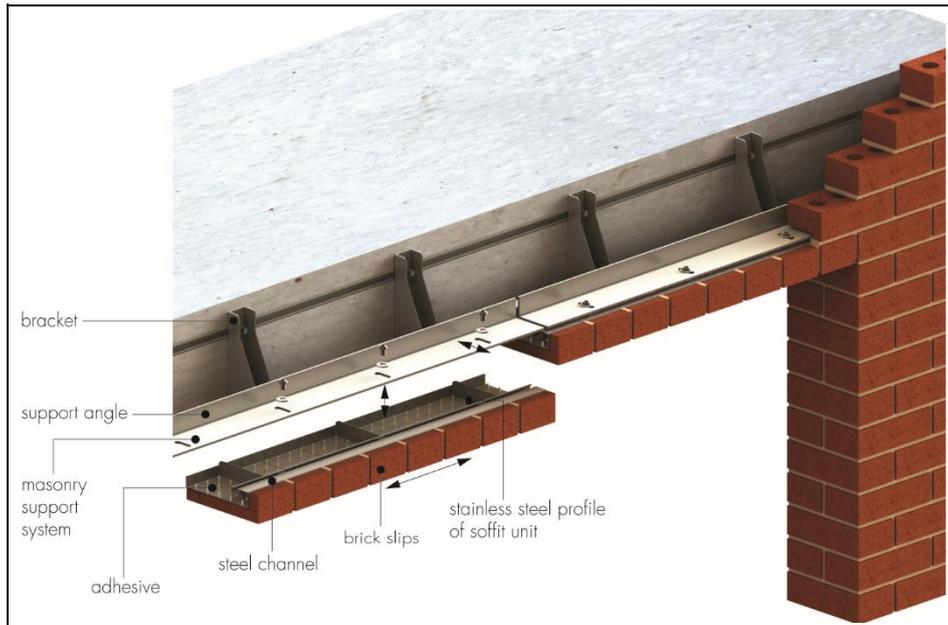
14.7 The hand clamps can be released at this point. The levelling line should be adjusted, and the soffit unit should be gauged to the string or laser line and required coursing. A spirit level can be used to continually check the level. If the angle is correctly levelled, there should be no need to add shims between the soffit unit and the angle. If, however, shims are required, they should be added at this time to ensure that any gaps between the underside of the shelf angle and top of the soffit unit system are sufficiently packed before tightening. The final check for levelling the soffit unit correctly is to measure front to back using a spirit level. Packing shims can be used where necessary to level the soffit front to back.

14.8 Once the units are set and shimmed as appropriate, a calibrated torque wrench with an 8 mm hexagon socket should be used to torque the screw up to a minimum of 15 and a maximum of 25 Nm. The specific torque setting is to ensure that the soffit unit is firmly clamped to the underside of the angle.

14.9 The installation can progress with the subsequent units by repeating steps 14.3 to 14.8 and by always referring to the layout drawings provided and checking the line level, gauge and coursing.

14.10 Brickwork should continue on the masonry support system in line with normal bricklaying practice.

Figure 10 Installation of soffits



## Technical Investigations

### 15 Tests

Tests were carried out and the results assessed to determine:

- load-deflection characteristic to BS EN 845-2 : 2013
- bond strength after accelerated ageing
- impact strength after accelerated ageing
- integrity of the bond at maximum design deflection
- fire resistance performance based on the fire resistance test (ad-hoc) utilising the heating conditions of BS EN 1363-1: 2012.

### 16 Investigations

16.1 An assessment was made of data relating to:

- calculations to establish minimum temperature factors and the  $\Psi$  values of typical constructions incorporating the products, undertaken to IP 1/06
- durability
- practicability of installation.

16.2 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 Information Paper IP 1/06 *Assessing the effects of thermal bridging at junctions and around openings*
- BRE Report BR 497 : 2007 *Conventions for calculating linear thermal transmittance and temperature factors*
- BS 4320 : 1968 *Specification for metal washers for general engineering purposes – Metric series*
- BS 4729 : 2005 + A1 : 2016 *Clay bricks of special shapes and sizes – Recommendations*
- BS 5250 : 2011 + A1 : 2016 *Code of practice for control of condensation in buildings*
- BS EN 771-1 : 2011 + A1 : 2015 *Specification for masonry units – Clay masonry units*
- BS EN 845-2 : 2013 + A1 : 2016 *Specification for ancillary components for masonry – Lintels*
- BS EN 1090-1 : 2009 + A1 : 2011 *Execution of steel structures and aluminium structures – Requirements for conformity assessment of structural components*
- BS EN 1363-1 : 2012 *Fire resistance tests – General requirements*
- BS EN 1990 : 2002 *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*
- 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 *UK 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 *UK National Annex to Eurocode 6: Design of masonry structures – General rules – Structural fire design*
- BS EN 10028-7 : 2016 *Flat products made of steels for pressure purposes – Stainless steels*
- BS EN ISO 10211 : 2017 *Thermal bridges in building construction – Heat flows and surface temperatures – Detailed calculations*
- BS EN ISO 3506-1 : 2009 *Mechanical properties of corrosion-resistant stainless steel fasteners – Bolts, screws and studs*
- BS EN ISO 9001 : 2015 *Quality management systems – Requirements*

### 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
- 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.

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:

- 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.

17.6 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.