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Agrément Certificate
20/5787
Product Sheet 1

ASH & LACY CLADDING SYSTEM

MECHSLIP CLADDING SYSTEM AND AXIAL SUPPORTING SYSTEM

This Agrément Certificate Product Sheet(1) relates to the Mechslip Cladding System and AxiAL Supporting System, for use as protective/decorative cladding externally over masonry, concrete, timber-frame or steel-frame substrate walls of 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 systems can be designed to resist wind actions normally encountered in the UK (see section 6).
Behaviour in relation to fire — the systems' components are Class A1 as defined in the national Building Regulations (see section 7).
Air and water penetration — the systems minimise water penetration and the risk of damage to the inner wall (see section 8).
Durability — when used in normal exposure conditions, the systems can have a service life in excess of 35 years (see section 10).

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: 30 July 2020

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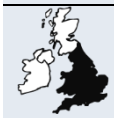
Regulations

In the opinion of the BBA, the Mechslip Cladding System and AxiAL Supporting 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 systems are acceptable. See sections 6.2 to 6.10 of this Certificate.
Requirement:	**B3(4)**	**Internal fire spread (structure)**
Requirement:	**B4(1)**	**External fire spread**
Comment:		The systems can contribute to satisfying these Requirements. See sections 7.1 and 7.6 of this Certificate.
Requirement:	**C2(b)(c)**	**Resistance to moisture**
Comment:		The systems will contribute to satisfying this Requirement. See sections 8.1 to 8.4 of this Certificate.
Regulation:	**7(1)**	**Materials and workmanship**
Comment:		The systems are acceptable. See sections 10.1 and 10.2 and the *Installation* part of this Certificate.
Regulation:	**7(2)**	**Materials and workmanship**
Comment:		The systems are acceptable. See sections 7.1, 7.3, 7.5 and 7.6 of this Certificate.

The Building (Scotland) Regulations 2004 (as amended)

Regulation:	**8(1)(2)**	**Durability, workmanship and fitness of materials**
Comment:		The systems can contribute to a construction satisfying this Regulation. See sections 9, 10.1 and 10.2 and the *Installation* part of this Certificate.
Regulation:	**9**	**Building standards applicable to construction**
Standard:	1.1 (a)(b)	Structure
Comment:		The systems are acceptable, with reference to clause 1.1.1(1)(2) of this Standard. See sections 6.2 to 6.10 of this Certificate.
Standard:	2.4	Cavities
Comment:		The systems can contribute to satisfying this Standard, with reference to clause 2.4.2(1)(2). See section 7.2 of this Certificate.
Standard:	2.6	Spread to neighbouring buildings
Comment:		The systems are unrestricted by this Standard, with reference to clauses 2.6.4(1)(2), 2.6.5(1) and 2.6.6(2). See sections 7.1, 7.3, 7.5 and 7.6 of this Certificate
Standard:	2.7	Spread on external walls
Comment:		The systems are unrestricted by this Standard, with reference to clause 2.7.1(1)(2). See sections 7.1, 7.3, 7.5 and 7.6 of this Certificate.

Standard:	3.10	Precipitation
Comment:		The systems will contribute to a construction satisfying this Standard, with reference to clauses 3.10.1[(1)(2)] and 3.10.6[(1)(2)]. See sections 8.1 to 8.4 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.
Regulation:	**12**	**Building standards applicable to conversions**
Comment:		Comments in relation to the systems 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) (iii)(b)**	**Fitness of materials and workmanship**
Comment:		The systems are acceptable. See sections 10.1 and 10.2 and the *Installation* part of this Certificate.
Regulation:	**28(b)**	**Resistance to ground moisture and weather**
Comment:		The systems are 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 systems are acceptable. See sections 4.3, 4.4 and 6.2 to 6.10 of this Certificate.
Regulation:	**35(4)**	**Internal fire spread – Structure**
Regulation:	**36(a)**	**External fire spread**
Comment:		The systems can contribute to satisfying these Regulations. See sections 7.1 and 7.6 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.

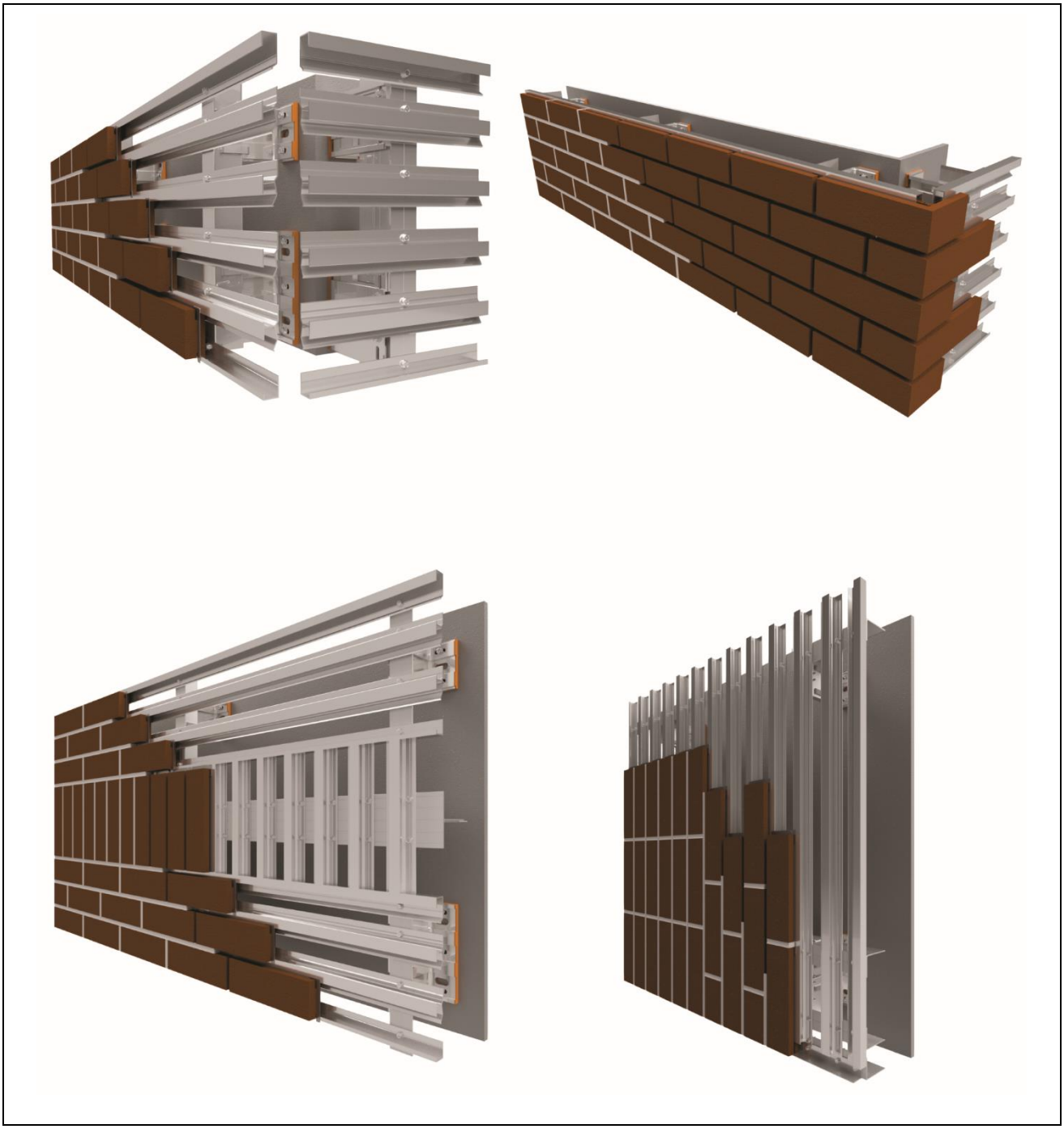
See section: 3 *Delivery and site handling* of this Certificate.

Technical Specification

1 Description

1.1 The Mechslip Cladding System comprises clay brick slips mechanically fixed onto bespoke rails (installed vertically or horizontally), which are in turn attached to the AxiAL Supporting System fixed to the substrate wall. The support system creates a ventilated cavity between the substrate wall and brick slip cladding. The vertical and horizontal joints between the brick slip elements are pointed with mortar (see Figure 1). The systems are designed to provide protective/decorative cladding externally over existing masonry, concrete, timber-frame or steel-frame substrate walls of new or existing domestic and non-domestic buildings. The systems have not been assessed for installation below ground.

Figure 1 Mechslip System and AxiAL Supporting System



1.2 The Mechslip System is a ventilated rainscreen cladding system comprising:

- profiled brick slips – fired clay brick slips conforming to BS EN 771-1 : 2011. The length of the bricks can be 215, 290, 327, 440 or 490 mm. The height of bricks can be 50, 65, 68 or 73 mm. The thickness of bricks can be from 28 to 48 mm; however, the 'standard' bricks are 28 or 48 mm (see Figure 2)
- aluminium support rail – anodised 6063 T6 grade aluminium support rails in accordance with BS EN 755-9 : 2016. The rails are available as starter rail, middle rail and top rail profiles (see Figure 3)
- fixings (for fixing aluminium support rails to AxiAL Supporting System mullions) — Ash & Lacy stainless steel self-drilling SS-LS22, BM-LS25 or BM-SS-LS25 screws.
- pointing mortar – Parex Historic mortar: a hydrated lime, sand, GGBS (cement free) pointing mortar manufactured to BS EN 998-2 : 2016.

Figure 2 Profiled brick slips

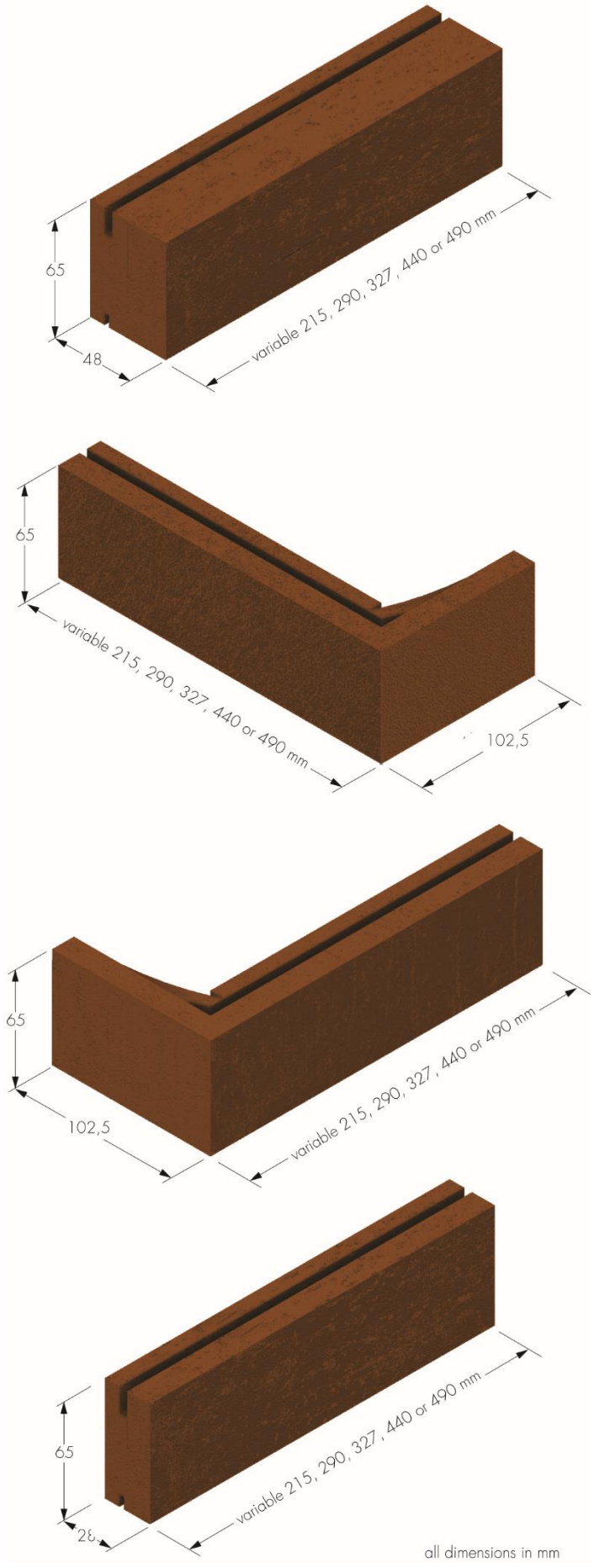
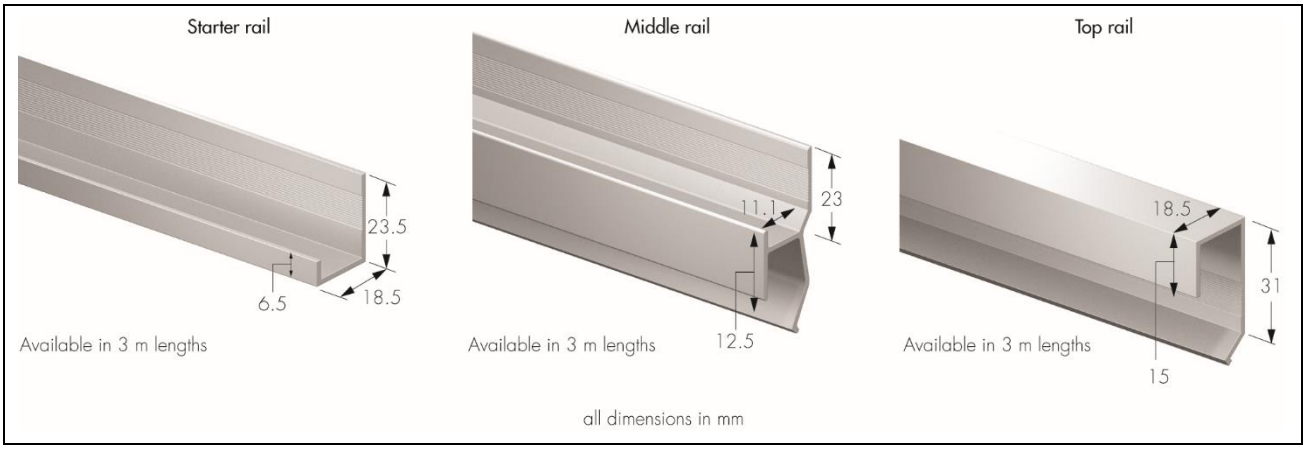


Figure 3 Aluminium support rails

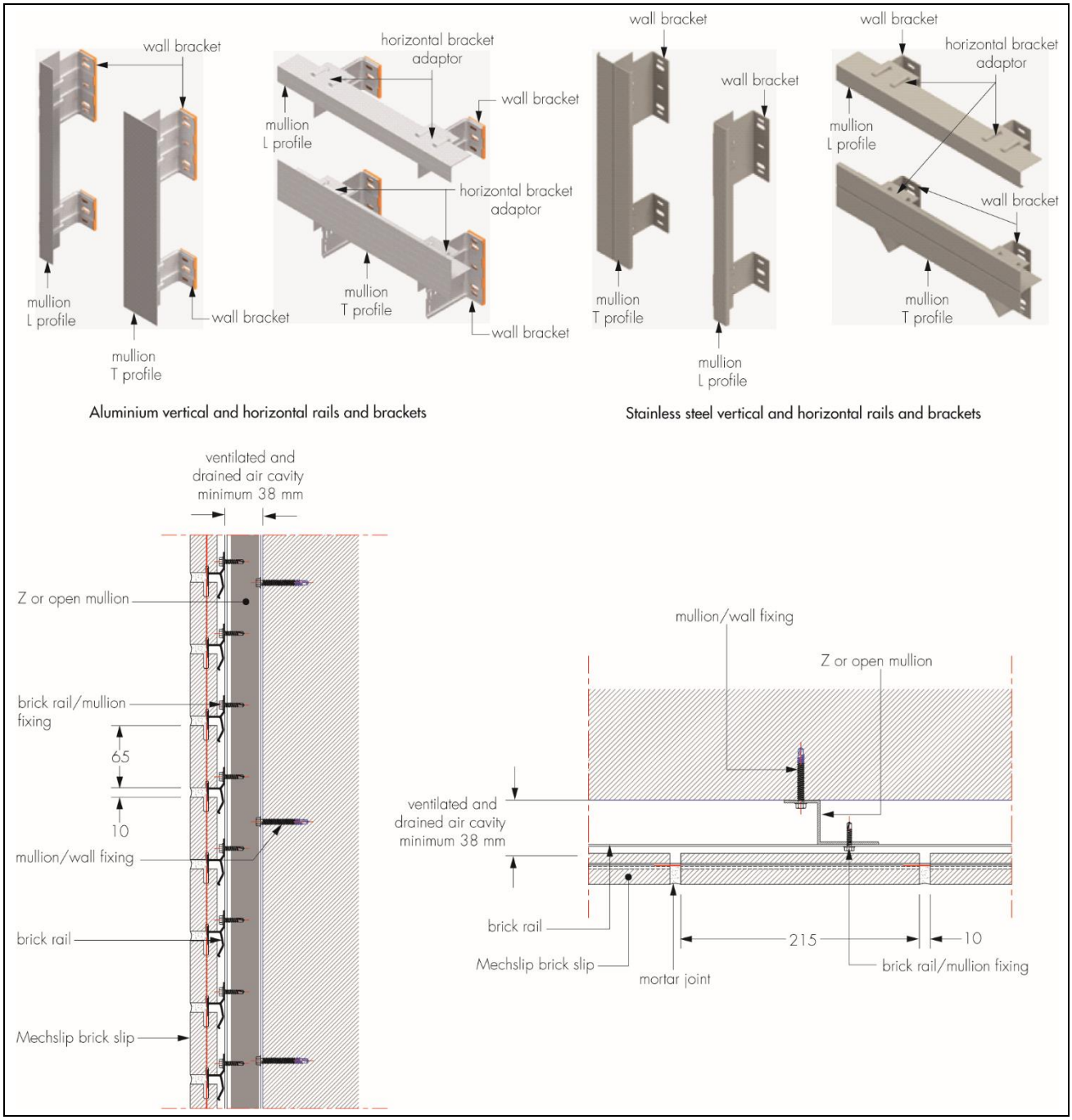


1.3 The AxiAL Supporting System (see Figure 4) comprises:

- mullions — L, T and Z profiles, open mullion and top hat rails made of aluminium and stainless steel, with a maximum length of 6000 mm, and fixed to the aluminium or stainless steel wall brackets using self-drilling screws. The system can be installed horizontally or vertically with the vertical or horizontal mullions respectively.
- fixings — the L,T, Z and top hat mullions are fixed to the brackets using Ash & Lacy stainless steel grade 304 self-drill screws SS-LS22 or BM-LS25 for aluminium mullions and brackets, and Ash & Lacy stainless steel grade 316 self-drill screws BM-SS-LS25 for stainless steel mullions and brackets (see Figure 7).
- wall brackets — fitted to the substrate using appropriate fixings(1). L-shaped mill-finish aluminium brackets, with a P66 nylon thermal break isolator pad (insulating properties outside the scope of this Certificate) fitted to the heel, and stainless steel bracket. Two variants of the brackets are available: single and double. The single brackets have a height of 80 mm with a thickness of 2 and 3 mm and the double brackets, 160 mm, with a thickness of 3 mm.
- horizontal adaptor — assembled with standard AxiAL aluminium single and double brackets to create the horizontal solution for the AxiAL. With this horizontal adaptor, the vertical rail can be installed horizontally. The details of fixing holes and clips on the adaptor are the same as those on the AxiAL aluminium bracket, so for the horizontal system, the rail fixings and adjustment are the same as those of the standard AxiAL aluminium bracket.
- Open mullion and Z rail — for build-ups that use the open mullion or Z rail support, the Mechslip cladding system is attached to the open mullions or Z rails, which are in turn directly attached to the substrate wall

(1) Outside the scope of this Certificate.

Figure 4 AxiAL Supporting System



1.4 The systems' components are manufactured to the profile dimensions detailed in Figures 5 and 6, and the following material grades:

- L, T and Z profile and top hat aluminium rails to grade EN AW–6063T6, to BS EN 573-3 : 2019
- L, T and Z profile and top hat stainless steel rails to grade 316, to BS EN 10088-1 : 2014
- open mullion aluminium rails to grade EN AW–6063T6, to BS EN 573-3 : 2019
- L-shaped aluminium bracket to grade EN AW–6063T6, to BS EN 573-3 : 2019
- L shaped stainless steel bracket to grade 316, to BS EN 10088-1 : 2014
- horizontal aluminium bracket adaptor to grade EN AW–6063T6, to BS EN 573-3 : 2019.

1.5 The components have the characteristics described in Tables 1 to 5, in section 6 of this Certificate.

Figure 5 Aluminium component details

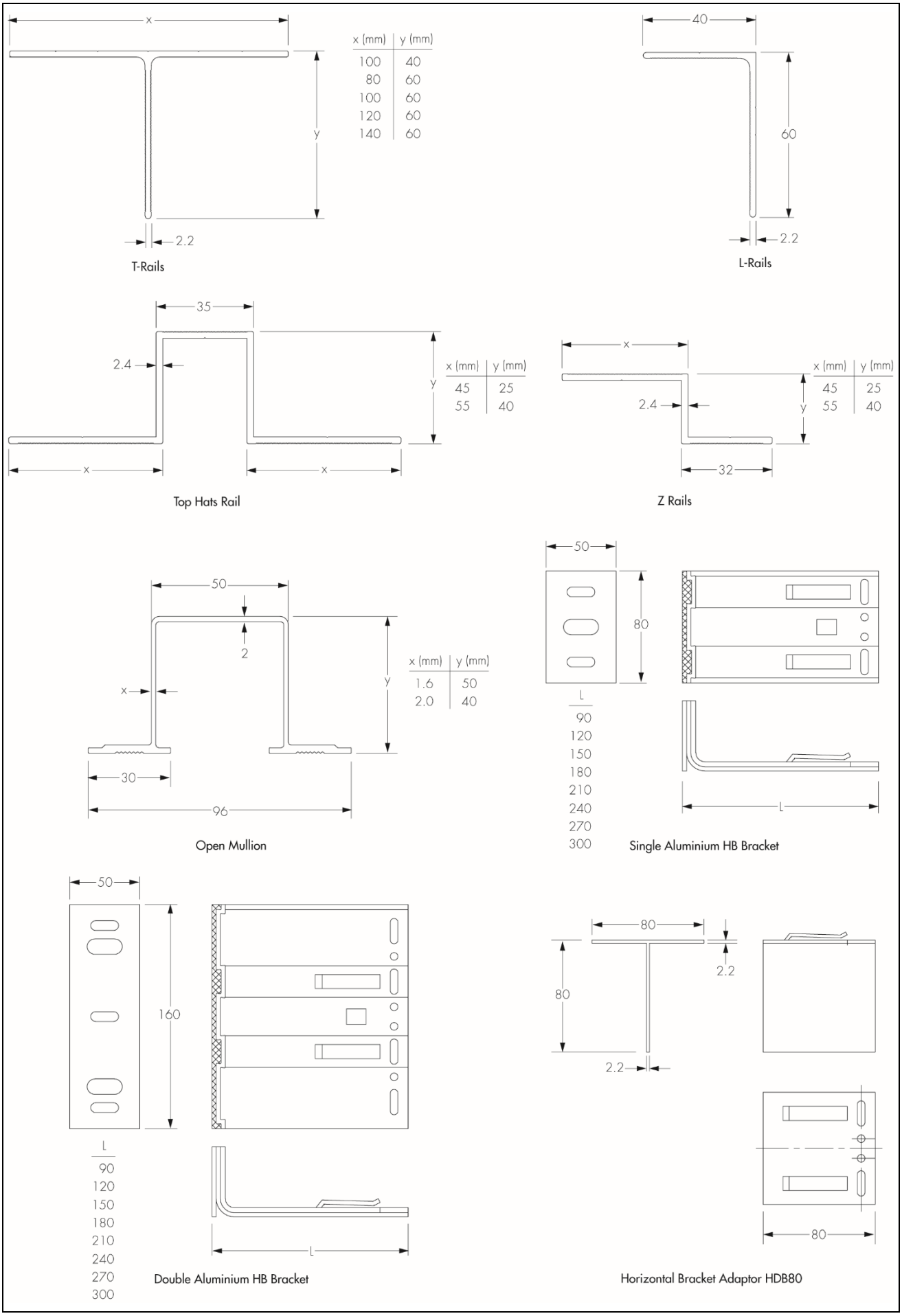


Figure 6 Stainless steel component details

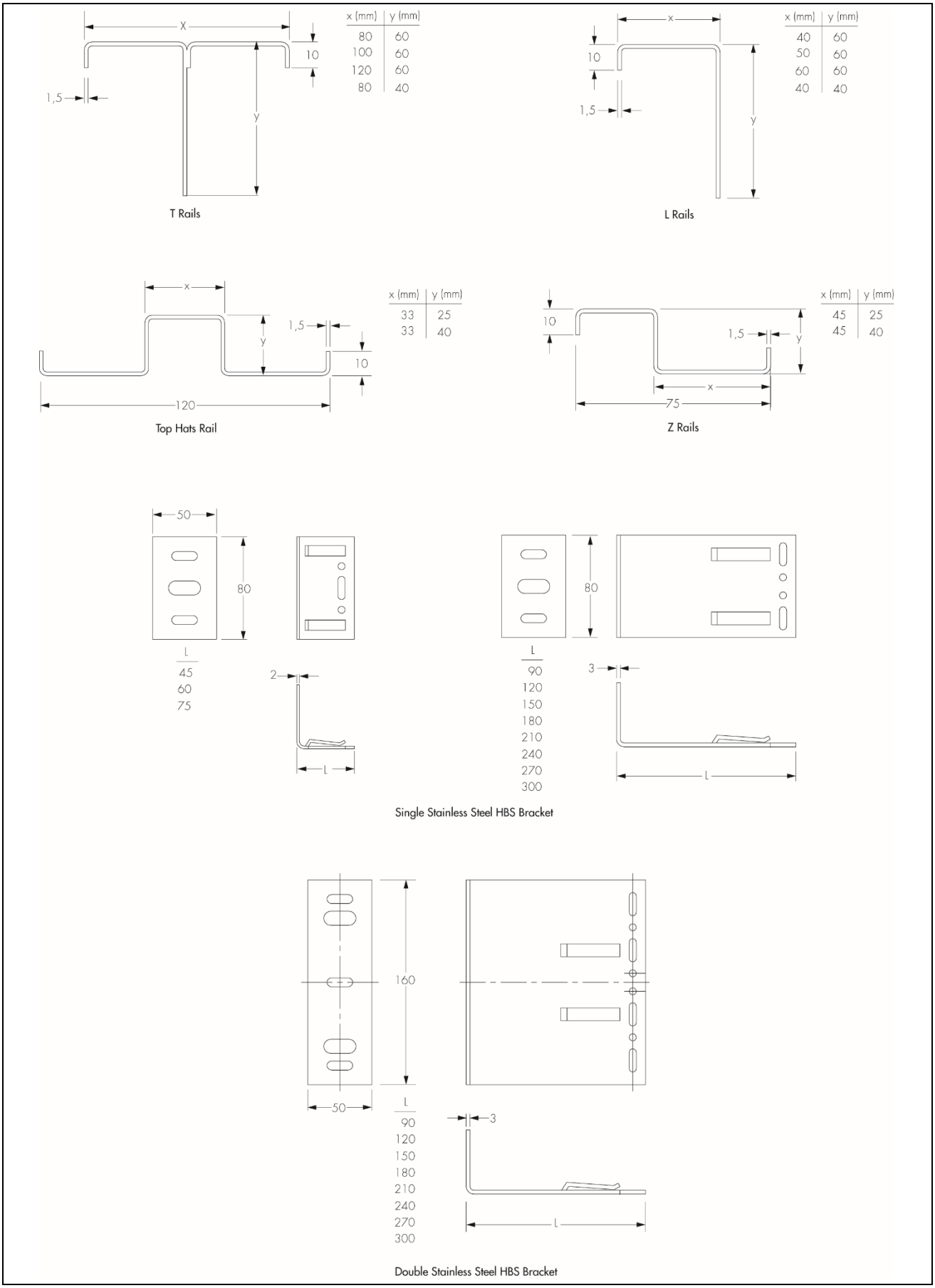
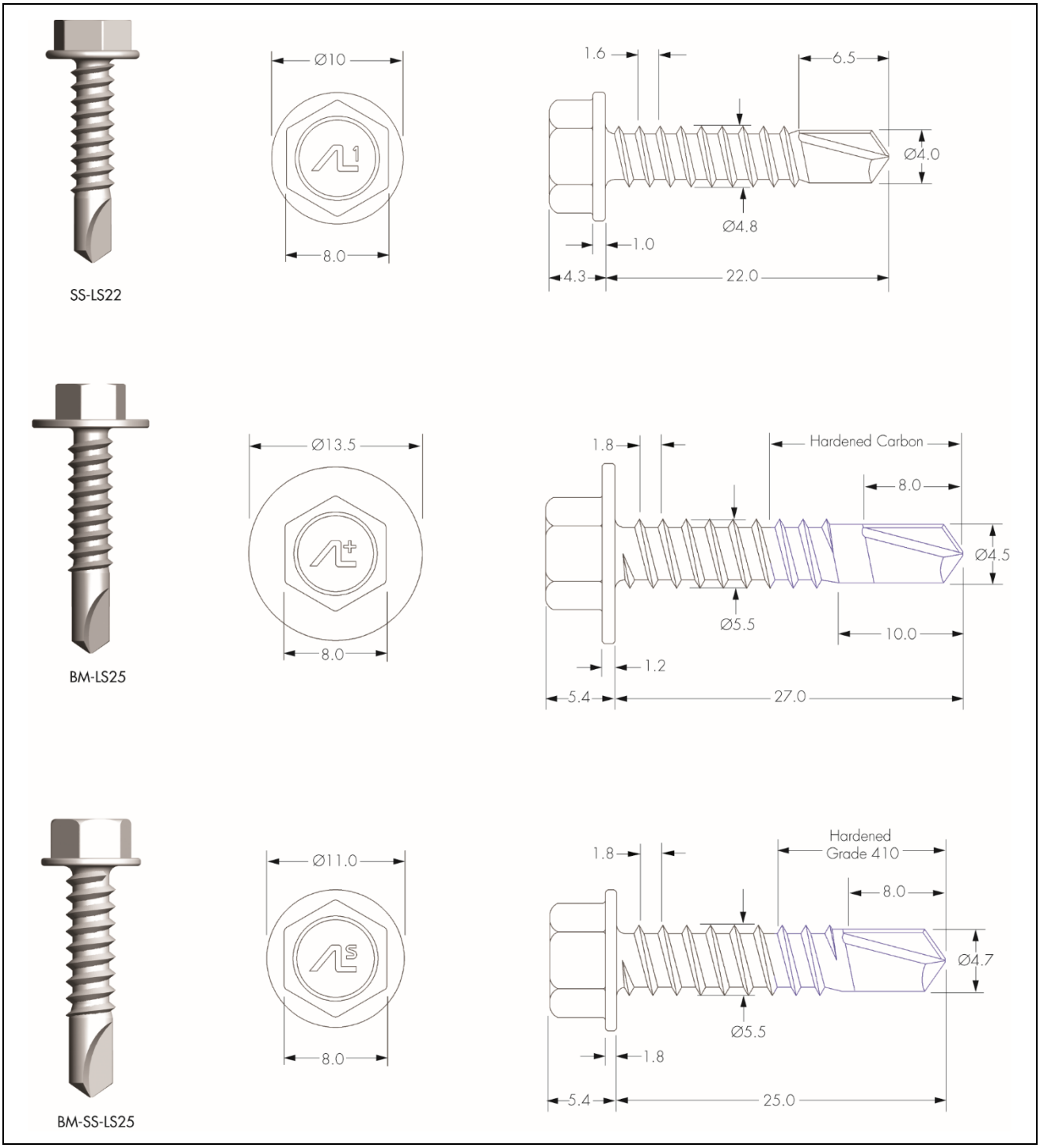


Figure 7 Self-drilling screws



1.6 Ancillary components specified for use with the systems, but outside the scope of this Certificate, include:

- fixings attaching the brackets to the substrate wall
- insulation
- movement joint fillers and/or sealants.

2 Manufacture

2.1 The systems' 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 Ash & Lacy Holdings Ltd has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2015 by SAI Global (Certificate QEC 23355).

3 Delivery and site handling

3.1 The use of personal protective equipment (PPE) is strongly recommended whenever practicable, to minimise the risks associated with falling objects and sharp edges.

3.2 The Mechslip Cladding System and AxiAL Supporting System components may be grouped together into packs. Care should be taken in their handling. Equipment used for lifting packs must be adequate for the weight involved (the weight of the pack varies according to the content). The packs are delivered on disposable wooden pallets covered with plastic shrink-wrap.

3.3 All personnel involved in the handling of packs should be made aware that the components are contained within the plastic shrink-wrap and banding straps, and tilting of the pack could allow the components to fall out. Abnormal shocks to the packs, and sliding of one pack against the face of another pack, must be avoided.

3.4 Packs should be placed singly on dry, level ground.

3.5 Any pallets supplied by the Certificate holder to store or transport packs must be very close in size to the pack dimensions and must be of adequate strength to support the weight of components placed on them.

3.6 To lift pallets by a mobile fork truck, the holes in the pallets provided must be used. “Side grabs” should not be used to lift packs from the lorry. Opened packs of stacked packs should not be moved around site.

3.7 Where packs are lifted, the operational procedure needs to be covered by Risk Assessment Method Statements (RAMS).

3.8 If it is considered necessary to store a pack above ground level, it should only be placed on a suitably designed staging with guard rails of appropriate height, to prevent any components falling to lower working areas.

3.9 During storage, appropriate protection must be provided against staining, moisture, contamination and accidental or mechanical damage.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on the Mechslip Cladding System and AxiAL Supporting System.

Design Considerations

4 Use

4.1 The Mechslip Cladding System and AxiAL Supporting System, when installed in accordance with this Certificate, are satisfactory for use as protective and decorative back-ventilated and drained cavity rainscreen cladding systems on external walls of domestic and non-domestic buildings of masonry, concrete, timber-frame or steel-frame substrate walls, above the damp-proof course (DPC) level in areas with non-severe exposure to chemicals .

4.2 It is important for designers, planners, contractors and/or installers to ensure that the installation of the systems 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 individual in accordance with the requirements of the relevant national Building Regulations and Standards.

4.3 The substrate wall to which the systems are fixed must be structurally sound, and designed and constructed in accordance with the requirements of the relevant national Building Regulations and Standards:

- timber-frame walls must be designed and constructed in accordance with PD 6693-1 : 2019, BS EN 1995-1-1 : 2004 and BS EN 1995-1-2 : 2004 and their UK National Annexes, with workmanship in accordance with BS 8000-5 : 1990, and preservative-treated in accordance with BS EN 351-1 : 2007 and BS 8417 : 2011.
- steel-frame walls must be structurally sound, and designed and constructed in accordance with BS EN 1993-1-1 : 2005, BS EN 1993-1-2 : 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, and BS 8000-0 : 2014 and BS 8000-3 : 2020.
- concrete walls must be designed and constructed in accordance with BS EN 1992-1-1 : 2004 and BS EN 1992-1-2 : 2004, and their UK National Annexes.

4.4 The substrate wall to which the systems are fixed must satisfy the requirements of the relevant national Building Regulations and Standards with regard to watertightness, and heat and sound transmission.

4.5 The systems transfer their 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 actions. Particular care is required around window and door openings to ensure that the structure is capable of sustaining the additional weight of the systems. The maximum spacing between vertical and horizontal subframe supports must not exceed 600 mm centres.

4.6 Ventilation and drainage must be provided behind the systems. The clear cavity between the back of the brick and substrate wall (or insulation, if installed within the cavity) must be at least 38 mm wide. Joint gaps between the bricks are filled in with pointing mortar. All ventilation openings around the periphery of the systems should be suitably protected with mesh to prevent the ingress of birds, vermin and insects.

4.7 Vertical expansion joints to allow for horizontal movement should be provided through brick, mortar and steel backing sections at a maximum of 6 m centres in the brick slip cladding. 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 (see Figure 8).

4.8 Horizontal expansion joints, to allow for vertical movement, should be provided at a maximum of 6 m centres coincident with a floor, and more frequently in timber-frame structures (see Figure 8).

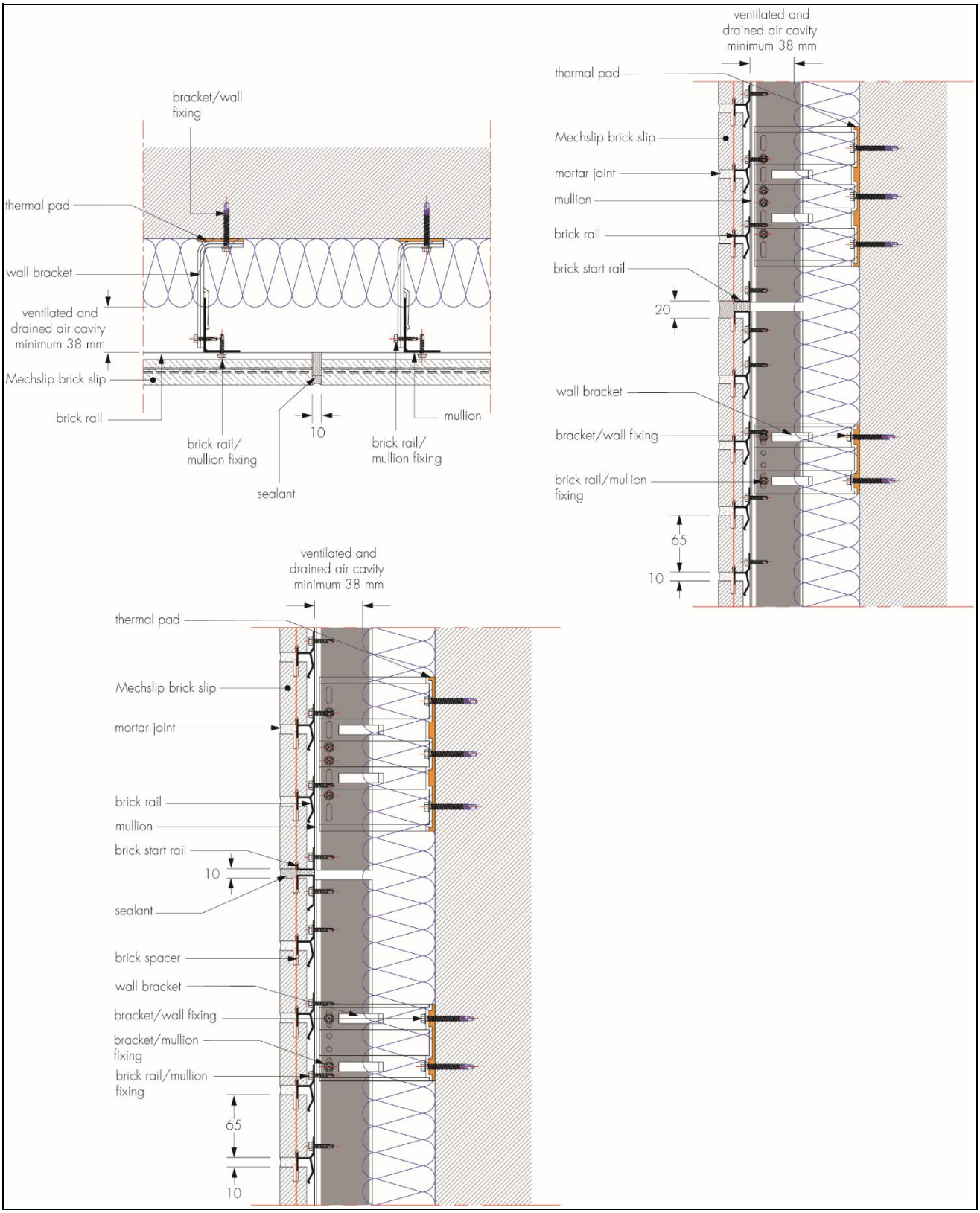
4.9 For framed structures, reference should be made to the structural engineer's details for deflection at floor level and movement joints in the substructure.

4.10 For retrofit installation, any existing external plumbing should be removed before installation, and alterations made to underground drainage, where appropriate, to accommodate repositioning on the finished face of the systems.

4.11 The fixing of rainwater goods, satellite dishes, clothes lines, hanging baskets and other similar items to the systems are outside the scope of this Certificate.

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

Figure 8 Vertical and horizontal movement joint



5 Practicability of installation

The systems should only be installed by installers who have been trained and approved by the Certificate holder.

6 Strength and stability

6.1 A suitably qualified and experienced individual must check that the design and installation of the systems provides adequate resistance to design actions applicable in the UK.

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

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

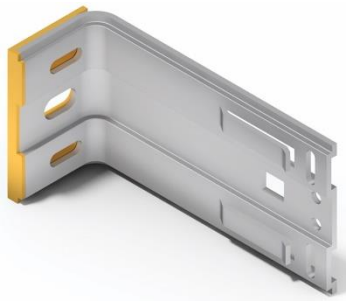
6.4 A suitably qualified and experienced design engineer should ensure that:

- the design of the AxiAL supporting system is in accordance with the relevant Codes and Standards, and is such as to limit mid-span deflections to L/200 and cantilever deflections to L/150, where L is the span
- the proposed systems and associated fixing layout provide adequate resistance to dead loads and wind actions
- any thermal expansion effects of both the support system and the cladding to be supported are taken into account in the design and detailing
- the open mullion and Z rail build-ups (see fifth bullet point of section 1.3) and the spacing of the fixings to the substrate wall are appropriately designed to ensure they have adequate resistance to the applied loadings
- the specified fixings have adequate tensile, shear and pull-out strength to resist the applied actions
- the fixing of the support brackets / open mullion / Z rail to the supporting wall has adequate tensile, shear and pull-out strength, and corrosion resistance (outside the scope of this Certificate).
- a check is carried out on the combinations of horizontal and vertical actions, in accordance with BS EN 1999-1-1 : 2007, BS EN 1999-1-3 : 2007, BS EN 1993-1-1 : 2005 and BS EN 1993-1-4 : 2006, and their UK National Annexes, in conjunction with BS EN 1990 : 2002 and all relevant standard parts and its corresponding UK National Annex.

6.5 Details of the brackets, with their design loadbearing resistances, are shown in Tables 1 to 5. The design loadbearing resistance of the connections should be greater than that of the bracket and adaptor as tabulated.

Table 1 Aluminium HB Bracket — single (80 mm)— design resistances

Bracket long leg length[1] (L) (mm)	Bracket short leg length (mm)	Code	Design resistance (kN)[2]		
			Tension	Compression	Shear
90	50	AXL-HB090S-TP	5.219	4.827	1.820
120	50	AXL-HB120S-TP	5.219	4.827	1.342
150	50	AXL-HB150S-TP	5.219	4.827	0.957
180	50	AXL-HB180S-TP	5.219	4.827	0.665
210	50	AXL-HB210S-TP	5.219	4.827	0.466
240	50	AXL-HB240S-TP	5.219	4.827	0.359
270	50	AXL-HB270S-TP	5.219	4.827	—
300	50	AXL-HB300S-TP	5.219	4.827	—



(1) See Figure 5.

(2) These design resistances have been calculated according to BS EN 1999-1-1 : 2007, Section 6. Partial safety factors for ultimate limit states γ_{M1} and γ_{M2} from Table 6.1 of BS EN 1999-1-1 : 2007.

Table 2 Aluminium HB Bracket — double (160 mm) — design resistances

Bracket long leg length[1] (L) (mm)	Bracket short leg length (mm)	Code	Design resistance (kN)[2]		
			Tension	Compression	Shear
90	50	AXL-HB090D-TP	5.391	5.493	7.936
120	50	AXL-HB120D-TP	5.391	5.493	5.850
150	50	AXL-HB150D-TP	5.391	5.493	4.240
180	50	AXL-HB180D-TP	5.391	5.493	3.043
210	50	AXL-HB210D-TP	5.391	5.493	2.197
240	50	AXL-HB240D-TP	5.391	5.493	1.638
270	50	AXL-HB270D-TP	5.391	5.493	1.303
300	50	AXL-HB300D-TP	5.391	5.493	1.131

(1) See Figure 5.

(2) These design resistances have been calculated according to BS EN 1999-1-1 : 2007, Section 6. Partial safety factors for ultimate limit states γ_{M1} and γ_{M2} from Table 6.1 of BS EN 1999-1-1 : 2007.

Table 3 Aluminium Horizontal Bracket Adaptor — design resistances

Bracket length[1] (L) (mm)	Bracket width (mm)	Code	Design resistance (kN)[2]		
			Tension	Compression	Shear
80	80	AXL-HBD80	37.616	19.070	15.487

(1) See Figure 5.

(2) These design resistances have been calculated according to BS EN 1999-1-1 : 2007, Section 6. Partial safety factors for ultimate limit states γ_{M1} and γ_{M2} from Table 6.1 of BS EN 1999-1-1 : 2007.

Table 4 Stainless Steel HBS Bracket — single (80 mm) — design resistances

Bracket long leg length[1] (L) (mm)	Bracket short leg length (mm)	Code	Design resistance (kN)[2]		
			Tension	Compression	Shear
45	50	AXL-HBS045S	2.543	3.849	2.208
60	50	AXL-HBS060S	2.543	3.849	2.208
75	50	AXL-HBS075S	2.543	3.849	1.766
90	50	AXL-HBS090S	4.253	5.551	3.177
120	50	AXL-HBS120S	4.253	5.551	2.030
150	50	AXL-HBS150S	4.253	5.551	1.275
180	50	AXL-HBS180S	4.253	5.551	0.822
210	50	AXL-HBS210S	4.253	5.551	0.580
240	50	AXL-HBS240S	4.253	5.551	0.458
270	50	AXL-HBS270S	4.253	5.551	0.365
300	50	AXL-HBS300S	4.253	5.170	0.212

(1) See Figure 6.

(2) These design resistances have been calculated according to Section 6 of BS EN 1993-1-1 : 2005, BS EN 1993-1-4 : 2006 and BS EN 1993-1-5 : 2006. Partial safety factors for ultimate limit states γ_{M0}, γ_{M1} and γ_{M2} from Table 5.1 of BS EN 1993-1-4 : 2006.

Table 5 Stainless Steel HBS Bracket — double (160 mm)— design resistances

Bracket long leg length[1] (L) (mm)	Bracket short leg length (mm)	Code	Design resistance (kN)[2]		
			Tension	Compression	Shear
90	50	AXL-HBS090D	5.611	5.611	8.449
120	50	AXL-HBS120D	5.611	5.611	5.971
150	50	AXL-HBS150D	5.611	5.611	4.223
180	50	AXL-HBS180D	5.611	5.611	3.055
210	50	AXL-HBS210D	5.611	5.611	2.315
240	50	AXL-HBS240D	5.611	5.611	1.853
270	50	AXL-HBS270D	5.611	5.611	1.517
300	50	AXL-HBS300D	5.611	5.611	1.157

(1) See Figure 6

(2) These design resistances have been calculated according to Section 6 of BS EN 1993-1-1 : 2005, BS EN 1993-1-4 : 2006 and BS EN 1993-1-5 : 2006. Partial safety factors for ultimate limit states γ_{M0}, γ_{M1} and γ_{M2} from BS EN 1993-1-4 : 2006, Table 5.1.

6.6 The design of the mullions, rails and associated connections must satisfy the requirements of BS EN 1993-1-1 : 2005, BS EN 1993-1-4 : 2006 and BS EN 1999-1-1 : 2007, and their UK National Annexes using the mechanical properties of the aluminium or stainless steel grade adopted. Mid-span deflections should be limited to span/200 and cantilever deflections limited to L/150.

6.7 The geometric properties of the rail sections (L, T, Z and top hats rails) can be found in detail in Tables 6 and 7 and are used by the structural designer for the rail design.

6.8 In general, the rails should be fixed at mid-length, fastening the rail to the brackets using normal clearance holes (fixed point) and allowed to expand towards the ends using slotted holes (flexible or sliding point). For standard six-metre-long rails, a gap of 10 mm between adjacent rails is adequate. For calculation purposes, references should be made to the relevant standards for the coefficient of thermal expansion of the rails. Movement joints in the supporting structure should be maintained through the rail system.

Table 6 Aluminium 'L' Profile, 'T' Profile, 'Z' Profile, Top Hat and Open Mullion Rail section details

					Second moment of area		Radius of gyration		Left bottom corner distance to centre of gravity C (mm)	
	dimension (X) (mm)	dimension (Y) (mm)	thickness (mm)	area (mm^2)	I_{xx} (cm^4)	I_{yy} (cm^4)	Axis x-x (mm)	Axis y-y (mm)	x	y
'L' Profile Rail section (see Figure 5)	40	60	2.2	205.8	7.827	2.87	19.5	11.8	31.3	41.5
'T' Profile Rail section (see Figure 5)	100	40	2.2	298.7	3.147	18.26	10.3	24.7	50	33.8
	80	60	2.2	293.4	9.404	9.338	17.9	17.8	40	47.3
	100	60	2.2	337.4	9.92	18.26	17.1	23.3	50	48.8
	120	60	2.2	381.2	10.32	31.56	16.5	28.8	60	50
	140	60	2.2	425.1	10.63	50.1	15.8	34.3	70	50.9
'Z' Profile Rail section (see Figure 5)	45	25	2.4	225.5	2.366	8.215	10.2	19.1	39.1	13.9
	55	40	2.4	284.2	7.576	12.5	16.3	21	46.1	23.3
Top Hat Rail section (see Figure 5)	45	25	2.4	382.1	3.422	35.74	9.5	30.6	60	8.80
	55	40	2.4	499.9	11.31	57.03	15	33.8	70	13.5
Open Mullion Rail section (see Figure 5)	50	40	1.6 - 2	362.3	9.692	26.13	16.4	26.9	48	17.3
	50	50	1.6 - 2	394.3	16.17	28.01	20.2	26.7	48	21.8

Table 7 Stainless steel 'L' Profile, 'T' Profile, 'Z' Profile and Top Hat Rail section details

					Second moment of area		Radius of gyration		Left bottom corner distance to centre of gravity C (mm)	
	dimension (X) (mm)	dimension (Y) (mm)	thickness (mm)	area (mm^2)	I_{xx} (cm^4)	I_{yy} (cm^4)	Axis x-x (mm)	Axis y-y (mm)	x	y
'L' Profile Rail section (see Figure 6)	40	40	1.5	127.6	1.897	2.713	12.2	14.6	26.8	29.7
	40	60	1.5	157.6	5.823	3.091	19.2	14	29.1	42.2
	50	60	1.5	172.6	6.225	5.381	19	17.7	35.5	43.6
	60	60	1.5	187.6	6.562	8.479	18.7	21.3	41.7	44.9
'T' Profile Rail section (see Figure 6)	80	40	1.5	210.2	2.279	9.877	10.4	21.7	39.9	32.9
	80	60	1.5	240.2	7.195	9.878	17.3	20.3	39.8	47.5
	100	60	1.5	270.2	7.565	17.98	16.7	25.8	49.8	48.8
	120	60	1.5	300.2	7.861	29.53	16.2	31.4	59.8	49.9
'Z' Profile Rail section (see Figure 6)	45	25	1.5	167.5	1.731	8.436	10.2	22.4	36.2	11.0
	45	40	1.5	190	5.116	8.495	16.4	21.1	35.6	18.0
Top Hat Rail section (see Figure 6)	33	25	1.5	267.3	2.332	31.13	9.30	34.1	60	8.30
	33	40	1.5	312.3	7.082	32.24	15.1	32.1	60	13.8

6.9 Wind load tests and supporting calculations were carried out on a full scale wall comprising the Mechslip Cladding System, fixed to the AxiAL Supporting System with aluminium brackets and aluminium rails (vertical and horizontal) spaced at 600 mm (maximum) centres, using stainless steel self-drilling screws, and achieved a serviceability and ultimate safety wind pressure of 2.4 $kN \cdot m^{-2}$ and 3.6 $kN \cdot m^{-2}$ respectively.

Impact resistance

6.10 Hard and soft body impact tests were carried out in the same wind test sample. The systems achieved adequate impact resistance for use in Impact Class 2 and Negligible Risk, as defined in CWCT TN76, Tables 1 and 2, an extract of which is shown in Tables 8 and 9 of this Certificate.

Table 8 Classes for serviceability performance (from CWCT TN76)

Class	Definition	Explanation/Examples
1	No damage	No damage visible from 1 m, and any damage visible from closer than 1 m unlikely to lead to significant deterioration
2	Surface damage of an aesthetic nature which is unlikely to require remedial action	Dents or distortion of panels not visible from more than 5 m (note visibility of damage will depend on surface finish and lighting conditions. Damage will generally be more visible on reflective surfaces), and any damage visible from closer than 5 m unlikely to lead to significant deterioration
3	Damage that may require remedial action or replacement of components to maintain appearance or long term performance but does not require immediate action	Dents or distortion of panels visible from more than 5 m, or spalling of edges of panels of brittle materials, or damage to surface finishes that could lead to deterioration of the substrate.
4	Damage requiring immediate action to maintain appearance or performance. Remedial action may include replacement of panel but does not require dismantling or replacement of supporting structure	Significant cracks in brittle materials, eg cracks that may lead to parts of tile falling away subsequent to test, or fracture of panels causing significant amounts of material to fall away during test
5	Damage requiring more extensive replacement than 4	Buckling of support rails

Note: Classes 3, 4 and 5 shown for information only and not suitable for these systems.

Table 9 Classes for safety performance (from CWCT TN76)

Class	Explanation/Examples
Negligible Risk	No material dislodged during test, no damage likely to lead to materials falling subsequent to test, no sharp edges produced that would be likely to cause severe injury to a person during impact, and cladding not penetrated by impactor
Low Risk	Maximum mass of falling particle 50 g, maximum mass of particle that may fall subsequent to impact 50 g, cladding not penetrated by impact, and no sharp edges produced that would be likely to cause severe injury during impact
Moderate Risk	Maximum mass of falling particle less than 500 g, maximum mass of particle that may fall subsequent to impact less than 500 g, cladding not penetrated by impact, and no sharp edges produced that would be likely to cause severe injury during impact
High Risk	Maximum mass of falling particle greater than 500 g, or cladding penetrated by impact, or sharp edges produced that would be likely to cause severe injury during impact

Note: Low, Moderate and High Risk Classes are shown for information only and are not suitable for these systems.

7 Behaviour in relation to fire

7.1 The external surface of the cladding has a reaction to fire classification(1) of A1 in accordance with BS EN 13501-1 : 2018. This relates to the full thickness and mounting methods referred to in section 1 of this Certificate.

(1) Report reference from Warringtonfire WF410145. Copies available from the Certificate holder.

7.2 The reverse side of the cladding (facing into the cavity) has a reaction to fire classification of A1 to BS EN 13501-1 : 2018.

7.3 The fixings and support system are classified as 'non-combustible' or 'of limited combustibility' in accordance with the relevant national regulatory guidance. See also section 7.5 of this Certificate.

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

7.5 Wall brackets with a P66 nylon thermal break isolator pad are used to reduce the risk of cold bridging across the bracket/wall interface. They are largely protected by the cladding panels and, as they are considered to be present in relatively small quantities, are unlikely to significantly affect the overall fire performance of the cladding.

7.6 The systems are classified as 'non-combustible' and are not subject to any restriction on building height or proximity to boundaries.

8 Air and water penetration

8.1 The brick slips have a mean water vapour permeability of μ= 50/100 in accordance with BS EN 1745 : 2012, Annex A.

8.2 The brick slips have a water absorption value of 15% in accordance with BS EN 771-1 : 2011.

8.3 The cladding system is not airtight or watertight but will minimise water penetration and the risk of damage to the inner wall. Any water collecting in the cavity owing to rain or condensation will be removed by drainage and ventilation.

8.4 The minimum cavity width between the back face of the steel backing sections and the substrate wall (or insulation if installed within the cavity) should be 38 mm, and a minimum ventilation area of 5000 mm^2 per metre run must be provided at the building base point and at the roof edge.

8.5 The substrate wall onto which the systems are installed must be resistant to water ingress 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. Typical installation details are shown in Figures 9 to 11 of this Certificate.

Figure 9 Typical installation detail at window opening

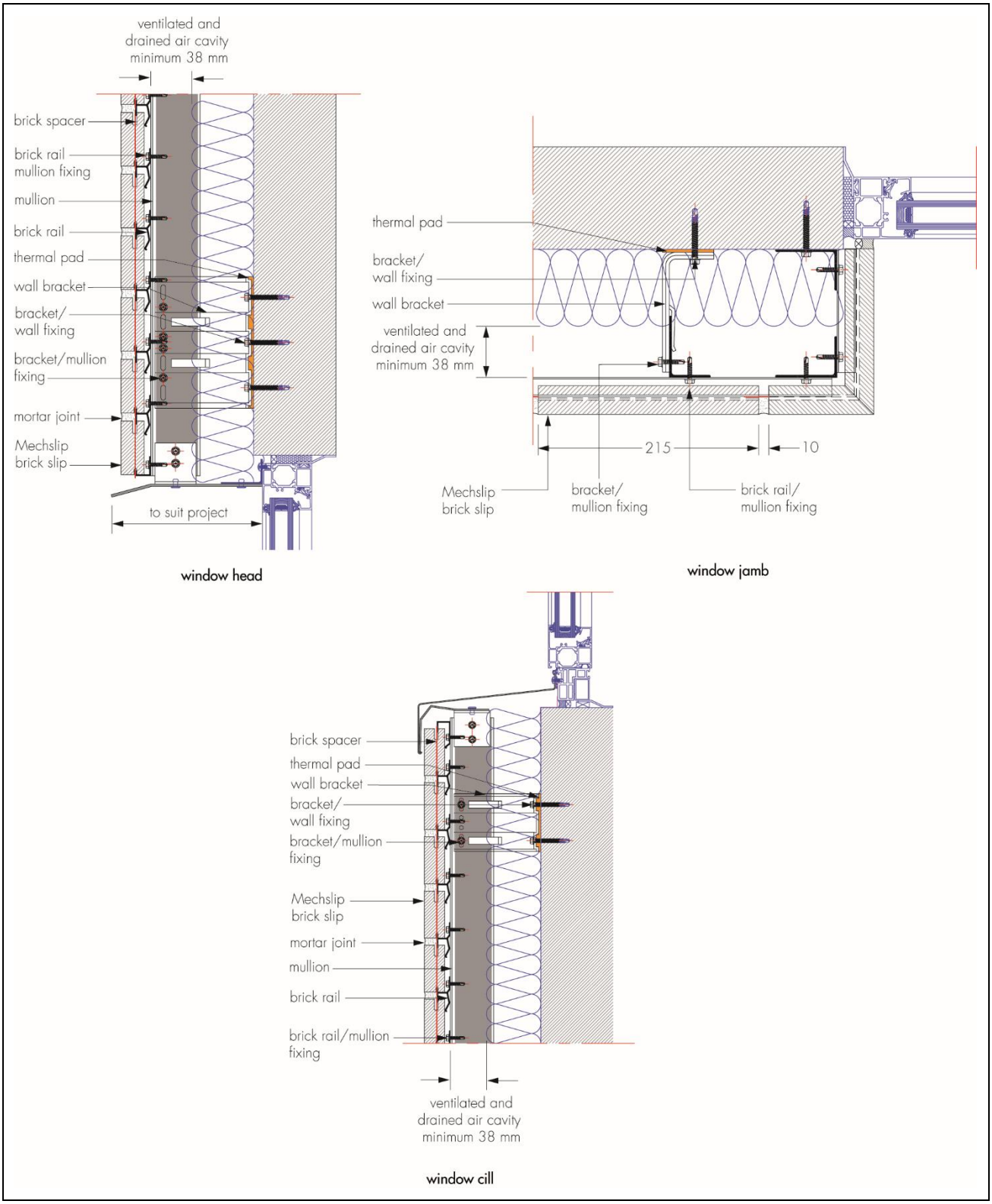


Figure 10 Typical installation base detail

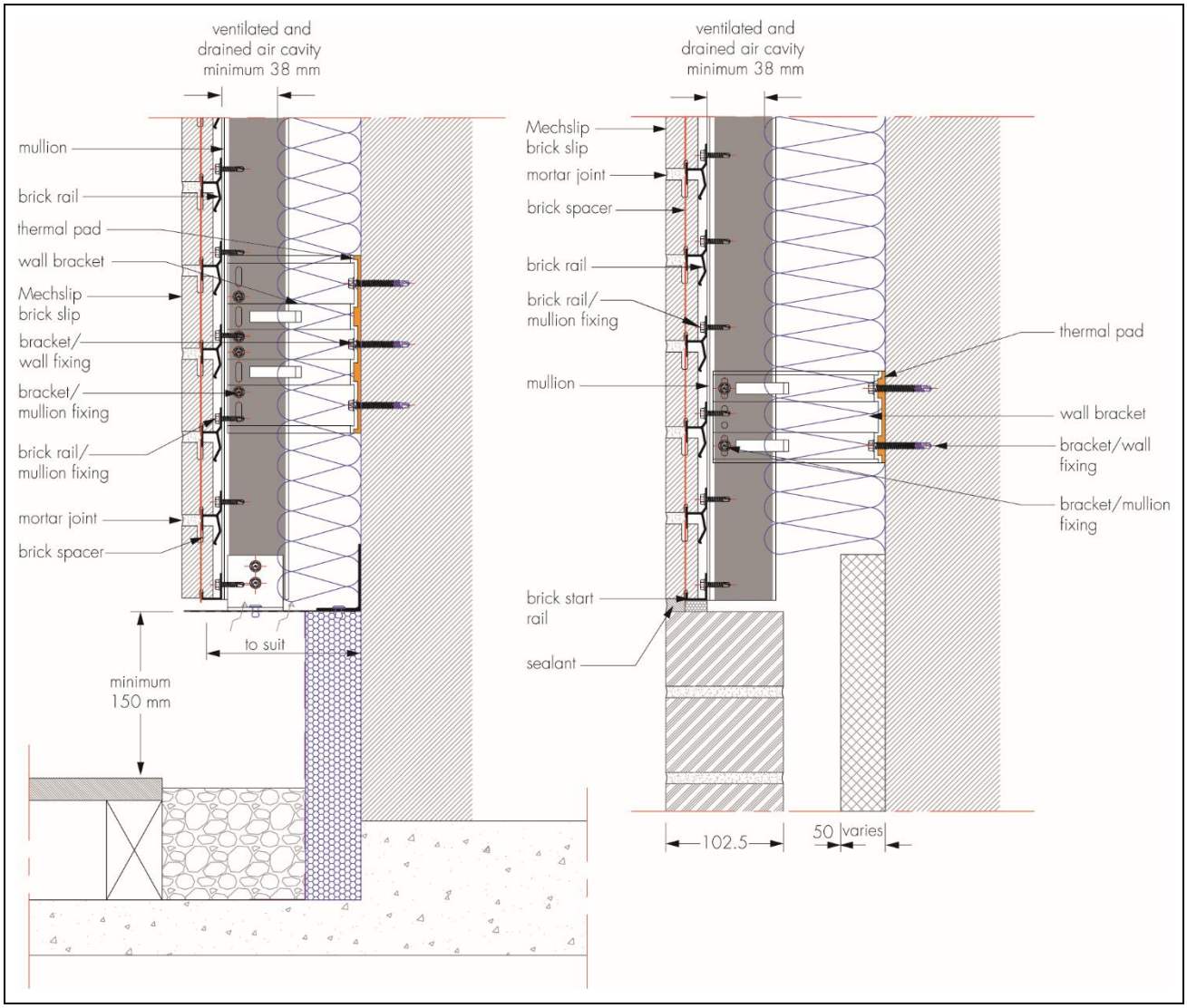
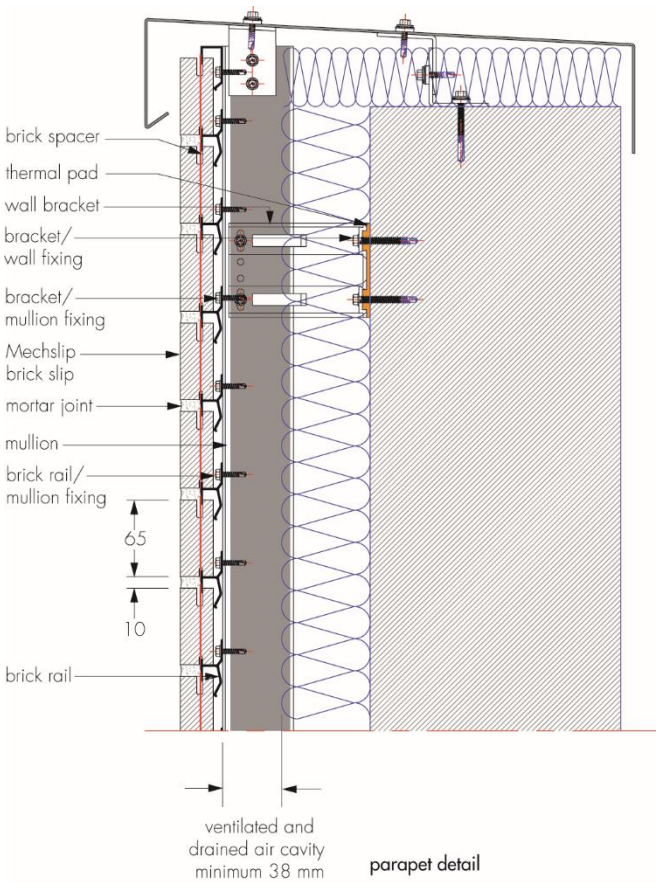


Figure 11 Typical installation detail of parapet



9 Maintenance

9.1 A maintenance schedule for the installed systems must include regular visual inspections:

- of the brick slips for signs of damage
- of architectural details designed to shed water to confirm that they are performing properly
- to ensure that water is not leaking from external downpipes or gutters (such leakage could penetrate the cladding).

9.2 Maintenance should include the replacement or resealing of joints (for example, between the cladding and window and/or door frames). Materials with signs of corrosion must be replaced.

9.3 Damaged brick slips must be removed and replaced as soon as practicable and in accordance with the Certificate holder's instructions.

10 Durability

10.1 The durability and service life of the systems will depend upon the building location and height, the intended use of the building and the immediate environmental conditions. Provided regular maintenance is carried out, as described in this Certificate and in accordance with the Certificate holder's instructions, the systems will have a service life in excess of 35 years in areas with non-severe exposure to chemicals (see section 4.1 of this Certificate).

10.2 When tested for freeze/thaw in accordance with DD CEN/TS 772-22 : 2006, the brick slips achieved a classification of F2, ie applicable to masonry subjected to severe exposure.

10.3 After natural weathering, a slight change in colour of the brick slips may occur. However, this is not likely to be progressive.

11 Reuse and recyclability

The systems contain aluminium and stainless steel which can be recycled.

Installation

12 General

12.1 The Mechslip Cladding System and AxiAL Supporting System must be installed in accordance with the Certificate holder's recommendations, the requirements of this Certificate and the specification laid down by the consulting engineer.

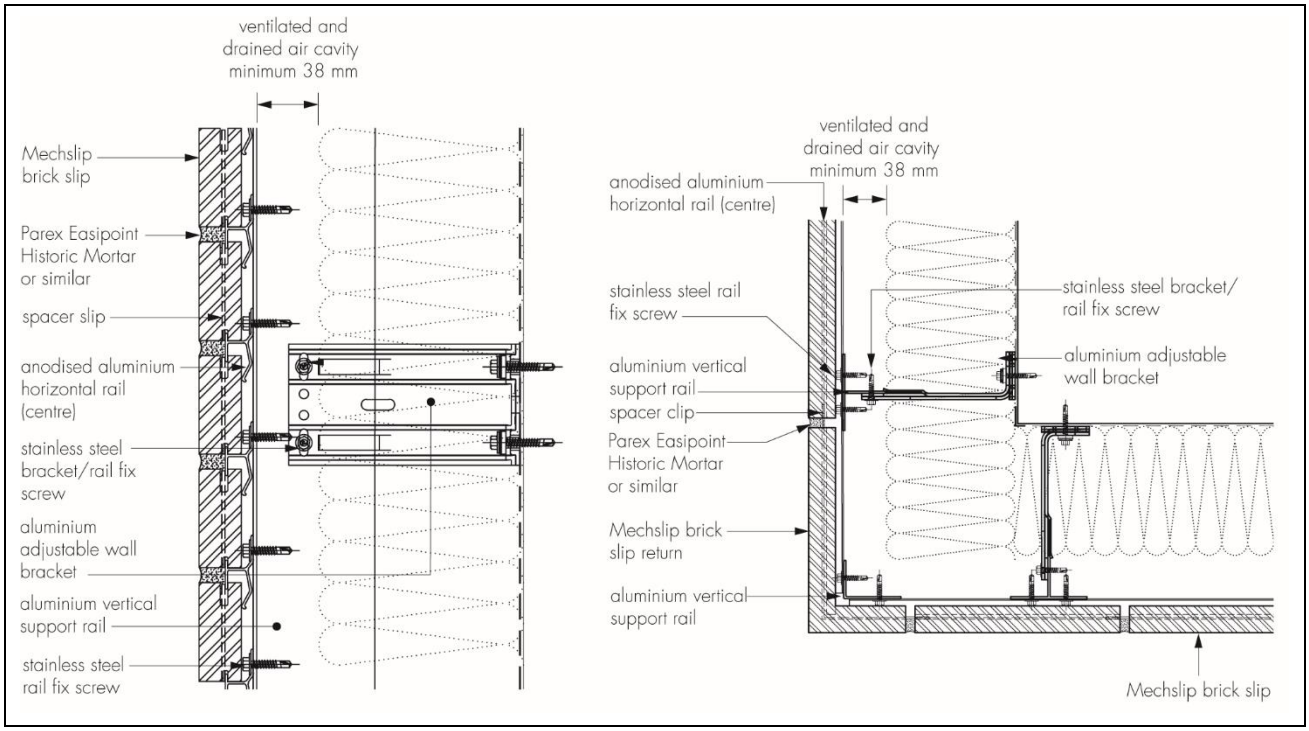
12.2 Installers must be trained and approved by the Certificate holder, who can provide technical assistance at the design stage and at the start of installation.

12.3 The substrate wall face to which the systems are fixed should be flat, vertical and capable of supporting appropriate loads. Vertical subframe supports are required at maximum 600 mm centres.

12.4 A pre-installation survey must be done to check the condition of the substrate wall with regard to being flat and vertical within the acceptable tolerances. The brackets can provide up to 30 mm adjustment to accommodate deviations in the substrate wall.

12.5 A typical installation of the Mechslip Cladding System is shown in Figure 12.

Figure 12 Installation detail of the Mechslip Cladding System



13 Procedure

13.1 Using the appropriate grid layout, vertical or horizontal rails are fixed to the supporting brackets using stainless steel screws, identifying positions where cut-outs are required.

13.2 When using 65 mm high brick slips, the brick rails should be fixed at the vertical supports at 75 mm vertical centres. The rail centres can be adjusted to accommodate bricks of different sizes if required. A gauge tool can be supplied to allow simultaneous setting out/fixing of horizontal rails.

13.3 Mechslip brick slips are slotted firmly into place, guided by the pre-formed upper and lower retainers.

13.4 Mechslip brick slips have integrated rebates consistently setting the horizontal bed joint at nominal 10 mm. Supplied brick spacers should be inserted between each brick to create a nominal 10 mm vertical joint and act as the backing for pointing mortar.

13.5 When installation is complete, the joints are injected with Parex Historic pointing mortar.

Technical Investigations

14 Tests

Tests were carried out and the results assessed to determine:

- wind load resistance
- pull-through strength of fixings
- resistance of brick slip groove
- mechanical resistance of the rails and brackets
- deformation of rails
- pull-through under shear strength of fixings
- resistance to hard and soft body impact
- hygrothermal behaviour
- freeze/thaw resistance
- weathertightness.
- water vapour permeability
- water absorption
- durability
- reaction to fire.

15 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.

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16 Conditions

16.1 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.

16.2 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.

16.3 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.

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

16.5 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
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- 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.

16.6 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.