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Agrément Certificate
00/3697
Product Sheet 1

LOCKCLAD RAINSCREEN CLADDING SYSTEMS

LOCKCLAD RAINSCREEN CLADDING SYSTEM

PRODUCT SCOPE AND SUMMARY OF CERTIFICATE

This Certificate relates to the Lockclad Rainscreen Cladding System, an open-jointed, back-ventilated and drained cladding comprising clay tiles hung on aluminium support rails.

AGRÉMENT 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 — As the cladding is open-jointed, the substrate wall must be able to take the full wind load (see section 5).

Behaviour in relation to fire — The tiles have a Class 0 fire rating under the UK Building Regulations (see section 6).

Air and water penetration — The cladding is not airtight or watertight, but is intentionally open-jointed (see section 7).

Maintenance — The tiles are generally self-cleaning (see section 8).

Durability — The system has a design life in excess of 25 years (see section 9).

The BBA has awarded this Agrément 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

A handwritten signature in black ink, appearing to read 'B Chamberlain'.

Brian Chamberlain
Head of Approvals — Engineering

A handwritten signature in black ink, appearing to read 'G Cooper'.

Greg Cooper
Chief Executive

Date of First issue: 16 February 2009

Originally certificated on 29 March 2000

Certificate amended on 30 September 2015 to update front page information.

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

Readers are advised to check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA direct.

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Regulations

In the opinion of the BBA, the Lockclad Rainscreen Cladding System, if used in accordance with the provisions of this Certificate, will meet or contribute to meeting the relevant requirements of the following Building Regulations:



The Building Regulations 2000 (as amended) (England and Wales)

Requirement:	A1	Loading
Comment:		The claddings are acceptable for use as set out in sections 3.2 and 5.1 to 5.6 of this Certificate.
Requirement:	B4(1)	External fire spread
Comment:		The claddings are judged to meet the Class 0 requirements. See sections 6.1 to 6.5 of this Certificate.
Requirement:	C2(b)(c)	Resistance to moisture
Comment:		The claddings are not watertight, but will resist the passage of rainwater to the supporting structure. See sections 7.1 to 7.5 of this Certificate.
Requirement:	Regulation 7	Materials and workmanship
Comment:		The claddings are acceptable. See sections 9.1 to 9.4 and the <i>Installation</i> part of this Certificate.



The Building (Scotland) Regulations 2004 (as amended)

Regulation:	8(1)(2)	Fitness and durability of materials and workmanship
Comment:		The system can contribute to a construction satisfying this Regulation. See sections 8.1 to 8.3 and 9.1 to 9.4 and the <i>Installation</i> part of this Certificate.
Regulation:	9	Building standards – construction
Standard:	1.1(a)(b)	Structure
Comment:		The claddings as set out in section 3.2 and 5.1 to 5.6 are acceptable.
Standard:	2.1	Compartmentation
Comment:		The claddings can contribute to satisfying this Standard, with reference to clause 2.1.15 ⁽²⁾ . See sections 6.1 to 6.5 of this Certificate.
Standard:	2.2	Separation
Comment:		The claddings can contribute to satisfying this Standard, with reference to clauses 2.2.7 ⁽²⁾ and 2.2.10 ⁽¹⁾ . See sections 6.1 to 6.5 of this Certificate.
Standard:	2.4	Cavities
Comment:		The claddings can contribute to satisfying this Standard, with reference to clauses 2.4.2 ⁽¹⁾⁽²⁾ , 2.4.3 ⁽²⁾ , 2.4.7 ⁽¹⁾ and 2.4.9 ⁽²⁾ . See sections 6.1 to 6.5 of this Certificate.
Standard:	2.5	Internal linings
Comment:		The claddings are classified as ‘non-combustible’ and so are unrestricted by this Standard, with reference to clause 2.5.1 ⁽¹⁾⁽²⁾ . See sections 6.1 to 6.5 of this Certificate.
Standard:	2.6	Spread to neighbouring buildings
Comment:		The claddings are classified as ‘non-combustible’ and therefore are unrestricted under this Standard, with reference to clauses 2.6.4 ⁽¹⁾⁽²⁾ , 2.6.5 ⁽¹⁾ and 2.6.6 ⁽²⁾ . See sections 6.1 to 6.5 of this Certificate.
Standard:	2.7	Spread on external walls
Comment:		The claddings are classified as ‘non-combustible’ and therefore are unrestricted under this Standard, with reference to clause 2.7.1 ⁽¹⁾⁽²⁾ . See sections 6.1 to 6.5 of this Certificate.
Standard:	3.10	Precipitation
Comment:		The claddings are not watertight, but will resist the passage of rainwater to the supporting structure, with reference to clauses 3.10.1 ⁽¹⁾⁽²⁾ , 3.10.5 ⁽¹⁾⁽²⁾ and 3.10.6 ⁽¹⁾⁽²⁾ . See sections 7.1 to 7.5 of this Certificate.
Regulation:	12	Building standards – conversions
Comment:		All comments given for this system under Regulation 9, 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) 2000 (as amended)

Regulation:	B2	Fitness of materials and workmanship
Comment:		The claddings are acceptable. See sections 9.1 to 9.4 and the <i>Installation</i> part of this Certificate.
Regulation:	B3(2)	Suitability of certain materials
Comment:		The claddings are acceptable. See sections 8.1 to 8.3 of this Certificate.
Regulation:	C4	Resistance to ground moisture and weather
Comment:		The claddings are not watertight, but will resist the passage of rainwater to the supporting structure. See sections 7.1 to 7.5.
Regulation:	D1	Stability
Comment:		The system is acceptable for use when installed in accordance with this Certificate. See sections 3.2 and 5.1 to 5.6 of this Certificate.
Regulation:	E5	External fire spread
Comment:		The claddings are judged to meet the Class 0 requirements. See sections 6.1 to 6.5 of this Certificate.

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

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

See section: 2 Delivery and site handling (2.5).

Non-regulatory Information

NHBC Standards 2008

NHBC accepts the use of the Lockclad Rainscreen Cladding System, when installed and used in accordance with this Certificate, in relation to *NHBC Standards*, Chapter 6.9 *Curtain walling and cladding*.

Zurich Building Guarantee Technical Manual 2007

In the opinion of the BBA, the Lockclad Rainscreen Cladding System, when installed and used in accordance with this Certificate, satisfies the requirements of the *Zurich Building Guarantee Technical Manual*, Section 4 *Superstructure*, Sub-section *External walls*.

General

This Certificate relates to the Lockclad Rainscreen Cladding System.

The product is an open-jointed, back-ventilated and drained cladding comprising clay tiles hung on aluminium support rails.

It is essential that the cladding is installed in accordance with the manufacturer's instructions and the requirements of this Certificate.

Technical Specification

1 Description

1.1 Lockclad Rainscreen Cladding System is an open-jointed, back-ventilated and drained system comprising clay tiles hung on aluminium support rails.

1.2 The tiles are of one basic design and thickness (see Figure 1), but vary in width, from 210 mm to 400 mm, and face height, from 175 mm to 240 mm. Mitred tiles are available for corners.

1.3 The range of tiles covers three blends of clay and five colours (see Table 1). For all colours there will be some tile to tile variation in shade, due to the natural origin of the product.

1.4 The tiles weigh from 44 kgm⁻² to 47 kgm⁻², have water absorption values in the range of 5% to 8%, and flexural strength in excess of 2 kN.

1.5 The tiles are formed by vacuum extrusion and fired in an automated kiln at around 1000°C.

1.6 Quality control is exercised during the production of the tiles; checks include appearance, dimensions, weight, moisture absorption and behaviour under freeze-thaw cycling.

1.7 The components of the aluminium support system, bought-in to an agreed specification, are shown in Figure 2. The function of the components is detailed in Table 2. In brief, the tiles fit between horizontal Lockrails fixed via brackets to vertical rails on the substrate wall. There is a 10 mm baffled opening between tiles horizontally and either a 2 mm opening or 8 mm loose-fitting, black polypropylene strip between tiles vertically. The fixing of brackets to the vertical rails, the specification of the vertical rails, and the fixing of vertical rails to the substrate, all of which must be approved by an appropriately qualified engineer, are outside the scope of this Certificate, as are top, side, corner, bottom and other finishing trims.

Figure 1 Lock Tile

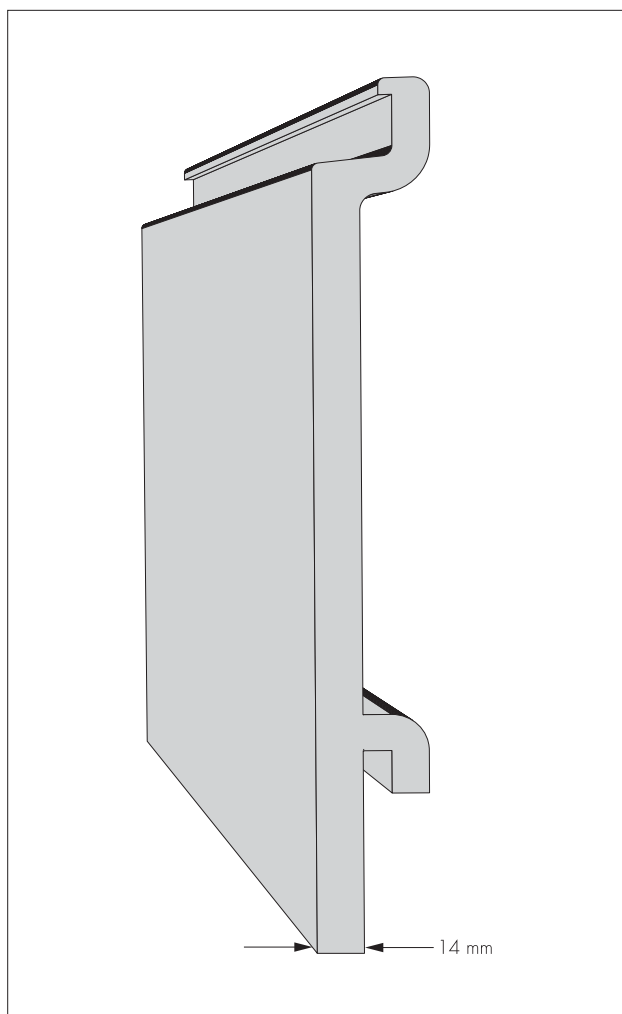


Table 1 Blends and colours of tiles

Clay blend	Colour
Terracotta	Red
Buff	Buff, Antique
Slate body	Slate, Brown

Table 2 Aluminium support system

Component	Function	Material
Lockrail 1	Main horizontal support rail	Aluminium alloy: Al Mg Si 0.5 F22
Lockrail 2	Top/bottom horizontal support rail	Aluminium alloy: Al Mg Si 0.5 F22
Lockbracket 1	Fixing Lockrails to substructure where there is already minimum 25 mm ventilation cavity behind cladding	Aluminium alloy: Al Mg Si 0.5 F22
Lockbracket 2	As above but where bracket is required to provide 25 mm cavity behind cladding	Aluminium alloy: Al Mg Si 0.5 F22
Lockbracket 3	In place of Lockbracket 1 where there are obstructions in the building and the Lockbracket has to be fixed in 2 parts	Aluminium alloy: Al Mg Si 0.5 F22
Lockclip 1	To provide tight fit at bottom of tile and 2 mm vertical space between tiles	Polypropylene copolymer (black)
Lockclip 2	As above, but to be used about every fifth tile along a row (to allow access and replacement of tiles), and for last tile of the row	Polypropylene copolymer (black)
Lockspacer 2	For use with 2 mm spaced tiles, to prevent water splashing behind cladding from rail at tile corner joints	Polypropylene copolymer (black)
Lockspacer 8	As above but for 8 mm spaced tiles	Polypropylene copolymer (black)
8 mm bar	To be fitted between two Lockspacer 8 units to restrict water ingress between tiles	Polypropylene copolymer (black)
Top/bottom bar	As above but used on top/bottom row of tiles	Polypropylene copolymer (black)
Toplock 1-6 and Bottomlock 1-2	Fittings for use with Lockrail 2 at top/bottom	Aluminium alloy: Al Mg Si 0.5 F22

2 Delivery and site handling

2.1 Tiles are delivered to site shrink-wrapped on wooden pallets, with heavy-duty cardboard between each layer of tiles. Pallets should be stored on level ground and not stacked.

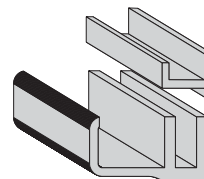
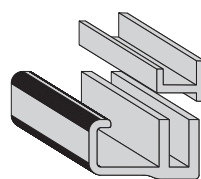
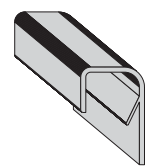
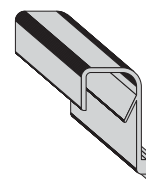
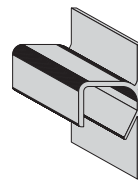
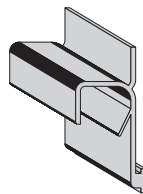
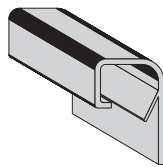
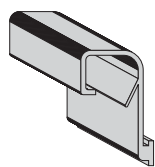
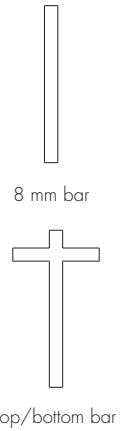
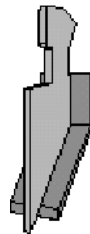
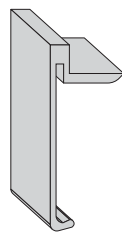
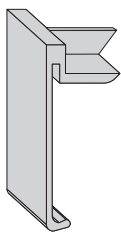
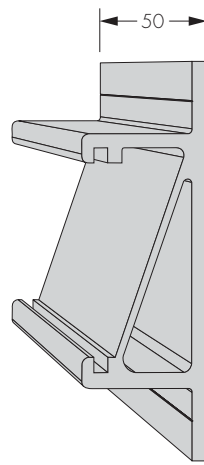
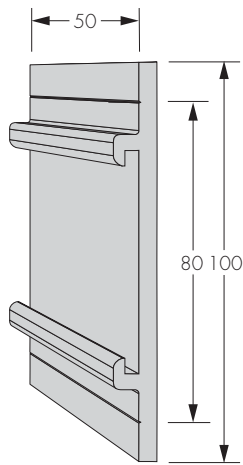
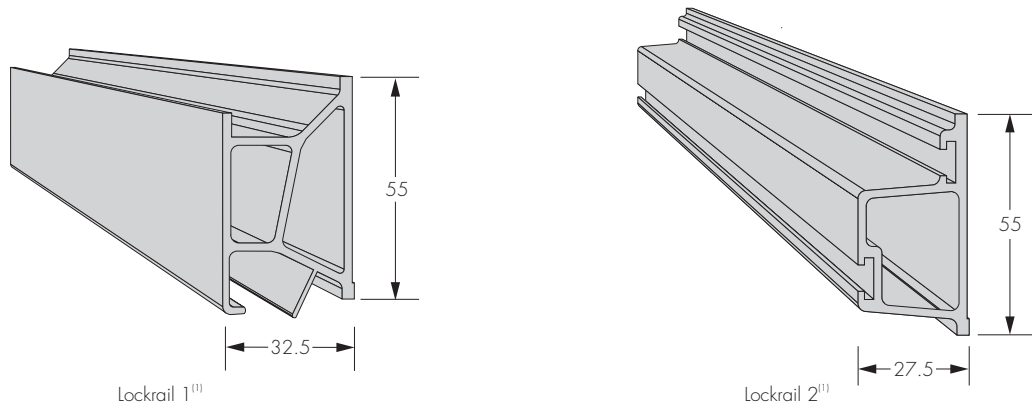
2.2 Each pallet of tiles bears a label with product details (such as type, size, quantity) and the edge of each tile is marked with an identification code including a manufacturing reference.

2.3 Lockrails are delivered to site in timber stillages and Lockbrackets, Lockclips and spacers in cardboard boxes.

2.4 Packs of Lockrails should be stacked horizontally on sufficient bearers to prevent distortion, to a maximum height of 1 m. Other components should be stored in a safe weatherproof store.

2.5 Tiles should be handled with care to avoid damage or breakage. Care is required when handling long lengths of rail, particularly at height.

Figure 2 Components of the support system



(1) available in standard 6 m lengths
 (2) also available in 100 mm width for use at Lockrail joint
 all dimensions in mm

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on the Lockclad Rainscreen Cladding System.

Design Considerations

3 General

3.1 Ventilation and drainage must be provided behind the cladding suitable for a back-ventilated and drained system. A minimum of 25 mm wide air space is specified behind the back face of the horizontal aluminium support rail and minimum ventilation opening of 10 000 mm² and 20 000 mm² per metre run at the top and bottom of the installation, respectively. The ventilation openings should be suitably protected or baffled to prevent the ingress of birds, vermin and rain. The openings around each tile will provide additional ventilation and drainage pathways.



3.2 The wall and sub-frame to which the cladding is fixed should be structurally sound and constructed in accordance with the requirements of the relevant building regulations and national standards. The components of the sub-frame system should be durable and corrosion resistant.

3.3 The wall to which the cladding is fixed should be watertight and preferably airtight and resistant to the transmission of sound.

3.4 Insulation behind the cladding needs to be suitably fixed to the inner leaf to resist the forces of wind suction incident upon them as a result of the open joints of the cladding. Insulation should be of a rigid structure (eg boards). The ventilation pathway behind the cladding must not be allowed to become blocked nor the insulation moved into a position where it may be vulnerable to wetting.

3.5 The coefficient of expansion of aluminium is $23 \times 10^{-6} \text{ K}^{-1}$. Provision needs to be provided for the thermal movement of the horizontal aluminium support rail and, as necessary, of the sub-frame to which it is attached. Rails are joined over a 100 mm bracket: the maximum gap between rails when cold should not exceed 15 mm (under normal UK conditions an individual six-metre rail will not expand by more than 10 mm). It is recommended that installation is undertaken in temperatures between 5°C and 25°C. Installation in temperatures outside of this range should be avoided.

3.6 A suitably qualified engineer must check the design of each installation.

4 Practicability of installation

The product is suitable for installation by general building contractors provided that they have undergone appropriate training by the Certificate holder.

5 Strength and stability

Wind loading



5.1 The tiles have a flexural strength in excess of 2 kN and will withstand windloads likely to be encountered in the UK.

5.2 Load-span data for the horizontal aluminium rails (for a span/200 deflection) is given in Table 3. These values reflect a minimum safety factor of 4 before failure of either tiles or support system.

5.3 The span of horizontal rails is restricted to 2100 mm to maintain L/600 dead load vertical deflection of horizontal rails.

5.4 A cantilever length of L/5 is permitted at the end of a horizontal rail, where L is the span of the fully supported adjacent section.

5.5 As the cladding is open-jointed, the supporting wall must be able to take the full wind load.

5.6 Wind loads should be calculated in accordance with BS EN 1991-1-4 : 2004 and BS 6399-2 : 1997.

Impact

5.7 In common with all clay tiles, the Lockclad tiles are susceptible to damage from hard body impacts. It is recommended that use of the product is restricted to locations where there is some incentive to exercise care and little chance of hard body impacts, such as detailed under categories C, D and F described in BS 8200 : 1985, Table 2.

Table 3 Load-span tables for horizontal aluminium rails

Span (mm)	Maximum permitted wind pressure for L/200 deflection (kPa)	
	With full wind load on tiles/rails (no allowance for pressure equalisation)	With reduced wind loads on tiles/rails (allowing for pressure equalisation ⁽¹⁾)
1000	4.5	—
1100	3.9	—
1200	3.4	—
1300	2.9	—
1400	2.5	—
1500	2.2	—
1600	1.9	—
1700	1.7	4.5
1800	1.4	4.0
1900	1.2	3.5
2000	1.0	3.0
2100	0.8	2.5

(1) For pressure equalisation:

- the inner wall must be airtight.
- Lockrail 2 must only be used as top or bottom rail.
- a soffit or equivalent must overhang the cladding at the top of the installation.
- the cavity behind the cladding must be closed vertically at the corners of the installation. If the corners are not closed, but other conditions for pressure equalisation apply, then pressure equalised loads may be assumed beyond 1.8 m from the corner; up to 1.8 m, full wind loads must be assumed.
- when used above an opening (eg on a wall above an open ground-floor car park) a suitable protruding baffle must be in place at the bottom of the installation to maintain pressure equalisation without blocking essential drainage/ventilation pathways.
- the cladding must be installed in accordance with manufacturer's instructions.
- a suitably qualified engineer must check the design and installation of the cladding.

6 Behaviour in relation to fire



6.1 The tiles and aluminium support rails are non-combustible and as such have a Class 0 fire rating under the national Building Regulations.

6.2 The polypropylene Lockclips and Lockspacer components are largely protected by the tiles and, although the 8 mm wide polypropylene spacer bar extends between tiles vertically up the installation, it is considered that these plastic ancillary components are present in such relatively small amounts they are unlikely to significantly affect the overall fire performance of the cladding.

6.3 As a consequence of sections 6.1 and 6.2, Lockclad Rainscreen Cladding System may be regarded as suitable for installations where a Class 1 surface spread of flame is specified in accordance with BS 476-7 : 1997, and fire propagation indices of $I < 1.2$ and $i_1 < 6$ in accordance with BS 476-6 : 1989. On the basis of these data, therefore, the cladding may be considered to achieve the product performance classification of Class 0, as defined in the Building Regulations.

6.4 The incorporation of combustible material behind the cladding should be avoided wherever possible; any insulation should be non-combustible.

6.5 Cavity barriers should be incorporated behind the cladding as required under the national Building Regulations, but should not block essential ventilation pathways, for example by use of intumescent fire stops or overhanging incombustible breaks at each floor level.

7 Air and water penetration



7.1 The cladding is not airtight or watertight, but is intentionally open-jointed, back-ventilated and drained.

7.2 The inner wall supporting the cladding must be watertight.


7.3 A water-repellent insulant is recommended where insulation is used behind the cladding.

7.4 Provided that the inner wall is airtight, the effect of pressure equalisation will be such that rain will not be readily driven beyond the cladding and the majority of that which does will run down the back of one tile and out onto the

front of the one below. Some rain, however, may be driven beyond the cavity behind the cladding and onto the inner leaf or insulation a minimum of 25 mm behind the cladding support rail. However, the effect of pressure equalisation will be such that the volume of any such rain will be expected to be small and readily removed by the effects of drainage and ventilation in the cavity behind the cladding. To maintain the effect of pressure equalisation at the corner of the installation it is necessary to close the cavity behind the cladding over the full height of the installation. Otherwise a breather membrane up to 1.8 m from the corner or side should be used to protect the insulation.

7.5 Where pressure equalisation does not apply, insulation behind the cladding should be protected by a breather membrane.

8 Maintenance

 8.1 The tiles are generally self-cleaning. Where necessary, a soft brush and copious amounts of clean water (eg a car hose-brush) may be used. Hard bristled brushes should not be used. For the removal of graffiti and other persistent stains the manufacturer's advice should be sought. The removal of tiles and use of proprietary stain removers may be necessary.

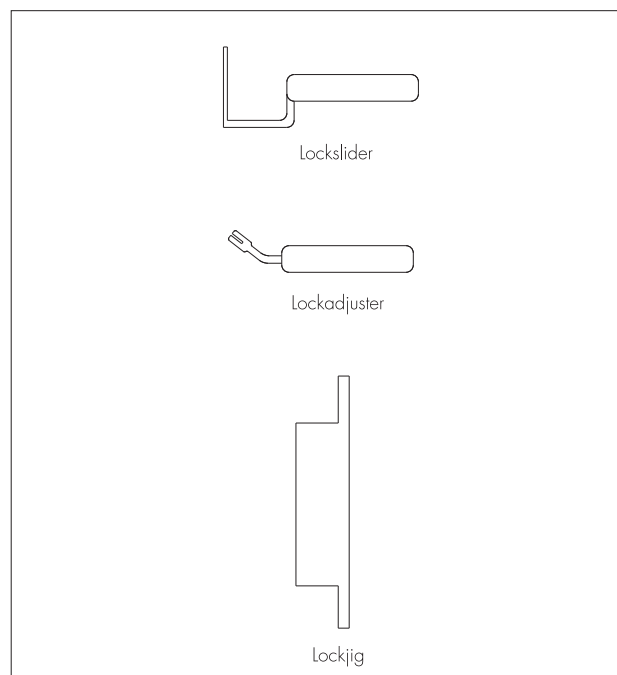
8.2 Damaged tiles should be replaced as soon as practicable following the manufacturer's procedure:

- locate the closest tile on the same row supported on a Lockclip 2, identified with a small recess in the middle of the bottom edge of the clip (which should be centralised between two tiles)
- use the Lockslider tool (see Figure 3) to push the Lockclip under the adjacent tile away from the damaged one
- remove this tile and Lockclip 1 at the other side of the tile
- remove Lockclip 1 and tiles one by one along the row until the damaged tile is reached
- replace the damaged tile and reinsert the others⁽¹⁾ using standard installation procedure.


(1) Care should be taken to ensure that the shade of the replacement tile blends in with the installation.

8.3 Checks should be carried out periodically to ensure that ventilation and drainage pathways remain clear.

Figure 3 Installation tools



9 Durability

 9.1 Freeze-thaw tests indicate that there will be no significant change in the physical properties of the tiles on ageing.

9.2 The tiles will have a life equivalent to known, good quality, clay tiles, when used in normal exposure conditions in the United Kingdom (ie in excess of 35 years).

9.3 The aluminium Lockrails and Lockbrackets will have a lifetime at least commensurate with the tiles they are supporting.

9.4 Accelerated weathering tests indicate that the plastic fittings will have a life of at least 25 years in normal UK conditions.

9.5 After natural weathering some slight change in colour of the tiles may occur. However, this is not likely to be progressive.

10 General

10.1 The product must be installed in accordance with the manufacturer's recommendations, the requirements of this Certificate and the specification laid down by the consulting engineer.

10.2 Installers must be trained and approved by the Certificate holder.

10.3 Reference should be made to Figures 2, 3 and 4, Table 2 and section 1.7 when reading the procedural details given in section 11.

10.4 As colour variation in shade occurs within and between batches, care needs to be taken to achieve the desired variation on the finished wall, normally by some random selection of tiles during the installation period in accordance with the Certificate holder's recommendations.

10.5 Vertical rails and other parts of the substructure are outside the scope of this Certificate.

11 Procedure

11.1 The components are prepared and assembled for the job. Lockbrackets are slid onto the Lockrails and positioned at the appropriate centres.

11.2 The first rail, normally the bottom one, is positioned horizontally and the Lockbrackets fixed to the substructure (eg vertical rail).

11.3 The second and subsequent rails are fixed to the substructure in the same way using a Lockjig tool to set the vertical spacing between rails.

11.4 Rails are joined over a special 100 mm wide Lockbracket allowing for expansion⁽¹⁾ between rails. Use, over the join, of a water-resistant adhesive tape, specified by the manufacturer, is recommended to avoid the possibility of splash back to the inner leaf at this junction.

(1) To be calculated by the site engineer.

11.5 Lockrails are fixed at one position only with a stainless steel screw through the top of one Lockbracket into the top of the Lockrail.

11.6 Lockrail 1 may be used throughout the whole installation. However, it is normal practice to use Lockrail 2 at the top and bottom along with associated top and bottom fittings (see Table 2).

11.7 The tiles are fitted into the rails by inserting the top nib of the tile, at an angle, into the bottom channel of the rail above and then straightening the tile so that the bottom nib falls into the upper channel of the rail below.

11.8 The bottom channel on the upper rail can be adjusted with the Lockadjuster tool to give a tight fit on the tile.

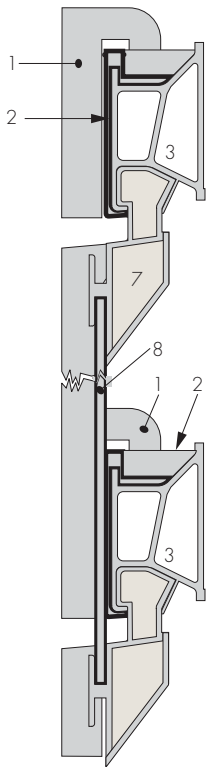
11.9 Lockclips are inserted over the lower rail and under the bottom nib of the tile to give a tight fit at the bottom of the tiles. Lockclip 1 includes a 2 mm spacer in the standard clip and sets a 2 mm vertical gap between tiles. Lockclip 2 is the same as Lockclip 1 but without the 2 mm spacer. This is used in conjunction with the Lockspacer tool for the last tile in every row and also used about every fifth tile in a row to allow for subsequent tile removal if required.

11.10 Lockspacers are inserted into the bottom channel of the rail between tiles to reduce splash-back from the rail onto the substructure. Lockspacer 2 has a 2 mm spacer and is used for standard installation with a 2 mm vertical gap between tiles. Lockspacer 8 sets a wider 8 mm gap between tiles. When using this spacer, an 8 mm bar is inserted between adjacent clips in the vertical space between rails to restrict water penetration between tiles at this wider opening. At the top and bottom row of tiles a cross piece, which fits behind the tiles, must be used as a spacer.

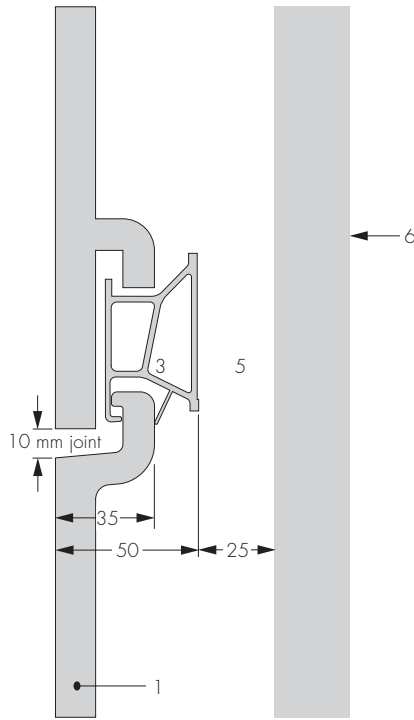
11.11 At corners, tiles may be butted or mitred, or used with a trim (outside the scope of this Certificate). The Lockrails should be mitred at the corners and both corner tiles fitted into brackets fixed to a vertical rail (which may or may not be fixed back to the substrate) or to angle brackets (see Figure 4).

11.12 At the end of a section, a small mitred return tile or trim may be used.

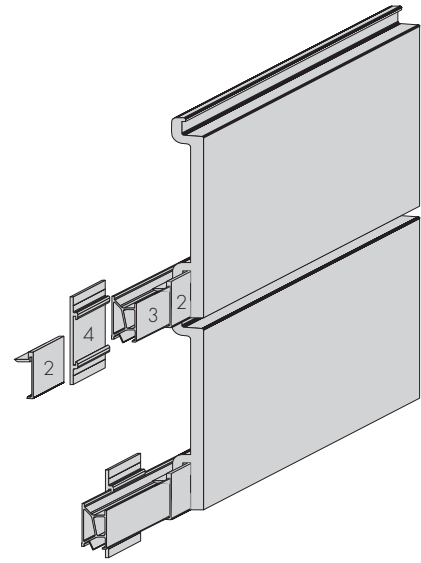
Figure 4 Typical installation details



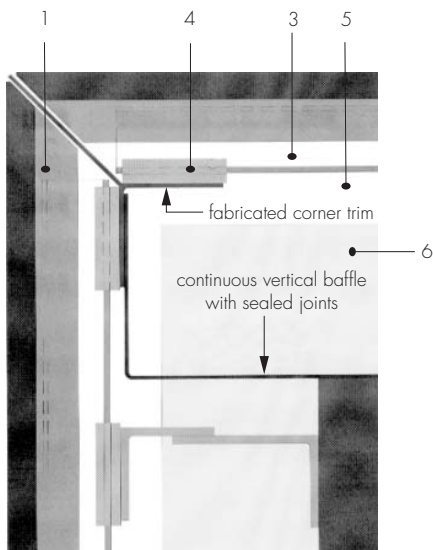
Joint with clip, spacer and 8 mm bar



detail with Lockclip, Lockbracket and Lockspacer omitted for clarity



detail with Lockspacer omitted for clarity

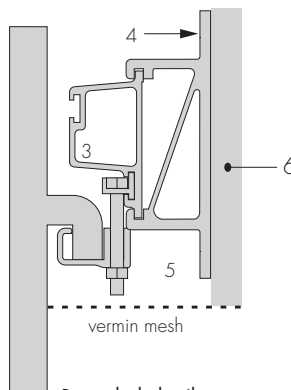


Closed corner

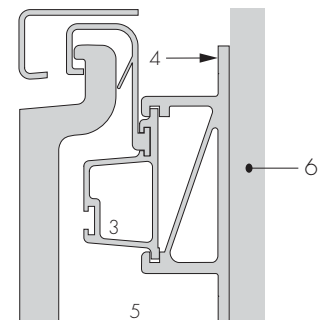


Corner detail

- 1 Locktile
- 2 Lockclip
- 3 Lockrail
- 4 Lockbracket
- 5 Ventilated cavity
- 6 Insulation
- 7 Lockspacer
- 8 8 mm Spacer bar



Bottomlock detail



Toplock detail

12 Tests

12.1 Tests were carried out on tiles to determine:

- resistance to frost damage
- water absorption
- flexural strength
- resistance to impact
- impermeability
- dimensions.

12.2 Tests were carried out on rails to determine deflection under positive, negative and dead weight loading.

12.3 Tests were carried out on rails and brackets under positive and negative loading to determine failure loads and mechanisms.

12.4 Tests were carried out on clips to evaluate resistance to weathering and heat ageing.

12.5 Tests were carried out on 2 m square cladding panels to evaluate:

- resistance to the penetration of wind driven rain
- pressure equalisation.

13 Investigations

13.1 Installations-in-progress were inspected to evaluate the practicability of installation.

13.2 A visit was made to the site of manufacture to evaluate the production and quality control procedures.

13.3 Established installations were inspected to assess performance in use.

13.4 An assessment was made of the behaviour of the product in fire.

Bibliography

BS 476-6 : 1989 *Fire tests on building materials and structures — Method of test for fire propagation for products*

BS 476-7 : 1997 *Fire tests on building materials and structures — Method of test to determine the classification of the surface spread of flame of products*

BS 6399-2 : 1997 *Loading for buildings — Code of practice for wind loads*

BS 8200 : 1985 *Design of non-loadbearing external vertical enclosures of buildings*

BS EN 1991-1-4 : 2005 *Eurocode 1 : Actions on structures — General actions — Wind actions*

14 Conditions

14.1 This Certificate:

- relates only to the product/system that is named and described on the front page
- is granted only to the company, firm or person named on the front page — no other company, firm or person may hold or claim any entitlement to this Certificate
- 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.

14.2 References in this Certificate to any Act of Parliament, Statutory Instrument, Directive or Regulation of the European Union, British, European or International Standard, Code of Practice, manufacturers' instructions or similar publication, are references to such publication in the form in which it was current at the date of this Certificate.

14.3 This Certificate will remain valid for an unlimited period provided that the product/system and the manufacture and/or fabrication including all related and relevant 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.

14.4 In granting this Certificate, the BBA is not responsible for:

- 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
- individual installations of the product/system, including the nature, design, methods and workmanship of or related to the installation
- the actual works in which the product/system is installed, used and maintained, including the nature, design, methods and workmanship of such works.

14.5 Any information relating to the manufacture, supply, installation, use and maintenance 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 and maintained. It does not purport in any way to restate the requirements of the Health & Safety at Work etc Act 1974, or of any other statutory, common law or other duty which may exist at the date 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. In granting this Certificate, the BBA does not accept responsibility to any person or body for any loss or damage, including personal injury, arising as a direct or indirect result of the manufacture, supply, installation, use and maintenance of this product/system.