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Agrément Certificate
09/4678
Product Sheet 1

NVELOPE RAINSCREEN SYSTEMS

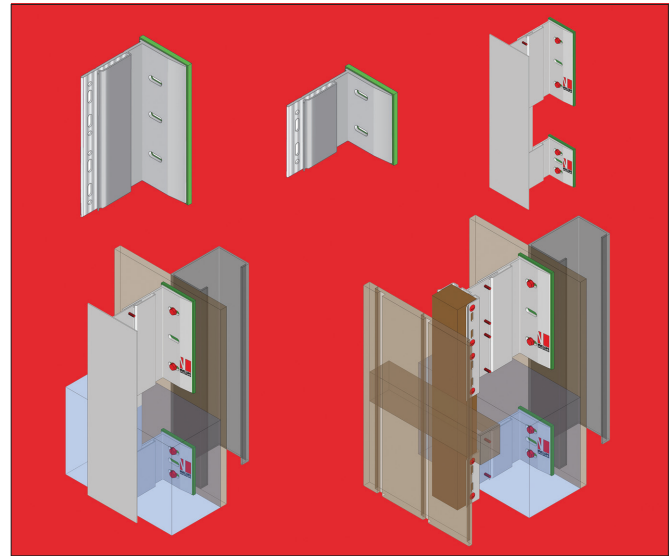
NVELOPE RAINSCREEN CLADDING SUPPORT SYSTEMS

PRODUCT SCOPE AND SUMMARY OF CERTIFICATE

This Certificate relates to the Nvelope Rainscreen Cladding Support Systems for use as a sub-frame to support cladding on the external or internal wall structure of new or existing buildings.

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

Mechanical resistance and stability — the system can be designed to support the cladding and to transfer the design loads to the substrate wall structure (see section 6).

Safety in case of fire — in respect of reaction to fire, the system may be regarded as having a class 0 surface or 'low risk' in accordance with the national building regulations (see section 7).

Hygiene, health and the environment — providing correct details are adopted, the system can provide adequate drainage and ventilation behind the cladding (see section 8).

Durability — the support system will have a service life in excess of 35 years (see section 10).

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

Date of First issue: 13 July 2012

Originally certificated on 14 August 2009

Certificate amended on 06 January 2015 Durability statement.

Handwritten signature of Brian Chamberlain.

Brian Chamberlain

Head of Approvals — Engineering

Handwritten signature of Greg Cooper.

Greg Cooper

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

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, Nvelope Rainscreen Cladding Support Systems, 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 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)

Requirement: A1	Loading
Comment:	The system can be designed to adequately transfer the design loads from the cladding to the substrate wall structure. See sections 6.1 to 6.13 of this Certificate.
Requirement: B4(1)	External fire spread
Comment:	The system is judged to meet the Class 0 requirements. See section 7.1 of this Certificate.
Requirement: C2(b)(c)	Resistance to moisture
Comment:	The system will contribute to meeting the stated requirements. See sections 8.2 to 8.6 of this Certificate.
Requirement: Regulation 7	Materials and workmanship
Comment:	The system is acceptable. See section 10 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 is acceptable. See sections 9.1, 9.2 and 10 and the <i>Installation</i> part of this Certificate.
Regulation: 9	Building standards – construction
Standard: 1.1(a)(b)	Structure
Comment:	The system can be designed to adequately transfer the design loads from the cladding to the substrate wall structure, with reference to clause 1.1.1 ⁽¹⁾⁽²⁾ . See sections 6.1 to 6.13 of this Certificate.
Standard: 2.6	Spread to neighbouring buildings
Comment:	The system will contribute to satisfying this Standard, with reference to clause 2.6.4 ⁽¹⁾⁽²⁾ . See section 7.1 of this Certificate.
Standard: 2.7	Spread on external walls
Comment:	The system will contribute to satisfying this Standard, with reference to clause 2.7.1 ⁽¹⁾⁽²⁾ . See sections 7.1 and 7.5 of this Certificate.
Standard: 3.10	Precipitation
Comment:	The system will contribute to meeting this Standard, with reference to clauses 3.10.1 ⁽¹⁾⁽²⁾ to 3.10.3 ⁽¹⁾⁽²⁾ . See sections 8.2 to 8.6 of this Certificate.
Standard: 7.1(a)(b)	Statement of sustainability
Comment:	The product can contribute to meeting the relevant Requirements of Regulation 9, Standards 1 to 6, and, therefore, will contribute to a construction meeting a bronze level of sustainability as defined in this Standard. (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 system is acceptable. See section 10 and the <i>Installation</i> part of this Certificate.
Regulation: B3(2)	Suitability of certain materials
Comment:	The system is acceptable. See sections 9.1 and 9.2 of this Certificate.
Regulation: C4	Resistance to ground moisture and weather
Comment:	The system will contribute to meeting this Regulation. See sections 8.2 to 8.6 of this Certificate.
Regulation: D1	Stability
Comment:	The system can be designed to adequately transfer the design loads from the cladding to the substrate wall structure. See sections 6.1 to 6.13 of this Certificate.
Regulation: E5	External fire spread
Comment:	The system is judged to meet the Class 0 requirements. See section 7.1 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 sections: 3 *Delivery and site handling* (3.6) and 9 *Maintenance* (9.2) of this Certificate.

Additional Information

NHBC Standards 2011

NHBC accepts the use of Nvelope Rainscreen Cladding Support Systems, when installed and used in accordance with this Certificate, in relation to NHBC Standards, Chapter 6.9, D8 Rainscreen cladding.

General

This Certificate relates to the Nvelope Rainscreen Cladding Support Systems for use as a sub-frame to support cladding on the external or internal wall structure of new or existing buildings.

It is important for designers, planners, contractors and/or installers to ensure that the support system has adequate structural capacity to support cladding panels in accordance with the design and installation requirements of the cladding panel supplier.

The system components are designed and manufactured by Nvelope Rainscreen Systems Ltd, using extruded sections from various sources within the UK, bought-in to agreed specification. The system is distributed in the UK by the Certificate holder.

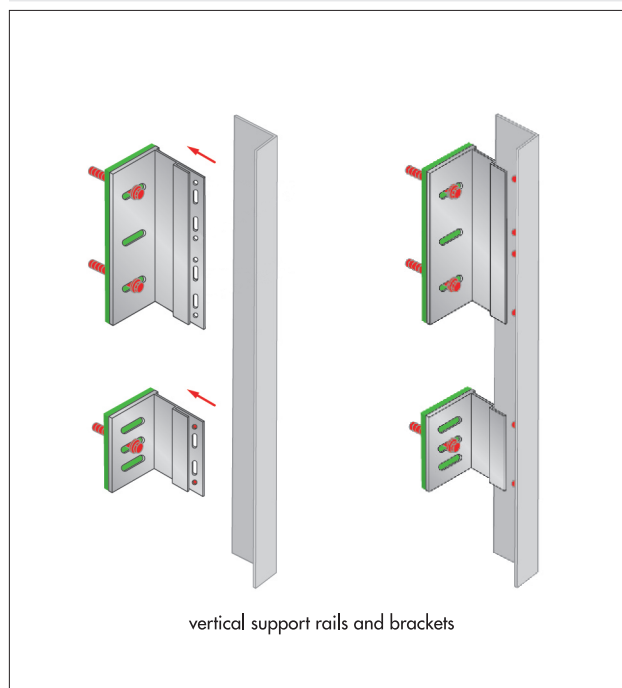
Technical Specification

1 Description

1.1 The Nvelope Rainscreen Cladding Support Systems, attached to the external or internal wall structure of buildings, consists of (see Figure 1):

- NV brackets — fitted to the substrate using appropriate fixings (outside the scope of this Certificate). Brackets feature a polypropylene thermal isolator pad fitted to the back. Two variants of the brackets are available: Single and Double. The Single brackets have a height of 75 mm and the double brackets, 150 mm
- Nvelope carriers — vertical, 'U' section profiles, fixed to the NV brackets using self-drilling screws or blind rivets (see Figure 2), used to support timber battens to which cladding panels can be fixed. Four variants of carrier are available, with widths of 50 mm or 100 mm and heights of 75 mm or 150 mm
- Nvelope L and T rails — rails of 'L' and 'T' profile, fixed to the NV brackets using self-drilling screws or blind rivets (see Figure 1), which provide a fixing area for the cladding panels.

Figure 1 Typical rail/bracket arrangement



1.2 The main system components (see Figure 2) are manufactured from aluminium alloy, to a minimum grade of EN AW — 6063T6 (Al Mg 0.7Si) to BS EN 573-3 : 2007, with the characteristics as described in Tables 1, 2 and 3.

Figure 2 Component details

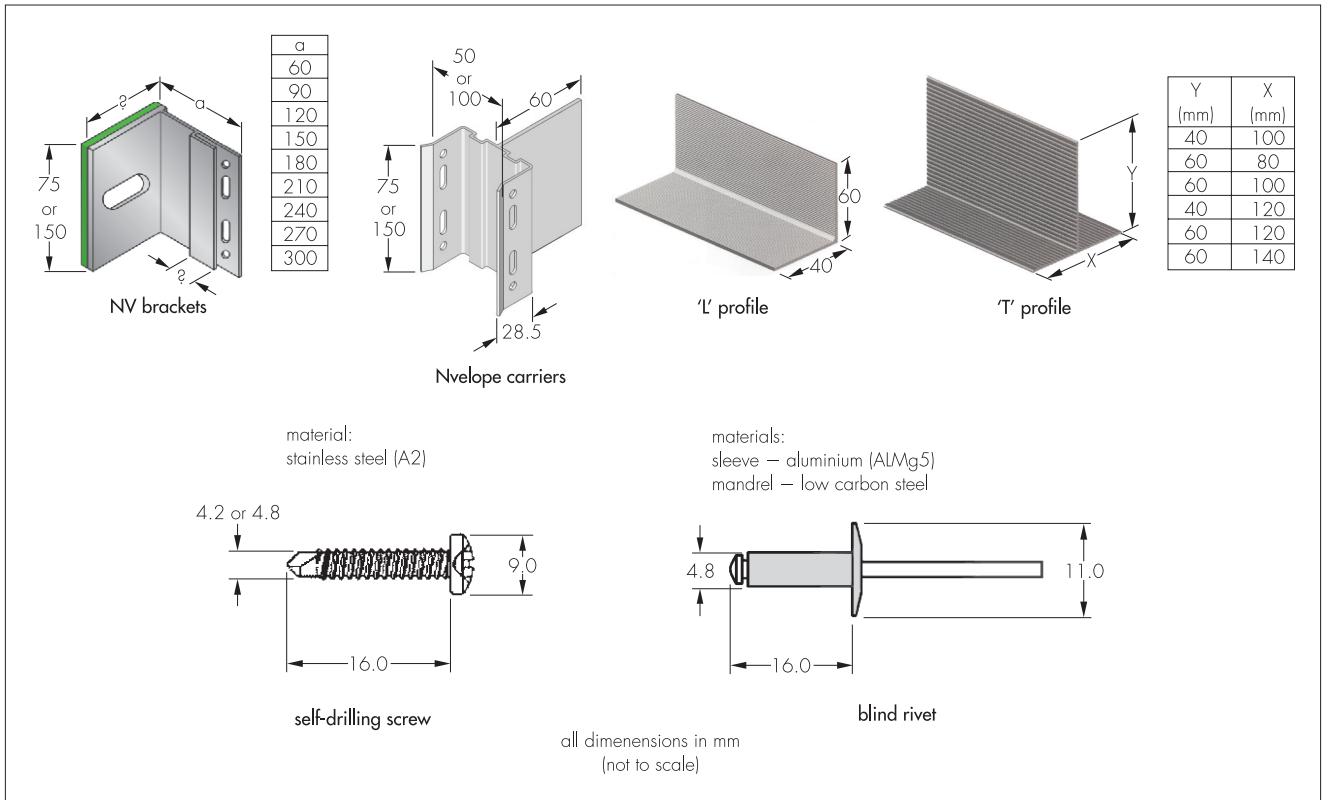
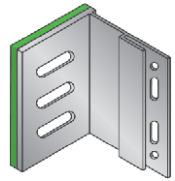


Table 1 NV bracket – Single (75 mm) – maximum permissible shear loads (for bracket out-stand leg)

Bracket leg length (a) ⁽¹⁾ (mm)	Projection range ⁽²⁾ (mm)	Code	Maximum permissible shear loads (kN)	
			Vertical	Horizontal
60	62–102	VB060S	4.43	7.36
90	92–132	VB090S	4.21	8.10
120	122–162	VB120S	3.88	8.10
150	152–192	VB150S	3.72	8.10
180	182–222	VB180S	3.62	8.10
210	212–252	VB210S	3.57	8.10
240	242–282	VB240S	3.54	8.10
270	272–312	VB270S	3.51	8.10
300	302–342	VB300S	3.49	8.10




(1) See Figure 2.

(2) Distance between back face of bracket to back of rail profile (see Figure 1).

Table 2 NV bracket – Double (150 mm) – maximum permissible shear loads (for bracket out-stand leg)

Bracket leg length (a) ⁽¹⁾ (mm)	Projection range ⁽²⁾ (mm)	Code	Maximum permissible shear loads (kN)	
			Vertical	Horizontal
60	62–102	VB060D	3.88	7.36
90	92–132	VB090D	5.82	8.41
120	122–162	VB120D	4.52	8.79
150	152–192	VB150D	3.42	8.56
180	182–222	VB180D	2.97	9.11
210	212–252	VB210D	2.46	9.81
240	242–282	VB240D	2.53	10.58
270	272–312	VB270D	2.41	11.44
300	302–342	VB300D	2.32	12.32

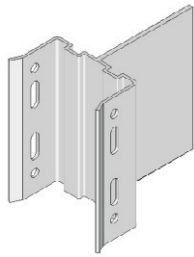


(1) See Figure 2.

(2) Distance between back face of bracket to back of rail profile (see Figure 1).

Table 3 Nvelope carriers — maximum permissible shear loads

Description	Code	Maximum permissible shear loads (kN)	
		Vertical	Horizontal
50 mm carrier (Single)	UC050S	13.60	17.00
50 mm carrier (Double)	UC050D	13.60	34.00
100 mm carrier (Single)	UC100S	13.60	17.00
100 mm carrier (Double)	UC100D	13.60	34.00



1.3 The brackets are fixed to the substrate wall structure using stainless steel anchors of predetermined size. The support rails are secured to the brackets using stainless steel screws or rivets as specified in Figure 2.

2 Manufacture

- 2.1 The main system components are manufactured from extruded sections of aluminium alloy.
- 2.2 To ensure product quality is consistently maintained to the required specification, the BBA has:
 - agreed with the Certificate holder/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 non-conformities
 - checked that equipment has been properly tested and calibrated
 - undertaken to carry out the above measures on a regular basis as part of a surveillance process to ensure that standards are maintained and that the product or system remains as Certificated.

3 Delivery and site handling

- 3.1 The aluminium rails are banded on pallets. Every pallet carries a label bearing the manufacturer’s name and a label bearing the BBA identification mark incorporating the number of this Certificate.
- 3.2 Packs of rails should be stacked horizontally, on sufficient bearers to prevent distortion, to a maximum height of one metre. Other components should be stored safely until ready for use.
- 3.3 The pallets should be stored on a dry, flat and level surface, suitably protected from the weather. Ancillary items should be stored in separate boxes.
- 3.4 The brackets are delivered to site in cartons of a size suitable for manual handling.
- 3.5 The system components should be handled with care. Damaged items should be discarded.
- 3.6 Protective clothing should be worn, as required, and all health and safety regulations observed. Care should be exercised when handling long lengths of rail, especially at height.

Assessment and Technical Investigations

The following gives a summary of the assessment and technical investigations carried out on Nvelope Rainscreen Cladding Support Systems.

Design Considerations

4 General

Nvelope NV Brackets and Nvelope L and T Rails are satisfactory for use in back ventilated and drained cavity rainscreen cladding systems, as well as for internal cladding, in new and existing buildings.

5 Practicability of installation

The system is suitable for installation by cladding contractors approved by the Certificate holder.

6 Mechanical resistance and stability

Wind loading

 6.1 The substrate wall to which the cladding is to be fixed should be designed and constructed in accordance with the requirements of the relevant UK Building Regulations and British Standards.

6.2 The designer must ensure that:

- the system attachment to the substrate has adequate fixing pull-out capacity for the calculated loads
- the bearing capacity of the fixings between the NV brackets and rails is not exceeded
- the support system and cladding to be supported are compatible
- thermal expansion effects of both the support system and the cladding to be supported are taken into consideration in the design and detailing.

6.3 The supporting wall must be able to resist the full wind, as well as any racking loads, on its own. No contribution from the cladding system may be assumed in this respect.

6.4 The pull-out value of the fixings for securing the brackets to the wall should be determined on site from the characteristic pull-out strength and appropriate safety factors as given in BS 5427-1 : 1996.

6.5 Wind loads should be calculated in accordance with BS EN 1991-1-4 : 2005 or BS 6399-2 : 1997.

6.6 When calculating wind loads, higher pressure coefficients applicable to corners of the building should be used, as recommended in the appropriate Standards.

6.7 Details of the brackets, with their maximum permissible loadbearing capacities, are shown in Figure 2. The permissible load-carrying capacity of the connections should be greater than that of the bracket as tabulated.

6.8 Details of the screws for connecting the support rails to the brackets are shown in Figure 2. For details of the fixing suppliers, the advice of the Certificate holder should be sought.

6.9 The design of the rails and associated connections should be such as to satisfy the requirement of BS EN 1999-1-1 : 2007, using the mechanical properties of the aluminium grade adopted. Mid-span deflections should be limited to $L/200$ and cantilever deflections limited to $L/150$.

6.10 In general, the rails should be fixed at mid-length using normal clearance holes (fixed point) and allowed to expand toward the ends using slotted holes (flexible or sliding point) (see Figures 1 and 2). To allow for expansion, a minimum gap of 2.5 mm per metre length should be provided. For standard three-metre long rails, a gap of 8 mm between adjacent rails is adequate. For calculation purposes, the coefficient of thermal expansion for aluminium may be taken as $23 \times 10^{-6} \text{ K}^{-1}$.

6.11 The design of the installation must be checked by a suitably qualified chartered engineer or other appropriately qualified person.

6.12 Any insulation behind the cladding should be suitably fixed to the supporting wall, and protected, to resist the forces of wind suction. Insulation should be, at least, of semi-rigid type (eg boards or batts).

Impact loading

6.13 The impact resistance of a cladding system is a function of the support framing arrangement and the cladding panel used. The structural engineer should ensure that the system has adequate impact resistance for the support frame arrangement and cladding panels used, for the intended location category as defined in BS 8200 : 1995, Table 2.

7 Safety in case of fire



7.1 The aluminium brackets, rails, and associated fixings are non-combustible and, therefore, may be regarded as having a Class 0 surface in relation to The Building Regulations 2000 (as amended) (England and Wales), Approved Document B, and a 'low risk' material as defined in The Building (Scotland) Regulations 2004 (as amended), Annex 2C.



7.2 The Nvelope NV brackets feature polypropylene insulation pads, 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.

7.3 For resistance to fire, the performance of a wall incorporating the cladding systems can only be determined by tests from a suitably accredited laboratory and is not covered by this Certificate.

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

7.5 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 the use of intumescent cavity barriers (specific types not covered by this Certificate) or overhanging incombustible breaks at each floor level.

8 Hygiene, health and the environment (external wall)



8.1 The substrate wall to which the cladding is to be fixed should be watertight and resistant to the transmission of sound.

8.2 The support system, when incorporated in back-ventilated and drained cavity rainscreen cladding systems will not have an adverse effect on the removal of water from the cavity by drainage and ventilation.

8.3 For effective removal of moisture from the cavity, a minimum ventilation area of 100 cm² per metre run of cladding should be provided. The ventilation openings should be suitably protected or baffled to prevent the ingress of birds, vermin and rain.

8.4 Providing the joints between the cladding panels are adequately baffled, the amount of water entering the cavity by wind-driven rain will be small, thus reducing precipitation on the system components.

8.5 The air space between the back of the cladding panels and the supporting wall or insulation should be as wide as possible allowing for normal building tolerances. Guidance on recommended cavity widths is given in NHBC Standards, Chapter 6.9.

8.6 The ventilation pathway behind the cladding must not be allowed to become blocked nor the insulation dislodged where it may be vulnerable to wetting.

8.7 As the aluminium is sourced from naturally occurring ores, the components are non-toxic during fabrication and in normal use and, as they are non-combustible, do not produce toxic effects when exposed to fire.

9 Maintenance



9.1 The support system itself does not require special maintenance. The cladding system, however, should be inspected annually to ensure that rainware is complete and in good order and that the cladding panels are in place and secure.

9.2 Damaged panels should be repaired or replaced as soon as is practicable following the manufacturer's instructions and observing all necessary health and safety regulations.

10 Durability



The support system, when used as prescribed in this Certificate, can be expected to have an ultimate service life in excess of 35 years in normal UK conditions.

11 Re-use and recyclability

The aluminium and polypropylene components of the system can be recycled.

Installation

12 General

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

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

13 Procedure

13.1 Based on a preliminary survey of the wall and architectural/structural design, a grid layout for the sub-frame is first prepared.

13.2 The brackets (with the isolator pad) are fixed to the substrate wall using stainless steel fixings of appropriate size as determined by design (see section 6.4).

13.3 The rails are inserted into the brackets and, after adjustment for line and level, are fixed to them using self-drilling stainless steel screws, or rivets, as determined by design.

13.4 The rails are normally attached to the substrate wall such as to span one storey height. They are normally anchored at mid-span using the round holes on the brackets (fixed point/dead loads), and allowed to expand at the ends using the elongated holes on the brackets (flexible point).

13.5 Where specified, insulation should be tightly butted around the brackets and secured to the substrate wall using the appropriate fixings.

13.6 Where required, to protect the substrate wall or insulation from wind-driven rain, a vapour permeable membrane conforming to BS 4016 : 1997 should be applied.

13.7 The cladding panels (outside of the scope of this Certificate) deemed to be compatible with the support system are appropriately fixed to the vertical rails.

14 Investigations

- 14.1 An assessment was made of the product's resistance to wind and impact loading, reaction to fire, durability, the production method and associated quality control procedures.
- 14.2 From test data, an assessment was made of the product's behaviour in relation to fire.
- 14.3 Based on a user survey, an assessment was made of the product's practicability of installation and its performance in use.
- 14.4 The Certificate holder's technical literature was examined for any inconsistencies and general content.

Bibliography

- BS 4016 : 1997 *Specification for flexible building membranes (breather type)*
- BS 6399-2 : 1997 *Loading for buildings — Code of practice for wind loads*
- BS 8200 : 1985 *Code of practice for design of non-loadbearing external vertical enclosures of buildings*
- BS 5427-1 : 1996 *Code of practice for the use of profiled sheet for roof and wall claddings on buildings — Design*
- BS EN 573-3 : 2007 *Aluminium and aluminium alloys — Chemical composition and form of wrought products — Chemical composition and form of products*
- BS EN 1991-1-4 : 2005 *Eurocode 1 : Actions on structures — General actions — Wind actions*
- BS EN 1999-1-1 : 2007 *Eurocode 9 : Design of aluminium structures — General structural rules*

15 Conditions

15.1 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.

15.2 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.

15.3 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.

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

15.5 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
- individual 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.

15.6 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.

