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Agrément Certificate
09/4678
Product Sheet 1

EUROFOX RAINSCREEN CLADDING SUPPORT SYSTEM

PRODUCT SCOPE AND SUMMARY OF CERTIFICATE

This Certificate relates to the Eurofox Rainscreen Cladding Support System 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 5).

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 6).

Hygiene, health and the environment — providing correct details are adopted, the system can provide adequate drainage and ventilation behind the cladding (see section 7).



The BBA has awarded this Agrément Certificate to the company named above for the product described herein. This product 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

Brian Chamberlain
Head of Approvals — Engineering

Greg Cooper
Chief Executive

Date of First issue: 14 August 2009

The BBA is a UKAS accredited certification body — Number 1113. 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 Eurofox Rainscreen Cladding Support 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 system can be designed to adequately transfer the design loads from the cladding to the substrate wall structure. See sections 5.1 to 5.14
Requirement: B4(1)	External fire spread
Comment:	The system is judged to meet the Class 0 requirements. See section 6.1.
Requirement: C2(b)(c)	Resistance to moisture
Comment:	The system will contribute to meeting the stated requirements. See sections 7.2 to 7.6.
Requirement: Regulation 7	Materials and workmanship
Comment:	The system is acceptable. See section 9 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 8.1, 8.2 and 9 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 5.1 to 5.14
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 6.1.
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 6.1 and 6.5.
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 7.2 to 7.6. (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 9 and the <i>Installation</i> part of this Certificate.
Regulation: B3(2)	Suitability of certain materials
Comment:	The system is acceptable. See sections 8.1 and 8.2 of this Certificate.
Regulation: C4	Resistance to ground moisture and weather
Comment:	The system will contribute to meeting this Regulation. See sections 7.2 to 7.6.
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 5.1 to 5.14.
Regulation: E5	External fire spread
Comment:	The system is judged to meet the Class 0 requirements. See section 6.1.

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: 2 *Delivery and site handling* (2.6) and 8 *Maintenance* (8.2).

Non-regulatory Information

NHBC Standards 2008

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

Zurich Building Guarantee Technical Manual 2007

In the opinion of the BBA, the use of the Eurofox Rainscreen Cladding Support System, in relation to this Certificate, is not subject to the requirements of this Technical Manual.

General

This Certificate relates to the Eurofox Rainscreen Cladding Support System 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 installation of the cladding is in accordance with the Certificate holder's instructions and the information given in this Certificate.

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

Technical Specification

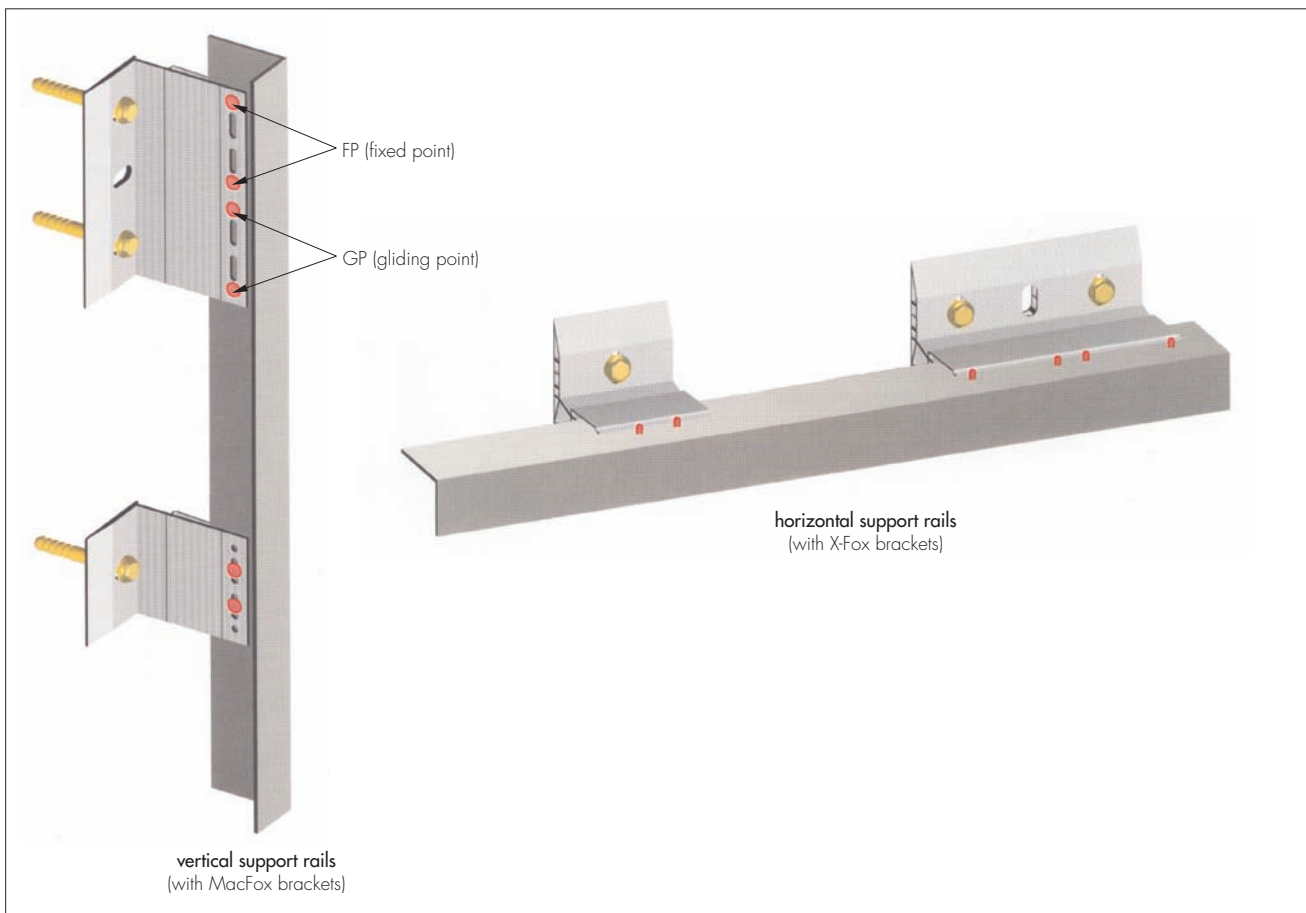
1 Description

1.1 The system, consisting of Macfox⁽¹⁾ brackets, X-Fox⁽²⁾ brackets, Eurofox rails and IsoFox thermal insulation pads, is attached to the external or internal wall structure of buildings to support cladding (see Figure 1).

(1) MacFox brackets are used predominantly for vertical rail assembly.

(2) X-Fox brackets are used predominantly for horizontal rail assembly.

Figure 1 Typical rail/bracket arrangement



1.2 The main system components are manufactured from extruded sections of aluminium alloy, minimum EN AW – 6063T6 (Al Mg 0.7Si) to BS EN 573-3 : 2007 (see Figure 2).

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.

1.4 Production control is by internal audits, with regular bi-annual inspections undertaken by the BBA or by an appointed agency on behalf of the BBA.

Figure 2 System component details

MacFox bracket Medium — 80 mm length

Projection range ⁽¹⁾ (mm)	Code	Max permissible loads (kN)	
		V ⁽²⁾	H ⁽³⁾
40-60	17/040M	1.00	1.25
60-100	17/060M	0.80	1.25
90-130	17/090M	0.65	1.25
120-160	17/120M	0.50	1.25
150-190	17/150M	0.42	1.25
180-220	17/180M	0.36	1.25
210-250	17/210M	0.32	1.25
240-280	17/240M	0.30	1.25



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

X-Fox bracket Medium — 80 mm length

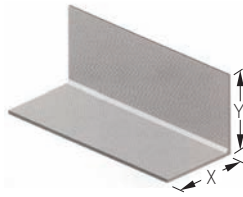
Projection range ⁽¹⁾ (mm)	Code	Max permissible loads (kN)	
		V ⁽²⁾	H ⁽³⁾
70-110	17/070M	0.32	1.10
90-130	17/090M	0.31	1.10
120-160	17/120M	0.28	1.10
150-190	17/150M	0.28	1.10
180-220	17/180M	0.20	1.10



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

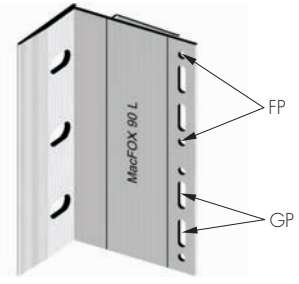
L Profiles

Y (mm)	X (mm)	thickness (mm)
60	40	2.2



MacFox bracket Large — 160 mm length

Projection range ⁽¹⁾ (mm)	Code	Max permissible loads (kN)	
		V ⁽²⁾	H ⁽³⁾
40-60	17/040L	2.40	2.30
60-100	17/060L	1.85	2.30
90-130	17/090L	1.74	2.30
120-160	17/120L	1.70	2.30
150-190	17/150L	1.50	2.30
180-220	17/180L	1.30	2.30
210-250	17/210L	1.15	2.30
240-280	17/240L	1.05	2.30



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

X-Fox bracket Large — 160 mm length

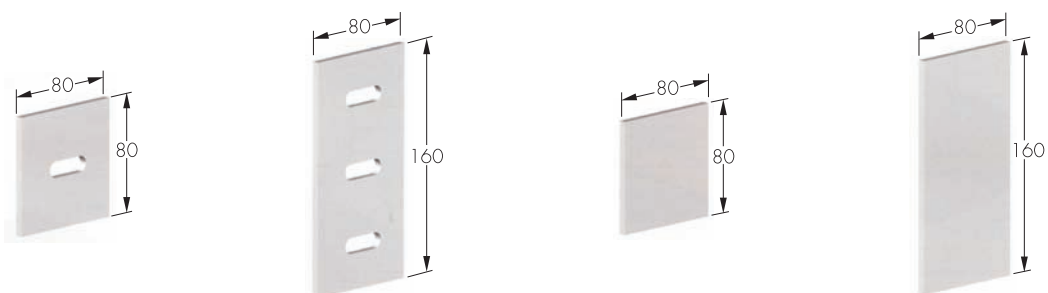
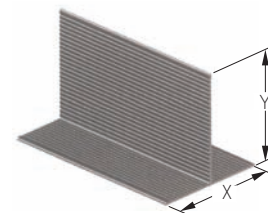
Projection range ⁽¹⁾ (mm)	Code	Max permissible loads (kN)	
		V ⁽²⁾	H ⁽³⁾
70-110	17/070L	0.62	2.10
90-130	17/090L	0.62	2.10
120-160	17/120L	0.56	2.10
150-190	17/150L	0.56	2.10
180-220	17/180L	0.40	2.10



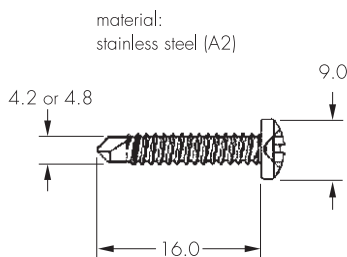
- (1) Distance between back face of bracket to back of rail profile (see Figure 2).
 (2) Vertical.
 (3) Horizontal.

T Profiles

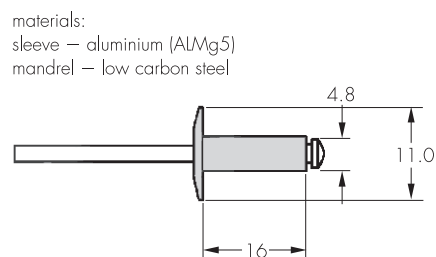
Y (mm)	X (mm)	thickness (mm)
40	100	2.2
60	80	2.2
60	100	2.2
40	120	2.2



IsoFox insulating pads
(not to scale)



self-drilling screw



blind rivet

all dimensions in mm
(not to scale)

2 Delivery and site handling

- 2.1 The aluminium rails are banded on pallets. Every pallet carries a label bearing the manufacturer's name and production batch number and a label bearing the BBA identification mark incorporating the number of this Certificate.
- 2.2 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.
- 2.3 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.
- 2.4 The brackets are delivered to site in cartons of a size suitable for manual handling.
- 2.5 The system components should be handled with care. Damaged items should be discarded.
- 2.6 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 is a summary of the assessment and technical investigations carried out on the Eurofox Rainscreen Cladding Support System.

Design Considerations

3 General

MacFox and X-Fox Brackets and Eurofox 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.

4 Practicability of installation

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

5 Mechanical resistance and stability

Wind loading



- 5.1 The substrate wall to which the cladding is to be fixed should be designed and constructed in accordance with the requirements of the relevant building regulations and national standards.
- 5.2 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.
- 5.3 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 factor as given in BS 5427-1 : 1996.
- 5.4 Wind loads should be calculated in accordance with BS EN 1991-1-4 : 2005 and BS 6399-2 : 1997.
- 5.5 When calculating wind loads, higher pressure coefficients applicable to corners of the building should be used, as recommended in the appropriate Standards.
- 5.6 The system attachment to the substrate wall should be such as to ensure adequate fixings pull-out capacity for the calculated loads.
- 5.7 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.
- 5.8 Details of the screws for connecting the support rails to the brackets are shown in Figure 2. For details of the fixings suppliers, the advice of the Certificate holder should be sought.
- 5.9 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.
- 5.10 In general, the rails should be fixed at mid-length using normal clearance holes (FP) and allowed to expand toward the ends using slotted holes (GP) (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 $23 \times 10^{-6} \text{ K}^{-1}$.
- 5.11 A sample of the system with vertical rails at 600 mm centres, when tested in conjunction with a cladding material, was found to have adequate strength and stability against the maximum wind loading likely to be experienced in the UK.
- 5.12 The design of the installation must be checked by a suitably qualified chartered engineer or other appropriately qualified person.
- 5.13 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

5.14 The impact resistance of a cladding system is a function of the support framing arrangement and the cladding panel used. A test sample, designed to resist all wind pressures likely to be experienced in the UK and comprising vertical rails at 600 mm centres supporting fibre-cement concrete panels, when subjected to soft body impact in accordance with BS 8200 : 1985, performed adequately.

6 Safety in case of fire



6.1 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.



6.2 The IsoFox insulating pads, used to reduce the risk of cold bridging across the bracket/wall interface, 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.

6.3 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.

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

7 Hygiene, health and the environment (external wall)

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



7.2 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.

7.3 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.

7.4 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.

7.5 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.

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

7.7 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.

8 Maintenance



8.1 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.

8.2 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.

9 Durability



The support system, when used as prescribed in this Certificate, can be expected to have an ultimate service life commensurate with that of the cladding it is supporting.

Installation

10 General

10.1 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.

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

11 Procedure

- 11.1 Based on a preliminary survey of the wall and architectural/structural design, a grid layout for the sub-frame is first prepared.
- 11.2 The brackets (with the insulating pad) are fixed to the substrate wall using stainless steel fixings of appropriate size as determined by design (see section 5.3).
- 11.3 The rails are clipped 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.
- 11.4 The rails are normally attached to the substrate wall such as to span one storey height. They are anchored at mid-span using the round holes on the brackets (FP), and allowed to expand at the ends using the elongated holes on the brackets (GP).
- 11.5 Where specified, insulation should be tightly butted around the brackets and secured to the substrate wall using the appropriate fixings.
- 11.6 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.
- 11.7 Cladding panels can be fixed to the support rails using rivets, adhesives or other mechanical means, as recommended by the panel manufacturer whose advice should be sought as to the suitability of the support system and the fixing method.

Technical Investigations

12 Investigations

- 12.1 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.
- 12.2 From test data, an assessment was made of the product's behaviour in relation to fire.
- 12.3 Based on a user survey, an assessment was made of the product's practicability of installation and its performance in use.
- 12.4 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*

13 Conditions

13.1 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.

13.2 Publications and documents referred to in this Certificate are those that the BBA deems to be relevant at the date of issue or re-issue of this Certificate and include any: Act of Parliament; Statutory Instrument; Directive; Regulation; British, European or International Standard; Code of Practice; manufacturers' instructions; or any other publication or document similar or related to the aforementioned.

13.3 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.

13.4 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.

13.5 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.