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Agrément Certificate
10/4746
Product Sheet 1

MULTIPANEL CLADDING PANELS

ALUPANEL XT AND XT FR CLADDING PANELS

This Agrément Certificate Product Sheet⁽¹⁾ relates to Alupanel XT and XT FR Cladding Panels, composite panels comprising aluminium outer sheets and a polyethylene or mineral-based core respectively, used to provide a decorative and protective façade over the external walls of new and existing buildings or an internal lining fixed to a substructure.

(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 products, with suitable support, can resist wind and impact actions normally encountered in the UK (see section 6).

Behaviour in relation to fire — the XT and XT FR products have a D-s1, d0 and a B-s1, d0, Class O/'low risk' reaction to fire classification respectively. The use of both panels is restricted to buildings up to 18 metres in height, unless specific conditions are met (see section 7).

Weathertightness — the products restrict the passage of water entering the cavity. Any water collecting in the cavity will be removed by drainage and ventilation (see section 8).

Durability — the products have acceptable durability and can be expected to have a service life in excess of 30 years (see section 10).



The BBA has awarded this Certificate to the company named above for the products described herein. These products 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

Brian Chamberlain

Claire Curtis-Thomas

Date of Third issue: 4 August 2017

Brian Chamberlain

Claire Curtis-Thomas

Originally certificated on 19 April 2010

Head of Technical Excellence

Chief Executive

Certificate amended on 30 August 2017 for inclusion of revised NHBC statement.

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, Alupanel XT and XT FR Cladding Panels, 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 products are acceptable for use and can sustain and transfer the design loads to the structural frame as set out in sections 6.1 to 6.9 of this Certificate.
Requirement:	B2(1)	Internal fire spread (linings)
Comment:		The products may be restricted under this Requirement. See section 7.1 of this Certificate.
Requirement:	B3(2)(4)	Internal fire spread (structure)
Comment:		The products are restricted under this Requirement. See section 7.1 of this Certificate.
Requirement:	B4(1)	External fire spread
Comment:		The products can satisfy or contribute to satisfying these Requirements. See sections 7.1 to 7.5 and 7.7 to 7.9 of this Certificate.
Requirement:	C2(b)(c)	Resistance to moisture
Comment:		The products provide a degree of protection against water ingress. See section 8 of this Certificate.
Regulation:	7	Materials and workmanship
Comment:		The products are acceptable. See sections 10.1 to 10.3 and the <i>Installation</i> part of this Certificate.



The Building (Scotland) Regulations 2004 (as amended)

Regulation:	8(1)(2)	Durability, workmanship and fitness of materials
Comment:		The products can contribute to a construction satisfying this Regulation. See sections 9.1, 9.2 and 10.1 to 10.3 and the <i>Installation</i> part of this Certificate.
Regulation:	9	Building standards application to construction
Standard:	1.1(a)(b)	Structure
Comment:		The products are acceptable, with reference to clauses 1.1.1 ⁽¹⁾⁽²⁾ , 1.1.2 ⁽¹⁾⁽²⁾ and 1.1.3 ⁽¹⁾⁽²⁾ . See sections 6.1 to 6.9 of this Certificate.
Standard:	2.4	Cavities
Comment:		The products are restricted by this Standard, with reference to clauses 2.4.1 ⁽¹⁾⁽²⁾ , 2.4.2 ⁽¹⁾⁽²⁾ , 2.4.5 ⁽¹⁾⁽²⁾ and 2.4.9 ⁽²⁾ .
Standard:	2.5	Internal linings
Comment:		The products can contribute to a construction satisfying this Standard, with reference to clause 2.5.1 ⁽¹⁾⁽²⁾ . See sections 7.1 and 7.2 of this Certificate.
Standard:	2.6	Spread to neighbouring buildings
Comment:		The products can contribute to satisfying this Standard, with reference to clauses 2.6.4 ⁽¹⁾⁽²⁾ , 2.6.5 ⁽¹⁾ and 2.6.6 ⁽²⁾ . See sections 7.1 to 7.9 of this Certificate.
Standard:	2.7	Spread on external walls
Comment:		The products can contribute to satisfying this Standard, with reference to clause 2.7.1 ⁽¹⁾⁽²⁾ . See section 7 of this Certificate.
Standard:	3.10	Precipitation
Comment:		The products will contribute to satisfying this Standard, with reference to clauses 3.10.1 ⁽¹⁾⁽²⁾ , 3.10.3 ⁽¹⁾⁽²⁾ , 3.10.5 ⁽¹⁾⁽²⁾ and 3.10.6 ⁽¹⁾⁽²⁾ . See section 8 of this Certificate.
Standard:	7.1(a)(b)	Statement of sustainability
Comment:		The products 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.
Regulation:	12	Building standards applicable to conversions
Comment:		All comments given for the products 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)	Fitness of materials and workmanship
Comment:		The products are acceptable. See sections 10.1 to 10.3 and the <i>Installation</i> part of this Certificate.
Regulation:	28	Resistance to moisture and weather
Comment:		The products can contribute to satisfying this Regulation. See section 8 of this Certificate.
Regulation:	30	Stability
Comment:		The products are acceptable as set out in sections 6.1 to 6.9 of this Certificate.
Regulation:	34	Internal fire spread – Linings
Regulation:	36(a)	External fire spread
Comment:		The products are unrestricted by these Regulations. See sections 7.1 to 7.5 and 7.7 to 7.9 of this Certificate.

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 sections: 3 *Delivery and site handling* (3.4) and 9 *Maintenance* (9.3) of this Certificate.

Additional Information

NHBC Standards 2017

In the opinion of the BBA, Alupanel XT and XT FR Cladding Panels, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements in relation to *NHBC Standards*, Chapter 6.9 *Curtain walling and cladding*.

Technical Specification

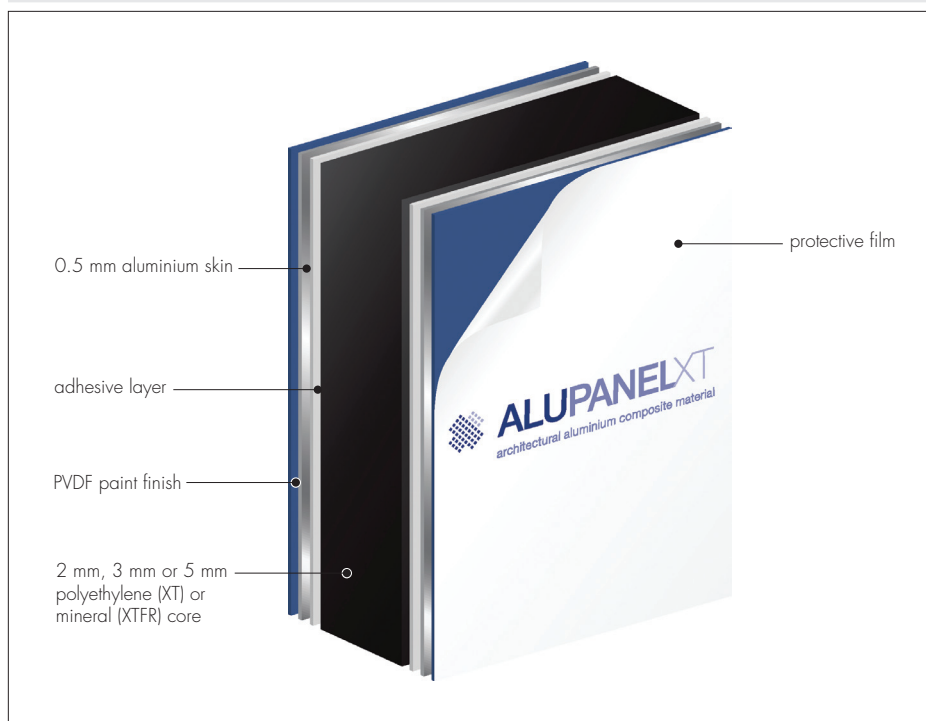
1 Description

1.1 Alupanel XT and XT FR Cladding Panels are a range of composite panels comprising a core bonded on either side to aluminium sheets (see Figure 1). The standard panel (XT) incorporates a low-density polyethylene (LDPE) core, and the fire-retardant grade (XT FR) incorporates an aluminium hydroxide mineral within the core material. The panels have the characteristics and dimensions⁽¹⁾ of:

width (mm)	1000, 1220, 1250 and 1500
length (mm)	2400 to 8000
aluminium sheet thickness (mm)	0.5
core thickness (mm)	2, 3 and 5
overall thickness (mm)	3, 4 and 6
weight (kg·m ⁻²)	4.5, 5.5 and 7.3.

(1) Other sizes are available to special order.

Figure 1 Panel build-up



1.2 The aluminium sheet is manufactured to aluminium alloy grade 3103 H46 (United Kingdom designation) equivalent to EN AW-3005 H46 (European designation). The outward-facing aluminium sheet has a 20 micron layer of polyvinylidene difluoride (PVDF) coating available in various colours. The reverse side is covered with a polyester (PE) primer protective finish.

1.3 Items such as the supporting sub-frame, its fixings and its attachment to the substrate wall, and other miscellaneous construction details as specified by the Certificate holder are outside the scope of this Certificate.

2 Manufacture

2.1 Colour-coated PVDF aluminium coil is laminated to both sides of the LDPE/mineral-based core and a protective film applied. The finished panel is cut to size.

2.2 The core material is manufactured by an extrusion process.

2.3 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.

3 Delivery and site handling

3.1 The panels are delivered on pallets. The pallets bear product details such as type, size, quantity, identification code, manufacturing references and colour.

3.2 Pallets should be stored on a dry, flat and level surface, suitably protected from the weather. The protective film on the panel should be removed as soon as possible after installation.

3.3 The panels should be handled with care to avoid damage. They should be lifted off rather than slid across other panels.

3.4 Care should be exercised when handling the panels to avoid injury from sharp edges. Protective clothing should be worn and all Health and Safety rules observed.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Alupanel XT and XT FR Cladding Panels.

Design Considerations

4 General

4.1 Alupanel XT and XT FR Cladding Panels are satisfactory as a decorative and protective non-loadbearing façade in back-ventilated and drained cladding systems. The panels are for use on external walls of new and existing buildings up to 18 metres in height and as an internal lining fixed to a substructure.

4.2 The substrate wall and the sub-frame to which the panel is fixed must be structurally sound and constructed in accordance with the requirements of the relevant national Building Regulations and Standards.

4.3 The substrate wall to which the cladding is fixed must satisfy the requirements of the relevant national Building Regulations and Standards with respect to heat and sound transmission.

4.4 All design aspects of the installation should be checked by a suitably-qualified and experienced individual such as a structural engineer. Specific construction details, eg flue penetrations, can be obtained from the Certificate holder.

4.5 As the cladding is open-jointed, any insulation (not covered by this Certificate) installed behind the panels must be suitably fixed to the supporting wall and protected to resist the forces of wind suction. Insulation should be of a rigid type (eg boards or batts) and, where its performance could be diminished by moisture, a breather membrane should be provided over its outer face. The ventilation pathway behind the cladding must not be allowed to become blocked, nor the insulation dislodged where it may be vulnerable to wetting.

4.6 To allow for longitudinal expansion, a gap of between 3 and 4 mm per metre length between adjacent support rails should be provided. The cladding panels must not be installed across this gap.

5 Practicability of installation

The panels are designed to be installed by cladding contractors who have undergone suitable training by the Certificate holder.

6 Strength and stability

6.1 For design purposes, the panels' properties given in Table 1 may be adopted.



Table 1 Panel properties⁽¹⁾

Panel thickness (mm)	Section modulus Z (cm ³ ·m ⁻¹) (MPa)	Flexural rigidity EI (Nm ² ·m ⁻¹) (MPa)
3	1.25	108.6
4	1.75	212.8
6	2.75	525.5

(1) The maximum panel centre deflection will be governed by specific project requirements, but should not exceed 1/30 of the diagonal formed by the four adjacent fixings or 50 mm, whichever is the lesser.

6.2 The minimum proof stress of 0.2% should be taken as 150 N·mm⁻².

6.3 For external applications, rivets or self-tapping screws should be used to attach the panels to the support frame. The design should ensure adequate capacity against wind pressure/suction. To allow for panel expansion, fixings in clearance holes should be provided as required.

6.4 The design pull-through resistance of the panel, using self-driving screws with a 4.7 mm diameter shaft and 12.25 mm diameter head, was calculated by applying a safety factor of 3.0 to the characteristic pull-through value⁽¹⁾ and achieved a result of 426 N (see Table 2). For evaluation of the wind load resistance of the panels, the designer should apply a wind load safety factor of 1.5 in accordance with the UK National Annex to BS EN 1990 : 2002, Table NA.A1.2(A).

(1) Determined by tests in accordance with BS EN 1383 : 1999.

Table 2 Multipanel characteristic wind load resistance (N)

Fixing type	Wind load resistance (N)		
	Fixing position		
	Centre	Edge ⁽¹⁾	Corner ⁽²⁾
Self-drilling screw ⁽³⁾	426	304	213

(1) Calculated by applying a factor of 1.4.

(2) Calculated by applying a factor of 2.

(3) 4.7 mm diameter shaft with 12.25 mm diameter head.

6.5 The maximum allowable wind pressure/suction will be the lesser value obtained by considering the panels and fixings separately.

6.6 Wind actions should be calculated in accordance with BS EN 1991-1-4 : 2005 and its UK National Annex. Higher pressure coefficients applicable to corners of the building should be used as recommended in this Standard.

6.7 Design of the sub-frame should be such as to limit mid-span deflections to L/200 and cantilever deflections to L/150.

6.8 In the design of the sub-frame attachment to the substrate wall, the adequacy of the pull-out capacity of the fixings must be ensured.

6.9 The supporting substrate wall must be able to take the full wind loads, as well as any racking loads, on its own. No contribution from the cladding panels and sub-frame may be assumed in this regard.

6.10 When tested in accordance with BS EN ISO 6272-1 : 2011, the panel coating was found to have adequate resistance to peeling and cracking.

7 Behaviour in relation to fire


 7.1 The reaction to fire classification for the surface of the panel in accordance with BS EN 13501-1 : 2007 or as defined in the national Building Regulations is shown in Table 3.

Table 3 Fire classifications of panels

Panels	Fire classification to BS EN 13501-1 : 2007	Fire classification to national Building Regulation
XT	D-s1, d0	—
XT FR (grey colour)	B-s1, d0	Class O ⁽¹⁾ or 'low risk' ⁽²⁾

(1) As defined in Appendix A, paragraph 13(a) to the Approved Document B to The Building Regulations 2010 (England and Wales) (as amended) and section 3.4 of the Technical Booklet E to The Building Regulations (Northern Ireland) 2012 (as amended).

(2) As defined in section 2.E.3, table 2.20 of the Technical Handbook (Non-domestic) and in table 2.8, section 2.B.3 of the Technical Handbook (Domestic) to The Building (Scotland) Regulations 2004 (as amended).

7.2 The XT FR product is also classified as Class O/'low risk' as defined in the national Building Regulations.

7.3 The performance given in Table 3 may not be achieved by all colours of the panels, and the classification of a particular colour should be confirmed by assessment or testing by a UKAS-accredited laboratory.

7.4 Alupanel XT and Alupanel XT FR are not classified as being 'non-combustible' or of 'limited combustibility' ('non-combustible' in Scotland) and so their use is restricted to 18 metres in height unless a full scale fire test to either BS 8414-1 : 2015 or BS 8414-2 : 2015 has been conducted for the specific wall construction under consideration, and the other requirements of BRE Report BR 135 : 2013 have been met.

7.5 For houses in Scotland and for all buildings in England and Wales and Northern Ireland, the XT FR product is suitable for use on, or at any distance from, the boundary.



7.6 For flats and maisonettes, and non-domestic buildings in Scotland, the the XT FR product is suitable only for use more than one metre from the boundary.



7.7 The XT product is only suitable for use more than one metre from the boundary.

7.8 The products are not classified as 'non-combustible', therefore calculations for unprotected areas may apply, dependent on the fire resistance characteristics of the wall.

7.9 For resistance to fire, the performance of a wall incorporating the products can only be determined by tests from a suitably-accredited laboratory for the specific complete wall construction under consideration, and is not covered by this Certificate.

7.10 To limit the risk of fire spread between floors in buildings subject to the national Building Regulations, fire barriers must be incorporated in the cavity behind the panels as required under these Regulations, but should not block essential ventilation pathways. Guidance on fire barriers can be found in BRE Report BR 135 : 2013.

8 Weathertightness



8.1 The panels are suitable for use in back-ventilated and drained cladding systems.

8.2 The substrate wall to which the cladding is fixed must be watertight and reasonably airtight, satisfying the requirements of the relevant national Building Regulations and Standards.

8.3 Open joints between panels should have a minimum opening of 10 mm, and a minimum 50 mm pressure-equalised air gap provided between the back of the panel and the supporting wall (or insulation where specified) . Any water entering the cavity behind the cladding by wind-driven rain or condensation will be minimal, and will be removed by drainage and ventilation. The ventilation pathway behind the cladding must not be allowed to become blocked, and openings should be suitably protected or baffled to prevent the ingress of birds, vermin and rain.

9 Maintenance



9.1 The coated surface may be cleaned with hot and cold water with a mild cleaning agent, using a non-abrasive pad or sponge. General household cleaners should not be used. After cleaning, the surface should be rinsed with clean water. For more difficult chemical soiling, the Certificate holder's specialist advice must be sought.

9.2 Annual maintenance inspections should be carried out to ensure that rainwater goods are complete and in good order, that such features as tiles, flashings and seals are in place, and that ancillary fixings are secure.

9.3 Damaged panels should be replaced as soon as is practicable. Work carried out should be in accordance with the Certificate holder's instructions, and all necessary Health and Safety Regulations should be observed.

10 Durability



10.1 When incorporated in a wall cladding system, the panels can be expected to have an ultimate service life in excess of 30 years.

10.2 In a non-corrosive atmosphere, the panels can be expected to retain a good appearance for up to 20 years, and in coastal or severe industrial regions, 15 years.

10.3 In normal circumstances, the panels have adequate resistance to abrasion and scratching.

10.4 The performance of the coating will depend upon the colour chosen, building location, façade aspect and immediate environment. Colour change will be generally small and uniform on any one elevation.

Installation

11 General

11.1 Alupanel XT and XT FR Cladding Panels must be installed in accordance with the Certificate holder's recommendations, the requirements of this Certificate and the specifications laid down by the consulting engineer.

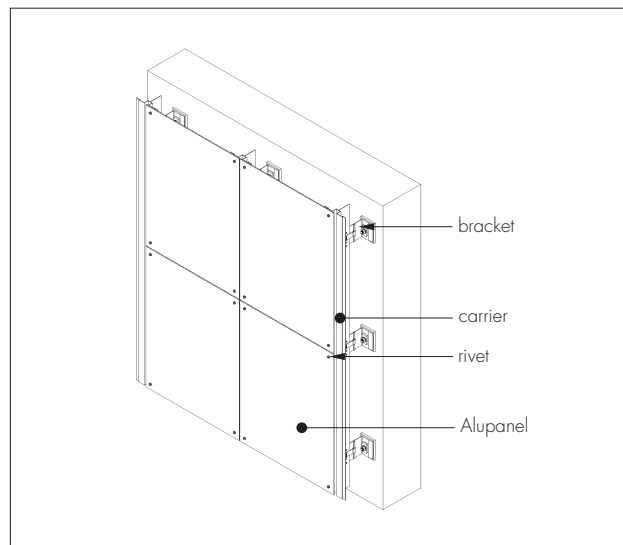
11.2 Installers must be trained and approved by the Certificate holder, who can provide technical assistance at the design stage and at the start of the installation.

11.3 The panels can be worked by conventional techniques in accordance with the Certificate holder's instructions. These include sawing and cutting, drilling and riveting. It is essential that the correct tools, in good condition, are used to prevent any damage to the coating, and that swarf is removed.

11.4 If significant colour variations between batches are likely, it may be necessary to mix panels from different pallets to obtain a uniform shade over the façade.

11.5 A typical installation method is shown in Figure 2.

Figure 2 Alupanel — typical installation method



12 Procedure

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

12.2 The aluminium sub-frame is attached to the substrate wall via cleats.

12.3 The panels must have pre-drilled clearance holes prior to self-drilling screws or rivets being inserted.

12.4 The panels are fixed directly to the sub-frame with aluminium rivets.

Technical Investigations

13 Tests

Tests were carried out and the results assessed to determine:

- flexural properties
- peel test
- effects of weathering
- resistance of coating to impact
- adhesion of paint coating
- resistance to abrasion
- fixing pull-through
- resistance to scratching
- degree of cracking
- degree of blistering.

14 Investigation

14.1 An examination was made of external test reports relating to fire testing classification to BS EN 13501-1 : 2007.

14.2 The manufacturing process was evaluated, including the methods adopted for quality control, and details were obtained of the quality and composition of the materials used.

Bibliography

BS 8414-1 : 2015 + A1 : 2017 Fire performance of external cladding systems — Test method for non-loadbearing external cladding systems applied to the masonry face of a building

BS 8414-2 : 2015 + A1 : 2017 Fire performance of external cladding systems — Test method for non-loadbearing external cladding systems fixed to and supported by a structural steel frame

BS EN 1383 : 1999 *Timber structures — Test methods — Pull-through resistance of timber fasteners*
NA to BS EN 1990 : 2002 + A1 : 2010 UK National Annex to Eurocode — *Basis of structural design*

BS EN 1991-1-4 : 2005 + A1 : 2010 *Eurocode 1 — Actions on structures — General actions — Wind actions*
NA to BS EN 1991-1-4 : 2005 + A1 : 2010 UK National Annex to Eurocode 1 — *Actions on structures — General actions — Wind actions*

BS EN 13501-1 : 2007 + A1 : 2009 *Fire classification of construction products and building elements — Classification using test data from reaction to fire tests*

BS EN ISO 6272-1 : 2011 *Paints and varnishes — Rapid-deformation (impact resistance) tests — Falling-weight test, large-area indenter*

BRE Report BR 135 : 2013 *Fire performance of external walls of multi-storey buildings*

Conditions of Certification

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
- 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.

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.