

## Specialist Building Products Ltd

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Agrément Certificate

11/4839

Product Sheet 1

## SPECIALIST BUILDING PRODUCTS CLADDING SYSTEMS

### KESTREL CELLULAR PVC-U CLADDING SYSTEM

#### PRODUCT SCOPE AND SUMMARY OF CERTIFICATE

This Certificate relates to the Kestrel Cellular PVC-U Cladding System, comprising white PVC-U cladding planks and PVC-U trims for external use on buildings as a decorative and protective facing fixed either horizontally, vertically or diagonally. The components of the system are available in three shades of white: standard white, dove white and brilliant white.

#### 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** — when installed in accordance with the requirements of this Certificate, onto battens at 600 mm spacings, the cladding can withstand dynamic wind pressures shown in Table 2 (see section 5).

**Behaviour in relation to fire** — when tested to BS 476-6 : 1981, the cladding material achieved a fire propagation index (I) of 15.4 with sub-indices ( $i_1$ ), ( $i_2$ ) and ( $i_3$ ) of 7.6, 6.4 and 1.4, respectively. When tested in accordance with BS 476-7 : 1987, the co-extruded material achieved a Class 1Y rating (see section 6).

**Durability** — the system will retain its decorative qualities for a period of 35 years with only minor changes in surface appearance (see section 10).

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

Handwritten signature of Sean Moriarty in black ink.

Sean Moriarty  
Head of Approvals — Physics

Handwritten signature of Greg Cooper in black ink.

Greg Cooper  
Chief Executive

Date of First issue: 11 July 2011

*Certificate amended on 16 January 2014 to include changes in name, e-mail address and website address.*

*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](http://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 Kestrel Cellular PVC-U 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 2010 (England and Wales)

<b>Requirement:</b> A1	<b>Loading</b>
Comment:	The system is acceptable for use as set out in sections 3.2 to 3.4 and sections 5.1 to 5.6 of this Certificate.
<b>Requirement:</b> B4(1)	<b>External fire spread</b>
Comment:	The cladding has a fire propagation index (I) of 15.4 and its acceptability for use is as set out in sections 6.1 to 6.5 of this Certificate.
<b>Requirement:</b> C2(a)(b)(c)	<b>Resistance to moisture</b>
Comment:	The system does not form a watertight or airtight facing. To achieve a waterproof barrier, a breather membrane must be provided. See sections 7.1 to 7.4 of this Certificate.
<b>Requirement:</b> L1(a)(i)	<b>Conservation of fuel and power</b>
Comment:	The system will make a small reduction in a wall's U value. See section 8 of this Certificate.
<b>Requirement:</b> Regulation 7	<b>Materials and workmanship</b>
Comment:	The system is acceptable. See section 10.1 and the <i>Installation</i> part of this Certificate.



## The Building (Scotland) Regulations 2004 (as amended)

<b>Regulation:</b> 8(1)(2)	<b>Fitness and durability of materials and workmanship</b>
Comment:	The system is acceptable. See sections 9.1 to 9.3 and 10.1 and the <i>Installation</i> part of this Certificate.
<b>Regulation:</b> 9	<b>Building standards – construction</b>
<b>Standard:</b> 1.1(a)(b)	<b>Structure</b>
Comment:	The system can contribute to satisfying this Standard, with reference to clause 1.1.1 <sup>(1)(2)</sup> as set out in sections 3.2 to 3.4 and 5.1 to 5.6 of this Certificate.
<b>Standard:</b> 2.4	<b>Cavities</b>
<b>Standard:</b> 2.6	<b>Spread to neighbouring buildings</b>
<b>Standard:</b> 2.7	<b>Spread on external walls</b>
Comment:	The system can contribute to satisfying these Standards, with reference to clauses 2.4.1 <sup>(1)(2)</sup> , 2.4.2 <sup>(1)(2)</sup> , 2.4.6 <sup>(1)</sup> , 2.4.7 <sup>(1)</sup> , 2.4.8 <sup>(2)</sup> , 2.4.9 <sup>(2)</sup> , 2.6.4 <sup>(1)(2)</sup> and 2.7.1 <sup>(1)(2)</sup> respectively as set out in sections 6.1 to 6.3 and 6.6 of this Certificate.
<b>Standard:</b> 3.10	<b>Precipitation</b>
Comment:	The system can contribute to satisfying this Standard, with reference to clause 3.10.1 <sup>(1)(2)</sup> but does not form a watertight or airtight facing. To achieve a weatherproof barrier, a breather membrane must be provided. See sections 7.1 to 7.4 of this Certificate.
<b>Standard:</b> 3.15	<b>Condensation</b>
Comment:	Provided there is provision for adequate drainage and ventilation behind the cladding, and a breather membrane is incorporated, as required, the system can contribute to satisfying this Standard, with reference to clauses 3.15.4 <sup>(1)</sup> and 3.15.5 <sup>(1)</sup> . See sections 3.7 and 7.1 to 7.4 of this Certificate.
<b>Standard:</b> 6.2	<b>Building insulation envelope</b>
Comment:	The system will make a small reduction in a wall's U value, with reference to clause 6.2.1 <sup>(1)(2)</sup> . See section 8 of this Certificate.

(1) Technical Handbook (Domestic).  
(2) Technical Handbook (Non-Domestic).



## The Building Regulations (Northern Ireland) 2000 (as amended)

<b>Regulation:</b> B2	<b>Fitness of materials and workmanship</b>
Comment:	The system is acceptable. See section 10.1 and the <i>Installation</i> part of this Certificate.
<b>Regulation:</b> B3(2)	<b>Suitability of certain materials</b>
Comment:	The system is acceptable. See sections 9.1 to 9.3 of this Certificate.
<b>Regulation:</b> C4(b)	<b>Resistance to ground moisture and weather</b>
Comment:	The system does not form a watertight or airtight facing. To achieve a weatherproof barrier, a breather membrane must be provided. See sections 7.1 to 7.4 of this Certificate.
<b>Regulation:</b> D1	<b>Stability</b>
Comment:	The system is acceptable for use as set out in sections 3.2 to 3.4 and section 5.1 to 5.6 of this Certificate.
<b>Regulation:</b> E5	<b>External fire spread</b>
Comment:	The system has a fire propagation index (I) of 15.4 and its acceptability for use is as set out in sections 6.1 to 6.5 of this Certificate.
<b>Regulation:</b> F2(a)(i)	<b>Conservation measures</b>
Comment:	The system will make a small reduction in a wall's U value. See section 8 of this Certificate.

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* (2.3) and 11 *General* (11.3) of this Certificate.

## Non-regulatory Information

### NHBC Standards 2011

NHBC accepts the use of Kestrel Cellular PVC-U Cladding System, when installed and used in accordance with this Certificate, in relation to *NHBC Standards*, Chapter 6.1 *External masonry walls* (section D14 – *Claddings*) and Chapter 6.2 *External timber framed walls*.

## General

This Certificate replaces Certificate 93/2876, Third issue, which was originally issued on 17 February 1993.

## Technical Specification

### 1 Description

1.1 This Certificate relates to the Kestrel Cellular PVC-U Cladding System, a protective and decorative facing for external use.

1.2 The system comprises white PVC-U cladding planks with matching PVC-U trims (see Figures 1 and 2).

Figure 1 Kestrel Cellular PVC-U Cladding

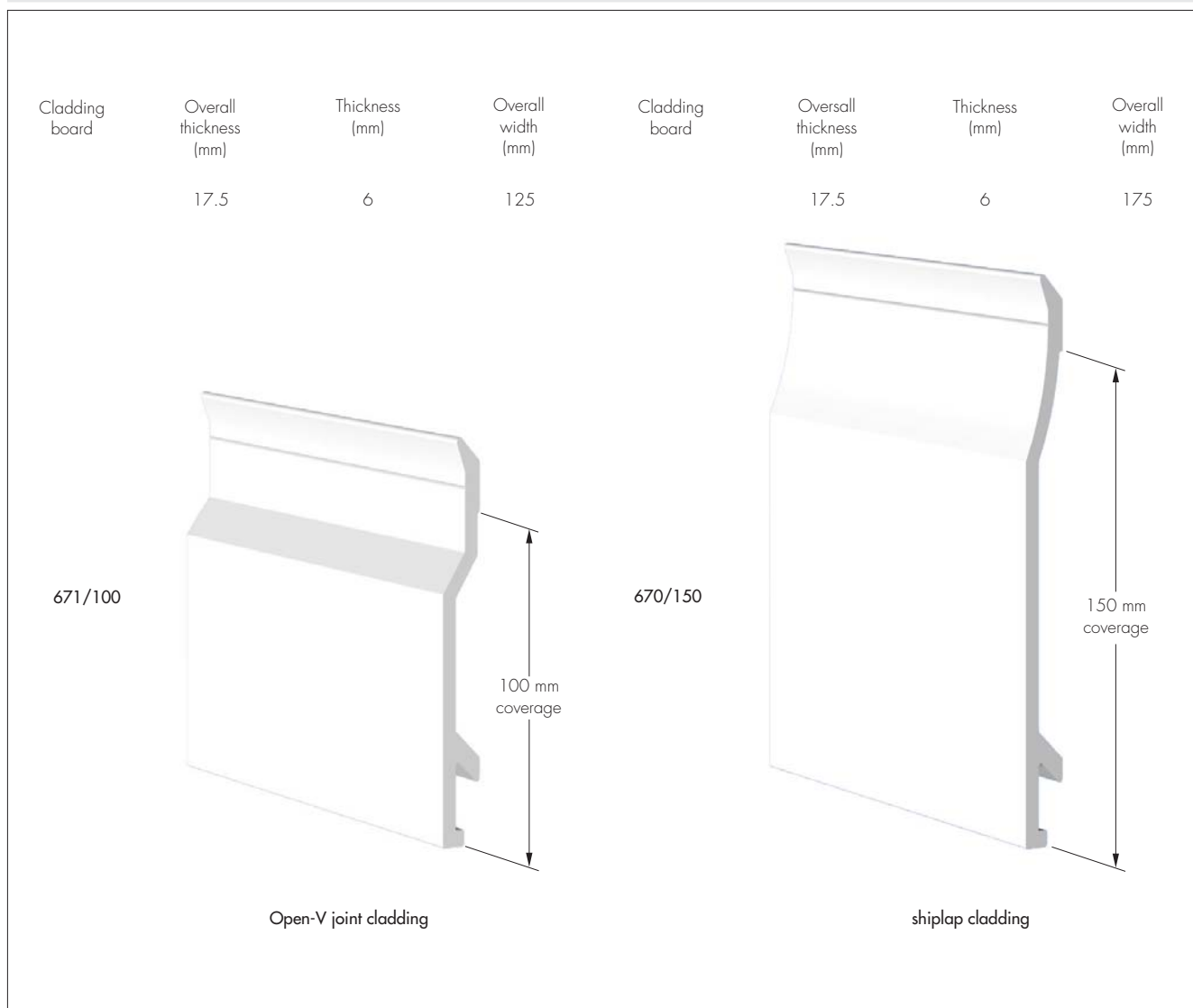
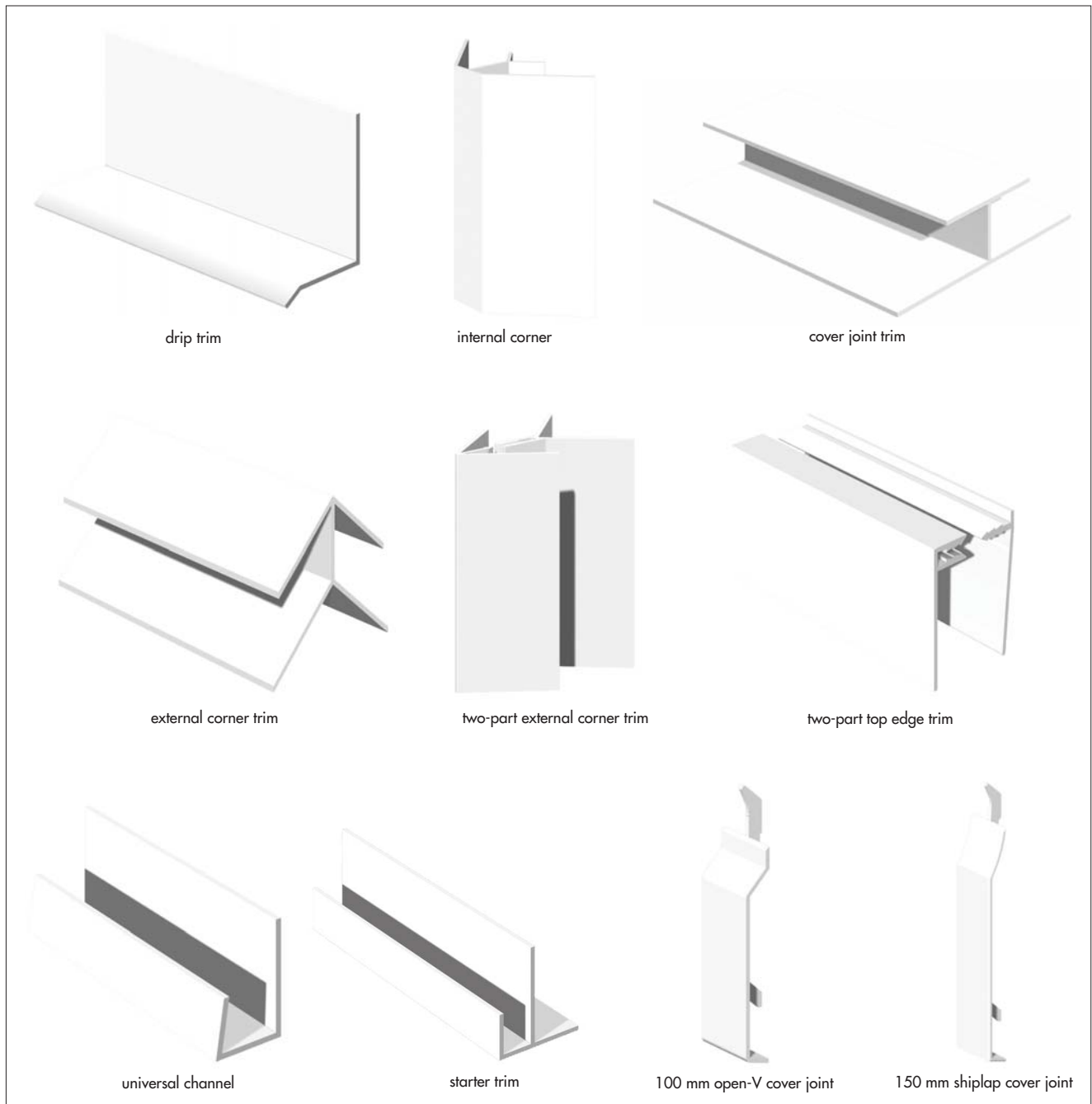


Figure 2 Cladding trims



1.3 The planks are composed of a cellular PVC-U core beneath an impact modified, outer weathering PVC-U skin. The trims consist of extrusions in impact modified PVC-U or injection mouldings in PVC-U.

1.4 The planks are available in two designs; Open-V and Shiplap, with the characteristics given in Table 1.

Table 1 Characteristics of planks

	Open-V	Shiplap
Standard length (m)	5	5
Cover width (mm)	100	150
Nominal thickness (mm)	6	6
Thickness of rigid outer surface (mm)	0.6	0.6
Nominal weight (kg·m <sup>-1</sup> )	0.49	0.63
Average density (kg·m <sup>-3</sup> )	420	420

1.5 The planks are manufactured by co-extruding a high-impact calcium/zinc PVC-U compound onto a foamed calcium/zinc PVC-UE compound, cooling and forming to section. Cellular PVC-U is formed during the process by the evolution of gas from blowing agents present in the PVC-U compound. A transparent polythene film is applied to the outer face of the extrusion before the board is cut to length.

1.6 The trims are manufactured using conventional extrusion and injection moulding techniques.

1.7 Continuous quality control is exercised during manufacture, checks include:

- appearance
- dimensions
- weight per metre
- impact strength
- colour measurement.

1.8 Stainless steel, annular ring-shank pins (2.0 mm shank diameter) are used to fix cladding planks and extruded trims to timber studs or battens using a secret fixing. 30 mm pins are used to fix planks to studs, or to battens with cross-sections not less than 19 mm by 38 mm. 25 mm pins are used to fix planks to battens with cross-sections less than 19 mm by 38 mm and 20 mm pins are used to fix trims.

## 2 Delivery and site handling

2.1 Standard 5 m lengths of the extrusions are delivered to site sealed in polyethylene sleeves of five.

2.2 All packaging carries the Kestrel product code, and the BBA identification mark incorporating the number of this Certificate together with description and quantity.

2.3 Products should be stored flat, in their protective wrapping, on a clean, level surface. Stacks must not exceed 1 m in height and should be restrained to prevent collapse. If stored externally, the packs should be kept under cover.


## Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on the Kestrel Cellular PVC-U Cladding System.

## Design Considerations

### 3 General

3.1 The Kestrel Cellular PVC-U Cladding System is suitable for horizontal, vertical and diagonal fixing, as a decorative and protective external facing over a timber stud or masonry wall.

 3.2 The designer should ensure that the strength and integrity of the intended substrate is commensurate with that required of the cladding system (see sections 3.3 and 3.4).

3.3 Brickwork or blockwork walls should be constructed in the conventional manner in accordance with one of the following technical specifications:


- BS EN 1996-1-1 : 2005 and BS EN 1996-3 : 2006
- The Building Regulations 2010 (England and Wales), Approved Document A1/2, Section 2C
- *The Small Buildings Guide*, for use in conjunction with, or as an alternative to Mandatory Standard 1.1 (Clause 1.1.1) of The Building (Scotland) Regulations 2004 (as amended)
- The Building Regulations (Northern Ireland) 2000 (as amended), Technical Booklet D *Structure*.

3.4 Timber stud walls should be constructed and preservative treated in accordance with BS EN 1995-1-1 : 2004. Studding and framing should be adequately supported by noggings to ensure rigidity.

3.5 When used over a sheathed timber stud frame or over a masonry or block substrate, the cladding should be fixed to preservative-treated, good quality timber battens (measuring not less than 19 mm by 38 mm) rigidly fixed to the substrate at 600 mm centres or closer. Where a copper/chrome/arsenic<sup>(1)</sup> or copper/chrome/boron preservative is used, care should be taken to ensure that sufficient time is allowed for the complete fixation of the preservative (approximately seven days) before the cladding is fixed.

(1) CCA products should not be used in domestic applications according to European guidelines.

3.6 Cellular PVC-U has a similar coefficient of thermal expansion to that of conventional rigid PVC-U. To avoid distortion in service, care should be taken not to install the cladding in extremes of temperature (ie below 5°C or above 25°C) and to allow adequate gaps for expansion (see sections 12.13, 12.17, 12.21 and 12.29).

 3.7 In accordance with BPF 349/2, a minimum 19 mm vented airspace must be maintained behind the cladding, with ventilation slots giving a minimum of 5000 mm<sup>2</sup> per metre run at the top and bottom of the installation. To comply with the NHBC requirement (see *NHBC Standards 2011*, Chapter 6.2, Section D4) a minimum 15 mm drained and vented cavity behind cladding is required when installed over timber sheathing.

### 4 Practicability of installation

The system is designed to be installed by a competent general builder, or a contractor, experienced with this type of system.

## 5 Strength and Stability

### Wind Loading



5.1 Under wind loading the most likely mode of failure of the cladding will be by nail withdrawal under wind suction.

5.2 When installed in accordance with the requirements of this Certificate, onto battens at 600 mm spacings, on buildings up to 10 m in height, the cladding can withstand dynamic wind pressures shown in Table 2.

Table 2 Permissible dynamic wind pressures (Pa)

Length of fixing pin (mm)	Cladding Profile	
	Open-V (100 mm)	Shiplap (150 mm)
30	2650	1750
25	1750	1150

5.3 Wind loads should be calculated in accordance with BS EN 1991-1-4 : 2005.

5.4 The permissible dynamic wind pressure may be increased by reducing batten spacing. This is particularly recommended at the corner of buildings and in exposed locations. In common with all cladding, the adequacy of a proposed installation should always be checked by a qualified individual, who should include in the check the adequacy of the fixing of battens to the substrate, not covered by this Certificate.

5.5 The cladding should not be taken into account when designing a timber stud wall to resist racking forces.

### Resistance to impact

5.6 The cladding is suitable for use above ground-floor level in locations where it is unlikely to be subjected to impact from thrown or kicked objects, and at ground-floor level in private areas where there is some incentive to exercise care, as covered by BS 8200 : 1985, Table 2, categories C to F inclusive. The cladding is not recommended for use at ground-floor level in public areas where it may be exposed to vandalism and general misuse.

## 6 Behaviour in relation to fire



6.1 When tested to BS 476-6 : 1981, the cladding material achieved a fire propagation index (I) of 15.4 with sub-indices ( $i_1$ ), ( $i_2$ ) and ( $i_3$ ) of 7.6, 6.4 and 1.4, respectively.

6.2 When tested in accordance with BS 476-7 : 1987, the co-extruded material has achieved a Class 1Y surface spread of flame rating.

6.3 Although the spread of flame across the surface of PVC is limited, the material does tend to char and may fall away when exposed to fire. Due consideration should always be given to any combustible materials behind the cladding, which may become exposed in the event of fire. Where necessary, cavity barriers should be incorporated behind the cladding, as required by the relevant building regulations.



6.4 When determining the minimum distance between the sides of a building and the relevant boundary, any area of wall (with the appropriate fire resistance) covered by cellular PVC-U cladding is counted as an unprotected area amounting to half the actual area of the cladding.

6.5 Subject to the provisions given in section 6.4, the system is suitable for use on external walls other than those requiring a Class 0 external surface (eg external walls less than 1 m from a relevant boundary).



6.6 Combustible cladding need not be included in the calculation of unprotected area where:

- the combustible cladding is attached to the structure of the building and the external wall contains no openings other than the small openings described in clause 2.6.2b<sup>(1)(2)</sup>
- the wall behind the cladding (or the cladding itself) has the appropriate fire resistance duration from the inside. Otherwise, if this requirement is not met, the cladding must be treated as an unprotected area amounting to 100% opening.

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

## 7 Air and water penetration



7.1 The cladding is not airtight, watertight or water-vapourtight. When used on timber stud walls the system must be backed by a breather membrane acting as a vapour-permeable water barrier, incorporated behind the cladding under the supporting battens. This barrier must meet the requirements of BS 4016 : 1997 and have a vapour resistance of less than  $0.6 \text{ MN}\cdot\text{s}\cdot\text{g}^{-1}$  when calculated from the results of tests carried out at  $25^\circ\text{C}$  and a relative humidity of 75%, in accordance with BS 3177 : 1959.

7.2 Where the cladding is used as a decorative facing attached to weathertight masonry walls, a water barrier is not necessary as the amount of water that will penetrate the cladding will be small and will not have an adverse effect on the wall.

7.3 If the cladding is used in the renovation of a masonry wall which is structurally sound but not fully weathertight, the use of a vapour-permeable water barrier is advisable.

7.4 Provision must always be made to allow water that has penetrated behind the cladding to drain away.

## 8 Thermal insulation



For the purpose of U value calculations, in accordance with BS EN ISO 6946 : 2007 and BRE Report (BR 443 : 2006) *Conventions for U-value calculations*, the cavity between system and the wall should be treated as a 'well ventilated' air layer and the thermal insulating value of the cavity and everything between it and the external environment should be taken as equivalent to a still air layer, ie a total of  $0.13 \text{ m}^2 \cdot \text{K} \cdot \text{W}^{-1}$ .

## 9 Maintenance



9.1 The cladding should be maintained by washing with water and detergent. Solvent-based cleaners should not be used.

9.2 Replacement of a damaged section can be carried out but may require the temporary removal of undamaged planks above the damaged area.

9.3 Paints can cause premature embrittlement of PVC-U products and the application of dark colours to PVC-U cladding could lead to a risk of thermal distortion. Therefore, painting of the product is not recommended.

## 10 Durability



10.1 Accelerated weathering tests indicate that the cladding is as durable as conventional rigid PVC and will retain adequate impact resistance for a period of 35 years.

10.2 The cladding will retain its decorative function for the service life of the product with only minor changes in surface appearance. However, staining will result from contact with creosote or bitumen.

# Installation

## 11 General

11.1 Installation of the Kestrel Cellular PVC-U Cladding System must be carried out in accordance with the manufacturer's instructions and the requirements of this Certificate. The cladding can be installed easily under normal site conditions. Care should be taken when installing long lengths of cladding above ground-floor level.

11.2 Provision should be made for adequate drainage and ventilation behind the cladding.

11.3 The components of the system are easy to work using normal woodworking tools for cutting, drilling and shaping. Handsaws should have a fine-toothed blade. Hand-held and bench-mounted power tools with a carbide tipped blade should be run at speeds similar to, or higher than, those normally used for timber. When using power tools to cut or shape the components it is recommended that eye protection and a coarse-particle dust mask are used.

## 12 Procedure

### Preparation

12.1 Before installation commences the cladding operation should be thoroughly planned and prepared.

12.2 A final inspection of the substrate should be made to confirm that it is as prescribed in section 3.2 of this Certificate.

12.3 Appropriate cladding planks and trims should be selected and assembled (see Figures 1, 2 and 6).

12.4 The appropriate battens (selected and treated in accordance with section 3.5) should be fixed at centres not exceeding 600 mm.

12.5 For horizontal cladding, vertical battens are required at the ends of each section, at the sides of windows and at joints between planks. Horizontal battens are not recommended at the top/bottom of either the installation or window/door openings, where they may restrict ventilation and drainage. If placed at the top/bottom of a section, adequate drainage/ventilation holes must be provided.

12.6 For vertical cladding, horizontal battens are required at the top and bottom of each section, at the top and bottom of each window, and at any joints between planks. It is important to provide 10 mm diameter drainage holes at 1000 mm centres in the bottom and windowhead battens.

12.7 For diagonal cladding, battens are required around the whole area to be clad and around openings. Adequate drainage holes must be provided as described in section 12.6.

12.8 On non-weatherproof substrates a vapour-permeable water barrier must be installed behind battens.

12.9 Windowheads and other protrusions should be protected by a suitable weatherproof membrane or drip trim.



## Horizontal installation (see Figures 3 and 6)

Figure 3 Horizontal installation

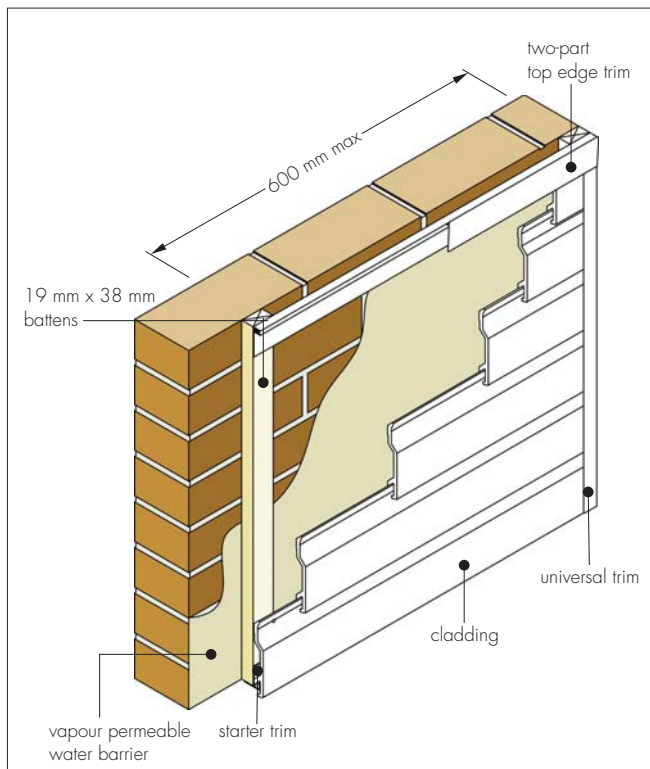
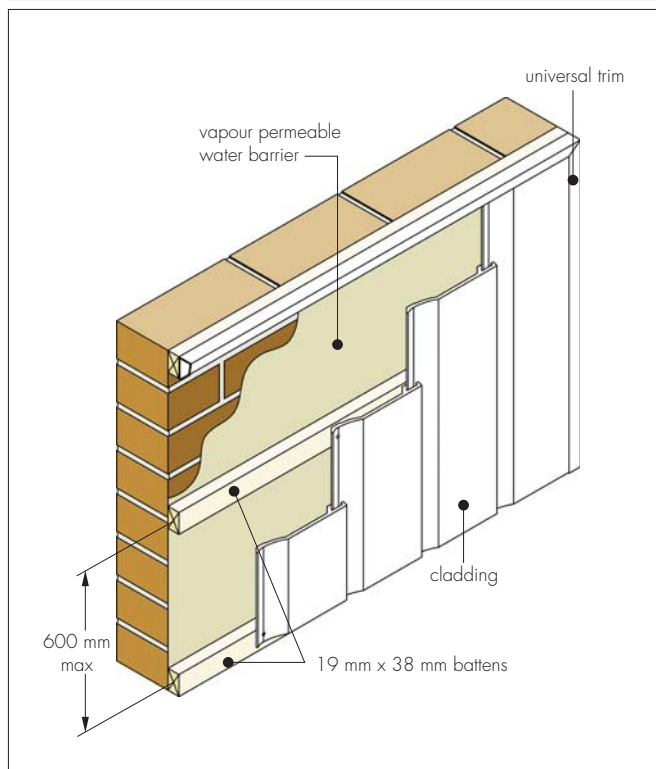


Figure 4 Vertical installation



12.10 Working from a level line, a starter trim is fixed to timber studs or battens. Care should be taken to ensure that the starter trim does not obstruct the opening required for drainage and ventilation at the base of the cladding.

12.11 All vertical trims, followed by top trims, are then fixed to perimeter battens (including battens around windows) using the 20 mm pin specified.

12.12 Where two-part trims are required, only the back half is fixed at this stage.

12.13 The bottom cladding plank is then located onto the starter trim and into the vertical trims, and fixed into place using the specified stainless steel pins, starting at one end or working from the centre outward, nailing into each batten in turn. Pins should be inserted only along the marked line in each plank. At the end of each plank a 5 mm gap should be allowed for expansion (ie 10 mm between boards).

12.14 Where necessary, trims and planks are cut to size and shaped with a fine-toothed saw.

12.15 Subsequent planks are fitted into the preceding planks, ensuring that the tongue-and-groove joint is firmly closed, and pin heads are concealed by the overlap.

12.16 If necessary, the top plank is cut to fit the remaining space. Where this occurs, packing pieces taken from cladding offcuts should be placed behind the cut plank at each fixing centre.

12.17 Where sections longer than 5 m are to be clad, butt joints of adjacent cladding planks should be concealed by either a cover joint or cover joint trim; a 10 mm expansion gap should be allowed between the planks, both ends of which should be securely fixed to battens. The cover joint trim should be used wherever possible. Where it is not possible or aesthetically unacceptable to use a cover joint trim, a cover joint may be used provided both ends of the planks are securely fixed to the battens. Cover joints should be fitted at least two fixing centres away from a panel edge and with continuous boards immediately above and below the joint.

12.18 Where two-part trims have been used the installation is completed by fastening the front part of the trim.

### Vertical installation (see Figure 4)

12.19 The appropriate trims are fitted to the perimeter of the elevation to be clad, and around window and door openings. A drip trim may be used at the base of the cladding to provide a drip. Where two-part trims are required only the back half is fixed at this stage.

12.20 Starting from one edge the plank is positioned, using a plumb line, and nailed at the fixing centres.

12.21 To ensure that cladding remains flat, all nailing should be undertaken progressively from the centre working outward on each plank. All plank ends must engage into the trims, allowing 5 mm clearance expansion at each end.

12.22 Subsequent planks are fitted over the preceding planks, ensuring that the tongue-and-groove joint is firmly closed so that the pin heads are concealed by the overlap.



12.23 The finishing plank should be cut to include the groove and fitted onto the tongue of the penultimate plank. It should be nailed through packing at every fixing centre along the cut edge. (For aesthetic reasons it is recommended that the installation is planned so that the width of the starting and finishing planks is the same. That is, both are either full planks or cut planks of the same width).

12.24 Care must be taken to ensure that the pins through the cut planks are positioned so that the trim sections cover the nail heads.

12.25 Where two-part trims have been used, the installation is completed by fastening the front part of the trim to the rear part.

**Diagonal installation** (see Figure 5)

Figure 5 Diagonal installation

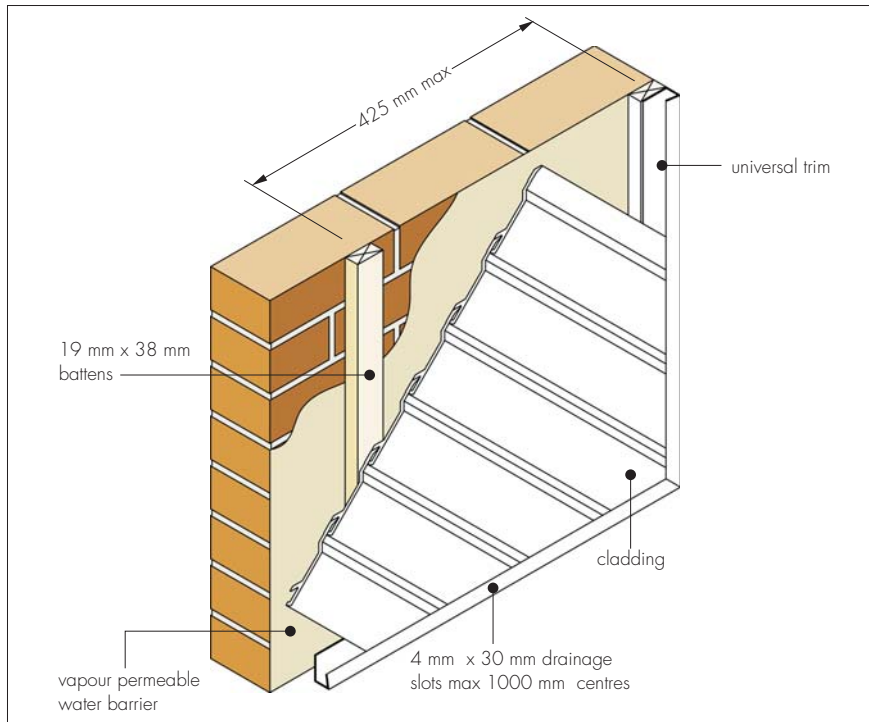
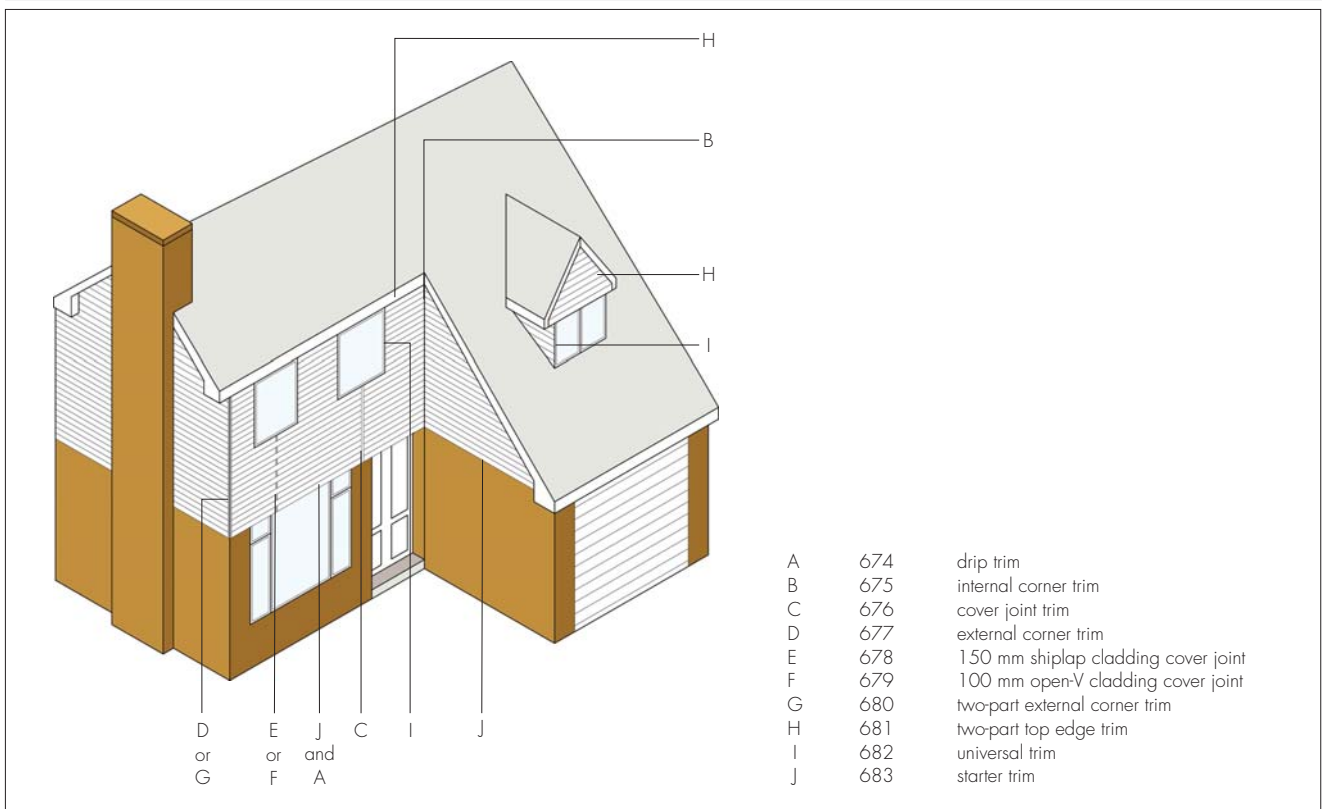
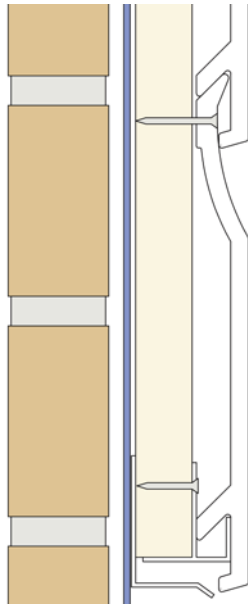
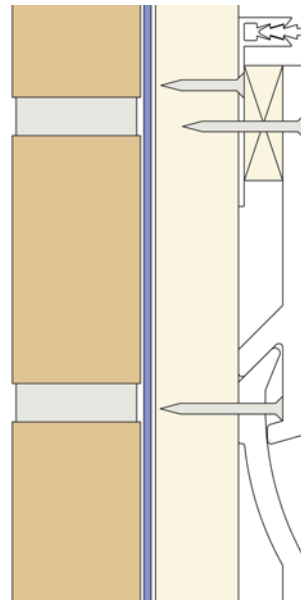


Figure 6 Trim locations

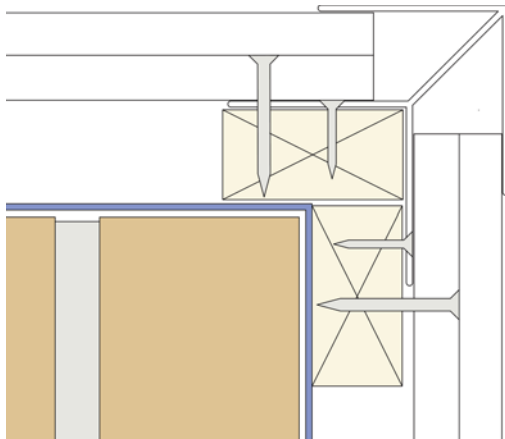




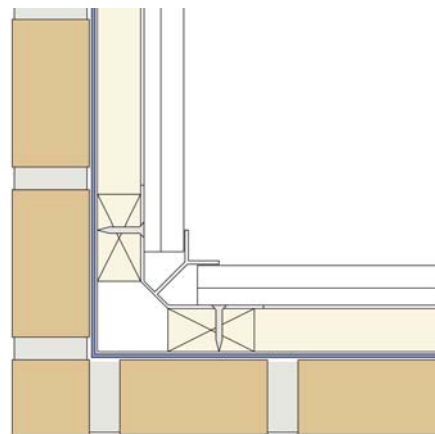
starter trim – horizontal installation



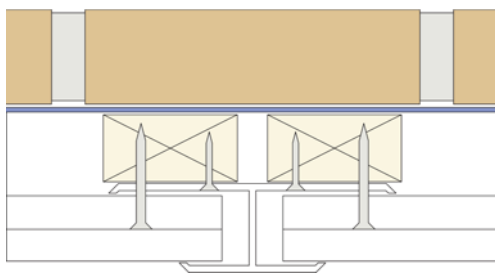
Two-part top edge trims – horizontal installation



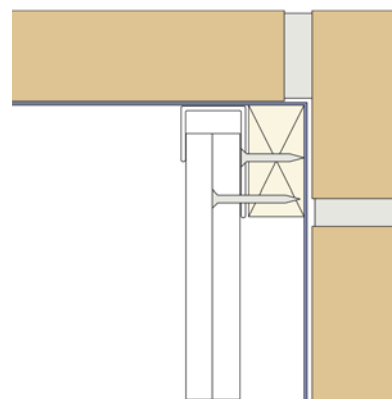
external corner – horizontal cladding



internal corner – horizontal installation



centre joint trim installation



universal channel – general edge installation

12.26 Horizontal battens are fixed to the substrate at maximum spacings of 425 mm to give a 600 mm distance between fixing centres on the diagonal cladding.

12.27 The appropriate trims are fixed to battens; use of two-part trims facilitates the installation. Only the back half of these trims are fixed at this stage.

12.28 The cladding planks are cut to size and fixed across the section at the required angle, starting with the smallest plank at the bottom corner.

12.29 To ensure that cladding remains flat, all nailing should be undertaken progressively from the centre working outward on each plank. All plank ends must engage into the trims, allowing 5 mm clearance for expansion at each end.

12.30 Subsequent planks are fitted into the preceding planks, ensuring that the tongue-and-groove joint is firmly closed so that the pin heads are concealed by the overlap.

12.31 Where two-part trims have been used the installation is completed by fastening the front part of the trim.

## Technical Investigations

### 13 Tests

Tests were carried out on the Kestrel Cellular PVC-U Cladding System planks and trims to determine:

- Vicat softening temperature
- density
- weight per linear metre
- ash content
- tensile impact strength
- Izod impact strength (ISO 180 : 1982)
- impact resistance (MOAT No 43 : 1987)
- dimensional stability
- tensile strength/elongation
- modulus of elasticity
- impact strength/DHC (dehydrochlorination)/appearance after UV ageing
- impact strength/DHC/appearance after heat ageing
- impact strength/DHC/appearance after watersoak
- nail pull-through
- heat reversion
- acetone resistance
- stress relief.

### 14 Investigations

14.1 Following the determination of nail pull-through values, calculations were undertaken to establish the resistance of the cladding to wind suction.

14.2 The dimensions of the cladding planks and trims were checked.

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

14.4 An assessment was made of data relating to:

- behaviour of the cladding in fire
- colour stability.

14.5 The practicability of installation was assessed.

## Bibliography

BS 476-6 : 1981 *Fire tests on building materials and structures — Method of test for fire propagation for products*

BS 476-7 : 1987 *Fire tests on building materials and structures — Method for classification of the surface spread of flame of products*

BS 3177 : 1959 *Method for determining the permeability to water vapour of flexible sheet materials used for packaging*

BS 4016 : 1997 *Specification for flexible building membranes (breather type)*

BS 8200 : 1985 *Code of practice for design of non-loadbearing external vertical enclosures of buildings*

BS EN 1991-1-4 : 2005 *Eurocode 1 : Actions on structures — General actions — Wind actions*  
BS EN 1995-1-1 : 2004 *Eurocode 5 : Design of timber structures — General — Common rules and rules for buildings*  
BS EN 1996-1-1 : 2005 *Eurocode 6 : Design of masonry structures — General rules for reinforced and unreinforced masonry structures*  
BS EN 1996-3 : 2006 *Eurocode 6 : Design of masonry structures : Simplified calculation methods for unreinforced masonry structures*  
BS EN ISO 6946 : 2007 *Building components and building elements — Thermal resistance and thermal transmittance — Calculation method*  
ISO 180 : 1982 *Plastics — Determination of Izod impact strength*  
BPF 349/2 : 2009 *Code of Practice for the installation of cellular PVC-U cladding systems*  
MOAT No 43 : 1987 *UEAtc Directives for Impact Testing Opaque Vertical Building Components*

## 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
- 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.

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.