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Agrément Certificate No 93/2876
*Second issue**

Designated by Government to issue European Technical Approvals

KESTREL CO-EXTRUDED CELLULAR PVC-U CLADDING SYSTEM

Façade légère en PVC-U
Verkleidung

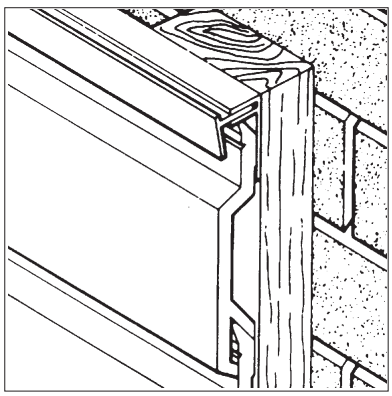
Product

- *THIS CERTIFICATE RELATES TO THE KESTREL CO-EXTRUDED CELLULAR PVC-U CLADDING SYSTEM.*
- *The cladding is supplied in white planks with shiplap and open V joints.*
- *The product has been assessed for use externally on buildings as a decorative and protective facing fixed horizontally, vertically or diagonally on the following substrates:*

(a) timber stud walls with or without sheathing,

(b) brick or block masonry walls.

- *It is essential that the product is installed in accordance with the manufacturer's instructions and the* Design Data *and* Installation *sections of this Certificate.*



Building Regulations

1 The Building Regulations 1991 (England and Wales)

The Secretary of State has agreed with the British Board of Agrément the requirements of the Building Regulations to which cladding systems can contribute in achieving compliance. In the opinion of the BBA, Kestrel Co-extruded Cellular PVC-U Cladding System, if used in accordance with the provisions of this Certificate, will contribute to meeting the relevant requirements.

Requirement:	A1	Loading
Comment:		The product is acceptable for use as set out in sections 6 and 8 of this Certificate.
Requirement:	B4	External fire spread — external walls
Comment:		The product has a fire propagation index (I) of 15.4 and its acceptability for use is as set out in section 9 of this Certificate.
Requirement:	C4	Resistance to weather and ground moisture
Comment:		The product does not form a watertight or airtight facing. To achieve a weatherproof barrier a breather membrane must be provided. See section 10 of this Certificate.
Requirement:	L1	Conservation of fuel and power
Comment:		The insulation values of the planks and the cavity formed between the planks and the backing wall reduce the overall U value with reference to Table 1 of Approved Document L1. See section 11 of this Certificate.
Requirement:	Regulation 7	Materials and workmanship
Comment:		The product is acceptable. See section 13.

2 The Building Standards (Scotland) Regulations 1990

In the opinion of the BBA, Kestrel Co-extruded Cellular PVC-U Cladding System, if used in accordance with the provisions of this Certificate, will satisfy or contribute in satisfying the various Regulations and related Technical Standards as listed below.

Regulation:	10	Fitness of materials
Standard:	B2	Selection and use of materials, fittings, components and other manufactured products
Comment:		The product is acceptable.
Regulation:	11	Structure
Standard:	C2.2	Loads acting on a building
Comment:		The product is acceptable for use as set out in sections 6 and 8 of this Certificate.
Regulation:	12	Structural fire precautions
Standard:	D2.4	External wall claddings
Comment:		The product has a fire propagation index (I) of 15.4 and its acceptability for use is as set out in section 9 of this Certificate.
Regulations:	16, 17 and 18	Preparation of sites and resistance to moisture
Standard:	G3	Resistance to precipitation
Comment:		The product does not form a watertight or airtight facing. To achieve a weatherproof barrier a breather membrane must be provided. See section 10 of this Certificate.
Standard:	G4	Condensation
Comment:		Provided that there is provision for adequate drainage and ventilation behind the cladding, and that a breather membrane is incorporated, as required, the product will comply with this Standard. See sections 6.7 and 10 of this Certificate.

continued

Regulation:	22	Conservation of fuel and power
Standard:	J2	Conservation of fuel and power: the building fabric
Comment:		The thermal resistance of the planks and the cavity formed between the planks and the backing wall will contribute to achieving the required U value. See section 11 of this Certificate.

3 The Building Regulations (Northern Ireland) 1990 (as amended 1991)

In the opinion of the BBA, Kestrel Co-extruded Cellular PVC-U Cladding System, if used in accordance with the provisions of this Certificate, will satisfy the various Building Regulations as listed below.

Regulation:	B2	Fitness of materials and workmanship
Comment:		The product is acceptable. See section 13 of this Certificate.
Regulation:	C4	Resistance to ground moisture and weather
Comment:		The product does not form a watertight or airtight facing. To achieve a weatherproof barrier a breather membrane must be provided. See section 10 of this Certificate.
Regulation:	D3	Stability
Comment:		The product is acceptable for use as set out in sections 6 and 8 of this Certificate.
Regulation:	E7	External walls
Comment:		The product has a fire propagation index (I) of 15.4 and its acceptability for use is as set out in section 9 of this Certificate.
Regulation:	F2	Conservation of fuel and power
Comment:		The insulation values of the planks and the cavity formed between the planks and the backing wall reduce the overall U value. See section 11 of this Certificate.

Technical Specification

4 Description

4.1 Kestrel Co-extruded Cellular PVC-U Cladding System is a protective and decorative facing for external use.

4.2 The system comprises white cladding planks (see Figure 1) and matching trims (see Figure 2).

4.3 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.

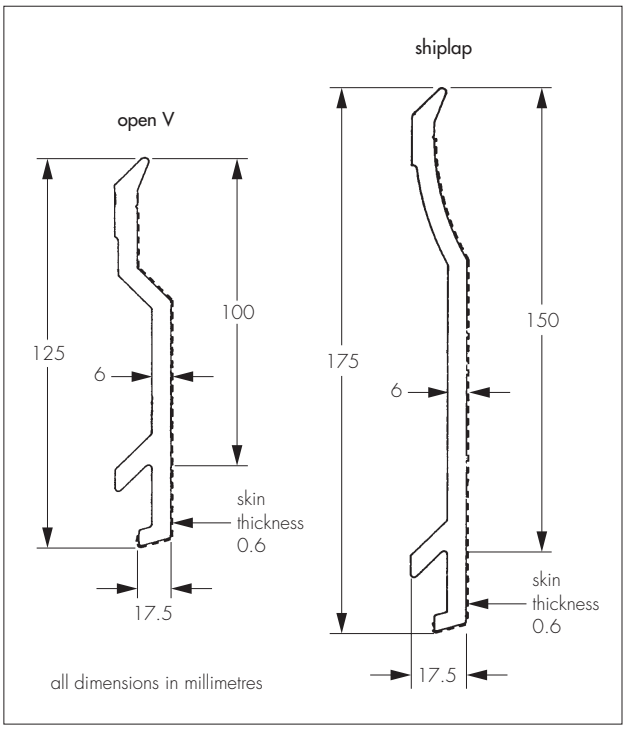
4.4 The planks are available in two designs, open V and shiplap with the characteristics given in Table 1.

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 (kgm^{-1})	0.49	0.63
average density (kgm^{-3})	550	550

4.5 The planks are manufactured by coextruding a high impact PVC-U compound onto a foamable PVC-U compound, cooling and forming to section and finally cutting to length. Cellular PVC-U is formed during the process by the evolution of gas from sodium bicarbonate.

Figure 1 Cladding planks



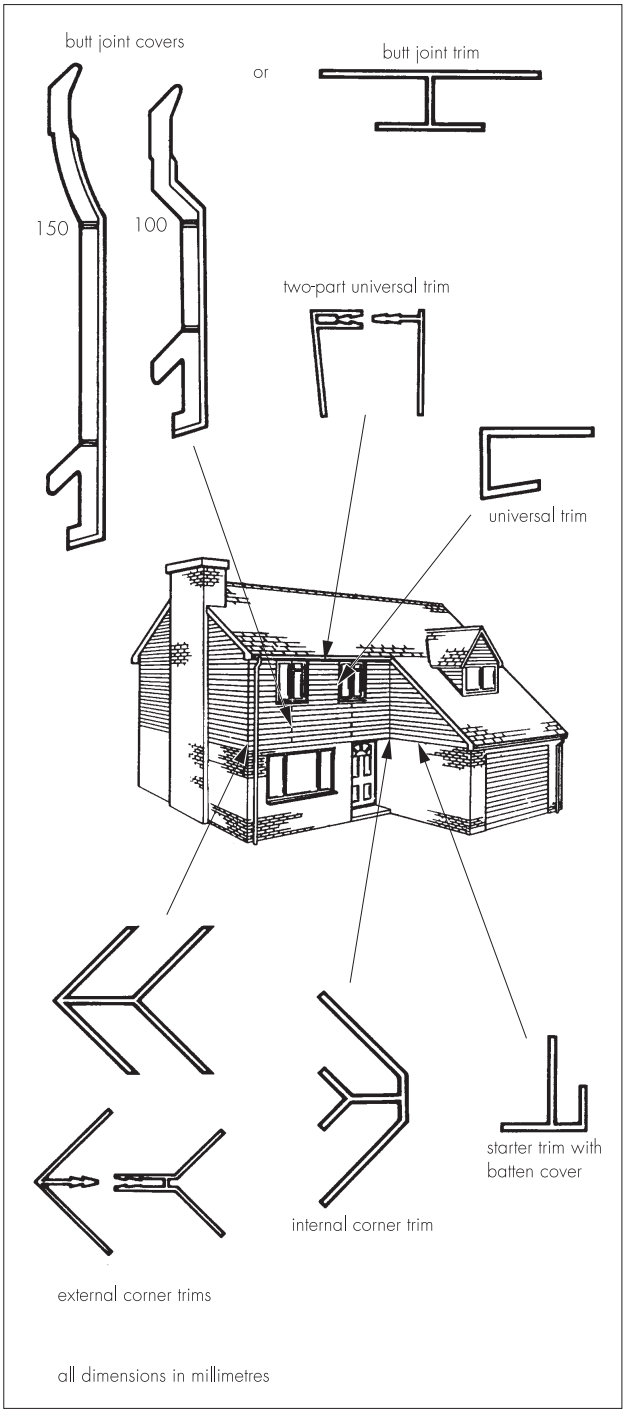
4.6 The trims are manufactured using conventional extrusion and injection moulding techniques.

4.7 Continuous quality control is exercised during manufacture: checks include appearance, dimensions, weight per metre, heat reversion, heat ageing, colour measurement, stress relief and impact strength.

4.8 Stainless steel, annular ring-shank nails (2.0 mm shank diameter) are used to fix cladding

planks and trims to timber studs or battens. 30 mm nails are used to fix planks to studs, or to battens with cross-sections not less than 24 mm by 38 mm. 25 mm nails are used to fix planks to battens with cross-sections less than 24 mm by 38 mm (eg 19 mm by 38 mm). 20 mm nails are used to fix trims.

Figure 2 Trims



5 Delivery and site handling

5.1 Standard 5 metre lengths of Kestrel cladding are delivered to site in packs of five sealed in polythene sleeves.

5.2 All packaging carries the Kestrel product code, and the BBA identification mark incorporating the number of this Certificate.

5.3 Unloading should be carried out by hand to avoid damage to the components which should be stored flat, in their protective wrapping, on a clean, level surface. Stacks must not exceed one metre in height and should be restrained to prevent collapse. To avoid damage it is recommended that additional protection is provided when the planks are stored in the open.

Design Data

6 General

6.1 Kestrel Co-extruded 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.

6.2 The designer should ensure that the strength and integrity of the intended substrate is commensurate with that required of the cladding system (see sections 6.3 and 6.4).

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

(1) BS 5628 : Part 1 : 1978(1985) and BS 5628 : Part 3 : 1985.

(2) Section 1, Part C of Approved Document A1/2 to the Building Regulations 1991 (England and Wales).

(3) The *Small Buildings Guide,* for compliance with Part C of the Technical Standard for compliance with the Building Standards (Scotland) Regulations 1990.

(4) Technical Booklet D, Structure, to the Building Regulations (Northern Ireland) 1990.

6.4 Timber stud walls should be constructed in accordance with BS 5268 : Part 2 : 1991 and BS 5268 : Part 6 : Section 6.1 : 1988 and preservative treated in accordance with BS 5268 : Part 5 : 1989. Studding and framing should be adequately supported by noggings to ensure rigidity.

6.5 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 CCA (copper/chrome/arsenic) preservative is used, care should be taken to ensure that sufficient time is allowed for the complete fixation of the CCA preservative (approximately seven days) before the cladding is fixed.

6.6 Cellular PVC-U has a similar coefficient of thermal expansion to that of conventional rigid PVC. 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 15.13, 15.17 and 15.21).

6.7 The cladding must be installed to provide a minimum ventilated air space of 19 mm between the cladding and the backing wall, for example, by the use of spacing battens. This satisfies both the NHBC requirement (see NHBC Standards, Chapter 6.2 : 1992) for a minimum 10 mm wide ventilated cavity and the Foundation 15 (Clause 6.9.2.3 Foundation 15 *Technical Handbook*) for a minimum 19 mm cavity to be maintained between claddings and sheathing.

7 Practicability of installation

7.1 Kestrel cellular PVC-U cladding can be easily installed under normal site conditions provided the work is carried out according to the guidance given in sections 14 and 15 of this Certificate.

7.2 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.

8 Strength and stability

Wind loading

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

8.2 When installed in accordance with the requirements of this Certificate, onto battens at maximum 600 mm centres, on buildings up to 10 metres in height, Kestrel cellular PVC-U cladding is suitable for use in the geographical areas shown in Table 2.

Table 2 Geographical areas of use

Fixing nail (mm)	Cladding profile	
	Open V (100 mm)	Shiplap (150 mm)
30	All areas of UK (with basic wind speeds up to 56 ms^{-1})	Industrial/lowland areas of England, Wales and Northern Ireland (with basic wind speeds up to 46 ms^{-1})
25	All areas of UK apart from most exposed northern areas of Scotland and Northern Ireland (with basic wind speeds up to 50 ms^{-1})	South East England (with basic wind speeds up to 40 ms^{-1})

8.3 When the cladding is used in exposed locations (eg buildings above 10 metres in height, buildings on unprotected sites or in open countryside) it is recommended that batten spacing be reduced, particularly at the corners of the building, in order to increase the resistance of the cladding to wind suction. In particularly exposed locations, in common with all cladding, the adequacy of a proposed installation should always be checked by a qualified engineer, who should include in the check the adequacy of the fixing of battens to the substrate, not covered by this Certificate.

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

Resistance to impact

8.5 The cladding is suitable for use above ground-floor level, and at ground-floor level in private areas where there is some incentive to exercise care, as covered by categories C to F, inclusive, of Table 2 of BS 8200 : 1985. It is not recommended for use at ground-floor level in public areas where it may be exposed to vandalism and general misuse.

9 Behaviour in relation to fire

9.1 When tested to BS 476 : Part 6 : 1981 Kestrel cellular PVC-U 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.

9.2 Kestrel cellular PVC-U cladding is suitable for use as cladding on the external walls of buildings less than 20 metres in height (England and Wales) or 15 metres in height (Scotland) provided that the wall is 1 metre or more from the relevant boundary.

9.3 The product is suitable for use on the external walls of buildings in Northern Ireland less than 15 metres in height provided the wall is 1 metre or more from the relevant boundary, but excluding use on buildings of purpose group VII (assembly buildings) having more than one storey, at situations up to 7.5 metres above the finished surface of any adjoining ground, or of any adjoining roof or other part of the building to which persons have access.

9.4 The product is suitable for use as a cladding on the external walls of buildings 20 metres or more in height (England and Wales) or 15 metres or more in height (Scotland) provided that the wall is 1 metre or more from the relevant boundary and the cladding does not extend higher than 20 metres (England and Wales) or 15 metres (Scotland).

9.5 The product is suitable for use on the external walls of buildings in Northern Ireland which are 15 metres or more in height provided the wall is 1 metre or more from the relevant boundary and the cladding does not extend higher than 15 metres, but excluding use on buildings of purpose group VII (assembly buildings) having more than one storey, at situations up to 7.5 metres above the finished surface of any

adjoining ground, or of any adjoining roof or other part of the building to which persons have access.

9.6 When tested in accordance with BS 476 : Part 7 : 1987, the coextruded material has achieved a Class 1Y rating.

9.7 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 a fire.

10 Air and water penetration

10.1 Kestrel cellular PVC-U cladding is not air, water or water-vapour tight. When used on timber stud walls the product 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 : 1972 and have a vapour resistance less than 0.6 $MNsg^{-1}$ when calculated from the results of tests carried out at 25°C and a relative humidity of 75%, in accordance with BS 3177 : 1959.

10.2 Where the product 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.

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

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

11 Thermal insulation

An improvement in the U value (thermal transmittance) of the external wall will be obtained by the use of the system, due in part to the cellular structure of the foam and in part to the air space between the cladding and the backing wall.

12 Maintenance

12.1 The cladding can be cleaned by washing with water and detergent. Solvent-based cleaners should not be used.

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

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

13 Durability

13.1 Accelerated weathering tests and limited natural exposure trials indicate that Kestrel cellular PVC-U cladding is as durable as conventional rigid PVC.

13.2 The product will retain adequate impact resistance and its decorative function for a period of 20 years with only minor changes in surface appearance. However, staining will result from contact with creosote or bitumen.

Installation

14 General

14.1 Installation must be carried out in accordance with the manufacturer's instructions and the requirements of this Certificate.

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

15 Procedure

Preparation

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

15.2 A final inspection of the substrate should be made to confirm that it is as prescribed in section 6.2 of this Certificate.

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

15.4 The appropriate battens (selected and treated in accordance with section 6.5) should be fixed at centres not exceeding 600 mm.

15.5 For horizontal cladding, vertical battens are required at the ends of each section, at the sides of windows and at joins between planks. If a horizontal batten is placed at the bottom of the section, adequate drainage holes must be provided.

15.6 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 joins between planks. It is important to provide 10 mm diameter drainage holes at 1000 mm centres in the bottom and windowhead battens.

15.7 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 15.6.

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

15.9 Windowheads and other protrusions should be protected by a weatherproof membrane.

Horizontal installation (see Figures 3 and 6)

15.10 Working from a level line, a starter trim is fixed to the 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.

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

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

15.13 The bottom cladding plank is then located firmly in the starter trim and vertical trims, and fixed into place using the specified stainless steel nails, starting either at one end or working from the centre outwards. Nails 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.

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

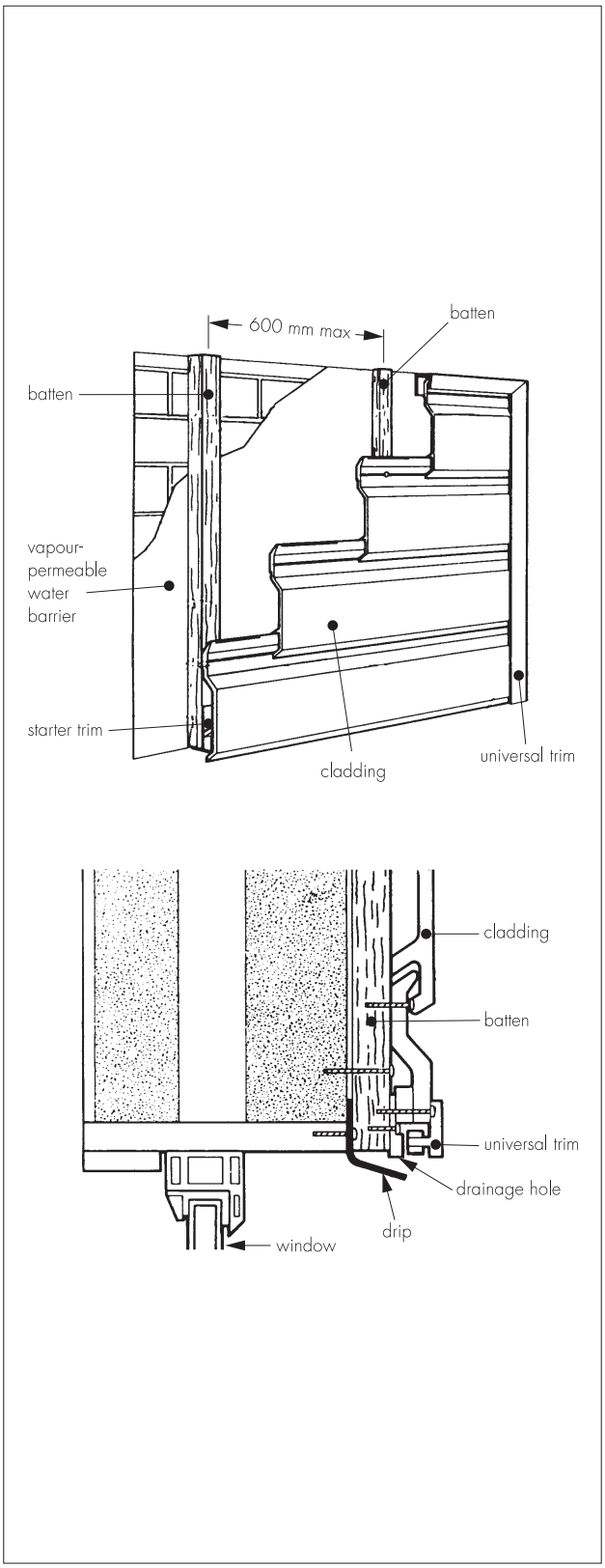
15.15 Subsequent planks are fitted into the preceding planks, ensuring that the tongue-and-groove joint is firmly closed so that the nailheads are concealed by the overlap.

15.16 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.

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

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

Figure 3 Horizontal installation



Vertical installation (see Figures 4 and 6)

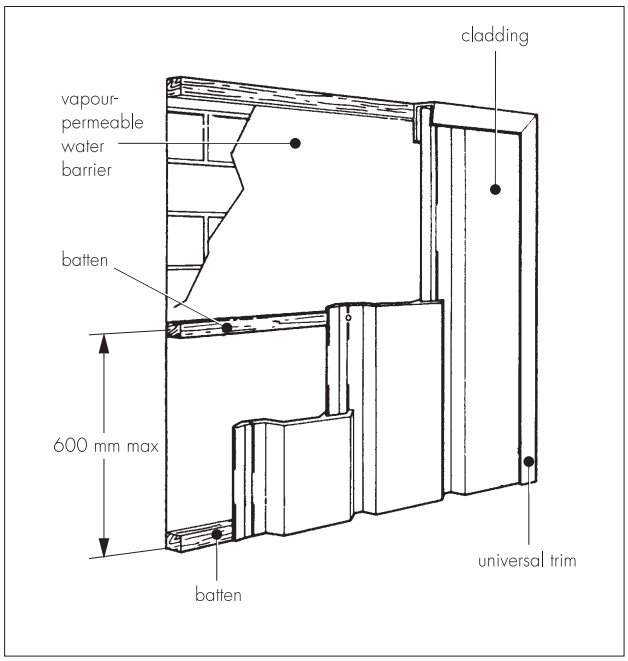
15.19 The appropriate trims are fitted to the perimeter of the elevation to be clad and around window and door openings. A two-part universal trim may be used at the base of the cladding to provide a drip. Where two-part trims are required only the back half is fixed at this stage.

15.20 Starting from one edge the first plank is aligned, using a plumb-line, and nailed in position at the fixing centres.

15.21 To ensure that the cladding remains flat all nailing should be done progressively from the centre working outward on each plank. All plank ends must be secret-nailed through the trims, allowing 5 mm clearance for expansion at each end.

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

Figure 4 Vertical installation



15.23 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.

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

15.25 Where two-part trims have been used, complete the installation by fastening the front part of the trim to the rear part.

Diagonal installation (see Figures 5 and 6)

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

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

15.28 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.

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

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

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

Figure 5 Diagonal installation

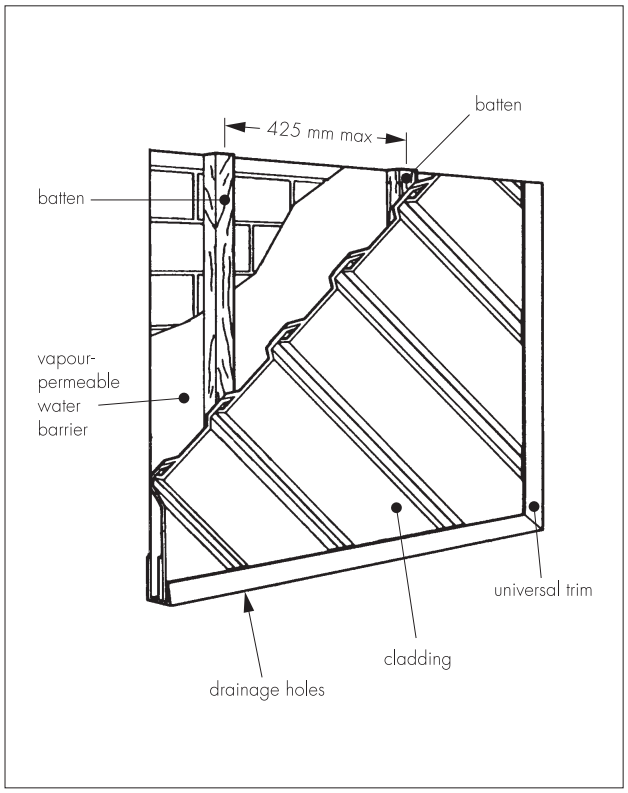
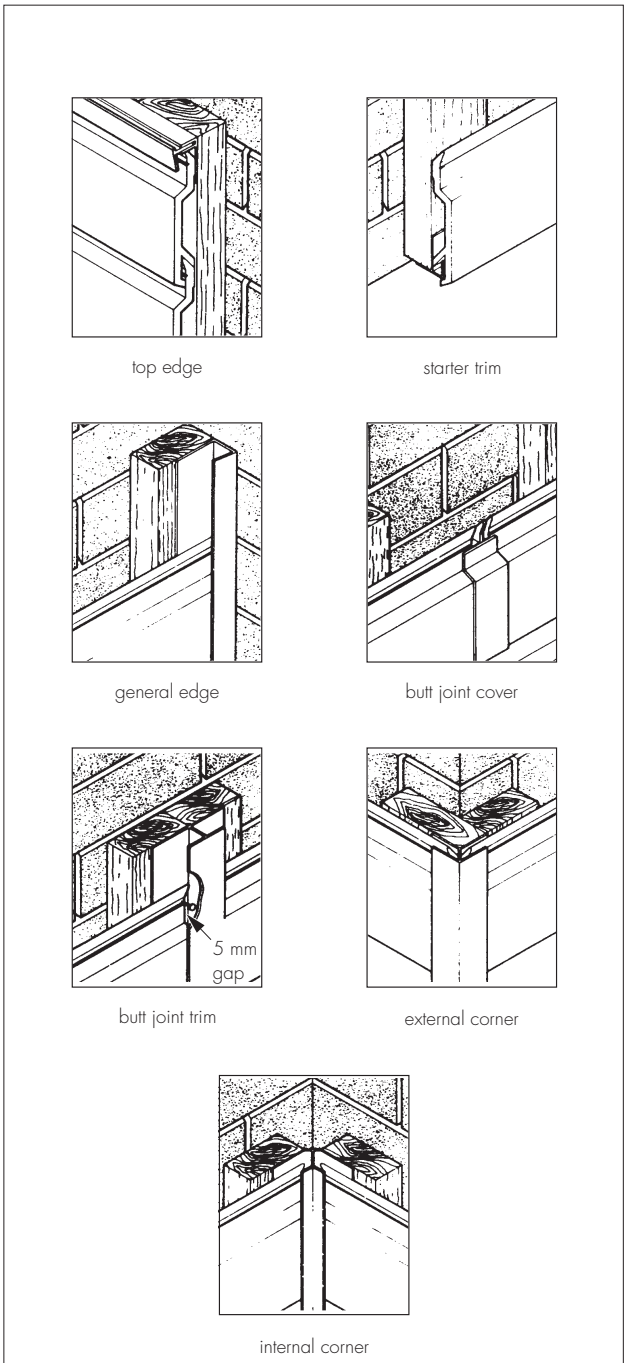


Figure 6 Installation details



Technical Investigations

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

16 Tests

Tests were carried out on planks and trims to determine:

Vicat softening point
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.

17 Other investigations

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

17.2 The dimensions of cladding planks and trims were checked.

17.3 An examination was made of data relating to:

behaviour of the cladding in fire
colour stability.

17.4 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.

17.5 The practicability of installation was assessed.

Bibliography

BS 476 *Fire tests on building materials and structures*
Part 6 : 1981 *Method of test for fire propagation for products*
Part 7 : 1987 *Method for the 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 : 1972 *Specification for building papers (breather type)*

BS 5268 *Structural use of timber*
Part 2 : 1991 *Code of practice for permissible stress design, materials and workmanship*
Part 5 : 1989 *Code of practice for the preservative treatment of structural timber*
Part 6 : Section 6.1 : 1988 *Code of practice for timber frame walls — Dwellings not exceeding three storeys*

BS 5628 *Code of practice for use of masonry*
Part 1 : 1978(1985) *Structural use of unreinforced masonry*
Part 3 : 1985 *Materials and components, design and workmanship*

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

ISO 180 : 1982 *Plastics — Determination of Izod impact strength of rigid materials*

MOAT No 43 : 1987 *UEAtc Directives for Impact Testing Opaque Vertical Building Components*

NHBC Standards Chapter 6.2 : 1983 *External timber frame walls and wall panels*

Conditions of Certification

18 Conditions

18.1 This Certificate:

(a) relates only to the product that is described, installed, used and maintained as set out in this Certificate;

(b) is granted only to the company, firm or person identified on the front cover — no other company, firm or person may hold or claim any entitlement to this Certificate;

(c) has to be read, considered and used as a whole document — it may be misleading and will be incomplete to be selective;

(d) is copyright of the BBA.

18.2 References in this Certificate to any Act of Parliament, Regulation made thereunder, Directive or Regulation of the European Union, Statutory Instrument, Code of Practice, British Standard, manufacturers' instructions or similar publication, shall be construed as references to such publication in the form in which it was current at the date of this Certificate.

18.3 This Certificate will remain valid for an unlimited period provided that the product and the manufacture and/or fabricating process(es) thereof:

(a) are maintained at or above the levels which have been assessed and found to be satisfactory by the BBA;

(b) continue to be checked by the BBA or its agents; and

(c) are reviewed by the BBA as and when it considers appropriate.

18.4 In granting this Certificate, the BBA makes no representation as to:

(a) the presence or absence of any patent or similar rights subsisting in the product or any other product;

(b) the right of the Certificate holder to market, supply, install or maintain the product; and

(c) the nature of individual installations of the product, including methods and workmanship.

18.5 Any recommendations relating to the use or installation of this product which are contained or referred to in this Certificate are the minimum standards required to be met when the product is used. They do 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 or in the future; nor is conformity with such recommendations to be taken as satisfying the requirements of the 1974 Act or of any present or future 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 installation and use of this product.

BBA BRITISH BOARD OF AGRÉMENT
TECHNICAL APPROVALS FOR CONSTRUCTION

In the opinion of the British Board of Agrément, Kestrel Co-extruded Cellular PVC-U Cladding System is fit for its intended use provided it is installed, used and maintained as set out in this Certificate. Certificate No 93/2876 is accordingly awarded to Kestrel Building Products.

On behalf of the British Board of Agrément

Date of Second issue: 10th August 2001

Chief Executive

**Original Certificate issued on 17th February 1993. This version issued to include change of Certificate holder's name and revised* Conditons of Certification.

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