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BBA BRITISH BOARD OF AGRÉMENT
TECHNICAL APPROVALS FOR CONSTRUCTION

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Agrément Certificate No 96/3261
*Third issue**

Designated by Government to issue European Technical Approvals

ULTRAFRAME CONSERVATORY ROOF SYSTEMS

Système de serre
Gewächshaussystem

Product

- *THIS CERTIFICATE RELATES TO ULTRAFRAME CONSERVATORY ROOF SYSTEMS.*
- *The roof systems are for conservatories used as extensions to new or existing buildings where an external grade door separates conservatory from inner room.*
- *It is essential that the roofs are installed and used in accordance with the conditions set out in the* Design Data *and* Installation *parts of these Front Sheets and accompanying Detail Sheets.*

Regulations — Detail Sheet 1

1 The Building Regulations 2000 (as amended) (England and Wales)

The Secretary of State has agreed with the British Board of Agrément that the extension of a building by the addition at ground level of a conservatory, where the floor area does not exceed 30 m², is exempt from the Building Regulations.

2 The Building Standards (Scotland) Regulations 1990 (as amended)

A conservatory forming a single-storey extension to an existing dwelling of purpose sub-group 1B or 1C, where the conservatory does not contain a flue or heat-producing appliance, is not within one metre of a boundary and the floor area does not exceed 8 m², is exempt from these Regulations. For conservatories with floor areas between 8 m² and 30 m² the following is applicable:

Regulation:	22	Conservation of fuel and power
Standard:	J7.1	Conservatories
Comment:		Glazing (including frames) for conservatories above 8 m² but under 30 m² may have a U value not more than 3.3 $Wm^{-2}K^{-1}$. See section 5 of Detail Sheet 2 of this Certificate.

3 The Building Regulations (Northern Ireland) 2000

A conservatory constructed as an annexe to an existing building and having a floor area not exceeding 30 m² and not less than one metre from any boundary is exempt from these Regulations provided that the conditions described in A5 Exemptions are met.

4 Construction (Design and Management) Regulations 1994 (as amended)

Construction (Design and Management) Regulations (Northern Ireland) 1995 (as amended)

Information in this Certificate may assist the client, planning supervisor, designer and contractors to address their obligations under these Regulations.

See section: 2 *Delivery and site handling* (2.4 and 2.5) of the accompanying Detail Sheets.

Design Data

5 Strength and stability

5.1 The manufacturer's design code for the Ultraframe Conservatory Roof Systems is generally in accordance with the relevant requirements of:

- BS 6399-3 : 1988
- CP 3 : Chapter V-2 : 1972
- CP 118 : 1969.

5.2 Structural testing has been used to verify the relevant aspects of the manufacturer's design code.

5.3 Roofs designed in accordance with the manufacturer's design code will have adequate resistance to wind loads calculated in accordance with CP 3 : Chapter V-2 : 1972.

5.4 The roof is designed to support an imposed load of 0.75 kNm^{-2}. The magnitude of the actual snow load imposed will depend upon a number of factors, such as height above sea level, geographical location, roof size and arrangement. It is, therefore, recommended that BS 6399-3 : 1988 is used to calculate the actual snow load when the roof is used in areas where a load greater than 0.75 kNm^{-2} can be expected.

5.5 Details of the connections between the roof, the existing structure and the conservatory walls are dependent upon their type and condition. Guidance is available from the Certificate holder or should be entrusted to a suitably qualified person.

5.6 The gable support system is suitable for widths/projections up to 4 m (unreinforced) and 5 m reinforced with steel insert (width only).

5.7 When using double doors, patio doors or folding doors on the elevation with the system, the maximum door span is 2000 mm (unreinforced) or 2500 mm (reinforced).

5.8 For reinforced gable beam, it is essential that either the Ultraframe Victorian fixing kit (or other similar fixing) is used, to fix the head of the gable frame to the PVC-U frame above it. The recommended fixing spacing is 450 mm when using the Victorian fixing kit.

6 Ventilation and solar heat gain

6.1 Trickle ventilation is provided through the ventilated ridge and eaves system. Additional background ventilation can be provided by the inclusion of controllable trickle ventilators in the head of window and door units where required.

6.2 Outward opening casement or tilt and turn lights can be included in the wall frame options to provide natural ventilation. The precise area of opening can be calculated. A habitable room may be ventilated through an adjoining conservatory if the ventilation openings have an area appropriate to Building Regulations requirements.

6.3 Opening roof vents can be included where required to provide greater levels of ventilation.

6.4 Solar heat gain through the roof panels and wall frames may provide a useful additional heat input during winter conditions; however, summertime internal temperatures will also be raised. To limit the latter effect, the following design factors should be considered:

- orientation with respect to south
- aspect ratio of the floor plan of the conservatory
- area of opening lights and doors to area of floor expressed as a percentage.

6.5 As an approximate guide, northerly-facing conservatories should have opening lights or doors of not less than 15% of the floor area, rising to not less than 25% with roof blinds for those of a southerly aspect. This should limit the solar gain temperature rise to less than 12°C for most situations in summertime, using only natural ventilation. Where lower temperature rises are desired, consideration can be given to mechanical forced ventilation. More precise methods of design and solar data are given in *CIBSE (Chartered Institution of Building Services Engineers) Guide Book*, Parts A4 and A6.

6.6 To reduce the effects of solar heat gain on the internal temperature of the conservatory, blinds can be fitted (Victorian roof only), but their performance has not been assessed by the BBA.

7 Security against intrusion

7.1 Glazing sheets are retained by glazing bar top cappings. Removal of glazing bar top

cappings is extremely difficult without use of a special tool.

7.2 The roof light is fitted with a screw closing mechanism and provides reasonable security against unauthorised entry by the opportunist intruder.

7.3 It is recommended that a conservatory forming an extension to an existing dwelling should retain a lockable exterior type door to the main building.

8 Ease of operation

The roof vent can be operated without difficulty when correctly installed in the conservatory roof.

9 Maintenance

9.1 The conservatory roof can be re-glazed and the gaskets replaced, but these operations should be carried out using the materials supplied by the Certificate holder and approved by the BBA.

9.2 If damage occurs to a roof vent, the furniture and fittings can be readily replaced by releasing the fixing screws and changing the fitting.

9.3 The PVC-U internal and external claddings can be cleaned using water containing household detergent. If dirt is allowed to build up on the members over long periods it may become more difficult to restore the surface appearance.

9.4 Care should be taken when using proprietary materials for cleaning the glazing to ensure that deposits are not allowed to remain on the PVC-U where they may cause discoloration and damage to the surface. In addition, care must be taken to avoid damage to, or discoloration of, the members when stripping paint from adjacent surfaces, for example, by means of a blowlamp, paint stripper or mechanical stripper.

9.5 Paints can adversely affect the impact strength of the PVC-U cladding and the application of dark colours could lead to a risk of thermal distortion. Therefore painting is not recommended.

9.6 The roof vent locking mechanisms and hinges should be lubricated periodically to minimise wear and to ensure smooth operation, as recommended by the Certificate holder.

9.7 The roof panels can be readily replaced, if damaged, by removal of the glazing bar top capping using a special tool. Cleaning should be carried out using water containing household detergent. To avoid scratching of the surface, only soft cloths should be used when cleaning.

Installation

10 General

10.1 Design and manufacture of the conservatory roof systems is undertaken by the Ultraframe (UK) Ltd in accordance with their technical manuals.

10.2 Cavity trays are required where the conservatory roof abuts the wall of the building for new construction and consideration is given to their inclusion in existing walls in exposed situations.

10.3 When the pitch of the building roof adjacent to the conservatory is steeper than 45° consideration should be given to the inclusion of snow guards. This will prevent the worst effects of snow slides and dropping debris.

11 Preparation

11.1 All supporting side frames incorporating window profile material, ie PVC, timber or aluminium, should be designed in accordance with the relevant British Standards for imposed loadings. The side frames/walls must provide conservatories with overall lateral stability and resistance to axial loading. Advice should be sought from the frame supplier for the specific use of members for the conservatory construction, with due consideration given to the recommended packings between glazing and framework.

11.2 Foundations must meet the requirements of BS 8004 : 1986, NHBC Standard, Chapter 4 : 1992 and Zurich Building Guarantees Technical Standards, where applicable. Consideration should be taken of local conditions and advice sought from the local authority when necessary. If there are any doubts with regard to the stability of a site, a suitably qualified engineer should be consulted.

Bibliography

BS 6399-3 : 1988 *Loading for buildings — Code of practice for imposed roof loads*

BS 8004 : 1986 *Code of practice for foundations*

CP 3 : 1972 *Code of basic data for the design of buildings — Chapter V-2 Loading — Wind loads*

CP 118 : 1969 *The structural use of aluminium*

Conditions of Certification

12 Conditions

12.1 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.

12.2 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.

12.3 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.

12.4 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.

12.5 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, Ultraframe Conservatory Roof Systems are fit for their intended use provided they are installed, used and maintained as set out in this Certificate. Certificate No 96/3261 is accordingly awarded to Ultraframe (UK) Ltd.

On behalf of the British Board of Agrément

Date of Third issue: 16th September 2003 Chief Executive

**Original Certificate issued 9th September 1996. This amended version includes reference to the revised Building Regulations, the addition of CDM Regulations and a revised* Bibliography.

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BBA BRITISH BOARD OF AGRÉMENT
TECHNICAL APPROVALS FOR CONSTRUCTION

Ultraframe (UK) Ltd

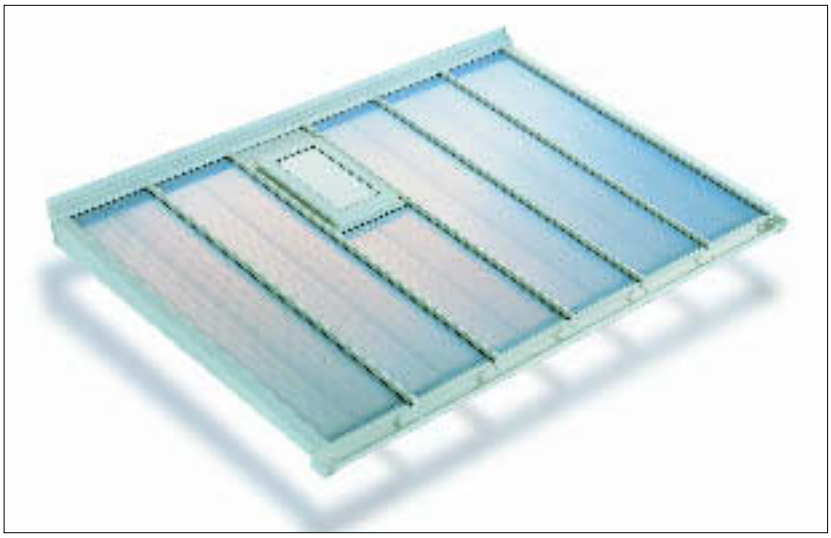
THE ULTRALITE 500 PVC AND 500 PC CONSERVATORY ROOF SYSTEMS

Certificate No 96/3261

DETAIL SHEET 3

*Third issue**

Product



• *THIS DETAIL SHEET RELATES TO THE ULTRALITE 500 PVC AND 500 PC CONSERVATORY ROOF SYSTEMS.*

This Detail Sheet must be read in conjunction with the Front Sheets, which give the product's position regarding the Building Regulations, general information relating to the system, and the Conditions of Certification, *respectively.*

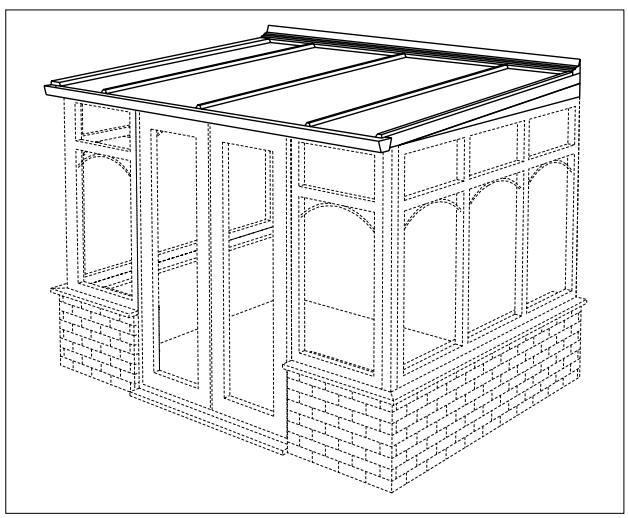
Technical Specification

1 Description

1.1 The Ultralite 500 PVC and 500 PC Conservatory Roof Systems are designed and fabricated by Ultraframe (UK) Ltd for use in the exposure conditions described in this Certificate.

1.2 The roof system is of aluminium and PVC-U construction with PVC or PC (polycarbonate) glazing panels. The 2.5° pitch roof is available as a lean-to configuration (see Figure 1).

Figure 1 Ultralite 500 conservatory roof



1.3 This Certificate relates to roofs up to 3.5 metres spans used anywhere in the UK and up to 4 metres spans where the negative wind pressure does not exceed 0.75 kNm^{-2}. Within these parameters, the conservatory floor area must not exceed 30 square metres. Larger roof spans over 4 metres (outside the scope of this Certificate) are possible but must be supported by a suitably designed purlin in accordance with relevant British Standards, according to the materials used. Design must include suitable fixing of reinforcing bars to purlin to prevent wind uplift. The size and specification of the purlin should be determined by a qualified person, advice can be sought from the Certificate holder.

1.4 The full specifications and drawings for the materials and components covered by this Certificate have been examined and are retained by the BBA. This section gives only general details of the system. A complete schedule of the component parts is contained in the Ultraframe Technical Manuals.

1.5 The roofing system (see Figures 2 and 3) consists of either PVC or polycarbonate multi-walled interlocking panels with co-extruded UV protection layer. The roof system is complete with PVC-U fascia, 2.5° firrings and dedicated gutter kit.

Figure 2 Components (Ultralite 500 PC)

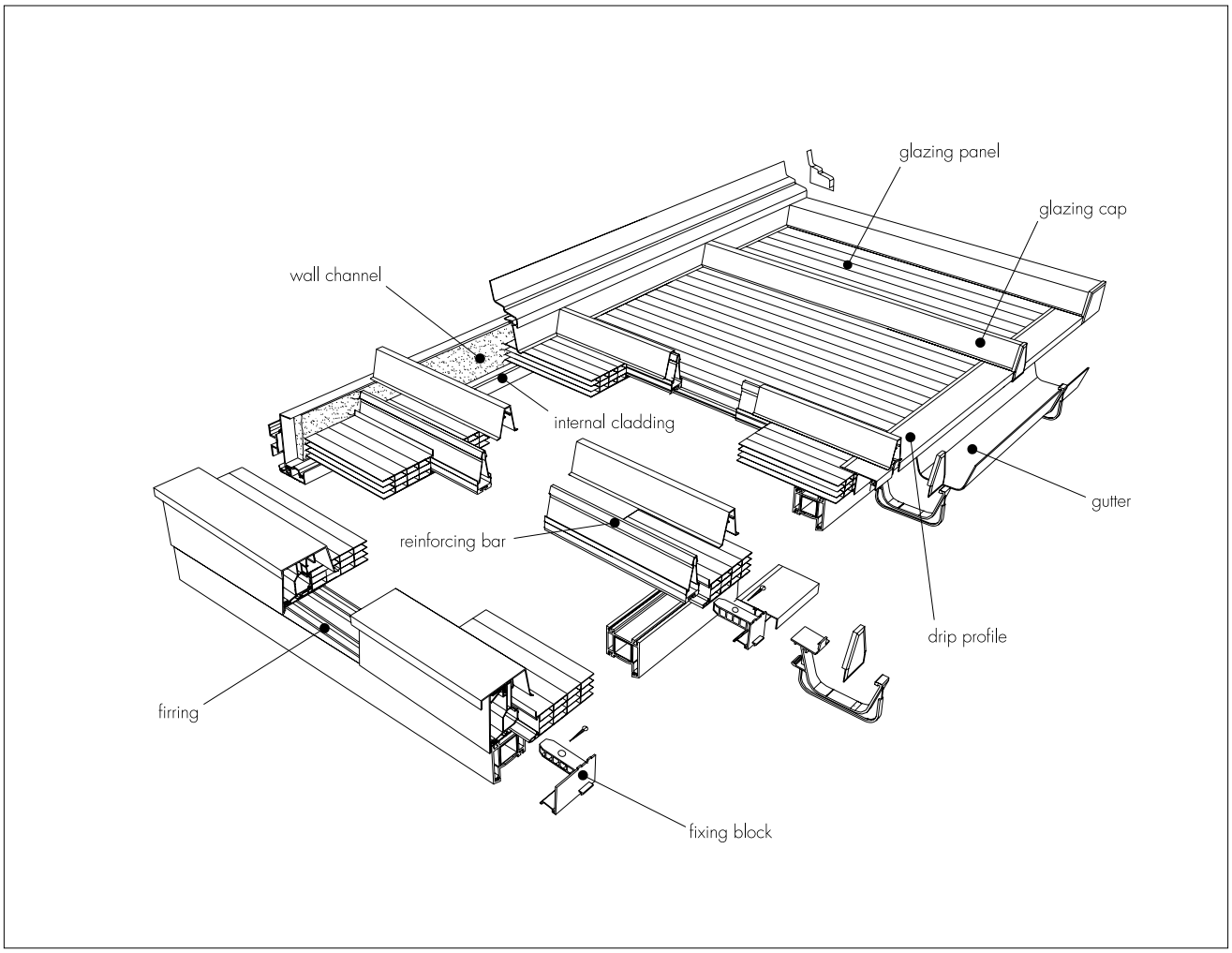


Figure 3 Section through Ultralite 500 PVC

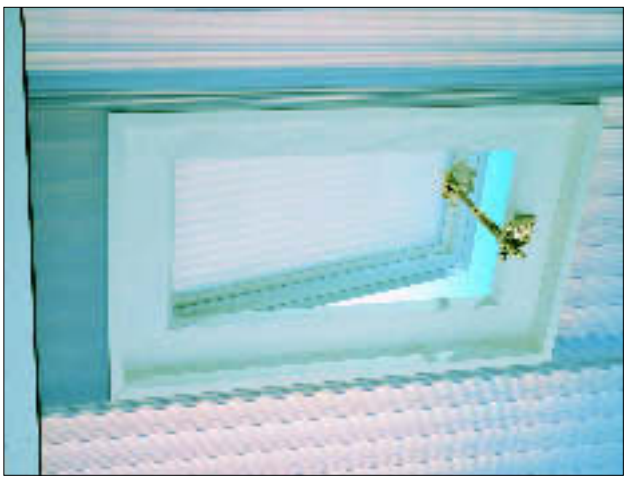
1.6 The glazing panels are joined together by aluminium interlocking reinforcing bar sections extruded from aluminium to BS 1474 : 1987, material designation 6063-T6, with PVC-U external claddings and TPE co-extruded gaskets.

1.7 The glazing panels are located and supported in a ventilated aluminium wall channel which incorporates an internal PVC-U cladding with a controllable slot ventilator.

1.8 The aluminium reinforcing bars are attached to the supporting wall frames with fixing blocks and screws.

1.9 An opening roof vent is available if required (see Figure 4).

Figure 4 Roof vent



Conservaflash[1] flashing system

1.10 The Conservaflash preformed PVC-U flashing system is an alternative to traditional lead flashing.

(1) Registered trademark.

1.11 Horizontal flashing panels overlap each other and oversail the wall plate PVC-U top cladding (see Figure 5).

Figure 5 Ultralite flashing panels

1.12 Conservaflash may also be used on extensions where the floor area does not exceed 30 m^2, given the appropriate soaker detail. However this use is outside the scope of this Detail Sheet.

Quality control

1.13 Quality control includes checks on all materials and components, in particular:

- extruded PVC-U profiles
- PVC and polycarbonate roof panels

Fabrication of roof system

- extrusions and components (visual inspection)
- overall dimensions.

2 Delivery and site handling

2.1 Conservatory roofs are fabricated in the Ultraframe factory. All components are suitably protected and delivered to site by Ultraframe (UK) Ltd.

2.2 The conservatory roof has a label bearing the company's mark and the BBA identification mark incorporating the number of this Certificate.

2.3 The roof components should be stored under cover in a clean area and suitably protected to avoid distortion or damage.

2.4 The weight of glazing can be calculated, where required for manual handling operations, by reference to the information contained in BS 952-1 : 1995. The weight of the unglazed frame, and its ease of handling, particularly by one person, must also be taken into account when planning site operations.

2.5 When selecting means of access, for example, use of scaffolding, the safety of the operatives, the occupants, and the passers-by, during the period of installation, should be considered.

Design Data

3 Weathertightness

3.1 A sample conservatory roof selected from the Ultralite 500 range covered by this Certificate was tested for weathertightness. There are no standards or guides applicable to conservatory roofs. Therefore, for the assessment, use was made of BS 6375-1 : 1989 and MOAT No 1 : 1974 giving the results shown in Table 1. The gradings are based on the assumption that the conservatory is installed in accordance with the Ultraframe Technical Manuals.

Table 1 Weathertightness[1]

	BS 6375-1 Test pressure class (Pa)	MOAT No 1 Grading[1][2]
Watertightness		
conservatory roof	300	E_3
rooflight	50	E_1

(1) E_1 indicates water leakage occurring between 50 Pa and 150 Pa.

(2) E_3 indicates water leakage occurring between 300 Pa and 499 Pa.

Note: A value for air permeability is not given as it will vary depending on the nature of the supporting walling structure.

3.2 To achieve the gradings given in Table 1, particular attention must be paid to the correct fitting of all gaskets and weatherseals, and to the detailing of sealants and flashings.

3.3 The ventilated wallplate will help to equalise the internal and external air pressures.

4 Behaviour in relation to fire

4.1 The polycarbonate panels used in the conservatory roof have achieved a Class 1 rating when tested to BS 476-7 : 1987 and are therefore classed as TP(a) rigid thermoplastic. In Table 18 of Approved Document B to the Building Regulations 2000 (as amended) (England and Wales) TP(a) rigid thermoplastics are allowed to be used in conservatory roofs.

4.2 The PVC panels used in the conservatory roof have achieved an EXT.F.AAX rating when tested to BS 476-3 : 1958.

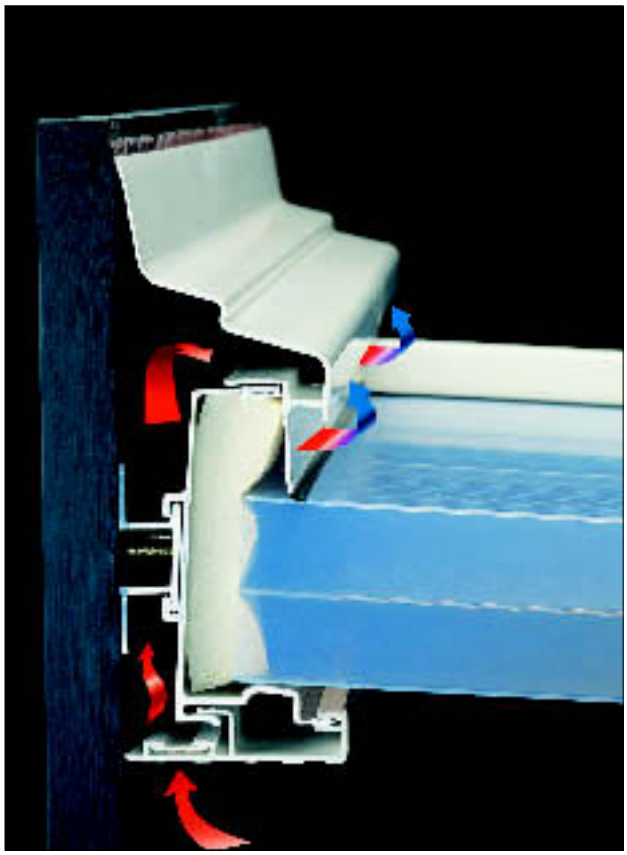
4.3 The spread of flame across PVC-U is limited, and in a fire it will tend to char and may fall away. The use of the material in the construction of a conservatory roof would not accelerate the development of a fire.

5 Condensation risk and thermal insulation

In common with all glazed roof structures, temperature reduction under night-time winter sky radiation conditions will lead to the possibility of condensation. However, the effects may be minimised by the wallplate ventilator (see Figure 6)

and by the use of background heating to maintain the internal temperature between 3°C and 4°C above the external ambient temperature during night-time winter clear sky conditions. The U value of the multi-walled roof sheets is calculated to be 1.9 $Wm^{-2}K^{-1}$ for PVC and 1.5 $Wm^{-2}K^{-1}$ for polycarbonate, using BS 6993-1 : 1989 and CIBSE *Chartered Institution of Building Services Engineers Guide Book,* Parts A3.5 to A3.7. The glazing bars are assessed as having higher U values and consequently may be subject to occasional winter condensation under severe conditions, though the PVC-U cladding on the aluminium will minimise the effects. In general, if temperatures and humidities within the conservatory are maintained within the normal domestic band from 10°C to 25°C and from 40% to 65% RH, respectively, any occurrence of condensation will be slight and temporary.

Figure 6 Trickle ventilation



6 Safety

6.1 If access to the roof is required for maintenance purposes, timber crawling boards must be placed across the roof panels.

6.2 The positioning of the hand operated controls of the opening vent will comply with the recommendations of BS 8213-1 : 1991.

7 Supporting structure

All supporting side frames incorporating window profile material, ie PVC, timber or aluminium, should be designed in accordance with the relevant British Standards for imposed loadings. The side frames/walls must provide conservatories with overall lateral stability and resistance to axial loading.

8 Durability

8.1 Evidence is available on the performance in the UK of white PVC-U similar to that used for the internal and external cladding, over a period of 15 years in windows and in excess of 20 years in other external applications. Such evidence, when compared with the results of tests on the Ultraframe PVC-U, indicates that the conservatory roof will have a life of at least 25 years. Slight colour change or surface dulling may occur within the overall life of the roof.

8.2 Aluminium reinforcing bars and other components, including the roof vent hinges, and locking mechanism, will have similar durability. Where conservatory roofs are to be installed in areas subject to particularly aggressive conditions, for example, in coastal locations or near sources of industrial pollutants, replacement of components may be necessary within the life of the conservatory roof.

8.3 In most UK situations it is unlikely that replacement of the PVC or polycarbonate glazing panels will be necessary within the lifetime of the conservatory. In south-facing situations where prolonged exposure to direct sunlight is likely to occur, consideration should be given to the use of polycarbonate glazing panels which have a greater resistance to ultraviolet degradation than PVC glazing panels.

8.4 The gaskets and silicone sealant may need to be replaced within the life of the conservatory roof.

Installation

Each Ultralite 500 PVC and 500 PC Conservatory Roof System is supplied with detailed fitting instructions.

9 Procedure (see Figures 2 and 3)

9.1 Pre-cut 2.5° PVC-U firrings are trimmed and fixed (see Figure 7).

Figure 7 Firrings

9.2 The ventilated wall channel and spacers are fixed to an external wall horizontally, using recommended fasteners and fixing centres.

9.3 Glazing panels are laid between the ventilated wall channel and the supporting side wall structure and an aluminium reinforcing bar is slid in at the interlocking detail of the panels along their length. All panels and glazing bars are fitted in this manner and fixed as recommended.

9.4 External PVC-U glazing caps with co-extruded TPE gaskets are snapped onto the reinforcing bar to form a seal against the panel.

9.5 The external PVC-U wall channel top cover is pushed into position, and lead flashing is dressed over at the abutment of the roof to the external wall.

9.6 Silicone is applied in accordance with fitting instructions.

9.7 The installation is completed by fitting such items as PVC-U trims, caps and gutters. Rainwater is directed to a suitable soakaway or drain.

Conservaflash flashing system

9.8 The mortar along the appropriate brick-line is chased out using a grinding wheel.

9.9 The flashing units are installed from gutter end towards opposite gutter end by slotting into the extruded soaker that is pre-clipped into the starter bar.

9.10 Silicone is used to seal the horizontal flashing units in at the wall where the mortar has been chased out.

Technical Investigations

The following is a summary of the technical investigations carried out on the Ultralite 500 PVC and 500 PC Conservatory Roof Systems.

10 Tests

Tests were carried out to determine:

- watertightness
- effect of wind loads
- effect of snow loads
- suitability of materials.

11 Investigations

11.1 The manufacturer's design code was examined for compliance with:

- BS 6399-3 : 1988
- CP 3 : Chapter V-2 : 1972
- CP 118 : 1969.

11.2 Calculated predictions of structural performance were compared to those obtained from full-scale testing.

11.3 A user survey was conducted to establish the product's ease of installation and performance and durability in service.

Bibliography

BS 476-3 : 1958 *Fire tests on building materials and structures — External fire exposure roof test*

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

BS 952-1 : 1995 *Glass for glazing — Classification*

BS 1474 : 1987 *Specification for wrought aluminium and aluminium alloys for general engineering purposes: bars, extruded round tubes and sections*

BS 6375-1 : 1989 *Performance of windows — Classification for weathertightness (including guidance on selection and specification)*

BS 6399-3 : 1988 *Loading for buildings — Code of practice for imposed roof loads*

BS 6993-1 : 1989 *Thermal and radiometric properties of glazing — Method for calculation of the steady state U-value (thermal transmittance)*

BS 8213-1 : 1991 *Windows, doors and rooflights — Code of practice for safety in use and cleaning of windows and doors (including guidance on cleaning materials and methods)*

CP 3 *Code of basic data for the design of buildings :* Chapter V-*2 : 1972 Loading — Winds loads*

CP 118 : 1969 *The structural use of aluminium*

MOAT No 1 : 1974 *Directive for the Assessment of Windows*

BBA BRITISH BOARD OF AGRÉMENT
TECHNICAL APPROVALS FOR CONSTRUCTION

On behalf of the British Board of Agrément

Date of Third issue: 16th September 2003

Chief Executive

**Original Detail Sheet issued 28th February 1997. This amended version includes the addition of the Conservaflash flashing system and a revised* Bibliography.

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BBA BRITISH BOARD OF AGRÉMENT
TECHNICAL APPROVALS FOR CONSTRUCTION

Ultraframe (UK) Ltd

THE ULTRAFRAME VICTORIAN CONSERVATORY ROOF SYSTEM

Certificate No 96/3261

DETAIL SHEET 4

*Second issue**

Product

- *THIS DETAIL SHEET RELATES TO THE ULTRAFRAME VICTORIAN CONSERVATORY ROOF SYSTEM.*

This Detail Sheet must be read in conjunction with the Front Sheets, which give the product's position regarding the Building Regulations, general information relating to the system, and the Conditions of Certification, *respectively.*

Technical Specification

1 Description

1.1 The Ultraframe Victorian Conservatory Roof System is designed and fabricated by Ultraframe (UK) Ltd for use in the exposure conditions described in this Certificate.

1.2 The roof system is of aluminium construction with white PVC-U internal and external cladding available in the following configurations:

- Victorian/Georgian style (duo pitched) with roof pitches between 15° and 35° (see Figure 1)
- Lean-to (mono pitch) Victorian style with roof pitches between 5° and 30° (see Figure 1)
- Combination 'P' shape (duo and mono pitched combined) achieved through a variable angle valley section (see Figure 1)
- Gable style (see Figure 1).

Victorian/Georgian, Lean-to Victorian and Combination 'P' systems

1.3 Permissible size parameters and configurations are described in the Ultraframe technical manuals; this Certificate relates to roofs used on conservatories not exceeding a floor area of 30 m^2 within these parameters.

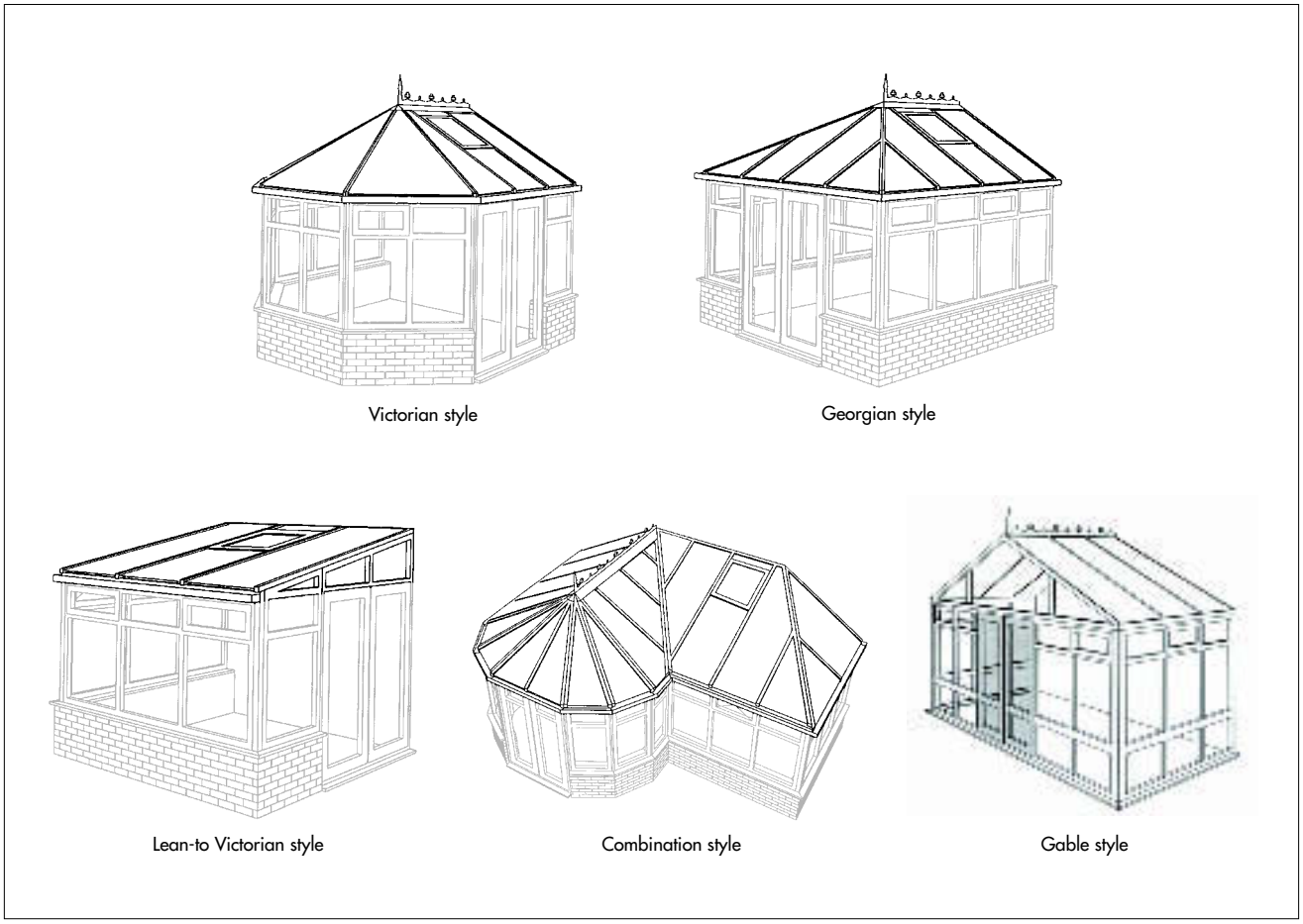
1.4 The full specifications and drawings for the materials and components covered by this Certificate have been examined and are retained by the BBA. This section gives only general details of the system. A complete schedule of the component parts is contained in the Ultraframe technical manuals.

1.5 The roof system (see Figures 6, 7 and 8) consists of a ridge beam member and glazing bar sections extruded from aluminium to BS 1474 : 1987, material designation 6063-T6, glazed with triple- or quadruple-wall polycarbonate panels or double-glazed sealed units. The units are of varying thicknesses, 16, 20, 24 and 28 mm, and Kitemarked to BS 5713 : 1979. An aluminium eaves ring beam is attached to the supporting side wall structure with corner joints fixed with aluminium cleats and zinc-plated screws.

1.6 Glazing bars with PVC-U internal cladding and TPE co-extruded gaskets are attached to the eaves beam and ridge beam member with zinc-plated steel bolts (captive in slots in the ridge and eaves beam aluminium extrusions). Hip bars are clamped onto the die-cast ridge end with Speedlok fixings. Starter glazing bars are attached to the ridge and eaves beams in the same manner as the transom glazing bars. The starter glazing bars are fixed directly to the existing building wall to provide lateral stability to the roof structure.

1.7 Glazing panels or units supported by the glazing bars are located into the ridge system through a PVC-U rain baffle and co-extruded gasket providing a seal against ingress of moisture External PVC-U caps with TPE co-extruded gaskets snap into position on the glazing bars and hold down the roof panels or units, forming a seal between the internal and external gaskets.

Figure 1 Conservatory roofs



1.8 To prevent the ingress of moisture a closed-cell bung is positioned at the ridge end at the intersection of the hip bars and a silicone seal is applied to the joints.

1.9 An external PVC ridge cap with integral ridge flashing trim is positioned on top of the ridge body and is clamped in position from the inside with nylon fixing rods.

1.10 A PVC gutter system is attached to the aluminium eaves beam around the full perimeter of the roof using push-fit brackets. The underside of the gutter is finished off with a PVC trim or dentil moulding options. The internal face of the eaves beam and the ridge beam clad with an internal PVC cladding.

1.11 Use of the Ultraquick ring beam system can give a quicker installation. The integral PVC-U extruded ring beam and gutter combination is reinforced with aluminium and jointed with special sections. A dentil moulding option finishes off the underside between gutter and walling frames.

Gable support system

1.12 The gable support system (see Figure 2) is suitable for Lean-to's and Gable style conservatories and comprises an aluminium extruded lintel across either end of a lean-to or the front of a Gable style conservatory to give increased structural stability and integrity, particularly in designs where double doors are featured in the same elevation.

Figure 2 Gable support system

1.13 The system, which is suitable for 10°–30° for lean-to roofs and 15°–40° for gable roofs pitches, comes complete with infill wedges to aid gable frame manufacturing (by others), PVC-U claddings, PVC-U guttering and down pipe and aluminium corner joints to connect gable beam to eaves beam.

All systems

1.14 An opening roof vent designed to match the glazing bar sections is available if required (see Figure 3).

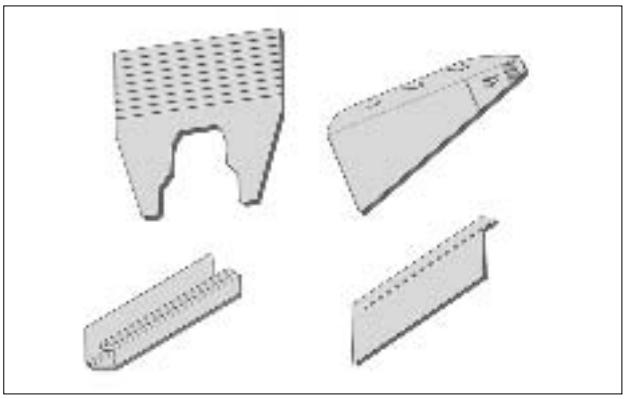
Figure 3 Roof vent

Conservaflash(1) flashing system

1.15 The Conservaflash preformed PVC-U flashing system (see Figure 4) is an alternative to traditional lead flashing.

(1) Registered trademark.

Figure 4 Conservaflash flashing system



1.16 For duo-pitched roofs, stepped flashing panels (left and right) slot into a preformed soaker which is pre-clipped into the starter bar of the roof (see Figure 5). A saddle apron panel and horizontal flashing is used at the apex.

1.17 For lean-to roofs, horizontal flashing panels overlap each other and overhang the lean-to half ridge/wall bracket PVC-U top cladding (see Figure 5).

1.18 Conservaflash may also be used on extensions where the floor area does not exceed 30 m^2, given the appropriate soaker detail. However, this use is outside the scope of this Detail Sheet.

Quality control

1.19 Quality control includes checks on all materials and components, in particular:

- extruded PVC-U profiles

Fabrication of roof system

- extrusions and components (visual inspection)
- overall dimensions.

2 Delivery and site handling

2.1 Conservatory roofs are prefabricated in the Ultraframe factory. Components are marked and numbered to assist assembly. All components are suitably protected and delivered to site by the Certificate holder. Alternatively, fully-assembled roofs can be supplied if required.

2.2 The conservatory roof has a label bearing the company's mark and the BBA identification mark incorporating the number of this Certificate.

2.3 The roof components should be stored under cover in a clean area and suitably protected to avoid distortion or damage.

2.4 The weight of glazing can be calculated, where required for manual handling operations, by reference to the information contained in BS 952-1 : 1995. The weight of the unglazed frame, and its ease of handling, particularly by one person, must also be taken into account when planning site operations.

2.5 When selecting means of access, for example, use of scaffolding, the safety of the operatives, the occupants, and the passers-by, during the period of installation, should be considered.

Figure 5 Flashing panels

duo-pitched roof stepped flashing panels into preformed soaker

lean-to roof horizontal flashing panels

Figure 6 Cross-section through ridge

Figure 7 Ventilated ridge

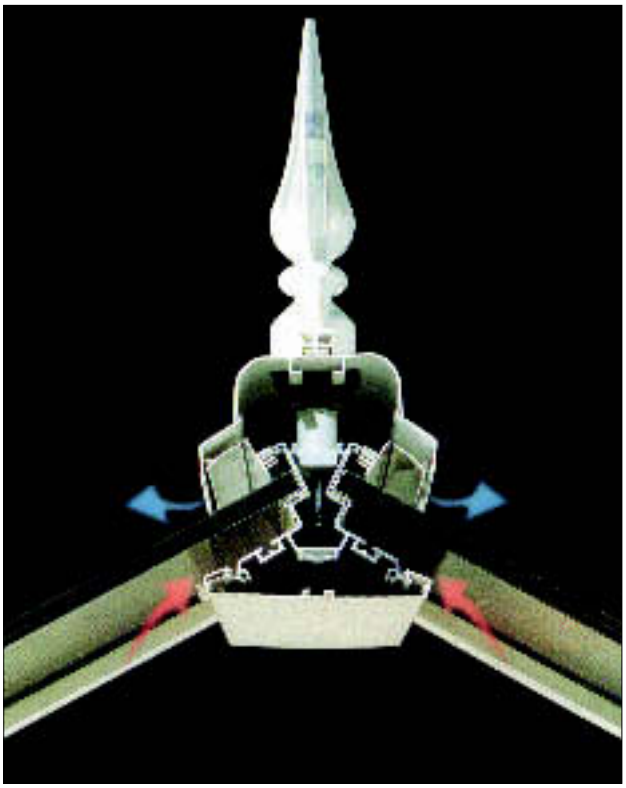
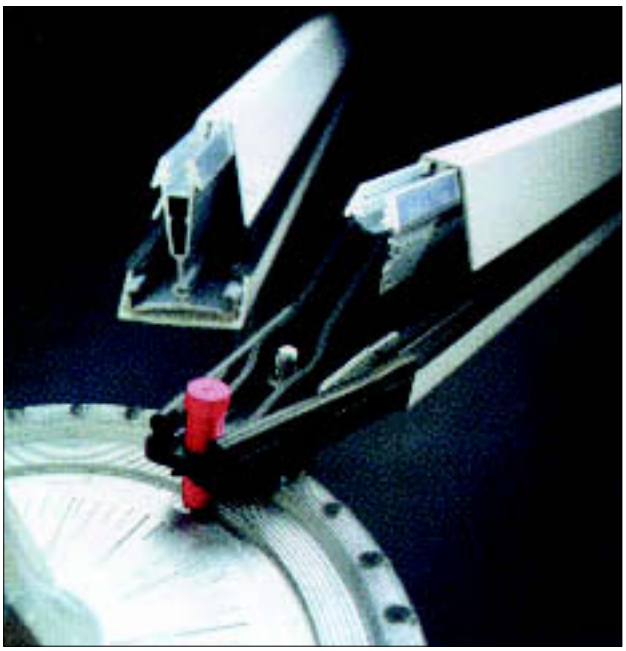


Figure 8 Speedloks clamped to glazing bars, which are fixed to the die-cast ridge end



Design Data

3 Weathertightness

3.1 Selected samples from The Ultraframe Victorian Conservatory Roof System configurations covered by this Certificate were tested for weathertightness. There are no standards or guides applicable to conservatory roofs. Therefore, for the assessment, use was made of BS 6375-1 : 1989 and MOAT No 1 : 1974 giving the results shown in Table 1. The gradings are based on the assumption that the conservatory is installed in accordance with the Ultraframe technical manuals.

Table 1 Weathertightness[1]

	BS 6375-1 Test pressure class (Pa)	MOAT No 1 Grading[2]
Watertightness	300	E_3

(1) A value for air permeability is not given as it will vary depending on the nature of the supporting walling structure.

(2) E_3 indicates water leakage occurring between 300 Pa and 499 Pa.

3.2 To achieve the gradings given in Table 1, particular attention must be paid to the correct fitting of all gaskets and weatherseals, and to the detailing of sealants and flashings.

3.3 The ridge and eaves trickle ventilators will help to equalise the internal and external air pressures.

4 Behaviour in relation to fire

4.1 The tempered safety glass used can be regarded as a non-combustible material and therefore can be taken as having a Class 0 performance rating.

4.2 The polycarbonate sheet used in the conservatory roof has achieved a Class 1 rating when tested to BS 476-7 : 1987 and is therefore classed as a TP(a) rigid thermoplastic. In Table 18 of Approved Document B to the Building Regulations 2000 (as amended) (England and Wales) TP(a) rigid thermoplastics are allowed to be used in conservatory roofs.

4.3 The spread of flame across PVC-U is limited, and in a fire it will tend to char and may fall away. The use of the material in the construction of a conservatory roof would not accelerate the development of a fire.

5 Condensation risk and thermal insulation

In common with all glazed roof structures, temperature reduction under night-time winter sky radiation conditions will lead to the possibility of condensation. However, the effects may be minimised by ridge and eaves ventilators (see Figure 7 for ventilated ridge) and by the use of background heating to maintain the internal temperature between 3°C and 4°C above the external ambient temperature during winter night-time clear sky conditions. The U value of the triple wall polycarbonate roof sheets is calculated to be 2.4 $Wm^{-2}K^{-1}$ using CIBSE *Chartered Institution of Building Services Engineers Guide Book*, Parts A3.5 to A3.7. The glazing bars are assessed as having higher U values and consequently may be subject to occasional winter condensation under severe conditions, though the PVC-U cladding on the aluminium will minimise the effects. In general, if temperatures and humidities within the conservatory are maintained within the normal

domestic band from 10°C to 25°C and from 40% to 65% RH, respectively, any occurrence of condensation will be slight and temporary.

6 Safety

6.1 Where a glass roof is specified, either sealed double-glazed units incorporating toughened safety glass Kitemarked to BS 6206 : 1981, or laminated glass, is used.

6.2 The positioning of the hand-operated controls of the opening vent will comply with the recommendations of BS 8213-1 : 1991.

7 Supporting structure

All supporting side frames incorporating window profile material, ie PVC, timber or aluminium, should be designed in accordance with the relevant British Standards for imposed loadings. The side frames/walls must provide conservatories with overall lateral stability and resistance to axial loading.

8 Durability

8.1 Evidence is available on the performance in the UK of PVC-U similar to that used for the internal and external cladding, over a period of 15 years in windows and in excess of 20 years in other external applications. Such evidence, when compared with the results of tests on the Ultraframe PVC-U, indicates that the conservatory roof will have a life of at least 25 years. Slight colour change or surface dulling may occur within the overall life of the roof.

8.2 Polycarbonate roof sheets, aluminium glazing bars and other components, including the roof vent hinges, locking mechanism and Conservaflash flashing, will have similar durability. Where conservatory roofs are to be installed in areas subject to particularly aggressive conditions, for example, in coastal locations or near sources of industrial pollutants, replacement of components may be necessary within the life of the conservatory roof. Polycarbonate roof sheet replacement may be necessary where prolonged exposure to direct sunlight causes degradation.

8.3 The gaskets and silicone sealant may need to be replaced within the life of the conservatory roof.

Installation

9 Procedure

Victorian/Georgian, Lean-to Victorian and Combination 'P' systems

9.1 The eaves beam is positioned on top and in line with the supporting side frames and secured using the recommended fastener and fixing centres. The corner joints are spliced with aluminium cleats and fixing screws.

9.2 The ridge beam is placed in position and located with the starter glazing bars, hip bars and transom bars. The hip bars with Speedlok fixings are clamped to the die-cast ridge end (see Figure 8), and to the eaves beam by captive bolts located in the eaves beam extrusion. Starter glazing bars and transom bars are attached to the ridge section and to the eaves beam by captive bolts located in the ridge and eaves beam extrusions.

9.3 The starter glazing bars are fixed directly to the existing house wall, using appropriate fixings.

9.4 The roof is glazed with polycarbonate sheets or sealed double-glazed units. Each panel is located into the ridge system between the PVC rain baffle and the co-extruded TPE gasket. External glazing caps with co-extruded TPE gaskets are snapped onto the glazing bars to form a seal against the glazing panel.

9.5 A closed-cell foam bung is positioned at the ridge end of the intersection of the hip bars and a silicone seal is applied to the joints. The PVC ridge cap is clamped into position from inside.

9.6 The installation is completed by fitting such items as trims, ridge cresting, finials, gutters (except for Ultraquick), and downpipes. Rainwater is directed to a suitable soakaway or drain.

Gable support system

9.7 The eaves beam and gable beam are positioned on top of the side frames. The corner joints are fixed with aluminium cleats and fixing screws.

9.8 The eaves beam and gable beam are fixed to the supporting frames using the recommended fasteners and fixing centres.

9.9 Gutter brackets are attached to gable/eaves beam at the recommended spacing and the gutter is clipped into position.

9.10 The gable beam top cladding is attached and the gable window frame is placed centrally on the gable beam and fixed into position with self-tapping screws or recommended fixings for the reinforced gable beam.

9.11 Gable infill wedges are fitted in place and the gable-frame firring top cap placed in position.

9.12 The ridge is centrally located to the gable frame and fixed to the starter bars, which are in turn fixed to the gable window frame.

9.13 The roof is fitted and glazed in the normal manner.

9.14 Finally, cappings, trims and end caps are fitted.

Conservaflash flashing system

9.15 The mortar along the appropriate brick-line is chased out using a grinding wheel.

9.16 The flashing units are installed from the gutter end towards the ridge by slotting into the extruded soaker that is pre-clipped into the starter bar (see Figure 9).

Figure 9 Installation of stepped flashing unit

9.17 For duo-pitched roofs the saddle apron panel and horizontal flashing is installed at the ridge and the joints are sealed with silicone.

9.18 Silicone is used to seal the flashing units in at the wall where the mortar has been chased out.

Technical Investigations

The following is a summary of the technical investigations carried out on The Ultraframe Victorian Conservatory Roof System.

10 Tests

Tests were carried out to determine:

- watertightness
- effect of wind loads
- effect of snow loads
- suitability of materials
- effects of heating due to solar radiation.

11 Investigations

11.1 The manufacturer's design code was examined for compliance with:

- BS 6399-3 : 1988
- CP 3 : Chapter V-2 : 1972
- CP 118 : 1969.

11.2 Computer predictions of structural performance were compared to those obtained from full-scale testing.

11.3 A user survey was conducted to establish the product's ease of installation and performance and durability in service.

Bibliography

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

BS 952-1 : 1995 *Glass for glazing — Classification*

BS 1474 : 1987 *Specification for wrought aluminium and aluminium alloys for general engineering purposes: bars, extruded round tubes and sections*

BS 5713 : 1979 *Specification for hermetically sealed flat double glazing units*

BS 6206 : 1981 *Specification for impact performance requirements for flat safety glass and safety plastics for use in buildings*

BS 6375-1 : 1989 *Performance of windows — Classification for weathertightness (including guidance on selection and specification)*

BS 6399-3 : 1988 *Loading for buildings — Code of practice for imposed roof loads*

BS 8213-1 : 1991 *Windows, doors and rooflights — Code of practice for safety in use and cleaning of windows and doors (including guidance on cleaning materials and methods)*

CP 3 : 1972 *Code of basic data for the design of buildings — Chapter V-2 Loading — Wind loads*

CP 118 : 1969 *The structural use of aluminium*

MOAT No 1 : 1974 *Directive for the Assessment of Windows*

On behalf of the British Board of Agrément

Date of Second issue: 16th September 2003

Chief Executive

**Original Detail Sheet issued on 2nd March 1998. This amended version includes the addition of a new gable support system, a Conservaflash system and a revised* Bibliography.

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TECHNICAL APPROVALS FOR CONSTRUCTION

Ultraframe (UK) Ltd

THE ULTRAFRAME VICTORIAN WOODGRAIN CONSERVATORY ROOF SYSTEM

Certificate No 96/3261

DETAIL SHEET 5
*Second issue**

Product

- *THIS DETAIL SHEET RELATES TO THE ULTRAFRAME VICTORIAN WOODGRAIN CONSERVATORY ROOF SYSTEM.*

This Detail Sheet must be read in conjunction with the Front Sheets, which give the product's position regarding the Building Regulations, general information relating to the system, and the Conditions of Certification, *respectively.*

Technical Specification

1 Description

1.1 The Ultraframe Victorian Woodgrain Conservatory Roof System is designed and fabricated by Ultraframe (UK) Ltd for use in the exposure conditions described in this Certificate.

1.2 The roof system is of aluminium construction with woodgrain PVC-U internal and external cladding available in the following configurations:

- Victorian/Georgian style (duo pitched) with roof pitches between 15° and 35° (see Figure 1)
- Lean-to (mono pitch) Victorian style with roof pitches between 5° and 30° (see Figure 1)
- Combination 'P' shape (duo and mono pitched combined) achieved through a variable angle valley section (see Figure 1)
- Gable style (see Figure 1).

Victorian/Georgian, Lean-to Victorian and Combination 'P' systems

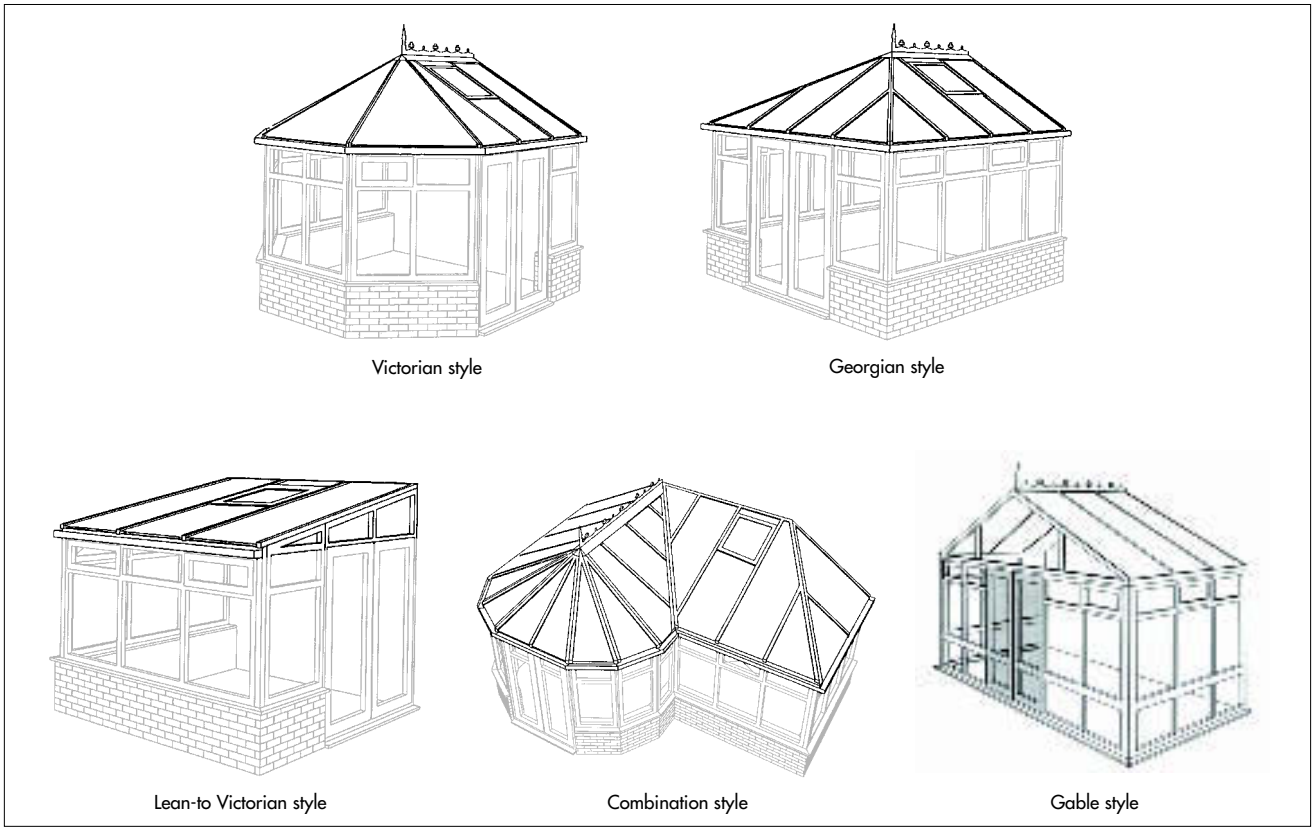
1.3 Permissible size parameters and configurations are described in the Ultraframe technical manuals; this Certificate relates to roofs used on conservatories not exceeding a floor area of 30 m^2 within these parameters.

1.4 The full specifications and drawings for the materials and components covered by this Certificate have been examined and are retained by the BBA. This section gives only general details of the system. A complete schedule of the component parts is contained in the Ultraframe technical manuals.

1.5 The roof system (see Figures 6, 7 and 8) consists of a ridge beam member and glazing bar sections extruded from aluminium to BS 1474 : 1987, material designation 6063-T6, glazed with triple- or quadruple-wall polycarbonate panels or double-glazed sealed units. The units are of varying thicknesses, 16, 20, 24 and 28 mm, and Kitemarked to BS 5713 : 1979. An aluminium eaves ring beam is attached to the supporting side wall structure with corner joints fixed with aluminium cleats and zinc-plated screws.

1.6 Glazing bars with PVC-U internal cladding and TPE co-extruded gaskets are attached to the eaves beam and ridge beam member with zinc-plated steel bolts (captive in slots in the ridge and eaves beam aluminium extrusions). Hip bars are clamped onto the die-cast ridge end with Speedlok fixings. Starter glazing bars are attached to the ridge and eaves beams in the same manner as the transom glazing bars. The starter glazing bars are

Figure 1 Conservatory roofs



fixed directly to the existing building wall to provide lateral stability to the roof structure.

1.7 Glazing panels or units supported by the glazing bars are located into the ridge system through a PVC-U rain baffle and co-extruded gasket providing a seal against ingress of moisture. External PVC-U caps with TPE co-extruded gaskets snap into position on the glazing bars and hold down the roof panels or units, forming a seal between the internal and external gaskets.

1.8 To prevent the ingress of moisture a closed-cell bung is positioned at the ridge end at the intersection of the hip bars and a silicone seal is applied to the joints.

1.9 An external PVC ridge cap with integral ridge flashing trim is positioned on top of the ridge body and is clamped in position from the inside with nylon fixing rods.

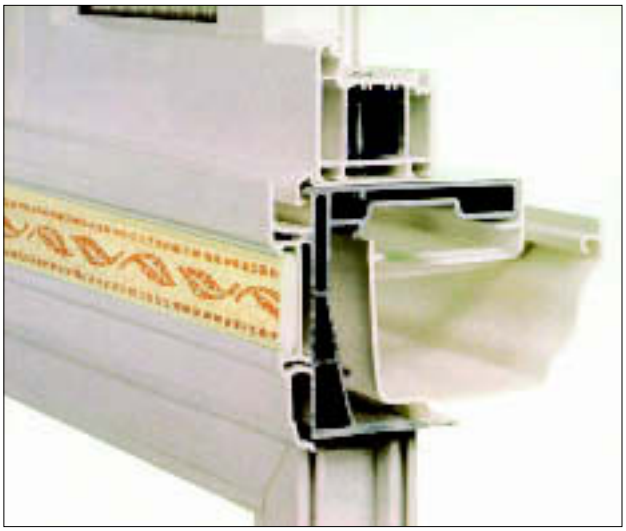
1.10 A PVC gutter system is attached to the aluminium eaves beam around the full perimeter of the roof using push-fit brackets. The underside of the gutter is finished off with a PVC trim or dentil moulding options. The internal face of the eaves beam and the ridge beam are clad with an internal PVC cladding.

1.11 Use of the Ultraquick ring beam system can give a quicker installation. The integral PVC-U extruded ring beam and gutter combination is reinforced with aluminium and jointed with special sections. A dentil moulding option finishes off the underside between gutter and walling frames.

Gable support system

1.12 The gable support system (see Figure 2) is suitable for Lean-to's and Gable style conservatories and comprises an aluminium extruded lintel across either end of a lean-to or the front of a Gable style conservatory to give increased structural stability and integrity, particularly in designs where double doors are featured in the same elevation.

Figure 2 Gable support system



1.13 The system, which is suitable for 10°–30° for lean-to roofs and 15°–40° for gable roofs pitches, comes complete with infill wedges to aid gable frame manufacturing (by others), PVC-U claddings, PVC-U guttering and down pipe and aluminium corner joints to connect gable beam to eaves beam.

All systems

1.14 An opening roof vent designed to match the glazing bar sections is available if required (see Figure 3).

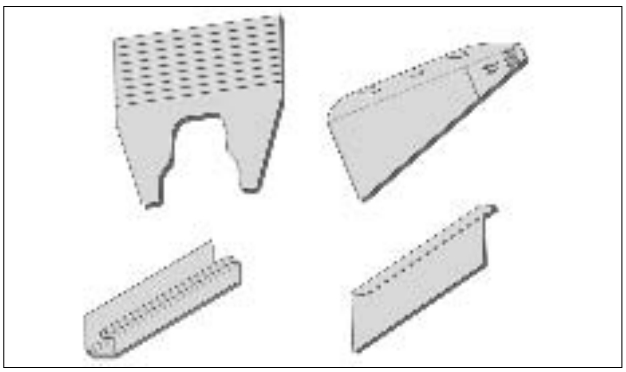
Figure 3 Roof vent

Conservaflash[1] flashing system

1.15 The Conservaflash preformed PVC-U flashing system (see Figure 4) is an alternative to traditional lead flashing.

(1) Registered trademark.

Figure 4 Conservaflash flashing system



1.16 For duo-pitched roofs, stepped flashing panels (left and right) slot into a preformed soaker which is pre-clipped into the starter bar of the roof (see Figure 5). A saddle apron panel and horizontal flashing is used at the apex.

1.17 For lean-to roofs, horizontal flashing panels overlap each other and overhang the lean-to half ridge/wall bracket PVC-U top cladding (see Figure 10).

1.18 Conservaflash may also be used on extensions where the floor area does not exceed 30 m^2, given the appropriate soaker detail. However, this use is outside the scope of this Detail Sheet.

Quality control

1.19 Quality control includes checks on all materials and components, in particular:

- extruded PVC-U profiles

Fabrication of roof system

- extrusions and components (visual inspection)
- overall dimensions.

2 Delivery and site handling

2.1 Conservatory roofs are prefabricated in the Ultraframe factory. Components are marked and numbered to assist assembly. All components are suitably protected and delivered to site by the Certificate holder. Alternatively, fully-assembled roofs can be supplied if required.

2.2 The conservatory roof has a label bearing the company's mark and the BBA identification mark incorporating the number of this Certificate.

2.3 The roof components should be stored under cover in a clean area and suitably protected to avoid distortion or damage.

2.4 The weight of glazing can be calculated, where required for manual handling operations, by reference to the information contained in BS 952-1 : 1995. The weight of the unglazed frame, and its ease of handling, particularly by one person, must also be taken into account when planning site operations.

2.5 When selecting means of access, for example, use of scaffolding, the safety of the operatives, the occupants, and the passers-by, during the period of installation, should be considered.

Figure 5 Flashing panels

duo-pitched roof stepped flashing panels into preformed soaker

lean-to roof horizontal flashing panels

Figure 6 Cross-section through ridge

3 Weathertightness

3.1 Selected samples from The Ultraframe Victorian Woodgrain Conservatory Roof System configurations covered by this Certificate were tested for weathertightness. There are no standards or guides applicable to conservatory roofs. Therefore, for the assessment, use was made of BS 6375-1 : 1989 and MOAT No 1 : 1974 giving the results shown in Table 1. The gradings are based on the assumption that the conservatory is installed in accordance with the Ultraframe technical manuals.

Table 1 Weathertightness[1]

	BS 6375-1 Test pressure class (Pa)	MOAT No 1 Grading[2, 3]
Watertightness	300	E_3
Roof Vent	150	E_2

(1) A value for air permeability is not given as it will vary depending on the nature of the supporting walling structure.

(2) E_2 indicates water leakage occurring between 150 Pa and 299 Pa.

(3) E_3 indicates water leakage occurring between 300 Pa and 499 Pa.

3.2 To achieve the gradings given in Table 1, particular attention must be paid to the correct fitting of all gaskets and weatherseals, and to the detailing of sealants and flashings.

3.3 The ridge and eaves trickle ventilators will help to equalise the internal and external air pressures.

4 Behaviour in relation to fire

4.1 The tempered safety glass used can be regarded as a non-combustible material and therefore can be taken as having a Class 0 performance rating.

4.2 The polycarbonate sheet used in the conservatory roof has achieved a Class 1 rating when tested to BS 476-7 : 1987 and is therefore classed as a TP(a) rigid thermoplastic. In Table 18 of Approved Document B to the Building Regulations 2000 (as amended) (England and Wales) TP(a) rigid thermoplastics are allowed to be used in conservatory roofs.

4.3 The spread of flame across PVC-U is limited, and in a fire it will tend to char and may fall away. The use of the material in the construction of a conservatory roof would not accelerate the development of a fire.

Figure 7 Ventilated ridge

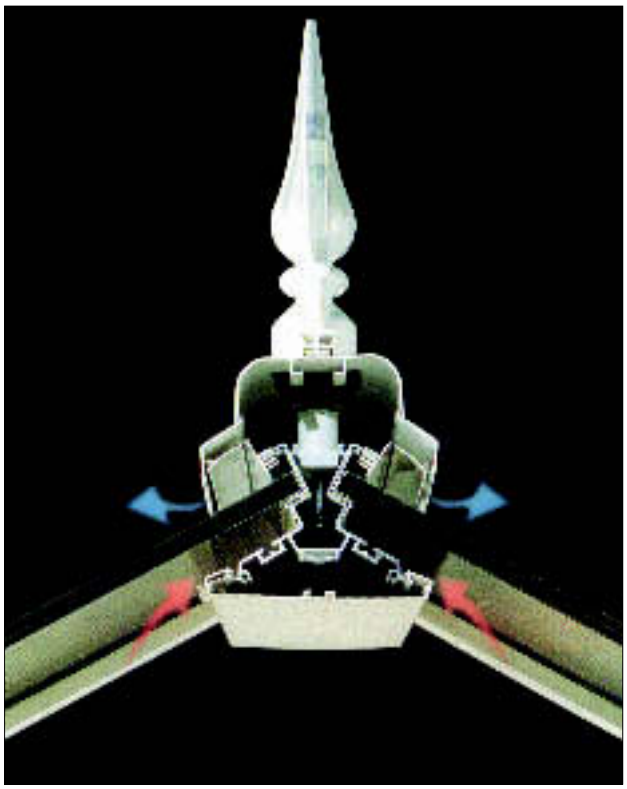
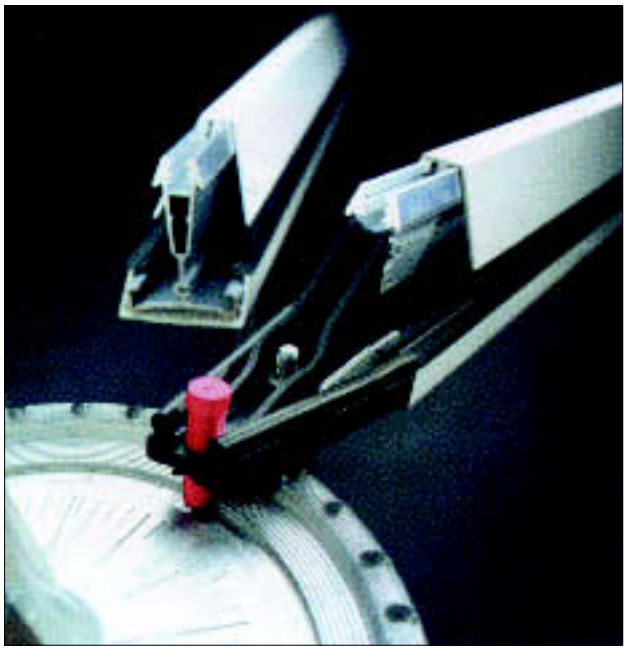


Figure 8 Speedloks clamped to glazing bars, which are fixed to the die-cast ridge end



5 Condensation risk and thermal insulation

In common with all glazed roof structures, temperature reduction under night-time winter sky radiation conditions will lead to the possibility of condensation. However, the effects may be minimised by ridge and eaves ventilators (see Figure 7 for ventilated ridge) and by the use of background heating to maintain the internal temperature between 3°C and 4°C above the external ambient temperature during winter night-time clear sky conditions. The U value of the triple wall polycarbonate roof sheets is calculated to be

2.4 $Wm^{-2}K^{-1}$ using *CIBSE (Chartered Institution of Building Services Engineers) Guide Book,* Parts A3.5 to A3.7. The glazing bars are assessed as having higher U values and consequently may be subject to occasional winter condensation under severe conditions, though the PVC-U cladding on the aluminium will minimise the effects. In general, if temperatures and humidities within the conservatory are maintained within the normal domestic band from 10°C to 25°C and from 40% to 65% RH, respectively, any occurrence of condensation will be slight and temporary.

6 Safety

6.1 Where a glass roof is specified, either sealed double-glazed units incorporating toughened safety glass Kitemarked to BS 6206 : 1981, or laminated glass, is used.

6.2 The positioning of the hand-operated controls of the opening vent will comply with the recommendations of BS 8213-1 : 1991.

7 Supporting structure

All supporting side frames incorporating window profile material, ie PVC, timber or aluminium, should be designed in accordance with the relevant British Standards for imposed loadings. The side frames/ walls must provide conservatories with overall lateral stability and resistance to axial loading.

8 Durability

8.1 Evidence is available on the performance in the UK of PVC-U similar to that used for the internal and external cladding, over a period of 15 years in windows and in excess of 20 years in other external applications. Such evidence, when compared with the results of tests on the Ultraframe PVC-U, indicates that the conservatory roof will have a life of at least 25 years. Slight colour change or surface dulling may occur within the overall life of the roof.

8.2 Polycarbonate roof sheets, aluminium glazing bars and other components, including the roof vent hinges, and locking mechanism, will have similar durability. Where conservatory roofs are to be installed in areas subject to particularly aggressive conditions, for example, in coastal locations or near sources of industrial pollutants, replacement of components may be necessary within the life of the conservatory roof. Polycarbonate roof sheet replacement may be necessary where prolonged exposure to direct sunlight causes degradation.

8.3 The gaskets and silicone sealant may need to be replaced within the life of the conservatory roof.

8.4 Solar heat gain will lead to higher surface temperatures for woodgrain finish roofs in comparison to the white finish. The actual external surface temperature reached will be dependent on a number of factors, including:

- orientation — south facing and 'sun-trap' locations with restricted air movement
- dark woodgrain finishes will reach a higher temperature than lighter shades
- shading by trees or other buildings.

8.5 In addition, to limit the effects of solar heat gain on the internal temperature of the conservatory, the area of opening lights and doors should be considered. As an approximate guide, northerly-facing conservatories should have opening lights or doors of not less than 15% of the floor area, rising to not less than 25% with roof blinds for those of a southerly aspect. This should limit the solar gain temperature rise to less than 12°C for most situations in summertime, using only natural ventilation. Where lower temperature rises are desired, consideration can be given to mechanical forced ventilation. More precise methods of design and solar data are given in *CIBSE Guide Book,* Parts A4 and A6.

8.6 In extreme cases, failure to consider these factors at the survey stage can lead to thermal distortion of capping profiles. For further guidance the Certificate holder should be contacted.

Installation

9 Procedure

Victorian/Georgian, Lean-to Victorian and Combination 'P' systems

9.1 The eaves beam is positioned on top and in line with the supporting side frames and secured using the recommended fastener and fixing centres. The corner joints are spliced with aluminium cleats and fixing screws.

9.2 The ridge beam is placed in position and located with the starter glazing bars, hip bars and transom bars. The hip bars with Speedlok fixings are clamped to the die-cast ridge end (see Figure 8), and to the eaves beam by captive bolts located in the eaves beam extrusion. Starter glazing bars and transom bars are attached to the ridge section and to the eaves beam by captive bolts located in the ridge and eaves beam extrusions.

9.3 The starter glazing bars are fixed directly to the existing house wall using appropriate fixings.

9.4 The roof is glazed with polycarbonate sheets or sealed double-glazed units. Each panel is located into the ridge system between the PVC rain baffle and the co-extruded TPE gasket. External glazing caps with co-extruded TPE gaskets are snapped onto the glazing bars to form a seal against the glazing panel.

9.5 A closed-cell foam bung is positioned at the ridge end of the intersection of the hip bars and a silicone seal is applied to the joints. The PVC ridge cap is clamped into position from inside.

9.6 The installation is completed by fitting such items as trims, ridge cresting, finials, gutters (except for Ultraquick), and downpipes. Rainwater is directed to a suitable soakaway or drain.

Gable support system

9.7 The eaves beam and gable beam are positioned on top of the side frames. The corner joints are fixed with aluminium cleats and fixing screws.

9.8 The eaves beam and gable beam are fixed to the supporting frames using the recommended fasteners and fixing centres.

9.9 Gutter brackets are attached to gable/eaves beam at the recommended spacing and the gutter is clipped into position.

9.10 The gable beam top cladding is attached and the gable window frame is placed centrally on the gable beam and fixed into position with self-tapping screws or recommended fixings for the reinforced gable beam.

9.11 Gable infill wedges are fitted in place and the gable-frame firring top cap placed in position.

9.12 The ridge is centrally located to the gable frame and fixed to the starter bars, which are in turn fixed to the gable window frame.

9.13 The roof is fitted and glazed in the normal manner.

9.14 Finally, cappings, trims and end caps are fitted.

Conservaflash flashing system

9.15 The mortar along the appropriate brick-line is chased out using a grinding wheel.

9.16 The flashing units are installed from the gutter end towards the ridge by slotting into the extruded soaker that is pre-clipped into the starter bar (see Figure 9).

Figure 9 Installation of stepped flashing unit

9.17 For duo-pitched roofs the saddle apron panel and horizontal flashing is installed at the ridge and the joints are sealed with silicone.

9.18 Silicone is used to seal the flashing units in at the wall where the mortar has been chased out.

Technical Investigations

The following is a summary of the technical investigations carried out on The Ultraframe Victorian Woodgrain Conservatory Roof System.

10 Tests

Tests were carried out to determine:

- watertightness
- effect of wind loads
- effect of snow loads
- suitability of materials
- effects of heating due to solar radiation.

11 Investigations

11.1 The manufacturer's design code was examined for compliance with:

- BS 6399-3 : 1988
- CP 3 : Chapter V-2 : 1972
- BS 8118-1 and BS 8118-2 : 1991.

11.2 Computer predictions of structural performance were compared to those obtained from full-scale testing.

11.3 A user survey and site visits were conducted to establish the product's ease of installation and performance and durability in service.

Bibliography

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

BS 952-1 : 1995 *Glass for glazing — Classification*

BS 1474 : 1987 *Specification for wrought aluminium and aluminium alloys for general engineering purposes: bars, extruded round tubes and sections*

BS 5713 : 1979 *Specification for hermetically sealed flat double glazing units*

BS 6206 : 1981 *Specification for impact performance requirements for flat safety glass and safety plastics for use in buildings*

BS 6375-1 : 1989 *Performance of windows — Classification for weathertightness (including guidance on selection and specification)*

BS 6399-3 : 1988 *Loading for buildings — Code of practice for imposed roof loads*

BS 8118-1 : 1991 *Structural use of aluminium — Code of practice for design*
BS 8118-2 : 1991 *Structural use of aluminium — Specification for materials, workmanship and protection*

BS 8213-1 : 1991 *Windows, doors and rooflights — Code of practice for safety in use and cleaning of windows and doors (including guidance on cleaning materials and methods)*

CP 3 : 1972 *Code of basic data for the design of buildings — Chapter V-2 Loading — Wind loads*

MOAT No 1 : 1974 *Directive for the Assessment of Windows*

BBA BRITISH BOARD OF AGRÉMENT
TECHNICAL APPROVALS FOR CONSTRUCTION

On behalf of the British Board of Agrément

Date of Second issue: 16th September 2003

Chief Executive

**Original Detail Sheet issued on 31st March 2000. This amended version includes the addition of a new gable support system, a Conservaflash system and a revised* Bibliography.

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BBA BRITISH BOARD OF AGRÉMENT
TECHNICAL APPROVALS FOR CONSTRUCTION

Ultraframe (UK) Ltd

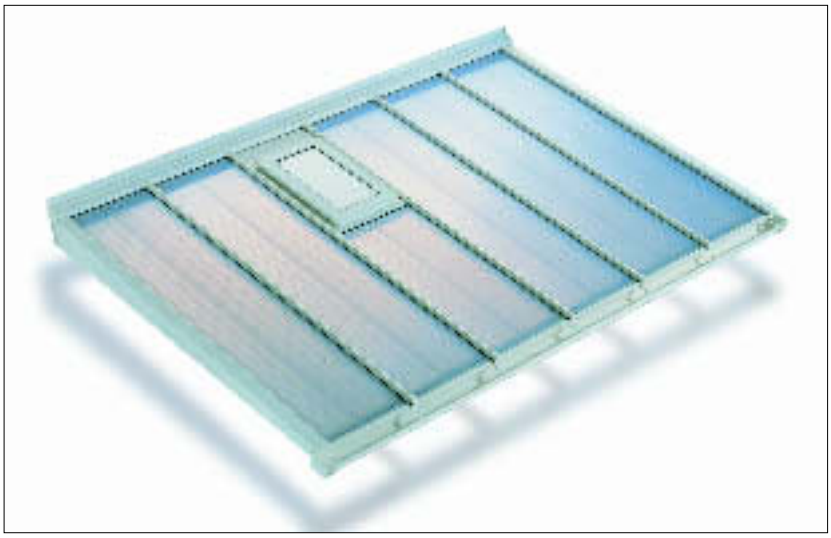
THE ULTRALITE 500 PVC BROWN AND 500 PC WOODGRAIN CONSERVATORY ROOF SYSTEMS

Certificate No 96/3261

DETAIL SHEET 6

*Second issue**

Product



- *THIS DETAIL SHEET RELATES TO THE ULTRALITE 500 PVC BROWN AND 500 PC WOODGRAIN CONSERVATORY ROOF SYSTEMS.*

This Detail Sheet must be read in conjunction with the Front Sheets, which give the product's position regarding the Building Regulations, general information relating to the system, and the Conditions of Certification, *respectively.*

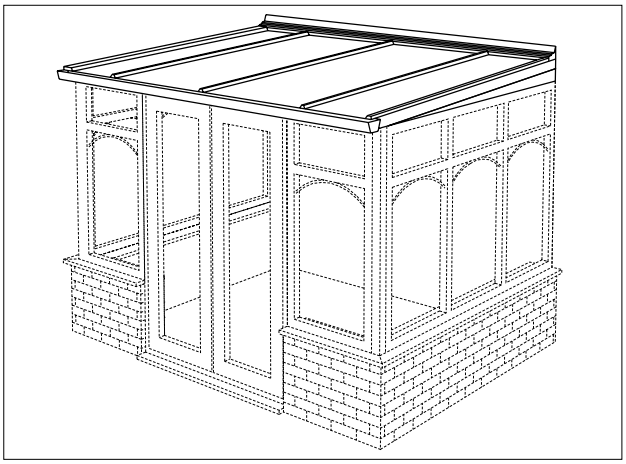
Technical Specification

1 Description

1.1 The Ultralite 500 PVC Brown and 500 PC Woodgrain Conservatory Roof Systems are designed and fabricated by Ultraframe (UK) Ltd for use in the exposure conditions described in this Certificate.

1.2 The roof system is of aluminium and PVC-U construction with PVC or PC (polycarbonate) glazing panels, retained by top capping of brown PVC-U in the 500 PVC system and by woodgrain foiled PVC-U in the 500 PC system. The 2.5° pitch roof is available as a lean-to configuration (see Figure 1).

Figure 1 Ultralite 500 conservatory roof

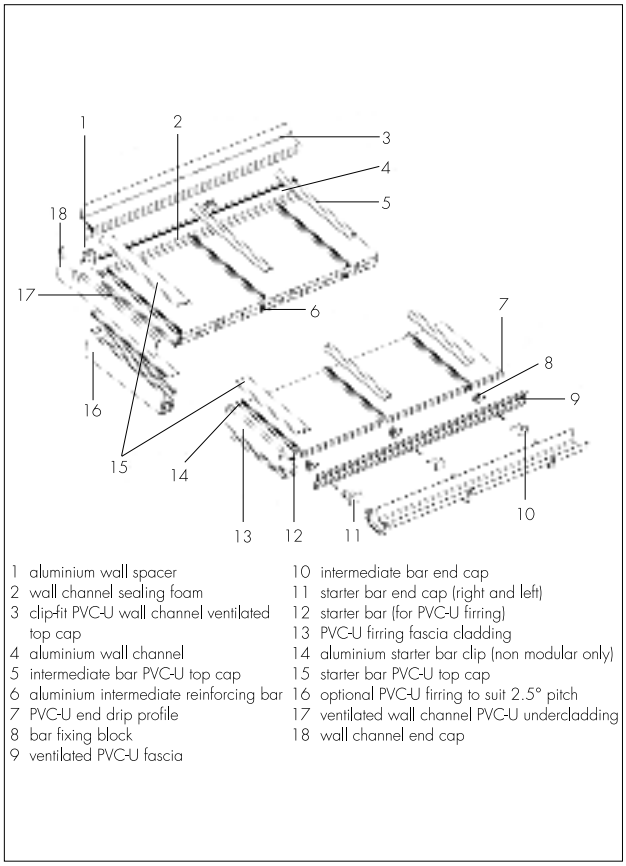


1.3 This Certificate relates to roofs up to 3.5 metres spans used anywhere in the UK and up to 4 metres spans where the negative wind pressure does not exceed 0.75 kNm^{-2}. Within these parameters, the conservatory floor area must not exceed 30 square metres. Larger roof spans over 4 metres (outside the scope of this Certificate) are possible but must be supported by a suitably designed purlin in accordance with relevant British Standards, according to the materials used. Design must include suitable fixing of reinforcing bars to purlin to prevent wind uplift. The size and specification of the purlin should be determined by a qualified person, advice can be sought from the Certificate holder.

1.4 The full specifications and drawings for the materials and components covered by this Certificate have been examined and are retained by the BBA. This section gives only general details of the system. A complete schedule of the component parts is contained in the Ultraframe Technical Manuals.

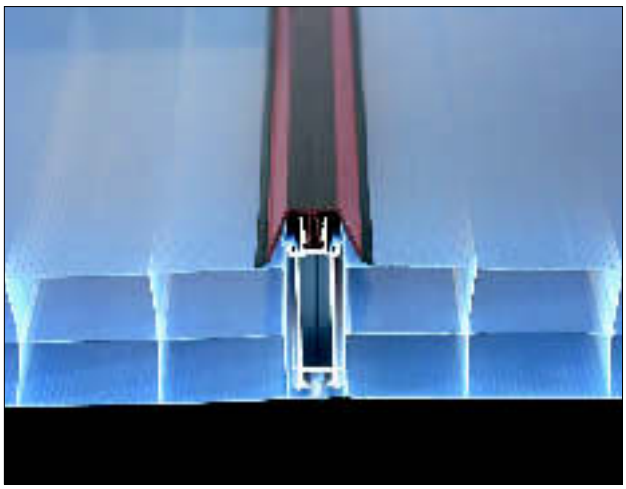
1.5 The roofing system (see Figures 2 and 3) consists of either PVC or polycarbonate multi-walled interlocking panels with co-extruded UV protection layer. The roof system is complete with PVC-U fascia, 2.5° firrings and dedicated gutter kit.

Figure 2 Components (Ultralite 500 PVC Brown)



1 aluminium wall spacer
2 wall channel sealing foam
3 clip-fit PVC-U wall channel ventilated top cap
4 aluminium wall channel
5 intermediate bar PVC-U top cap
6 aluminium intermediate reinforcing bar
7 PVC-U end drip profile
8 bar fixing block
9 ventilated PVC-U fascia
10 intermediate bar end cap
11 starter bar end cap (right and left)
12 starter bar (for PVC-U firring)
13 PVC-U firring fascia cladding
14 aluminium starter bar clip (non modular only)
15 starter bar PVC-U top cap
16 optional PVC-U firring to suit 2.5° pitch
17 ventilated wall channel PVC-U undercladding
18 wall channel end cap

Figure 3 Section through Ultralite 500 PVC Brown



1.6 The glazing panels are joined together by aluminium interlocking reinforcing bar sections extruded from aluminium to BS 1474 : 1987, material designation 6063-T6, with PVC-U external claddings and TPE co-extruded gaskets.

1.7 The glazing panels are located and supported in a ventilated, aluminium wall channel which incorporates an internal PVC-U cladding with a controllable slot ventilator.

1.8 The aluminium reinforcing bars are attached to the supporting wall frames with fixing blocks and screws.

1.9 An opening roof vent is available if required (see Figure 4).

Figure 4 Roof vent

Conservaflash[1] flashing system

1.10 The Conservaflash preformed PVC-U flashing system is an alternative to traditional lead flashing.

(1) Registered trademark.

1.11 Horizontal flashing panels overlap each other and oversail the wall plate PVC-U top cladding (see Figure 5).

Figure 5 Ultralite flashing panels

1.12 Conservaflash may also be used on extensions where the floor area does not exceed 30 m^2, given the appropriate soaker detail. However this use is outside the scope of this Detail Sheet.

Quality control

1.13 Quality control includes checks on all materials and components, in particular:

- extruded PVC-U profiles
- PVC and polycarbonate roof panels

Fabrication of roof system

- extrusions and components (visual inspection)
- overall dimensions.

2 Delivery and site handling

2.1 Conservatory roofs are fabricated in the Ultraframe factory. All components are suitably protected and delivered to site by Ultraframe (UK) Ltd.

2.2 The conservatory roof has a label bearing the company's mark and the BBA identification mark incorporating the number of this Certificate.

2.3 The roof components should be stored under cover in a clean area and suitably protected to avoid distortion or damage.

2.4 The weight of glazing can be calculated, where required for manual handling operations, by reference to the information contained in BS 952-1 : 1995. The weight of the unglazed frame, and its ease of handling, particularly by one person, must also be taken into account when planning site operations.

2.5 When selecting means of access, for example, use of scaffolding, the safety of the operatives, the occupants, and the passers-by, during the period of installation, should be considered.

Design Data

3 Weathertightness

3.1 A sample conservatory roof selected from the Ultralite 500 range covered by this Certificate was tested for weathertightness. There are no standards or guides applicable to conservatory roofs. Therefore, for the assessment, use was made of BS 6375-1 : 1989 and MOAT No 1 : 1974 giving the results shown in Table 1. The gradings are based on the assumption that the conservatory is installed in accordance with the Ultraframe Technical Manuals.

Table 1 Weathertightness[1]

	BS 6375-1 Test pressure class (Pa)	MOAT No 1 Grading[1][2]
Watertightness		
conservatory roof	300	E_3
conservatory roof with roof light fitted	100	E_1

(1) E_1 indicates water leakage occurring between 50 Pa and 150 Pa.
(2) E_3 indicates water leakage occurring between 300 Pa and 499 Pa.

Note: A value for air permeability is not given as it will vary depending on the nature of the supporting walling structure.

3.2 To achieve the gradings given in Table 1, particular attention must be paid to the correct fitting of all gaskets and weatherseals, and to the detailing of sealants and flashings.

3.3 The ventilated wallplate will help to equalise the internal and external air pressures.

4 Behaviour in relation to fire

4.1 The polycarbonate panels used in the conservatory roof have achieved a Class 1 rating when tested to BS 476-7 : 1987 and are therefore classed as TP(a) rigid thermoplastic. In Table 18 of Approved Document B to the Building Regulations 2000 (as amended) (England and Wales) TP(a) rigid thermoplastics are allowed to be used in conservatory roofs.

4.2 The PVC panels used in the conservatory roof have achieved an EXT.F.AAX rating when tested to BS 476-3 : 1958.

4.3 The spread of flame across PVC-U is limited, and in a fire it will tend to char and may fall away. The use of the material in the construction of a conservatory roof would not accelerate the development of a fire.

5 Condensation risk and thermal insulation

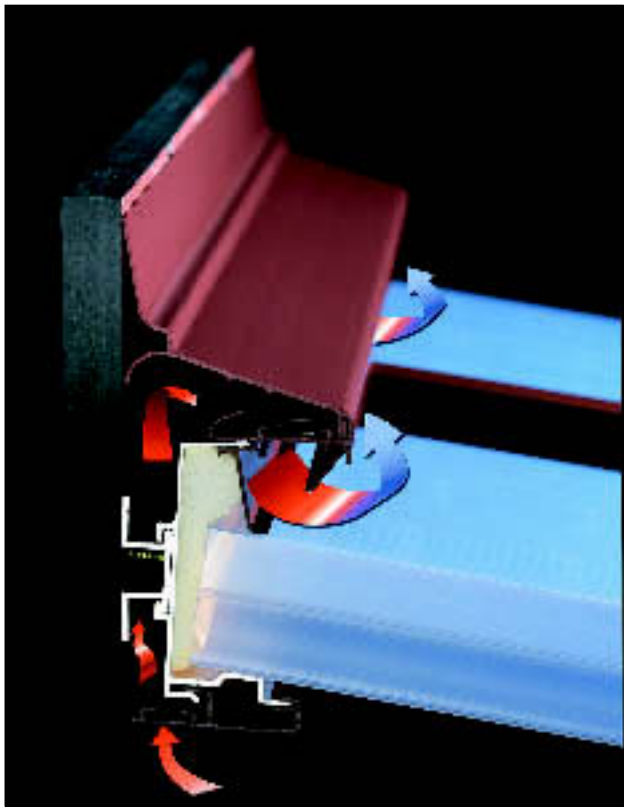
In common with all glazed roof structures, temperature reduction under night-time winter sky radiation conditions will lead to the possibility of condensation. However, the effects may be minimised by the wallplate ventilator (see Figure 6) and by the use of background heating to maintain the internal temperature between 3°C and 4°C above the external ambient temperature during night-time winter clear sky conditions. The U value of the multi-walled roof sheets is calculated to be 1.9 $Wm^{-2}K^{-1}$ for PVC and 1.5 $Wm^{-2}K^{-1}$ for polycarbonate, using BS 6993-1 : 1989 and CIBSE *Chartered Institution of Building Services Engineers Guide Book,* Parts A3.5 to A3.7. The glazing bars are assessed as having higher U values and consequently may be subject to occasional winter condensation under severe conditions, though the PVC-U cladding on the aluminium will minimise the effects. In general, if temperatures and humidities within the conservatory are maintained within the normal domestic band from 10°C to 25°C and from 40% to 65% RH, respectively, any occurrence of condensation will be slight and temporary.

6 Safety

6.1 If access to the roof is required for maintenance purposes, timber crawling boards must be placed across the roof panels.

6.2 The positioning of the hand-operated controls of the opening vent will comply with the recommendations of BS 8213-1 : 1991.

Figure 6 Trickle ventilation



7 Supporting structure

All supporting side frames incorporating window profile material, ie PVC, timber or aluminium, should be designed in accordance with the relevant British Standards for imposed loadings. The side frames/walls must provide conservatories with overall lateral stability and resistance to axial loading.

8 Durability

8.1 Evidence is available on the performance in the UK of white, brown and woodgrain PVC-U similar to that used for the internal and external cladding, over a period of 15 years in windows and in excess of 20 years in other external applications. Such evidence, when compared with the results of tests on the Ultraframe PVC-U, indicates that the conservatory roof will have a life of at least 25 years. Slight colour change or surface dulling of brown PVC-U may occur within the life of the roof. Woodgrain foiled PVC-U components will, in general, exhibit less colour change than brown PVC-U, provided that the acrylic lacquer is undamaged.

8.2 Aluminium reinforcing bars and other components, including the roof vent hinges, and locking mechanism, will have similar durability. Where conservatory roofs are to be installed in areas subject to particularly aggressive conditions, for example, in coastal locations or near sources of industrial pollutants, replacement of components may be necessary within the life of the conservatory roof.

8.3 In most UK situations it is unlikely that replacement of the PVC or polycarbonate glazing panels will be necessary within the lifetime of the conservatory. In south-facing situations where prolonged exposure to direct sunlight is likely to occur, consideration should be given to the use of polycarbonate glazing panels which have a greater resistance to ultraviolet degradation than PVC glazing panels.

8.4 The gaskets and silicone sealant may need to be replaced within the life of the conservatory roof.

8.5 Solar heat gain will lead to higher surface temperatures for brown PVC-U and woodgrain finish roofs in comparison to a white finish. The actual external surface temperature reached will be dependent on a number of factors, including:

- orientation — south facing and 'sun-trap' locations with restricted air movement
- brown PVC-U and dark woodgrain finishes will reach a higher temperature than lighter shades
- shading by trees or other buildings.

8.6 In addition, to limit the effects of solar heat gain on the internal temperature of the conservatory, the area of opening lights and doors should be considered. As an approximate guide, northerly facing conservatories should have opening lights or doors of not less than 15% of the floor area, rising to not less than 25% with roof blinds for those of a southerly aspect. This should limit the solar gain temperature rise to less than 12°C for most situations in summertime, using only natural ventilation. Where lower temperature rises are desired, consideration can be given to mechanical forced ventilation. More precise methods of design and solar data are given in *CIBSE Guide Book*, Parts A4 and A6.

8.7 In extreme cases, failure to consider these factors at the survey stage can lead to thermal distortion of capping profiles. For further guidance, the Certificate holder should be contacted.

Installation

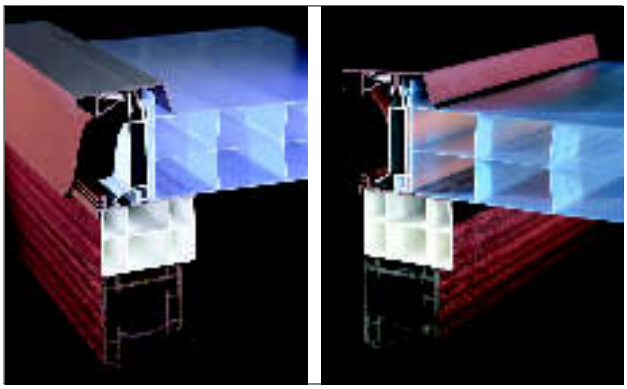
9 General

Each Ultralite 500 PVC Brown and 500 PC Woodgrain Conservatory Roof System is supplied with detailed fitting instructions.

10 Procedure (see Figures 2 and 3)

10.1 Pre-cut 2.5° PVC-U firrings are trimmed and fixed (see Figure 7).

Figure 7 Firrings



10.2 The ventilated wall channel and spacers are fixed to an external wall horizontally, using recommended fasteners and fixing centres.

10.3 Glazing panels are laid between the ventilated wall channel and the supporting side wall structure and an aluminium reinforcing bar is slid in at the interlocking detail of the panels along their length. All panels and glazing bars are fitted in this manner and fixed as recommended.

10.4 External PVC-U glazing caps with co-extruded TPE gaskets are snapped onto the reinforcing bar to form a seal against the panel.

10.5 The external PVC-U wall channel top cover is pushed into position, and lead flashing is dressed over at the abutment of the roof to the external wall.

10.6 Silicone is applied in accordance with fitting instructions.

10.7 The installation is completed by fitting such items as PVC-U trims, caps and gutters. Rainwater is directed to a suitable soakaway or drain.

Conservaflash flashing system

10.8 The mortar along the appropriate brick-line is chased out using a grinding wheel.

10.9 The flashing units are installed from gutter end towards opposite gutter end by slotting into the extruded soaker that is pre-clipped into the starter bar.

10.10 Silicone is used to seal the horizontal flashing units in at the wall where the mortar has been chased out.

Technical Investigations

The following is a summary of the technical investigations carried out on the Ultralite 500 PVC Brown and 500 PC Woodgrain Conservatory Roof Systems.

11 Tests

Tests were carried out to determine:

- watertightness
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- suitability of materials
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Bibliography

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

BS 952-1 : 1995 *Glass for glazing — Classification*

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BS 6375-1 : 1989 *Performance of windows — Classification for weathertightness (including guidance on selection and specification)*

BS 6399-3 : 1988 *Loading for buildings — Code of practice for imposed roof loads*

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BS 8118-1 : 1991 *Structural use of aluminium — Code of practice for design*
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BS 8213-1 : 1991 *Windows, doors and rooflights — Code of practice for safety in use and cleaning of windows and doors (including guidance on cleaning materials and methods)*

CP 3 *Code of basic data for the design of buildings* : Chapter V-*2 : 1972 Loading — Winds loads*

CP 118 : 1969 *The structural use of aluminium*

MOAT No 1 : 1974 *Directive for the Assessment of Windows*

BBA BRITISH BOARD OF AGRÉMENT
TECHNICAL APPROVALS FOR CONSTRUCTION

On behalf of the British Board of Agrément

Date of Second issue: 16th September 2003 Chief Executive

**Original Detail Sheet issued 21st December 2001. This amended version includes the addition of the Conservaflash flashing system and a revised* Bibliography.

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