



Wendland Roof Solutions

Wendland House
Olympus Park
Quedgeley
Gloucestershire GL2 4NF

Tel: 08704 207900 Fax: 08704 207901
e-mail: info@wendland.uk.com
website: www.wendland.uk.com

**Agrément
Certificate
No 98/3532**
*Third issue**

Designated by Government
to issue
European Technical
Approvals

WENDLAND CONSERVATORY ROOF SYSTEMS

Système de serre
Gewächshausystem

Product




• THIS CERTIFICATE RELATES TO WENDLAND 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
Standard: J7.1
Comment:

Conservation of fuel and power
Conservatories

Glazing (including frames) for conservatories above 8 m² but under 30 m² may have a U value not more than 3.3 Wm⁻²K⁻¹. See the tinted area in the *Condensation risk and thermal insulation* section of the accompanying Detail Sheet(s).

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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* (2.1 and 2.3 to 2.5) of the accompanying Detail Sheets.

Design Data

5 Strength and stability

5.1 The design of Wendland Conservatory Roof Systems is based on BS 6399-3 : 1988, BS 8118-1 : 1991, CP 3 : Chapter V-2 : 1972 and on comprehensive calculations prepared by a consulting engineer and verified by the BBA. Information required⁽¹⁾ to carry out a design includes:

- roof type
- site location (to evaluate wind and snow loads)
- glazing material
- span
- roof pitch

(1) The data is used to establish the glazing bar profiles required and to decide whether tie bars are necessary.

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

5.3 The appropriate wind and snow loads should be calculated in accordance with the relevant part of BS 6399. The manufacturer's design covers snow loads of 0.75 kNm⁻². In all cases, it is assumed that the wind pressure will not exceed these snow loadings. These loads cover the majority of sites in the UK. Where wind loads are outside of this range the advice of the Certificate holder's technical department should be sought.

5.4 The basic acceptance criteria for the design are as follows:

- aluminium sections to BS 8118-1 : 1991
- deflection limited to span/175 for glazed roofs
- deflection limited to span/115 for polycarbonate roof.

5.5 It is assumed that the supporting structure will have adequate rigidity. This aspect is outside the scope of the Certificate.

5.6 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.

6 Ventilation and solar heat gain

6.1 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 1.5% of the floor area, rising to not less than 2.5% 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.

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6.6 To reduce the effects of solar heat gain on the internal temperature of the conservatory, blinds can be fitted 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.

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 Wendland Roof Solutions 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. Abrasive cleaners should not be used, particularly on woodgrain finishes as the loss of the acrylic lacquer will have a serious effect on durability.

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 to white profiles 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 Wendland Roof Solutions.

9.7 The roof panels can be replaced, if damaged, by removal of the glazing bar top capping. 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 Wendland Roof Solutions 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 30° 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 : 1999 and Zurich Building Guarantees Technical Standards, Section 2, 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*

BS 8118-1 : 1991 *Structural use of aluminium — Code of practice for design*

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

Conditions of Certification

12 Conditions

12.1 This Certificate:

- (a) relates only to the product that is named, 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) is valid only within the UK;
- (d) has to be read, considered and used as a whole document — it may be misleading and will be incomplete to be selective;
- (e) is copyright of the BBA;
- (f) is subject to English law.

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, are 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 fabrication including all related and relevant processes 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 as and when deemed appropriate by the BBA under arrangements that it will determine; and

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

12.4 In granting this Certificate, the BBA is not responsible for:

- (a) the presence or absence of any patent, intellectual property 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 actual works in which the product is installed, used and maintained, including the nature, design, methods and workmanship of such works.

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.



In the opinion of the British Board of Agrément, Wendland Conservatory Roof Systems are fit for their intended use provided they are installed, used and maintained as set out in this Certificate. Certificate No 98/3532 is accordingly awarded to Wendland Roof Solutions.

On behalf of the British Board of Agrément

Date of Third issue: 23rd December 2004

Chief Executive

**Original Certificate issued on 25th February 1999. This amended version issued to include a change of Certificate holder's name, address, telephone and facsimile numbers, new CDM Regulations and Conditions of Certification and a revised list of Associated Detail Sheets.*

Associated Detail Sheets

The following Detail Sheets are part of this Certificate:

Detail Sheet	Edition	Date of issue	No of pages	Imprint ref	Title	System status
2	3	23rd December 2004	8	03GWC2	The Wendland Styl Conservatory Roof System	Current
3	3	23rd December 2004	8	03GWC3	The Wendland Styl Low Pitch Lean-To Conservatory Roof System	Current



Product



- THIS DETAIL SHEET RELATES TO THE WENDLAND STYAL 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 Wendland Styal Conservatory Roof System is designed by Wendland Roof Solutions and fabricated by the Certificate holder for use in the exposure conditions described in this Certificate.

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

- Victorian/Edwardian style (duo pitched) with roof pitches between 15° and 30° (see Figures 1 and 2).
- Lean-to (mono pitch) style with roof pitches between 5° and 30° (see Figure 3).
- Combination 'P' shape (duo and mono pitched combined) achieved through a variable angle valley section (see Figure 4).

1.3 Permissible size parameters and configurations are described in the Wendland Roof Solutions technical manuals; this Certificate relates to roofs used on conservatories not exceeding a floor area of 30 m² 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 *Wendland Roof Solutions Technical Manual*.

Figure 1 Victorian style conservatory roof

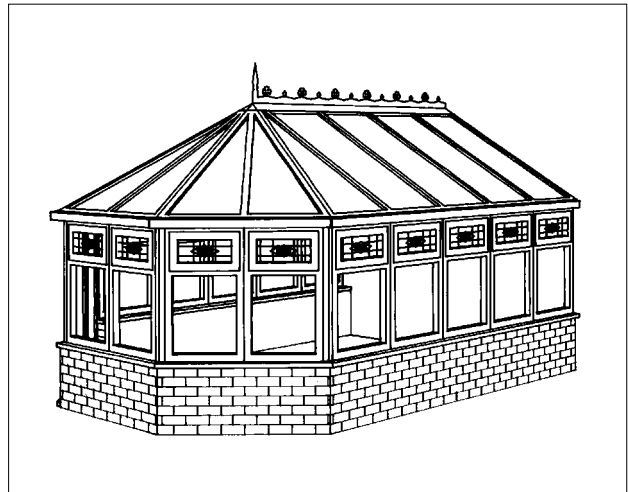
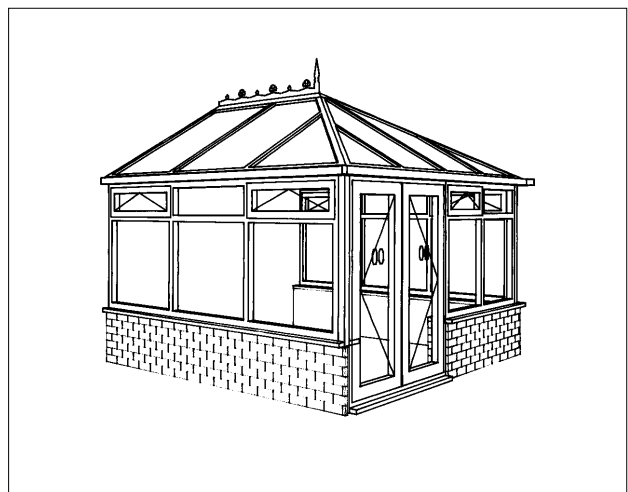


Figure 2 Edwardian style conservatory roof



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Figure 3 Lean-to style conservatory roof

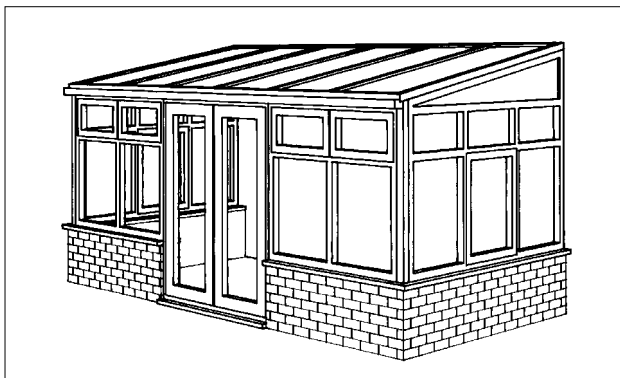
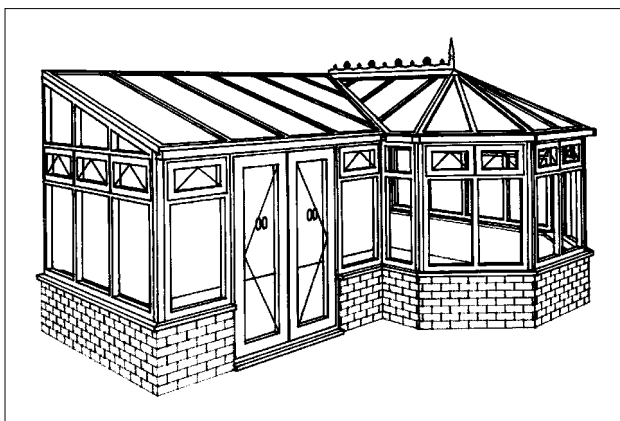


Figure 4 Combination style conservatory roof



1.5 The roof system (see Figures 6 and 7) consists of a ridge beam member and glazing bar sections extruded from aluminium to BS EN 755-2 : 1997⁽¹⁾, material designation 6063-T6, glazed with 3 wall (16 mm), 4 or 6 wall (25 mm, 32 mm and 40 mm) diagonal structure polycarbonate panels or (24 mm) double-glazed sealed units that carry the BSI Kitemark to BS 5713 : 1979. A PVC-U eaves beam with aluminium reinforcing is attached to the supporting side wall structure with corner joints fixed with aluminium cleats and zinc-plated screws. An aluminium swivel profile is located in the PVC-U eaves beam.

(1) Supersedes BS 1474 : 1987.

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 swivel aluminium extrusions). Hip bars are fixed onto the die-cast ridge end with spider fixings. Gable end glazing bars are attached to the ridge and eaves beams in the same manner as the transom glazing bars. The gable end 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 glazing pocket with a 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 External PVC-U ridge capping and ASA/ABS crown capping are snapped into position on top of the ridge body and are finished off with a cast aluminium cresting and finial. The internal side of the ridge is covered with a PVC-U ridge bottom capping.

1.10 A PVC-U gutter system is attached to the PVC-U eaves beam around the full perimeter of the roof using clip-in brackets.

1.11 Use of the integral ring beam system can give a quicker installation. The integral PVC-U extruded ring beam and gutter combination is reinforced with aluminium and is attached to the supporting side wall structure.

1.12 An opening roof vent designed to match the glazing bar sections is available if required (see Figure 5).

Figure 5 Roof vent



Quality control

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

- extruded aluminium profiles
- extruded PVC-U profiles
- other components.

1.14 Fabrication of the roof system includes visual inspection of:

- extruded aluminium profiles
- PVC-U profiles
- components
- and checks on overall dimensions.

2 Delivery and site handling

2.1 Conservatory roofs are prefabricated in the Certificate holder's factory. Components are marked and numbered to assist assembly. All components are suitably protected and delivered to site by the Certificate holder.

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 Selected samples from the Wendland Styl 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 *Wendland Roof Solutions Technical Manual*.

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) E₃ 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.

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. These effects may be minimised by the use of background heating to maintain the internal temperature between 3°C and 4°C above the external ambient temperature. The U values of the polycarbonate roof sheets and the central area of the double-glazed units are given in Table 2. The linear thermal transmittance of typical glazing rafters (90 mm unreinforced PVC-U capped in conjunction with 25 mm polycarbonate sheeting) has been calculated as approximately 0.40 Wm⁻²K⁻¹ and, therefore, has a higher U value than the glazing. Consequently, the rafters, and the adjacent areas of glazing, will have a higher risk of condensation than the central area of glazing. In general, if the temperature and humidity within the conservatory are maintained within the normal domestic banding of 10°C to 25°C and 40% to 65% RH, any occurrence of condensation will be slight and temporary.

Table 2 U values of glazing

Glazing type	Value (Wm ⁻² K ⁻¹)
4/16/4 mm double-glazed units ⁽¹⁾	3.4
16 mm triple wall polycarbonate sheeting ⁽²⁾	2.5
25 mm four wall polycarbonate sheeting ⁽²⁾	1.8
32 mm structural polycarbonate sheeting	1.6
40 mm structural polycarbonate sheeting	1.5

(1) In accordance with EN 673 : 1997.

(2) By numerical modelling.

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.

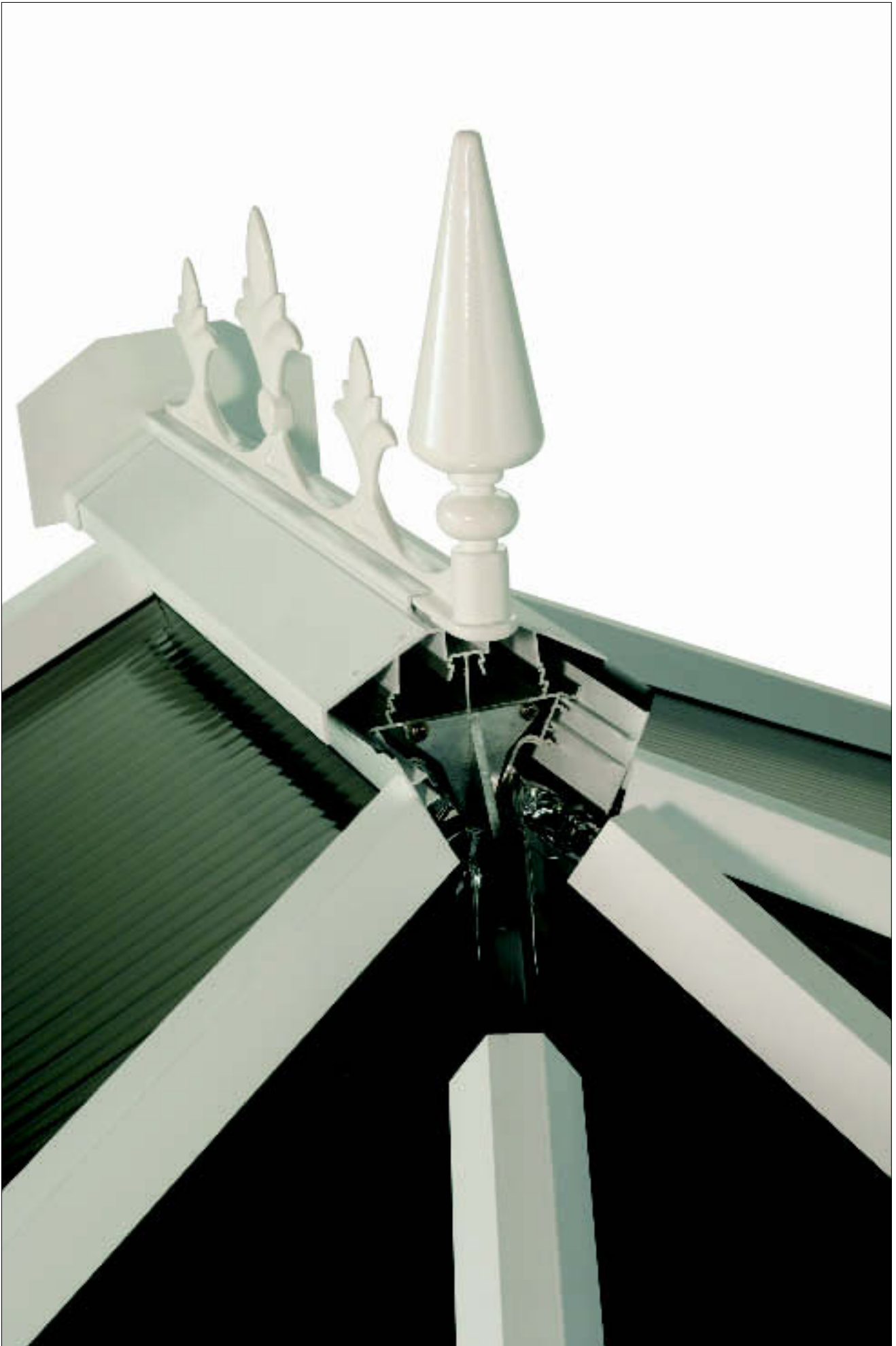
6.2 The positioning of the hand-operated controls of the opening vent will comply with the recommendations of BS 8213-1 : 1991.

7 Supporting structure

All supporting side frames incorporating window profile material, ie PVC-U, 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.

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Figure 6 Cross-section through ridge



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 Wendland 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. Replacement of polycarbonate roof sheets and sealed double-glazed units 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⁽¹⁾, 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.

(1) 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.

8.5 Woodgrain finish conservatory roofs include some paint coated components. These may require re-painting within the overall life of the roof where prolonged exposure to direct sunlight or atmospheric agents causes degradation. Only paints recommended by the Certificate holder should be used.

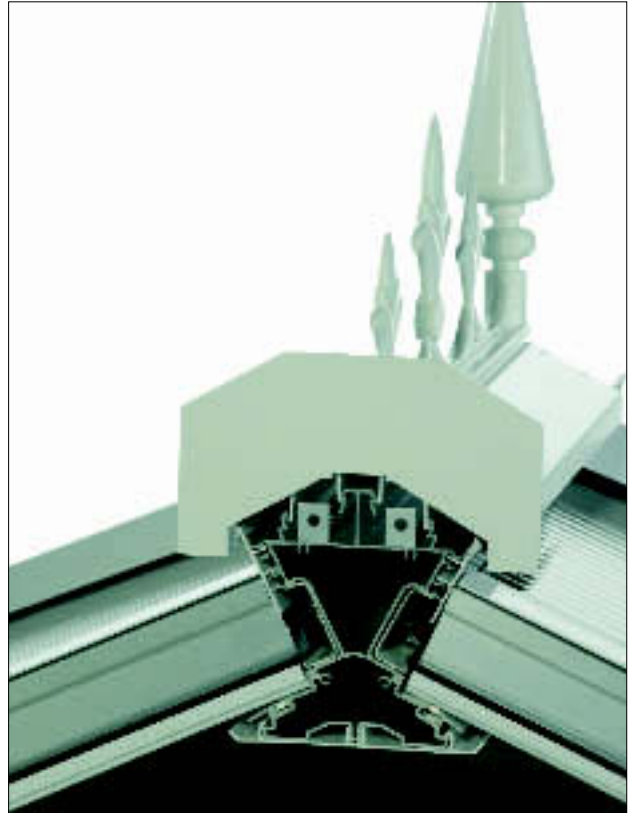
Installation

9 Procedure

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 gable end glazing bars, hip bars and transom bars. The hip bars with spider fixings are pinned to the die-cast ridge end (see Figure 7), and to the eaves beam by captive bolts located in the eaves beam swivel extrusion. Gable end 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 swivel extrusions.

Figure 7 Detail at ridge/hip junctions



9.3 The gable end 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 through a PVC-U glazing pocket with a 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-U ridge capping is snapped into position from the outside.

9.6 Lead flashing is fitted at the abutment of the roof to the house wall.

9.7 The installation is completed by fitting such items as trims, ridge cresting, finials, gutters (except for the integral ring beam system), and downpipes. Rainwater is directed to a suitable soakaway or drain.

Technical Investigations

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

10 Tests

Tests were carried out to determine:

- watertightness (rain and wind)
- effect of wind loads
- effect of snow loads
- static load
- suitability of materials
- effects of heating due to solar radiation.

11 Investigations

11.1 The manufacturer's technical manual was examined for compliance with:

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

11.2 Confirmatory calculations were carried out to verify section properties and glazing bar design charts.

11.3 Independent design calculations were carried out on typical roof designs to verify design methodology.

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

11.5 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 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)*

BS EN 755-2 : 1997 *Aluminium and aluminium alloys — Extruded rod/bar, tube and profiles — Mechanical properties*

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

EN 673 : 1997 *Glass in building — Determination of thermal transmittance (U value) — Calculation method*

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



On behalf of the British Board of Agrément

Date of Third edition: 23rd December 2004

A handwritten signature in black ink, appearing to read 'P. C. Hewitt'.

Chief Executive

Electronic Copy

British Board of Agrément

P O Box No 195, Bucknalls Lane
Garston, Watford, Herts WD25 9BA
Fax: 01923 665301

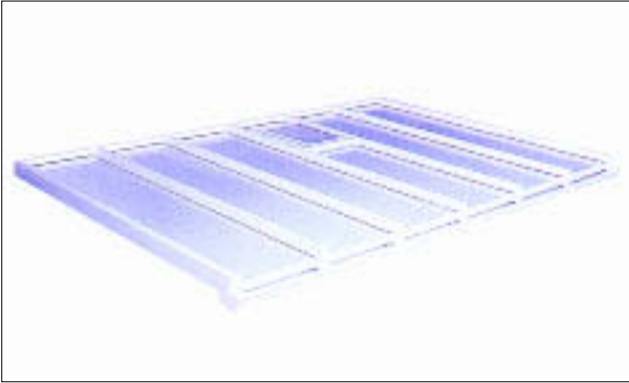
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website: www.bbacerts.co.uk



For technical or additional information,
contact the Certificate holder (see
front page).
For information about the Agrément
Certificate, including validity and
scope, tel: Hotline 01923 665400,
or check the BBA website.

Product



• THIS DETAIL SHEET RELATES TO THE WENDLAND STYAL LOW PITCH LEAN-TO 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 Wendland Styal Low Pitch Lean-to Conservatory Roof System is designed and fabricated by the Certificate holder for use in the exposure conditions described in this Certificate.

1.2 The roof system is of aluminium and white or woodgrain PVC-U construction with polycarbonate glazing panels or double-glazed sealed units. The 2.5° to 5° pitch roof is available as a lean-to configuration (see Figure 1).

Figure 1 The Wendland Styal Low Pitch Lean-to Conservatory Roof



1.3 This Certificate relates to roofs up to 3.5 m spans used anywhere in the UK and up to 4 m spans where the negative wind pressure does not exceed 0.75 kNm⁻². Within these parameters, the conservatory floor area must not exceed 30 m². Larger roof spans

over 4 m (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 rafter 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 Wendland Roof Solutions.

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 *Wendland Roof Solutions Technical Manual*.

1.5 The roofing system (see Figures 2 and 3) consists of either double-glazed sealed units that carry the BSI Kitemark to BS 5713 : 1979 or polycarbonate multi-walled panels with co-extruded UV protection layer. The roof system is complete with an integral ring beam gutter and/or an eaves beam with add on gutter.

Figure 2 Components of the Wendland Styal Low Pitch Lean-to conservatory roof



Figure 3 Section through the Wendland Styl Low Pitch Lean-to conservatory roof



1.6 The glazing panels are supported by aluminium rafter sections extruded from aluminium to BS EN 755-2 : 1997⁽¹⁾, material designation 6063-T6, and retained in position with PVC-U external cappings with TPE co-extruded gaskets.

(1) Supersedes BS 1474 : 1987.

1.7 The glazing panels are located and supported in an aluminium wall ridge which incorporates a glazing pocket.

1.8 The aluminium ring beam gutter reinforcer is attached to the supporting wall frames with screws. The aluminium rafters are attached to the ring beam reinforcer with rafter fixing plates and nuts.

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

Figure 4 Roof vent



Quality control

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

- extruded aluminium profiles
- extruded PVC-U profiles
- other components.

1.11 Fabrication of the roof system includes visual inspection of:

- extruded aluminium profiles
- PVC-U profiles
- components
- and checks on overall dimensions.

2 Delivery and site handling

2.1 Conservatory roofs are fabricated in the Wendland Roof Solutions factory. All components are suitably protected and delivered to site by Wendland Roof Solutions.

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, use of scaffolding and the safety of the operatives, occupants and passers-by during the period of installation should be considered.

Design Data

3 Weathertightness

3.1 A sample conservatory roof selected from the Wendland Styl Low Pitch Lean-to 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 *Wendland Roof Solutions Technical Manual*.

Table 1 Weathertightness

	BS 6375-1 Test pressure class (Pa)	MOAT No 1 Grading ⁽¹⁾⁽²⁾
Watertightness		
conservatory roof	300	E ₃
rooflight	200	E ₂

(1) E₂ indicates water leakage occurring between 150 Pa and 299 Pa.

(2) E₃ 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.

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 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 nighttime winter sky radiation conditions will lead to the possibility of condensation. These effects may be minimised by the use of background heating to maintain the internal temperature between 3°C and 4°C above the external ambient temperature. The U values of the polycarbonate roof sheets are given in Table 2. The linear thermal transmittance of typical glazing rafters (90 mm unreinforced PVC-U capped in conjunction with 25 mm polycarbonate sheeting) has been calculated as approximately 0.40 Wm⁻²K⁻¹ and, therefore, has a higher U value than the glazing. Consequently the rafters and the adjacent areas of glazing, will have a higher risk of condensation than the central area of glazing. Any occurrence of condensation will be slight and temporary provided the temperature and humidity within the conservatory are maintained within the normal domestic banding of 10°C to 25°C and 40% to 65% RH, which may require the use of ventilation via the rooflight.

Table 2 U values — glazing

Glazing type	Value (Wm ⁻² K ⁻¹)
25 mm four wall polycarbonate sheeting ⁽¹⁾	1.9
40 mm structural polycarbonate sheeting ⁽¹⁾	1.5

(1) By numerical modelling.

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 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 Wendland 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. Replacement of polycarbonate roof sheets and sealed

double-glazed units 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⁽¹⁾, 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.

(1) 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.

8.5 Woodgrain finish conservatory roofs include some paint coated components. These may require re-painting within the overall life of the roof where prolonged exposure to direct sunlight or atmospheric agents causes degradation. Only paints recommended by the Certificate holder should be used.

Installation

Each Wendland Styl Low Pitch Lean-to Conservatory Roof System is supplied with detailed fitting instructions.

9 Procedure

9.1 The ring beam gutter with ring beam reinforcer is screwed into position on the wall frames.

9.2 The aluminium wall ridge and glazing pocket is fixed horizontally to an external wall using recommended fasteners and fixings.

9.3 The gable ends are located and fixed onto the ridge and the ring beam reinforcer using rafter fixing plates and nuts.

9.4 The rafters are then located and fixed in a similar manner to the gable ends.

9.5 Furring strips are cut and infill between the underside of the gable ends and the conservatory side frames.

9.6 Polycarbonate sheeting is located in the ridge glazing pocket and between the rafters.

9.7 External PVC-U glazing caps with co-extruded TPE gaskets are snapped onto the rafters to form a seal against the roofing sheet.

9.8 Lead flashing is dressed down over the ridge glazing pocket, gable ends and top caps to provide a weatherproof seal.

9.9 Silicone is applied in accordance with fitting instructions.

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

Technical Investigations

The following is a summary of the technical investigations carried out on the Wendland Styl Low Pitch Lean-to Conservatory Roof System.

10 Tests

Tests were carried out to determine:

- watertightness (rain and wind)
- effect of wind loads
- effect of snow loads
- static load
- suitability of materials
- effects of heating due to solar radiation.

11 Investigations

11.1 The manufacturer's technical manual was examined for compliance with:

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

11.2 Confirmatory calculations were carried out to verify section properties and glazing bar design charts.

11.3 Independent design calculations were carried out on typical roof designs to verify design methodology.

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

11.5 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 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)*

BS 8118-1 : 1991 *Structural use of aluminium — Code of practice for design*

BS EN 755-2 : 1997 *Aluminium and aluminium alloys — Extruded rod/bar, tube and profiles — Mechanical properties*

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*



On behalf of the British Board of Agrément

Date of Third edition: 23rd December 2004

A handwritten signature in black ink, appearing to read 'P. C. Hewson'.

Chief Executive