CI/SfB
996

BBA BRITISH BOARD OF AGRÉMENT
TECHNICAL APPROVALS FOR CONSTRUCTION

SYNSEAL GLOBAL CONSERVATORY ROOF SYSTEM

DETAIL SHEET 3
Edition 1
No of pages 8

Product

- *THIS DETAIL SHEET RELATES TO THE SYNSEAL GLOBAL CONSERVATORY ROOF SYSTEM.*
- *The system is for use with a variety of wall frame systems (not covered by this Certificate).*

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 Synseal Global 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 construction with white or woodgrain PVC-U internal and external cladding or woodgrain aluminium external cladding and PVC-U internal cladding, available in the following configurations:

- Victorian/Edwardian/Georgian styles (duo pitched) with roof pitches between 15° and 35° (see Figures 1, 2 and 3)
- Lean-to (mono pitch) style with roof pitches between 5° and 30° (see Figure 4)
- Combination 'P' shape (duo and mono pitched combined) achieved through a variable angle valley section (see Figure 5).

Figure 1 Victorian style conservatory roof

Figure 2 Edwardian style conservatory roof

Figure 3 Georgian style conservatory roof

Figure 4 Lean-to style conservatory roof

Figure 5 Combination style conservatory roof

1.3 Permissible size parameters and configurations are described in the Synseal Global *Technical Manuals*. This Certificate relates to roofs used on conservatories not exceeding a floor area of 30 m^2 (8 m^2 in Scotland) 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 Synseal Global *Technical Manuals* and on the BBA technical file.

1.5 The roof system (see Figures 6 and 7) consists of a ridge beam, eaves beam, valley and glazing bar section, all extruded from aluminium to BS EN 755-2 : 1997 material designation 6063-T6. The roof can be glazed with either 16 mm three wall or 25 mm five wall polycarbonate panels or 24 mm double-glazed sealed units. The aluminium adjustable eaves ring beam is attached at the corners using aluminium cleats and plated steel screws at recommended centres.

Figure 6 Cross-section through ridge and eaves beam

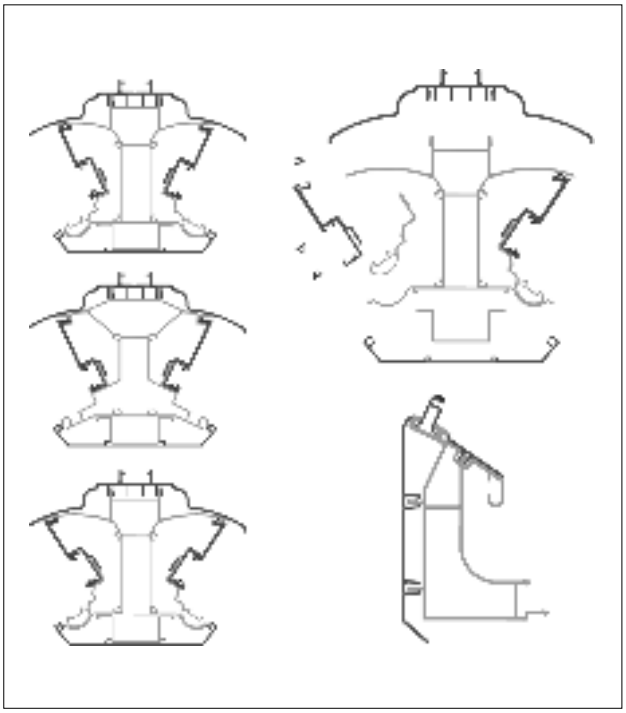
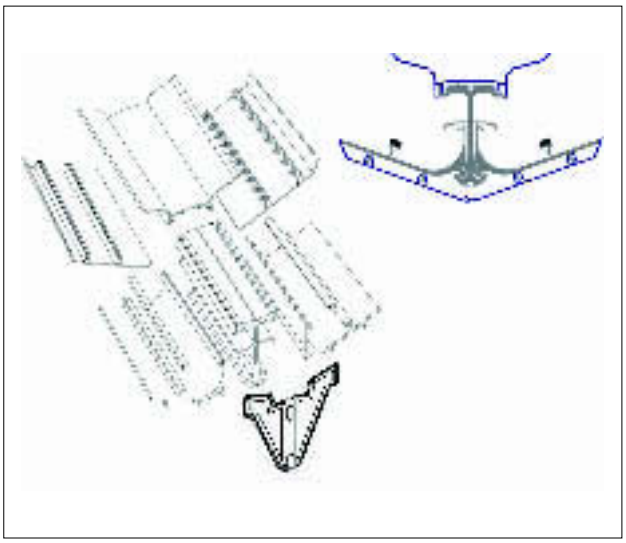


Figure 7 Detail of valley



1.6 Glazing bars with PVC-U internal capping and TPE co-extruded gaskets are attached to the ridge beam and ring beams with bolts. Wall plate glazing bars are attached to the ridge and eaves beam in the same manner. Hip bars are fixed onto the main aluminium radius end with bolts. Jack rafter glazing bars are attached to the hip bars and eaves beam if required. The wall plate is fixed directly to the existing host wall to provide lateral stability to the roof structure.

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

1.8 An external PVC-U ridge capping and PVC-U crown are fixed into position on top of the ridge body. The ridge is completed with a PVC-U finial and cresting. The internal side of the radius end is covered with a PVC-U capping.

1.9 To prevent ingress of moisture, silicone sealant is applied to the joint between the ridge cap and radius end cap in accordance with the installation instructions.

1.10 An Ogee PVC-U gutter system is attached to the PVC-U aluminium eaves beam around the full perimeter of the roof by means of an integral clip feature.

1.11 The internal and external faces of the ring beam are covered with a PVC-U fascia.

1.12 A selection of tie-bars may be fitted as required.

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 Synseal Global 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 *Synseal Global Assembly Guide*.

Table 1 Weathertightness[1]

	BS 6375-1 Test pressure class (Pa)	MOAT No 1 Grading[2]
Watertightness		
Conservatory roof	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 no water leakage occurring at 300 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 : 1997 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, calculated according to BS 6993-1 : 1989, are given in Table 2. The linear thermal transmittance of the glazing rafters, hip rafters and ridge beam has been calculated as approximately 0.8, 0.42 and 1.5 $Wm^{-1}K^{-1}$ respectively, when incorporating the 25 mm polycarbonate sheeting. The internal surfaces of the glazing rafters and ring beam adjacent to areas of glazing will have a similar risk of condensation to that of the glazing, whilst the internal surfaces of the PVC-U clad ring beam will have a higher risk of condensation. Any occurrence of condensation will be slight and temporary provided the environment within the conservatory is 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 a rooflight.

Table 2 U values of glazing

Type	Value ($Wm^{-2}K^{-1}$)
4/16/4 mm double-glazed units	3.1
16 mm triple-wall polycarbonate sheeting	2.3
25 mm structured polycarbonate sheeting	1.5

6 Safety

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.

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.

8 Durability

8.1 Evidence is available on the performance in the UK of PVC-U similar to that used for the external and internal cladding, over a period of 15 years in windows and in excess of 20 years in other applications. Such evidence, when compared with the results of the tests on the Synseal Global Conservatory Roof System, indicates that the Synseal Extrusions Ltd 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, 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 temperature reached will be dependent upon 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 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

9.1 The eaves beam is positioned on top and in line with the supporting side frames and secured using the recommended fasteners and fixing centres. The corner joints are spliced with aluminium cleats and plated steel screws. Gutters are clipped into place at this stage.

9.2 The pre-assembled ridge beam is placed in position and located by fixing the glazing bars into the holes provided. The hip bars are secured to the radius end brackets and eaves beam with bolts.

9.3 The wall-plate glazing bars are fixed directly to the existing host wall using appropriate fixings.

9.4 The roof is glazed with double-glazed units or polycarbonate sheets. Each panel is located on a supporting glazing bar with co-extruded TPE gasket. External caps with co-extruded TPE gasket are snapped onto the glazing bars to form a seal against the glazing panel.

9.5 A silicone seal is applied to the joints at the connection of the hip bars and ridge to the radius end. The PVC-U ridge capping is snapped into position from the outside. For use with woodgrain conservatories, a painted, aluminium capping slides on.

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

9.7 The installation is completed by fitting such items as trims, ridge, cresting, finial 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 Synseal Global 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
- BS 6399-2 : 1997
- CP 118 : 1969(1973).

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 : 1997 *Fire tests on building materials and structures — Method of test to determine the classification of the surface spread of flame of products*

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

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

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 6399-2 : 1997 *Loading for buildings — Code of practice for wind loads*

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)*

CP 118 : 1969(1973) *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 First edition: 30th March 2004

Chief Executive

Blank page

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

e-mail: mail@bba.star.co.uk
website: www.bbacerts.co.uk