



The Burnden Group

Burnden Works
Burnden Road
Bolton
Lancs BL3 2RB
Tel: 01204 554580 Fax: 01204 554556

**Agrément
Certificate
No 01/3795**

Designated by Government
to issue
European Technical
Approvals

K2 CONSERVATORY ROOF SYSTEMS

Système de serre
Gewächshausystem

Product




• *THIS CERTIFICATE RELATES TO K2 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


1 The Building Regulations 2000 (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 30 m², is exempt from these Regulations.

3 The Building Regulations (Northern Ireland) 1994 (as amended)

 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

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 of the relevant Detail Sheets.

5 Strength and stability

5.1 The design guide contained within the K2 Technical Manual is based on:

BS 6399-3 : 1988
BS 6399-2 : 1997
BS 8118-1 : 1991
BS 8118-2 : 1991.

The guide is based on comprehensive calculations prepared by a consulting engineer and verified by the BBA. Information required to carry out a design to the document includes:

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

This 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 guide covers snow and wind loads up to 0.8 kNm^{-2} . These loads cover the majority of sites in the UK. Where wind loads are outside of this range contact The Burnden Group technical department for advice.

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

Aluminium sections to BS 8118-1 : 1991 and
BS 8118-2 : 1991

limited to span/175 for glazed roofs
limited to span/125 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 Burnden Group or should be entrusted to a suitably qualified person.

6 Ventilation and solar heat gain

6.1 Outward opening casement or tilt and turn lights can be included in the wall frame option to provide natural ventilation. Opening roof vents (not assessed by the BBA) can be included where required to provide greater levels of rapid ventilation. Additional background ventilation can be provided by the inclusion of trickle ventilators in the head of window and door units.

6.2 Ventilation of a habitable room may occur through an adjoining conservatory where both have ventilation openings with an overall area equal to or greater than that given in the appropriate supporting document to the relevant Building Regulations for the room.

6.3 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.

6.4 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 A (1999) Section A4 and Appendix 5.A4*.

6.5 To reduce the effects of solar heat gain on the internal temperature of the conservatory, blinds or coloured/heat resistant glazing 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 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 Maintenance

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

8.2 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.

8.3 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 discolouration and damage to the surface. In addition, care must be taken to avoid damage to, or discolouration of, the members when stripping paint from adjacent surfaces, for example, by means of a blowlamp, paint stripper or mechanical stripper.

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

8.5 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.

8.6 Low pitch roofs are likely to require more frequent cleaning than those with a higher pitch; a greater pitch aids removal of dirt and debris by rainwater.

Installation

9 General

9.1 Design and manufacture of the conservatory roof systems is undertaken by The Burnden Group in accordance with their K2 Technical Manual.

9.2 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.

9.3 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.

10 Preparation

10.1 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.

10.2 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 *Loading for buildings*

BS 6399-2 : 1997 *Code of practice for wind loads*

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

BS 8004 : 1986 *Code of practice for foundations*

BS 8118 *The structural use of aluminium*

BS 8118-1 : 1991 *Code of practice for design*

BS 8118-2 : 1991 *Specification for materials, workmanship and protection*

Conditions of Certification

11 Conditions

11.1 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.

11.2 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.

11.3 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.

11.4 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.

11.5 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, K2 Conservatory Roof Systems are fit for their intended use provided they are installed, used and maintained as set out in this Certificate. Certificate No 01/3795 is accordingly awarded to The Burnden Group.

On behalf of the British Board of Agrément

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

Date of issue: 28th March 2001

Chief Executive

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	1	28th March 2001	8	01KBC2	The K2 Conservatory Roof System	Current

Product



• THIS DETAIL SHEET RELATES TO THE K2 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 K2 Conservatory Roof System is designed and fabricated by The Burnden Group 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 styles (duo pitched) with roof pitches between 25° 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 K2 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 K2 Technical Manuals and on the BBA technical file.

Figure 1 Victorian style conservatory roof

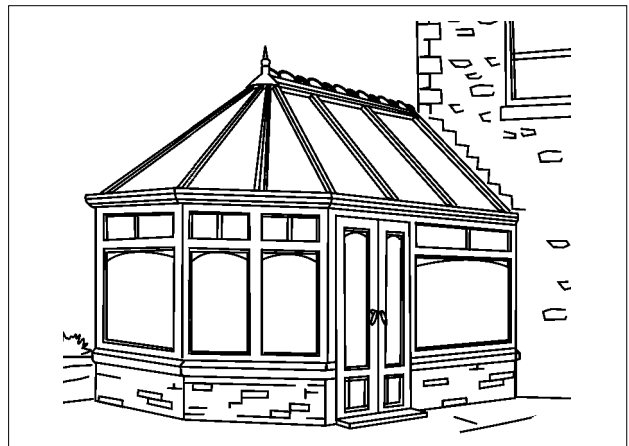


Figure 2 Edwardian style conservatory roof

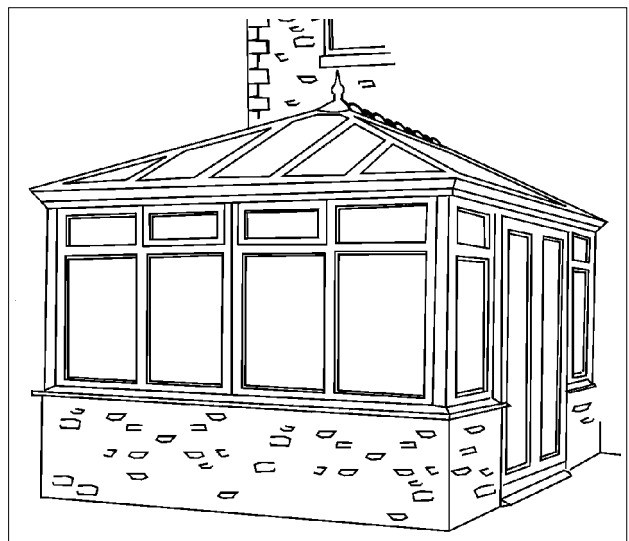


Figure 3 Lean-to style conservatory roof

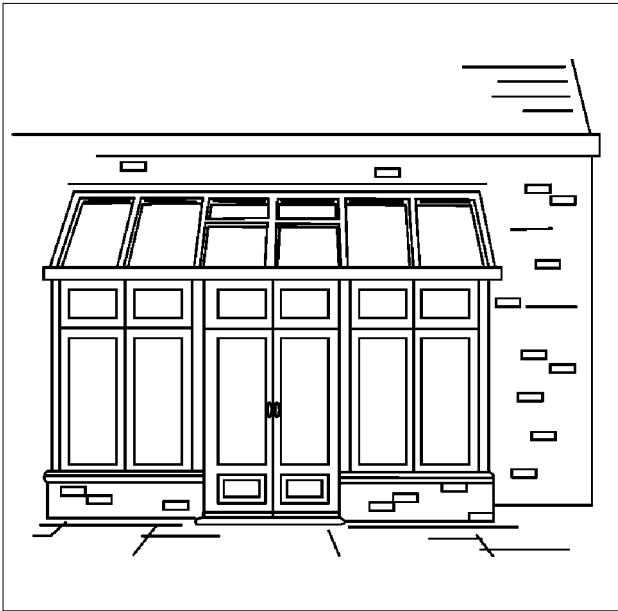
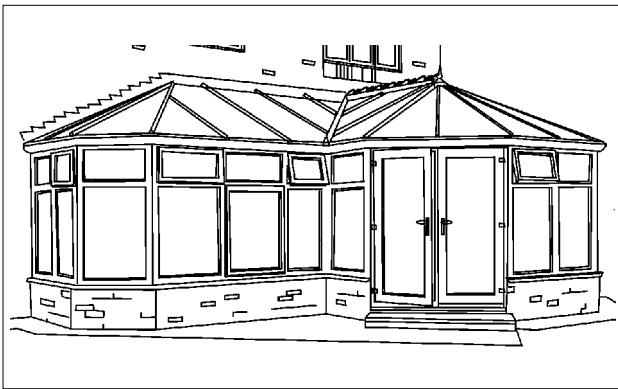


Figure 4 Combination style conservatory roof



1.5 The roof system (see Figures 5 and 6) consists of a ridge beam and glazing bar sections extruded from aluminium to BS 1474 : 1987, material designation 6063-T6, glazed with (three wall) 16 mm, (five wall), 25 mm polycarbonate panels or (24 mm) double-glazed sealed units that carry the BSI Kitemark to BS 5713 : 1979. An aluminium eaves beam is attached to the supporting sidewall structure with corner joints fixed with stainless steel 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 eaves beam aluminium extrusion). Hip bars are fixed onto the profiled aluminium ridge boss end. Wall end glazing bars are attached to the ridge and eaves beams in the same manner as the transom glazing bars. The wall 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 polyethylene bung is positioned at the ridge end at the intersection of the hip bars and 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 an ASA/ABS creasting 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 Tie bars may be fitted as required.

Quality Control

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

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

1.13 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 pre-fabricated in the K2 Conservatory Roof factory. Components are marked and numbered to assist assembly. All components are suitably protected and delivered to site by The Burden Group.

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 Cross-section through ridge



Figure 6 Detail at ridge/hip junctions



Design Data

3 Weathertightness

3.1 Selected samples from the K2 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 K2 Technical Manuals.

Table 1 Weathertightness⁽¹⁾

	BS 6375-1 : 1989 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) E₃ 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 : 1987 and is therefore classed as a TP(a) rigid thermoplastic. In Table 18 of Approved Document B to the Building Regulations 2000 (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(1995), are given in Table 2. The linear thermal transmittance of the glazing rafters has been calculated as approximately 0.36 Wm⁻¹K⁻¹ and U values are therefore higher than those of 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 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 or 6/12/6 mm double-glazed units	3.1
16 mm triple wall polycarbonate sheeting	2.4
25 mm five wall polycarbonate sheeting	1.6

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 K2 Conservatory Roof System PVC-U, indicates that the K2 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.

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.

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 stainless steel cleats and fixing screws.

9.2 The ridge beam is assembled, placed in position and located with the wall end glazing bars, hip bars and transom bars. The hip bars are secured to the assembled ridge end (see Figure 6), and to the eaves beam by captive bolts located in the eaves beam extrusion. Wall end glazing bars and transom bars are attached to the ridge section and to the eaves beam by captive bolts located in the eaves beam extrusion.

9.3 The wall 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 top 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, and downpipes. Rainwater is directed to a suitable soakaway or drain.

The following is a summary of the technical investigations carried out on the K2 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 Other investigations

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

BS 6399-3 : 1988

BS 6399-2 : 1997

BS 8118-1 : 1991

BS 8118-2 : 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 *Fire tests on building materials and structures*

BS 476-7 : 1987 *Method for classification of the surface spread of flame of products*

BS 952 *Glass for glazing*

BS 952-1 : 1995 *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 *Performance of windows*

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

BS 6399 *Loading for buildings*

BS 6399-2 : 1997 *Code of practice for wind loads*

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

BS 6993 *Thermal and radiometric properties of glazing*

BS 6993-1 : 1989(1995) *Method for calculation of the steady state U-value (thermal transmittance)*

BS 8118 *The structural use of aluminium*

BS 8118-1 : 1991 *Code of practice for design*

BS 8118-2 : 1991 *Specification for materials, workmanship and protection*

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



On behalf of the British Board of Agrément

Date of issue: 28th March 2001

A handwritten signature in black ink, appearing to read 'P. C. Newson', is written over a light grey background.

Chief Executive

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