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CI/SfB
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Agrément Certificate No 01/3793

BBA BRITISH BOARD OF AGRÉMENT
TECHNICAL APPROVALS FOR CONSTRUCTION

Designated by Government to issue European Technical Approvals

QUANTAL CONSERVATORY ROOF SYSTEMS

Système de serre
Gewächshaussystem

Product

- *THIS CERTIFICATE RELATES TO QUANTAL 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 (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.

Design Data

5 Strength and stability

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

BS 6399-3 : 1988
CP 3 : Chapter V-2 : 1972
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 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 imposed loads up to 1.0 kNm^{-2}. The minimum required by BS 6399-3 : 1988 is 0.6 kNm^{-2} and the magnitude of the actual snow loading imposed will depend upon a number of factors, such as height above sea level, geographical location, roof size and arrangement.

5.5 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 or 20 mm max for double-glazed roofs
limited to span/100 or 50 mm max for polycarbonate roofs.

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

5.7 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 Quantal 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 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 Book*, 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 the traditional glazing method of beads and gaskets, which offers reasonable security against unauthorised entry to a conservatory roof by the opportunist intruder.

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 gaskets replaced, with all beads being re-usable. This should be carried out using materials supplied by Quantal and in accordance with the installation instructions.

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 external powder coated painted aluminium and internal PVC-U claddings can be cleaned using water containing household detergent. Even if dirt is allowed to build up over long periods it is still possible to restore the external aluminium to a satisfactory finish, and whilst it may become more difficult to restore the surface appearance of the internal claddings, these can be removed and replaced if damaged. 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 or aluminium 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.

9.5 The external aluminium can be painted if required. 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.

9.6 The roof vent locking mechanisms should be lubricated periodically to minimise wear and ensure smooth operation. The continuous hinge does not require lubrication.

9.7 The roof panels can be replaced, if damaged, by removal of the gasket and glazing beads. Cleaning should be carried out using water containing household detergent. To avoid scratching of the surface, only soft cloths should be used when cleaning. 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

10 General

10.1 Design and manufacture of the conservatory roof systems is undertaken by Quantal 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 *Loading for buildings*
BS 6399-3 : 1988 *Code of practice for imposed roof loads*

BS 8004 : 1986 *Code of practice for foundations*

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

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

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.

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TECHNICAL APPROVALS FOR CONSTRUCTION

In the opinion of the British Board of Agrément, Quantal Conservatory Roof Systems are fit for their intended use provided they are installed, used and maintained as set out in this Certificate. Certificate No 01/3793 is accordingly awarded to Quantal Conservatory Roofing Systems.

On behalf of the British Board of Agrément

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	6	01QUC2	The Quantal Conservatory Roof System	Current

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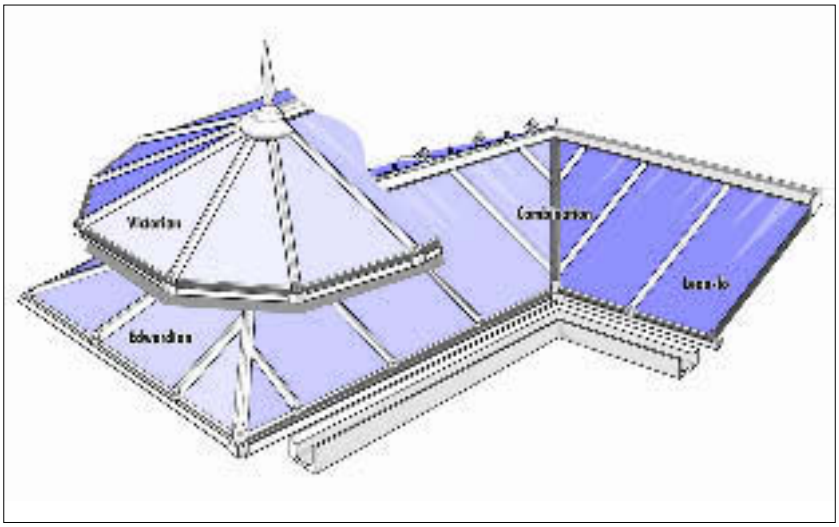
TECHNICAL APPROVALS FOR CONSTRUCTION

QUANTAL CONSERVATORY ROOF SYSTEM

DETAIL SHEET 2
Edition 1
No of pages 6

Product



- *THIS DETAIL SHEET RELATES TO THE QUANTAL 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 Quantal Conservatory Roof System is designed and fabricated by Quantal for use in the exposure conditions described in this Certificate.

1.2 The roof system is of aluminium construction in white or brown polyester powder coated paint finish, with white or woodgrain foiled PVC-U internal cladding available in the following configurations:

- Victorian/Edwardian/Georgian styles (duo pitched) with roof pitches between 15° and 37.5° (see Figures 1 and 2)
- Lean-to style (mono pitch) with roof pitches between 2.5° and 37.5° (see Figure 3)
- Combination shapes 'P' or 'L' (duo and mono pitched combined) styles (see Figure 4).

1.3 Permissible size parameters and configurations are described in the Quantal 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 Quantal 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 Figure 5) consists of a ridge beam and glazing bar sections extruded from aluminium to BS 1474 : 1987, material designation 6063-T6, glazed with 16 mm (three wall), 25 mm (five wall) or 35 mm (four wall) polycarbonate panels with co-extruded UV protection layer or 24 mm double-glazed sealed units that carry the BSI Kitemark BS 5713 : 1979.

1.6 The aluminium eaves beam assembly, complete with an aluminium-hinged profile, captive gasket and die-cast sliding connectors, is attached to the supporting sidewall structure (not covered by this Certificate). Corners and joints are fixed with aluminium cleats and stainless steel screws. Tie bar mounting brackets are attached to the eaves beam if required.

1.7 The extruded aluminium ridge beam assembly, complete with wings and captive gaskets, or wallplate assembly for Lean-to styles is attached to the supporting side wall structure. Glazing bars, complete with captive gaskets, and PVC-U internal cladding are attached to the ridge beam and eaves beam with zinc-plated steel bolts, captive in channels in the ridge beam. Extruded aluminium Hip glazing bar assemblies or transom bars, complete with captive gaskets with PVC-U internal cladding are attached to the extruded aluminium ridge gallery with stainless steel bolts. Jack Rafter glazing bars, complete with captive gaskets, are attached to the Hip bars and eaves beam if required. The gable end glazing bars are fixed directly to the existing building wall to provide lateral stability to the roof structure.

1.8 PVC-U end caps are fitted to the glazing bars with stainless steel screws. An aluminium extruded cover is fitted to the ridge beam with zinc-plated screws.

1.9 Glazing panels or double-glazed units are supported by the glazing bars and secured with extruded aluminium beads using wedged or retained gaskets which hold down the roof panels or units, forming a seal between the external and internal gaskets against the ingress of moisture.

1.10 To prevent the ingress of moisture, closed cell foam is positioned on the ridge beam gallery and silicone sealant is applied in accordance with the installation instructions. The cast aluminium ridge cresting, top cap and finial are fitted and silicone sealant is applied in accordance with the installation instructions.

1.11 A PVC-U gutter system is attached to the aluminium eaves beam around the full perimeter of the roof using clip-in brackets and fittings as required. An extruded aluminium gutter is available as required.

1.12 PVC-U internal claddings are fitted to the underside of the ridge beam and the eaves beam, with a ridge gallery undercap fitted.

1.13 An opening roof vent designed to match the glazing bar sections is available if required (see Figure 4).

1.14 Tie bars may be fitted as required.

Quality Control

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

extruded aluminium profiles

extruded PVC-U profiles

other components.

1.16 Fabrication of the roof system includes visual inspection of:

extruded aluminium profiles

PVC-U profiles

components

and checks on overall dimensions.

Figure 5 Cross-section through key structural elements

2 Delivery and site handling

2.1 Conservatory roofs are pre-fabricated in the Quantal factory. Components are marked and numbered to assist assembly. All components are suitably protected and delivered to site by Quantal.

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 Quantal 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 Quantal 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
Roof vent	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 : 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 0.30 $Wm^{-1}K^{-1}$ 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 the 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
35 mm four wall polycarbonate sheeting	1.6

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.

8 Durability

8.1 Evidence is available on the performance in the UK of aluminium and PVC-U similar to that used for external and internal components, 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 Quantal aluminium and 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 Quantal 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 fasteners and fixing centres. The joints and corners are joined with aluminium cleats and fixing screws.

9.2 The ridge beam assembly, or wall plate assembly for Lean-to styles, is placed in position and located with the gable end glazing bars, hip bars and transom bars secured to the ridge beam, ridge gallery and the eaves beam with bolts.

9.3 The ridge beam and gable end glazing bars are fixed directly to the existing house wall using appropriate fixings.

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

9.5 The roof is glazed with polycarbonate sheets or sealed double-glazed units. Each panel is located on the supporting glazing bars and secured with aluminium beads using wedged or retained gaskets, which hold down the roof panel or units, forming a seal between the external and internal gaskets against the ingress of moisture.

9.6 Closed cell foam is positioned on the ridge beam gallery and silicone sealant is applied in accordance with the installation instructions.

9.7 Fitting such items as external and internal trims, ridge cresting, top cap, finial, tie bars, gutters and downpipes, completes the installation. Rainwater is directed to a suitable soakaway or drain.

Technical Investigations

The following is a summary of the technical investigations carried out on the Quantal 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.

11 Other 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
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 6399-3 : 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*

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

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

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

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On behalf of the British Board of Agrément

Date of issue: 28th March 2001

Chief Executive

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