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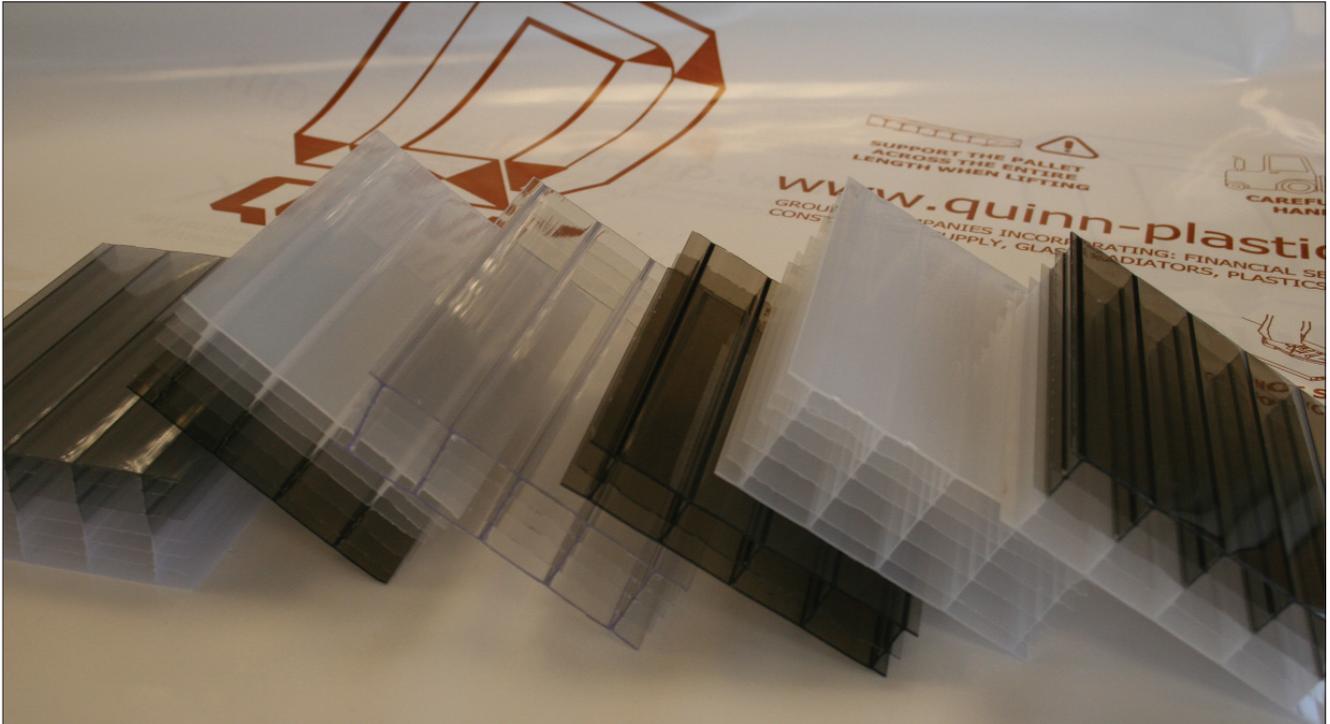
**Agrément  
Certificate  
No 04/4135**  
Second issue\*

Designated by Government  
to issue  
European Technical  
Approvals

## QUINN SPC MULTIWALL POLYCARBONATE GLAZING SHEETS

Lucarne  
Dachoberlicht

## Product



- THIS CERTIFICATE RELATES TO QUINN SPC MULTIWALL POLYCARBONATE GLAZING SHEETS.

- The products are for use as roof glazing materials in domestic, industrial and commercial installations in Tp(a) classification specifications.

## Regulations

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

 The Secretary of State has agreed with the British Board of Agrément the requirements of the Building Regulations to which rooflights can contribute in achieving compliance. In the opinion of the BBA, Quinn SPC Multiwall Polycarbonate Glazing Sheets, if used in accordance with the provisions of this Certificate, will meet or contribute to meeting the relevant requirements.

Requirement: A1

Loading

Comment:

The products when used in conjunction with a suitable structural system, will have sufficient strength and stiffness to sustain the design load. See sections 8.1 and 8.2 of this Certificate.

Requirement: B2

Internal fire spread (linings)

Comment:

The products can be classified as Tp(a) rigid material. See sections 10.1 to 10.3 of this Certificate.

Requirement: B4(2)

External fire spread

Comment:

The products can be taken as classified Tp(a) material. See sections 10.1 to 10.3 of this Certificate.

Requirement: C2(b)

Resistance to moisture

Comment:

When installed correctly in a suitable structural system the products will not adversely affect the resistance of the roof to the passage of moisture. See section 9 of this Certificate.

Requirement:	<b>L1(a)(i)</b>	Dwellings
Comment:		When demonstrating compliance for conservation of fuel and power by limiting the heat loss through the fabric of the building by the Elemental Method, the U-values given in section 12.1 may be used. When using the Target U-value or Carbon Index Methods, data given in sections 11.2 and 12.1 may be used. See also section 12.2 of this Certificate.
Requirement:	<b>L2(a)</b>	Buildings other than dwellings
Comment:		When demonstrating compliance for conservation of fuel and power by limiting the heat losses and gains through the fabric of the building by the Elemental Method, the U-values given in section 12.1 may be used. When using the Whole Building or Carbon Emissions Calculation Method, data given in sections 11.2 and 12.1 may be used. See also section 12.2 of this Certificate.
Requirement:	<b>Regulation 7</b>	Materials and workmanship
Comment:		The products are acceptable materials. See section 16.1.

## 2 The Building (Scotland) Regulations 2004



In the opinion of the BBA, Quinn SPC Multiwall Polycarbonate Glazing Sheets, if used in accordance with the provisions of this Certificate, will satisfy or contribute to satisfying the various Regulations and related Mandatory Standards as listed below.

Regulation:	<b>8</b>	<b>Fitness and durability of materials and workmanship</b>
Regulation:	8(1)	Fitness and durability of materials and workmanship
Comment:		The products can contribute to a construction satisfying this Regulation. See section 16.1 and the <i>Installation</i> part of this Certificate.
Regulation:	<b>9</b>	<b>Building standards – construction</b>
Standard:	1.1(b)	Structure
Comment:		The products when used in conjunction with a suitable structural system will have sufficient strength and stiffness to sustain design loads to satisfy the Requirements of clause 1.1.1 <sup>(1)(2)</sup> . See sections 8.1 and 8.2 of this Certificate.
Standard:	2.5	Internal linings
Comment:		The products have a Class 1 designation when tested in accordance with BS 476-7 : 1997 to satisfy the requirements of clauses 2.5.3 <sup>(1)(2)</sup> , 2.5.4 <sup>(1)(2)</sup> and 2.5.6 <sup>(1)(2)</sup> . See sections 10.2 and 10.3 of this Certificate
Standard:	2.8	Spread from neighbouring buildings
Comment:		The products have a Class 1 designation when tested in accordance with BS 476-7 : 1997 and can therefore be regarded as having an AA designation in accordance with this Standard with reference to clauses 2.8.1 <sup>(1)(2)</sup> and 2.8.2 <sup>(1)(2)</sup> . See sections 10.2 and 10.3 of this Certificate.
Standard:	3.10	Precipitation
Comment:		When installed correctly in a suitable structural system the products will not adversely affect the resistance of the roof to the passage of moisture to satisfy the requirements of clause 3.10.1 <sup>(1)(2)</sup> . See section 9 of this Certificate.
Standard:	3.15	Condensation
Comment:		The risk of surface condensation will depend on the environmental conditions in satisfying the requirements of clause 3.15.1 <sup>(1)</sup> . See sections 13.1 and 13.2 of this Certificate.
Standard:	6.2	Buildings insulation envelope
Comment:		The data given in sections 11.2, 12.1 and 12.2, of this Certificate, may be used to determine solar gain and heat loss to contribute to satisfying clauses 6.2.1 <sup>(1)(2)</sup> , 6.2.2 <sup>(1)(2)</sup> and 6.2.3 <sup>(1)(2)</sup> .
Regulation:	<b>12</b>	<b>Building standards – conversions</b>
Comment:		All comments given for these products under Regulation 9, also apply to this Regulation with reference to clause 0.12.1 <sup>(1)(2)</sup> and Schedule 6 <sup>(1)(2)</sup> .
		(1) Technical Handbook (Domestic).
		(2) Technical Handbook (Non-Domestic).

### 3 The Building Regulations (Northern Ireland) 2000



In the opinion of the BBA, Quinn SPC Multiwall Polycarbonate Glazing Sheets, if used in accordance with the provisions of this Certificate, will satisfy or contribute to satisfying the various Building Regulations as listed below.

Regulation:	<b>B2</b>	Fitness of materials and workmanship
Comment:		The products are acceptable materials. See section 16.1.
Regulation:	<b>C4</b>	Resistance to ground moisture and weather
Comment:		When installed correctly in a suitable system, the products, will not adversely affect the resistance of the roof to the passage of moisture. See section 9 of this Certificate.
Regulation:	<b>D1</b>	Stability
Comment:		The products when used in conjunction with a suitable structural system will have sufficient strength and stiffness to sustain design loads. See sections 8.1 and 8.2 of this Certificate.
Regulation:	<b>E3</b>	Internal fire spread – Linings
Comment:		The products can be classified as Tp(a) rigid material. See sections 10.1 and 10.3 of this Certificate.
Regulation:	<b>E5</b>	External fire spread
Comment:		The products can be classified as Tp(a) rigid material. See sections 10.1 and 10.3 of this Certificate.
Regulation:	<b>F2</b>	Building fabric
Comment:		When using either the Elemental Method or the Calculation Method for buildings other than dwellings to demonstrate that reasonable provision has been made for the conservation of fuel and power, the U values given in section 12.1 of this Certificate, may be used.  When using the Target U value Method for dwellings, or the Energy Use Method for buildings other than dwellings, the data given in sections 11.2, 12.1 and 12.2 of this Certificate, may be used to determine solar gain and heat loss.

### 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 sections: 5 Description (5.2), 6 Delivery and site handling (6.3), 15 Maintenance (15.2) and 18 Tooling (18.1).

## Technical Specification

### 5 Description

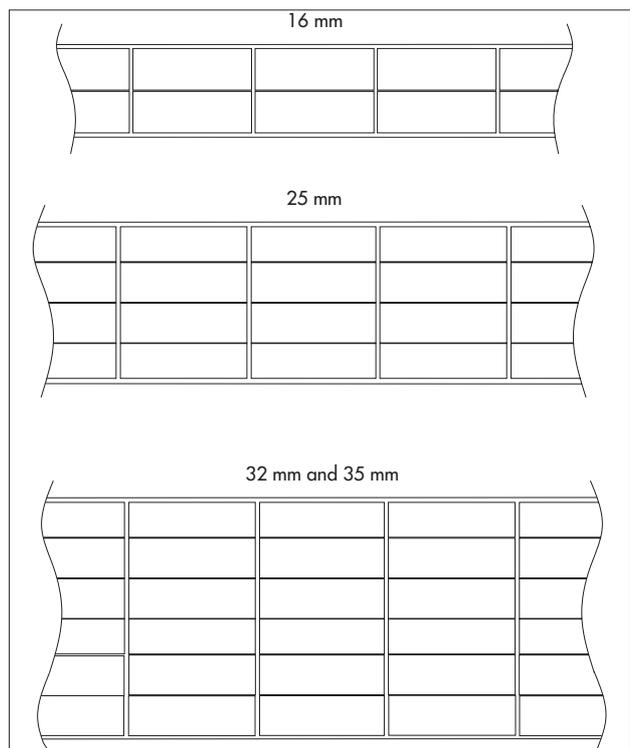
5.1 Quinn SPC Multiwall Polycarbonate Glazing Sheets are multi-walled glazing materials manufactured by extrusion.

5.2 The products are available in clear, bronze, opal, arctic pearl and bronze/opal grades. The products are available in the geometries (see Figure 1) and nominal characteristics given in Table 1.

Table 1 Characteristics

Characteristic (units)	Grade			
	16	25	32	35
Geometry	rectangular triple wall	rectangular five wall	rectangular seven wall	rectangular seven wall
Thickness (mm)	16	25	32	35
Maximum length (m)	7	7	7	7
Width (mm)	up to and including 2100			
Weight per unit area (kgm <sup>-2</sup> )	2.7	3.5	3.6	3.8

Figure 1 Sheet geometry



5.3 The nominal values for visible light transmission at normal incidence are given in Table 2.

Colour	16 mm	25 mm	32 mm/35 mm
Clear	72% <sup>(1)</sup> 72% <sup>(2)</sup>	62% <sup>(1)</sup> 63% <sup>(2)</sup>	51 <sup>(1)</sup> 55 <sup>(2)</sup>
Bronze	21% <sup>(1)</sup> 49% <sup>(2)</sup>	17% <sup>(1)</sup> 39% <sup>(2)</sup>	11 <sup>(1)</sup> 14 <sup>(2)</sup>
Opal	18% <sup>(1)</sup> 40% <sup>(2)</sup>	14% <sup>(1)</sup> 34% <sup>(2)</sup>	29 <sup>(1)</sup> 35 <sup>(2)</sup>
Arctic pearl	20% <sup>(1)</sup> 41% <sup>(2)</sup>	16% <sup>(1)</sup> 37% <sup>(2)</sup>	n/a n/a
Bronze/Opal	26% <sup>(1)</sup> 47% <sup>(2)</sup>	17% <sup>(1)</sup> 40% <sup>(2)</sup>	18 <sup>(1)</sup> 22 <sup>(2)</sup>
Silver/diffusive	n/a	n/a	8 <sup>(1)</sup> 8 <sup>(1)</sup>

(1) Visible light transmission

(2) Total solar transmission.

n/a not available.

5.4 Ancillary items for use with the products include:

- blocking tape — for sealing top and sides of sheets to stop ingress of contaminants into the sheets
- dust tape — for sealing bottom of sheets to stop ingress of contaminants.

5.5 Quality control checks on the products include:

- overall thickness
- wall thickness
- width
- length
- weight
- UV cap thickness and distribution
- appearance
- colour.

## 6 Delivery and site handling

6.1 The products are delivered to site on a pallet with a protective polypropylene film on both sides of sheet and wrapped in polyethylene film. Each pallet of sheeting bears a label detailing number of sheets, type of sheet, length, width, thickness, gross weight and the BBA identification mark incorporating the number of this Certificate.

6.2 The products must be stored under cover with the protective film left in place. When protected with the film, the sheets should not be left exposed to sunlight for any length of time as there is a risk of film adhering to the surface of the polycarbonate.

6.3 Care must be taken when handling products due to sharp edges.

6.4 The products can be damaged by scratching once the protective film is removed and precautions should be taken on site to prevent this.

## Design Data

### 7 General

Quinn SPC Multiwall Polycarbonate Glazing Sheets are satisfactory for use as roof glazing materials, greenhouse glazing and north lights in domestic, industrial and commercial installations in Tp(a) classification specifications (see section 10.1), such as conservatory roofs, roof lights and north-light roofs.

### 8 Strength and stability



8.1 Tests confirm that the sheets, when used in a suitable structural specification, can resist distributed loads up to 1.5 kNm<sup>-2</sup> and point loads up to 1.8 kN and are of adequate strength to resist the loadings likely to be encountered during service. Snow loadings for a specific structure should be calculated using BS 6399-3 : 1988. The Certificate holder's advice on distance between points of support for a specified load must be followed at all times.

8.2 Project design wind speeds should be determined, and wind uplift forces calculated in accordance with BS 6399-2 : 1997.

8.3 The products, when installed, have an acceptable maximum deflection of 5% and a critical deflection of 7% of the width of the sheet.

8.4 The material has a good resistance to impact from hard bodies, such as hailstones, or impacts due to vandalism (eg objects thrown onto the roof from ground level).

### 9 Weathertightness



The weathertightness of the structural specification into which a sheet is fitted is dependent on the method of installation of the sheet within the structure.

### 10 Behaviour in relation to fire



10.1 The products may be classified as Tp(a) rigid in accordance with Approved Document B to The Building Regulations 2000 (as amended) (England and Wales) and Technical Booklet E to The Building Regulations (Northern Ireland) 2000.



10.2 When tested in accordance with BS 476-7 : 1997 the sheets achieve a Class 1 surface and therefore can be regarded as having an AA designation.



10.3 Guidance on the limitations of use of the material is given in the Building Regulations:

#### England and Wales

Approved Document B, Tables 11, 17, 18 and 19

## Scotland

Table to deemed-to-satisfy provision to Mandatory Standards 2.5 and 2.8

## Northern Ireland

Technical Booklet E, Tables 2.2 and 4.8.

### 11 Light transmission and solar heat gain

11.1 For design purposes the approximate visible light and total solar transmission characteristics at normal incidence are given in Table 2.

 11.2 When showing compliance to the relevant Requirement or Regulation, for conservation of fuel and power — limiting the heat loss through the fabric of the building by using the methods listed below. Relevant solar transmittance factors for different sun angles should be provided by the Certificate holder for use with the methods outlined in CIBSE Guide A (1999) Section 2 and Appendix 5.A4 if the total solar gain of the building incorporating the products presents a significant heat input:

- the Calculation Method, Standard or Energy Use Method or Standards for buildings other than dwellings, or
- calculating the SAP Energy Rating of a Dwelling.

### 12 Thermal insulation

 12.1 The thermal transmittance (U values) of the polycarbonate sheets when horizontal, calculated according to the methods laid out in BS EN 10211 : 1996 are given in Table 3.

Table 3 U values and corresponding minimum temperature factors ( $f_{CRsi}$ ) of polycarbonate sheeting

Sheet reference	U value ( $Wm^{-2}K^{-1}$ )	$f_{CRsi}$
16 mm	2.6	0.81
25 mm	1.7	0.81
32 mm	1.4	0.85
35 mm	1.3	0.87

12.2 When showing compliance to the relevant Requirement or Regulation for conservation of fuel and power — limiting the heat loss through the fabric of the building, the U values given in Table 3 may be used when:

- using an elemental method and calculating the overall average U value of windows, doors and rooflights to determine the overall permitted area
- calculating the overall U value of a dwelling when using the Target U-value or Carbon index methods
- calculating the SAP Energy Rating of a dwelling
- using the Heat Loss, Whole-building or Carbon Emissions Calculation Methods, or Energy Use Method for buildings other than dwellings.

### 13 Condensation risk



13.1 The minimum temperature factors of the polycarbonate sheets, given in Table 3<sup>(1)</sup>, exceed the critical temperature factor for limiting the risk of surface condensation in dwellings, residential buildings and schools implied in BRE Information Paper IP 17/01 *Assessing the effects of thermal bridging at junctions and around openings*. The risk of surface condensation in these building types is, therefore, acceptable. The acceptability in specific buildings of other types may be determined in accordance with EN ISO 13788 : 2001.

- In common with all glazed roof structures, the environmental temperature to which the sheet is exposed can be 6°C or more below the design air temperature, because of temperature reduction under nighttime winter sky radiation conditions. Under such conditions the risk of surface condensation will be correspondingly higher than for vertically-mounted sheet.

13.2 In a conservatory the effects of any condensation will be minimised by the use of background heating to maintain the internal temperature between 3°C and 4°C above the external ambient temperature. Any occurrence of condensation should be slight and temporary provided the environment in the conservatory is maintained within the normal domestic band of 10°C to 25°C and 40% to 65% RH.

### 14 Safety in use

If the products are used in a rooflight in an area generally accessible to the public, provision must be made (eg guard rails) to prevent people falling onto the glazed area. If as a result of an accidental fall, contact is made with the polycarbonate, the sheet has good impact resistance, however, the overall safety of the rooflight is dependent on the method of fixing.

### 15 Maintenance

15.1 Cleaning of the products should be carried out using water containing solvent-free or alkali-free household detergent. To avoid scratching the surface only soft cloths should be used when cleaning and care should be taken to ensure that abrasive material is not in the cloth.

15.2 Precautions, when maintenance is being carried out, should be in line with the relevant clauses of the Health and Safety Executive's *Health and Safety in Roof Work* (HSG 33).

15.3 Under no circumstances should anyone venture onto the sheets. For maintenance purposes special precautions should be taken to prevent the possibility of falling through, even though the sheet and structural system may support such a load.

## 16 Durability



16.1 Accelerated weathering tests confirm that satisfactory retention of physical properties is achieved and indicates an expected life of at least 25 years.

16.2 After natural weathering, some slight change in colour will occur, however, the change will be even across the sheet and will not significantly decrease light transmission properties, although light transmittance (haze) may be affected.

16.3 Accidental or deliberate scratching of the sheet surface can lead to a reduction in the aesthetic and/or functional value.

## Installation

### 17 General

17.1 Installation of Quinn SPC Multiwall Polycarbonate Glazing Sheets into a structure should be in accordance with the relevant manufacturer's instructions for the structural system and the Certificate holder's instructions. The Certificate holder's advice on distance between points of support for a specified load must be followed at all times.

17.2 The products have a self-cleaning effect when installed with the correct pitch. The minimum roof pitch recommended by the manufacturer is 2.5°.

17.3 The line of the flutes in the installed sheet must run down the slope of the roof to allow drainage of moisture.

17.4 The products must be sealed to prevent clouding of the flutes by contaminants, using the appropriate recommended tapes.

17.5 Condensation can occur within the sheet's flutes and therefore it is necessary to ensure the chambers are allowed to vent by using the recommended breather tape over the bottom end of the sheet.

17.6 The average thermal expansion of the sheet is 3 mm per linear metre (longitudinal expansion coefficient is  $0.07 \text{ mm m}^{-1} \text{ }^{\circ}\text{C}^{-1}$ ) of material and this must be taken into account in allowances for the join or glazing systems used.

17.7 Advice should be sought from the Certificate holder on the compatibility of silicones, adhesives and gaskets with polycarbonate prior to use to ensure no adverse effects.

### 18 Tooling

18.1 The products can be cut using either, a handsaw, jigsaw, circular saw or sharp knife. When using a portable or fixed circular saw, protective eyewear and gloves must be worn. It is

recommended that a fine-toothed, high-speed, steel saw blade is used.

18.2 When drilling the material a medium-speed pointed drill should be used. An allowance of 4 mm on all sides should be made around any item positioned through the sheet to allow for thermal movement.

## Technical Investigations

The following is a summary of the technical investigations carried out on Quinn SPC Multiwall Polycarbonate Glazing Sheets.

### 19 Tests

19.1 Samples of the products were obtained from the manufacturer for testing. The results of the tests carried out by the BBA, which show typical values for the materials, are summarised in Table 4.

Table 4 Physical properties<sup>(1)</sup>

Test (units)	Method <sup>(2)</sup>	Mean result
Flexural strength (MPa)	BS EN ISO 178	
unaged	(test speed 5 mm min <sup>-1</sup> )	7.2
heat aged <sup>(3)</sup>		9.3
UV aged <sup>(4)</sup>		9.6
Apparent modulus of elasticity (MPa)	BS EN ISO 178	
unaged	(test speed 5 mm min <sup>-1</sup> )	512
heat aged <sup>(3)</sup>		545
UV aged <sup>(4)</sup>		532
Drop test		pass
Downward load distributed load (1.5 kNm <sup>-2</sup> )	MOAT 54 : 4.212	pass
Resistance to impact <sup>(5)</sup> (mm)	BS EN 1013-1	
unaged		2500
heat aged <sup>(3)</sup>		2400
UV aged <sup>(4)</sup>		2400
Haze (%)	ASTM D 1003	
clear	16 mm	9.1
	25 mm	11.7
bronze	16 mm	6.9
	25 mm	9.9
opal	16 mm	89.6
	25 mm	88.7
arctic pearl	16 mm	99.0
	25 mm	84.9

(1) All tests carried out on clear 16 mm sheets unless otherwise stated.

(2) The test documents are detailed in the *Bibliography*. Numbers in the table refer to the sections/parts of the document.

(3) Heat aged for 90 days at 100°C.

(4) Ultraviolet ageing, 1000 light hours using UVB 313 lamps for a cycle of four hours light at 50°C and four hours condensation at 50°C.

(5) Impact between ribs.

19.2 Other tests carried out on the 16 mm and 25 mm materials were:

- total sheet thickness
- sheet width
- inner and outer wall thickness
- weight per unit area
- light transmission (unaged)
- light transmission (heat aged)
- light transmission (light aged).

19.3 Tests carried out on the 32 mm and 35 mm materials were:

- total sheet thickness
- sheet width
- inner and outer wall thickness
- weight per unit area
- light transmission
- solar transmission.

## 20 Investigations

20.1 The manufacturing process was examined including the methods adopted for quality control, and details obtained of the quality and composition of the materials used.

20.2 A visit to an existing site and user survey were carried out to establish the product's performance in service.

20.3 Computer calculations for assessing the risk of condensation, thermal insulation properties and solar heat gain were carried out.

20.4 Existing data to BS 476-7 : 1997 were examined in relation to performance in fire.

## Bibliography

BS 476-7 : 1997 *Fire tests on building materials and structures — Method for classification of the surface spread of flame of products*

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 EN 1013-1 : 1998 *Light transmitting profiled plastic sheeting for single skin roofing — General requirements and test methods*

BS EN 10211 : 1996 *Chemical analysis of ferrous materials — Determination of titanium in steel and iron — Flame atomic absorption spectrometric method*

BS EN ISO 178 : 1997 *Plastics. Determination of flexural properties*

EN ISO 13788 : 2001 *Hygrothermal performance of building components and building elements — Internal surface temperature to avoid critical surface humidity and interstitial condensation — Calculation methods*

ASTM D 1003 : 1997 *Test Method for Haze and Luminous Transmittance of Transparent Plastics*

MOAT No 54 : 1989 *UEAtc guide for the Agrément of individual rooflights*

## Conditions of Certification

### 21 Conditions

21.1 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.

21.2 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.

21.3 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.

21.4 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.

21.5 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, Quinn SPC Multiwall Polycarbonate Glazing Sheets are fit for their intended use provided they are installed, used and maintained as set out in this Certificate. Certificate No 04/4135 is accordingly awarded to Quinn Plastics Ltd.

On behalf of the British Board of Agrément

Date of Second issue: 20th January 2006

A handwritten signature in black ink, appearing to read 'G. A. Cooper'.

Chief Executive

*\*Original Certificate issued on 24th November 2004. This amended version includes a change of company name and product name, the addition of 32 mm and 35 mm grades, reference to the revised national Building Regulations and new Conditions of Certification.*