

NaturalLight Systems Ltd

Accessory House
Barrington Industrial Estate
Bedlington
Northumberland NE22 7DQ
Tel: 01670 530333 Fax: 01670 824540
e-mail: info@naturalight.co.uk
website: www.naturalight.co.uk



Agrément Certificate
14/5096
Product Sheet 1

NATURALIGHT ROOFLIGHTS AND KERBS

NATURALIGHT ROOFLIGHT

This Agrément Certificate Product Sheet⁽¹⁾ relates to the NaturalLight Rooflight, for use on flat roofs of domestic and non-domestic buildings, to provide natural light.

(1) Hereinafter referred to as 'Certificate'.

CERTIFICATION INCLUDES:

- factors relating to compliance with Building Regulations where applicable
- factors relating to additional non-regulatory information where applicable
- independently verified technical specification
- assessment criteria and technical investigations
- design considerations
- installation guidance
- regular surveillance of production
- formal three-yearly review.



KEY FACTORS ASSESSED

Light and solar transmittance — the product provides natural lighting to the interior of a building (see section 6).

Thermal properties — for a typical 1.2 m by 1.2 m roof opening, triple- and quadruple-skinned rooflights can achieve a U value of 3.5 and 2.6 W·m⁻²·K⁻¹ respectively (see section 7).

Condensation risk — the risk of condensation on the product's internal surface will depend on the building type (see section 8).

Strength and stability — the product can withstand wind and snow loads typical in the UK (see section 9).

Weathertightness — the product will provide satisfactory resistance to moisture ingress (see section 10).

Behaviour in relation to fire — the polycarbonate domes can be classified as Tp(a) rigid in accordance with national Building Regulations. When classified to EN 13501-1 : 2007, the polycarbonate sheet achieved a European Class B-s2, d0 (see section 11).

Durability — the product will have a life of at least 25 years (see section 15).

The BBA has awarded this Certificate to the company named above for the product described herein. This product has been assessed by the BBA as being fit for its intended use provided it is installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

A handwritten signature in black ink, appearing to read 'John Albon'.

A handwritten signature in black ink, appearing to read 'Claire Curtis-Thomas'.

Date of First issue: 26 February 2014

John Albon — Head of Approvals
Construction Products

Claire Curtis-Thomas
Chief Executive

Certificate amended on 5 February 2015 to include various changes.

The BBA is a UKAS accredited certification body — Number 113. The schedule of the current scope of accreditation for product certification is available in pdf format via the UKAS link on the BBA website at www.bbacerts.co.uk

Readers are advised to check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA direct.

British Board of Agrément
Bucknalls Lane
Watford
Herts WD25 9BA

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tel: 01923 665300
fax: 01923 665301
e-mail: mail@bba.star.co.uk
website: www.bbacerts.co.uk

Regulations

In the opinion of the BBA, the NaturalLight Rooflight, if installed, used and maintained in accordance with this Certificate, will satisfy or contribute to satisfying the relevant requirements of the following Building Regulations (the presence of a UK map indicates that the subject is related to the Building Regulations in the region or regions of the UK depicted):



The Building Regulations 2010 (England and Wales) (as amended)

Requirement: A1	Loading
Comment:	The product will have sufficient strength and stiffness to sustain the design load. See sections 9.1 and 9.2 of this Certificate.
Requirement: B2(1)	Internal fire spread (linings)
Comment:	The polycarbonate sheets used in the rooflights can be classified as Tp(a) rigid material. Under European classifications the polycarbonate material achieved a European Class B-s2, d0 and will adequately resist the spread of flame over its surface. See sections 11.1 to 11.4 of this Certificate.
Requirement: B4(2)	External fire spread
Comment:	The polycarbonate sheets used in the rooflights can be taken as classified Tp(a) rigid material. Under European classifications the polycarbonate sheets can be regarded as having a B _{ROOF} (t4) classification and will adequately resist the spread of flame over the roof and from one building to another. See sections 11.1 to 11.4 of this Certificate.
Requirement: C2(b)	Resistance to moisture
Comment:	The rooflights will not adversely affect the resistance of the roof to the passage of moisture. The product provides adequate resistance to the ingress of precipitation. See sections 10.1 and 10.3 of this Certificate.
Requirement: C2(c)	Resistance to moisture
Comment:	The risk of surface condensation on the product will depend on the building humidity class. See sections 8.1 to 8.3 of this Certificate.
Requirement: K2(a)	Protection from falling (applicable to England only)
Comment:	Provisions must be made for pedestrian guarding (see section 12.1 of this Certificate). This Requirement does not apply to dwellings.
Requirement: K5.4	Safe access for cleaning windows etc (applicable to England only)
Comment:	Provisions must be made regarding the safe cleaning of rooflights (see section 12.1 of this Certificate). This Requirement does not apply to dwellings.
Requirement: L1(a)(i)	Conservation of fuel and power
Comment:	See section 7 of this Certificate. The product can also contribute to daylighting and solar transmittance. See section 6.1 of this Certificate.
Requirement: N4	Safe access for cleaning windows etc (applicable to Wales only)
Comment:	Provisions must be made regarding the safe cleaning of rooflights (see section 12.1 of this Certificate). This Requirement does not apply to dwellings.
Regulation: 7	Materials and workmanship
Comment:	The product is acceptable when used in accordance with this Certificate. See sections 15.1 and 15.4 and the <i>Installation</i> part of this Certificate.
Regulation: 26	CO₂ emission rates for new buildings
Comment:	See section 7 of this Certificate. The product can also contribute to daylighting and solar transmittance. See section 6.1 of this Certificate.



The Building (Scotland) Regulations 2004 (as amended)

Regulation: 8(1)(2)	Durability, workmanship and fitness of materials
Comment:	The product can contribute to a construction satisfying this Regulation. See sections 14, 15.1 and 15.4 and the <i>Installation</i> part of this Certificate.
Regulation: 9	Building standards applicable to construction
Standard: 1.1(b)	Structure
Comment:	The product will have sufficient strength and stiffness to sustain design loads, with reference to clause 1.1.1 ⁽¹⁾⁽²⁾ . See sections 9.1 and 9.2 of this Certificate.
Standard: 2.5	Internal linings
Comment:	The polycarbonate sheets used in the rooflights can be classified as Tp(a) rigid material, with reference to clauses 2.5.4 ⁽¹⁾⁽²⁾ and 2.5.6 ⁽¹⁾⁽²⁾ and therefore the rooflights are unrestricted. See sections 11.1 to 11.4 of this Certificate.
Standard: 2.8	Spread from neighbouring buildings
Comment:	The external glazing is classified 'low vulnerability' and the products are unrestricted by this Standard, with reference to clauses 2.8.1 ⁽¹⁾ , 2.C.3 ⁽¹⁾ and 2.F.3 ⁽²⁾ . See sections 11.1 to 11.4 of this Certificate.
Standard: 3.10	Precipitation
Comment:	The product provides adequate resistance to the ingress of precipitation, with reference to clause 3.10.1 ⁽¹⁾⁽²⁾ . See sections 10.1 and 10.3 of this Certificate.
Standard: 3.15	Condensation
Comment:	The risk of surface condensation on the product will depend on the humidity class of the building, with reference to clauses 3.15.1 ⁽¹⁾ and 3.15.4 ⁽¹⁾ . See sections 8.1 to 8.3 of this Certificate.

Standard:	3.16	Natural lighting
Comment:		In calculating the contribution of the product to natural lighting to this Standard, with reference to clauses 3.16.1 ⁽¹⁾ and 3.16.3 ⁽¹⁾ , the area of glazing given in Table 1 of this Certificate can be used.
Standard:	4.8(c)	Danger from accidents
Comment:		The provisions described in clause 4.8.3 ⁽¹⁾⁽²⁾ of this Standard regarding the safe cleaning of rooflights, must be taken into account. See section 12.1 of this Certificate.
Standard:	6.1(b)	Carbon dioxide emissions
Standard:	6.2	Building insulation envelope
Comment:		With reference to clauses 6.1.2 ⁽¹⁾ , 6.1.4 ⁽¹⁾⁽²⁾ , 6.2.1 ⁽¹⁾⁽²⁾ , 6.2.2 ⁽¹⁾ , 6.2.3 ⁽¹⁾⁽²⁾ , 6.2.4 ⁽²⁾ , 6.2.5 ⁽²⁾ , 6.2.6 ⁽²⁾ , 6.2.7 ⁽¹⁾ , 6.2.9 ⁽¹⁾⁽²⁾ , 6.2.10 ⁽¹⁾ , 6.2.11 ⁽²⁾ and 6.2.12 ⁽²⁾ , see sections 6.1 and 7 of this Certificate.
Standard:	7.1(a)(b)	Statement of sustainability
Comment:		The product can contribute to satisfying the relevant requirements of Regulation 9, Standards 1 to 6, and therefore will contribute to a construction meeting a bronze level of sustainability as defined in this Standard. In addition the product can contribute to a construction meeting a higher level of sustainability as defined in this Standard, with reference to clauses 7.1.4 ⁽¹⁾⁽²⁾ [Aspects 1 ⁽¹⁾⁽²⁾ and 2 ⁽¹⁾], 7.1.6 ⁽¹⁾⁽²⁾ [Aspects 1 ⁽¹⁾⁽²⁾ and 2 ⁽¹⁾] and 7.1.7 ⁽¹⁾⁽²⁾ [Aspect 1 ⁽¹⁾⁽²⁾]. See section 7 of this Certificate.
Regulation:	12	Building standards applicable to conversions
Comment:		All comments given for the product under Regulation 9, Standards 1 to 6, also apply to this Regulation, with reference to clause 0.12.1 ⁽¹⁾⁽²⁾ and Schedule 6 ⁽¹⁾⁽²⁾ . (1) Technical Handbook (Domestic). (2) Technical Handbook (Non-Domestic).



The Building Regulations (Northern Ireland) 2012

Regulation:	23	Fitness of materials and workmanship
Comment:		The product is acceptable. See sections 15.1 and 15.4 and the <i>Installation</i> part of this Certificate.
Regulation:	28(b)	Resistance to moisture and weather
Comment:		The product will not adversely affect the resistance of the roof to the passage of moisture. See sections 10.1 and 10.3 of this Certificate.
Regulation:	30	Stability
Comment:		The product has sufficient strength and stiffness to sustain the design loads. See sections 9.1 and 9.2 of this Certificate.
Regulation:	34	Internal fire spread – Linings
Comment:		The polycarbonate sheets used in the rooflights can be classified as Tp(a) rigid material. Under European classifications the polycarbonate material achieved a European Class B-s2, d0 and will adequately resist the spread of flame over its surface. See sections 11.1 to 11.4 of this Certificate.
Regulation:	36(b)	External fire spread
Comment:		The rooflights are unrestricted and will adequately resist the spread of flame over the roof and from one building to another. See sections 11.1 to 11.4 of this Certificate.
Regulation:	39(a)(i)	Conservation measures
Regulation:	40(2)	Target carbon dioxide emission rate
Comment:		See section 7 of this Certificate. The product can also contribute to daylighting and solar transmittance. See section 6.1 of this Certificate.
Regulation:	99	Safe means of access for cleaning glazing
Comment:		Provisions must be made regarding the safe cleaning of rooflights. See section 12.1 of this Certificate.

Construction (Design and Management) Regulations 2007

Construction (Design and Management) Regulations (Northern Ireland) 2007

Information in this Certificate may assist the client, CDM co-ordinator, designer and contractors to address their obligations under these Regulations.

See sections: 3 *Delivery and site handling* (3.5) and 4 *General* (4.2) of this Certificate.

Additional Information

NHBC Standards 2014

In the opinion of the BBA, the use of the NaturalLight Rooflights, in relation to this Certificate, is not subject to the requirements of these Standards.

1 Description

1.1 NaturalLight Rooflights are designed and thermoformed from 3 mm minimum thickness polycarbonate sheets (coated on both sides with a UV protection film).

1.2 The rooflights are available as fixed units, triple-skin (3/20/3/20/3 mm) or quadruple-skin (3/20/3/20/3/20/3 mm), in a clear smooth finish and are fixed onto a NaturalLight kerb (NLS L2). Kerbs and polycarbonate glazing are supplied to site separately.

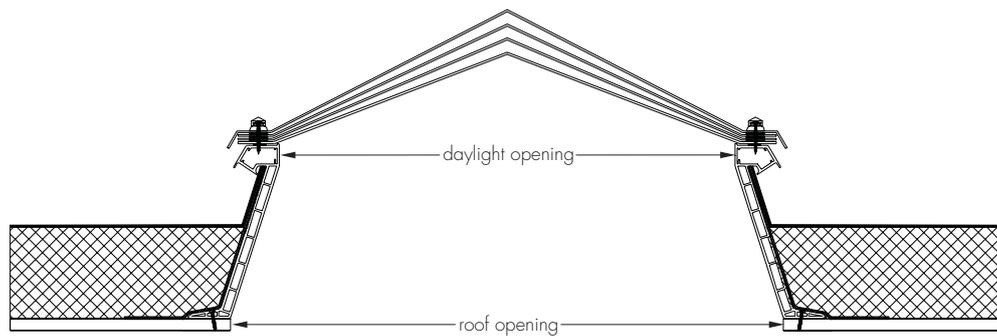
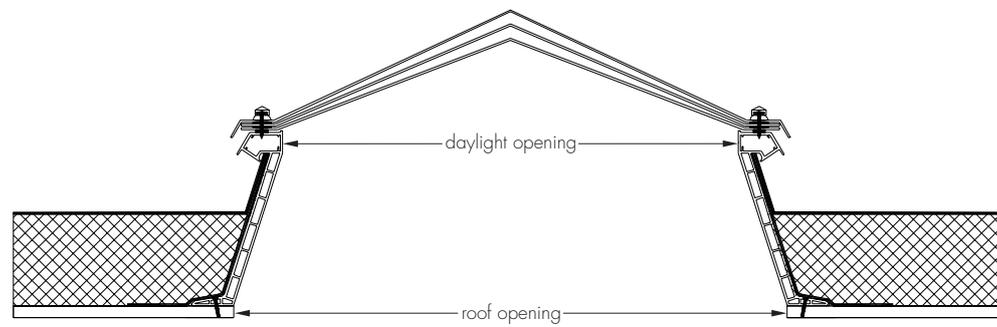
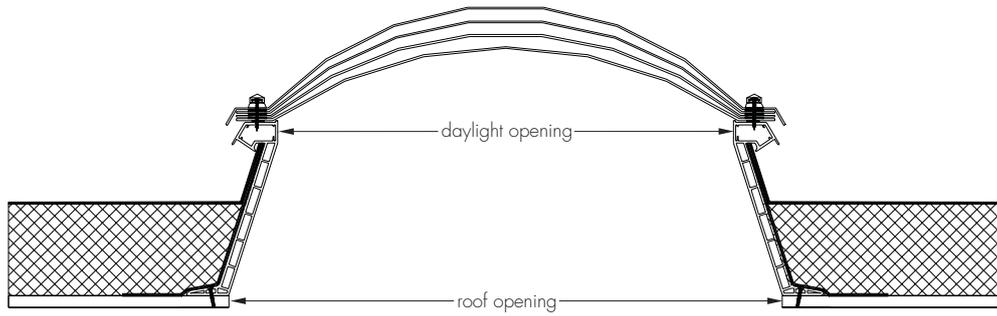
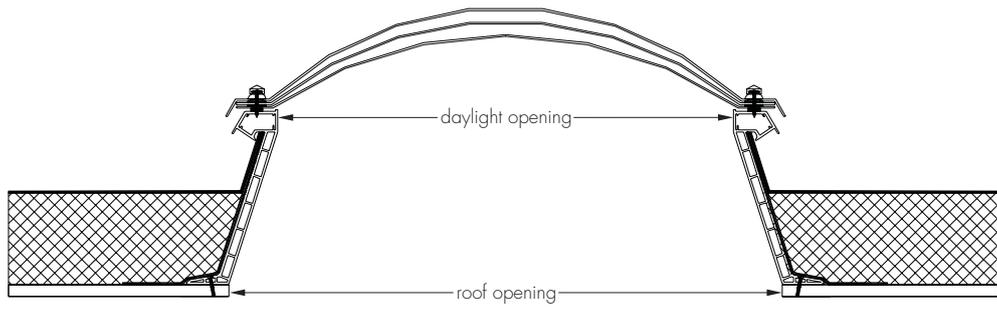
1.3 The polycarbonate glazing is available in a curved dome or a pyramid profile. Kerb adaptors⁽¹⁾ are available from the Certificate holder for non-standard roof openings, in order to provide a suitable fit onto the prepared builder's kerb. Rooflights are available in the styles and sizes listed in Table 1 and shown in Figures 1 and 2.

(1) Outside the scope of this Certificate.

Table 1 Sizes and styles of rooflights

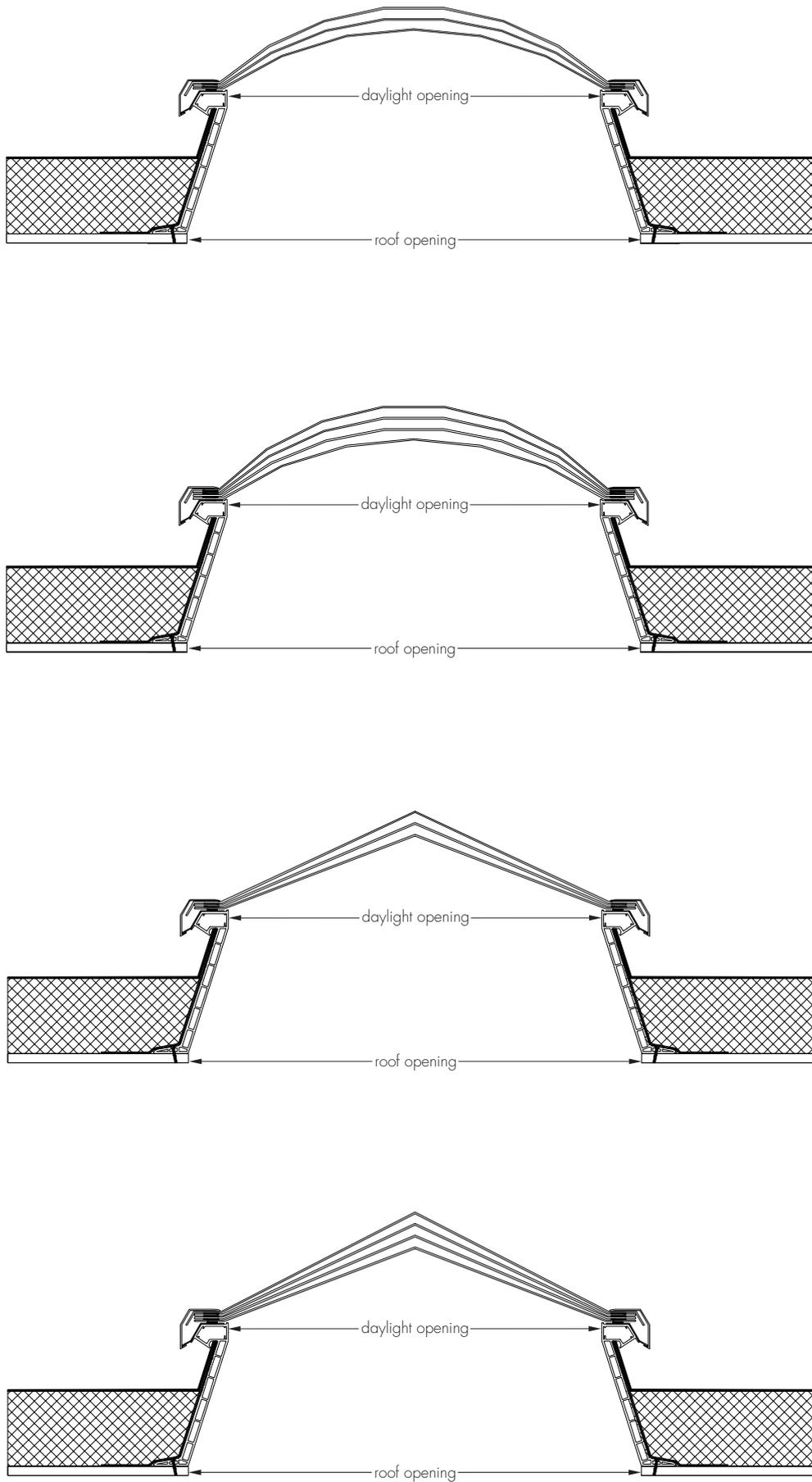
	Dome or pyramid base (mm)	Daylight opening (mm)	Roof opening (mm)
Square	600 x 600	600 x 600	750 x 750
	750 x 750	750 x 750	900 x 900
	900 x 900	900 x 900	1050 x 1050
	1000 x 1000	1000 x 1000	1150 x 1150
	1200 x 1200	1200 x 1200	1350 x 1350
	1350 x 1350	1350 x 1350	1500 x 1500
	1500 x 1500	1500 x 1500	1650 x 1650
	1800 x 1800	1800 x 1800	1950 x 1950
Rectangular	600 x 900	600 x 900	750 x 1050
	600 x 1200	600 x 1200	750 x 1350
	600 x 1500	600 x 1500	750 x 1650
	750 x 900	750 x 900	900 x 1050
	750 x 1000	750 x 1000	900 x 1150
	900 x 1200	900 x 1200	1050 x 1350
	900 x 1500	900 x 1500	1050 x 1650
	900 x 1800	900 x 1800	1050 x 1950
	1000 x 1500	1000 x 1500	1150 x 1650
	1200 x 1500	1200 x 1500	1350 x 1650
	1200 x 1800	1200 x 1800	1350 x 1950
	1200 x 2400	1200 x 2400	1350 x 2550

Figure 1 NaturalLight rooflights



Note: Roof insulation, roof covering and fixings of kerb to roof are outside the scope of this Certificate.

Figure 2 NaturalLight rooflights fitted with SecuriLight frame



Note: Roof insulation, roof covering and fixings of kerb to roof are outside the scope of this Certificate.

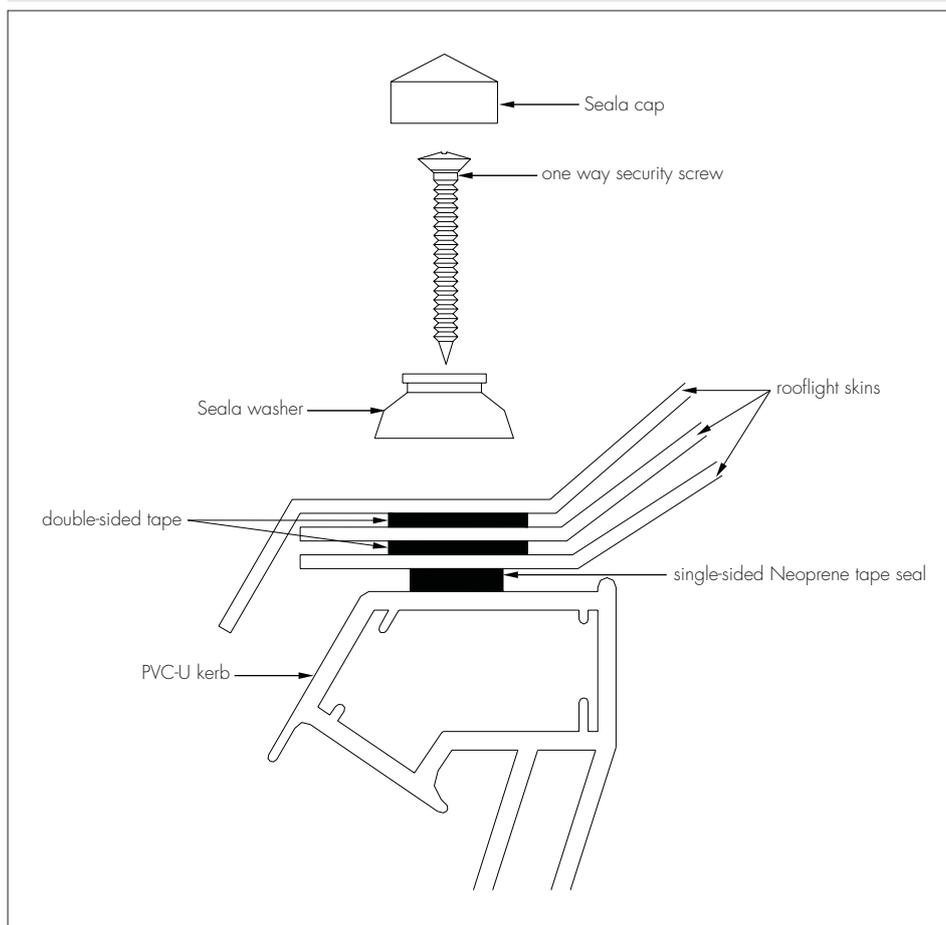
1.4 Other sizes within the size range in Table 1 of this Certificate can also be fabricated on request and are covered by this Certificate.

1.5 The NLS L2 kerb is manufactured from rigid, white uplasticised polyvinyl chloride (PVC-U) profiles and is 290 mm high. Rooflight kerbs may be unvented or can incorporate vents⁽¹⁾. Holes for fixing kerbs onto the roof structure are drilled on site.

(1) Outside the scope of this Certificate

1.6 Assembly of the triple- or quadruple-skin polycarbonate glazing is made using double-sided adhesive tape between skins. They are fixed on the kerbs using single-sided neoprene adhesive tape, screws, Seala washers and caps (see Figure 3). Polycarbonate glazing can be delivered with pre-drilled holes (diameter 8 mm). Fixings are pre-mounted in the factory and delivered with the polycarbonate rooflights.

Figure 3 Naturalight screw system



1.7 The rooflights can be pre-assembled with Securilight, a welded aluminium framework (see Figure 2). In this application, the polycarbonate glazing is fixed to the top of the kerb using rivets. The Securilight internal fixing plate is secured at approximately 75 mm from the outside corner of the kerb; intermediate plates are fixed at approximately 300 to 500 mm centres depending on the size of the rooflight. Rooflights fitted Securilight frames are supplied to site pre-assembled.

1.8 The full specifications and drawings for the materials and components covered by this Certificate are retained by the BBA.

2 Manufacture

2.1 Polycarbonate sheets are vacuum formed to the appropriate size. Kerbs are fabricated from white PVC-U profiles produced by conventional extrusion techniques, which are cut and welded together.

2.2 As part of the assessment and ongoing surveillance of product quality, the BBA has:

- agreed with the manufacturer the quality control procedures and product testing to be undertaken
- assessed and agreed the quality control operated over batches of incoming materials
- monitored the production process and verified that it is in accordance with the documented process
- evaluated the process for management of nonconformities
- checked that equipment has been properly tested and calibrated
- undertaken to carry out the above measures on a regular basis through a surveillance process, to verify that the specifications and quality control operated by the manufacturer are being maintained.

3 Delivery and site handling

- 3.1 The rooflights and kerbs are delivered to site in bubblewrap, ready assembled or in kit form. Each rooflight carries a label bearing the company's mark, the job identification mark and the BBA logo incorporating the number of this Certificate.
- 3.2 The Certificate holder's recommendations for site handling and installation are provided with each delivery.
- 3.3 If the rooflights are to be stored on site they should be stacked on edge with an air gap between each rooflight on a dry, flat, level surface under cover. Multi-skin rooflights must not be nested at any time.
- 3.4 Before installation the kerbs should be laid on timber packers placed on a level surface to avoid damage to finishes and accessories.
- 3.5 Smaller units may be lifted by hand to roof level but larger units will require lifting by crane. The weight of specific rooflights can be obtained by the Certificate holder.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on the NaturalLight Rooflight.

Design Considerations

4 General

- 4.1 NaturalLight Rooflights are suitable for use on flat roofs of domestic or non-domestic buildings to provide natural light. New roofs should be designed in accordance with the relevant Building Regulations.
- 4.2 The rooflights and kerbs are suitable for most existing roofs but it is important that the roof is checked by a suitably qualified and experienced individual to ensure that the possible removal of roof supporting members will not cause undue weakening of the structure and that it can bear the additional loads imposed upon it by the installation of the product.
- 4.3 The rooflights are suitable for replacing existing rooflights. The suitability of existing kerbs must be checked, and replaced if necessary. If the rooflights are to be fitted onto a kerb other than a factory supplied NLS L2 kerb, an adaptor kerb⁽¹⁾ from the Certificate holder can be used. Other kerbs are outside the scope of this Certificate.

(1) Outside the scope of this Certificate.

5 Practicability of installation

The product is designed to be installed by a competent general builder, or a contractor, experienced with this type of product.

6 Light and solar transmittance



6.1 For design purposes, the approximate light and solar transmission characteristics of new material at normal incidence are given in Table 2 of this Certificate. These figures and the daylight opening areas given in Table 1 of this Certificate may be used in SAP and SBEM⁽¹⁾ calculations.

(1) Further guidance is given in *Designing with rooflights supporting the guidance in AD L2A and AD L2B* (2010), published by NARM (National Association of Rooflight Manufacturers).

Table 2 Light and solar transmittance

Light transmittance ⁽¹⁾ (%)			Solar transmittance ⁽²⁾ (g _±)		
Single-skin	Triple-skin	Quadruple-skin	Single-skin	Triple-skin	Quadruple-skin
87	67	59	0.79	0.61	0.54

(1) In accordance with BS EN ISO 13468-1 : 1997

(2) Values calculated in accordance with BS EN 410 : 1998 for triple- and quadruple-skins separated by 20 mm airgaps.

6.2 The methods outlined in CIBSE Guide A (2006) *Environmental design*, Sections 5.7 and 5.8 and Appendix 5 should be used if the total solar gain of the building incorporating the products presents a significant heat input.

7 Thermal properties



7.1 When considering rooflight requirements, designers should refer to the detailed guidance contained in the documents supporting the national Building Regulations. Individual U values, quoted in Tables 3 and 4 of this Certificate, should be compared to the relevant national Building Regulations for England and Wales, Scotland and Northern Ireland.

7.2 U values were simulated for complete assemblies in accordance with BS EN ISO 10211 : 2007 and are shown in Tables 3 and 4 of this Certificate.

Figure 4 Typical rooflight cross section

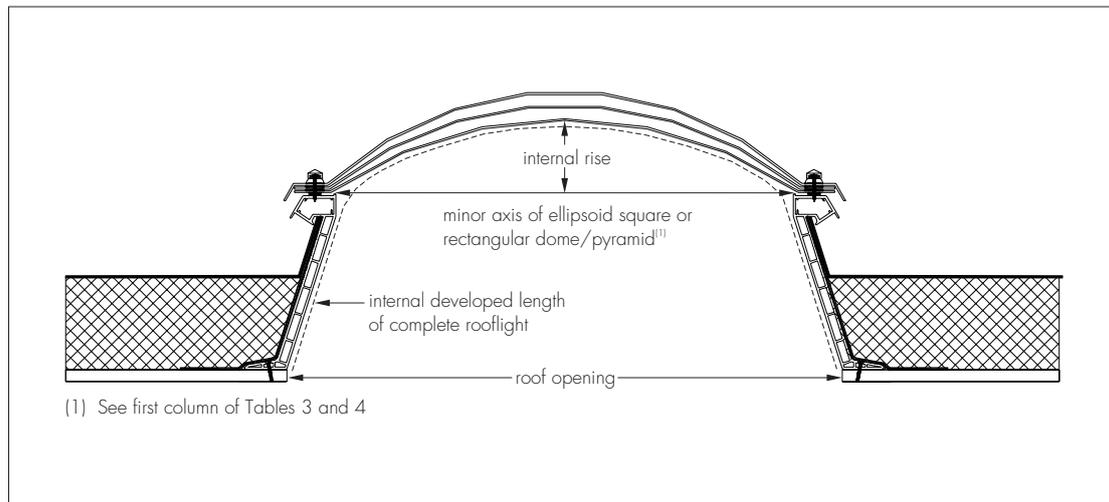


Table 3 Thermal performance of complete dome fixed rooflight with kerb

Dome size (minor dimension) (mm)	Internal rise of dome (mm)	Internal developed length of complete rooflight (with kerb) (m)	Skin	U value ⁽¹⁾ (W·m ⁻² ·K ⁻¹)	Developed U value ⁽²⁾ (W·m ⁻² ·K ⁻¹)	Surface area ratio ⁽³⁾	True U value ⁽⁴⁾ (W·m ⁻² ·K ⁻¹)	Surface area ratio ⁽⁵⁾
600	120	1.25	Triple	3.1	3.8	1.67	5.2	1.37
			Quadruple	2.8	3.3	1.67	4.7	1.42
750	150	1.41	Triple	3.1	3.7	1.57	4.8	1.30
			Quadruple	2.7	3.2	1.57	4.3	1.34
900	180	1.57	Triple	3.1	3.6	1.50	4.6	1.28
			Quadruple	2.7	3.1	1.50	4.0	1.29
1000	200	1.68	Triple	3.1	3.5	1.46	4.5	1.29
			Quadruple	2.7	3.0	1.46	3.9	1.30
1200	240	1.90	Triple	3.1	3.5	1.41	4.3	1.23
			Quadruple	2.6	2.9	1.41	3.7	1.28
1350	270	2.06	Triple	3.0	3.4	1.37	4.2	1.24
			Quadruple	2.6	2.9	1.37	3.6	1.24
1500	300	2.22	Triple	3.0	3.4	1.35	4.1	1.21
			Quadruple	2.6	2.8	1.35	3.5	1.25
1800	360	2.54	Triple	3.0	3.3	1.30	3.9	1.18
			Quadruple	2.5	2.7	1.30	3.3	1.22

(1) Based on internal developed area of complete rooflight.

(2) Based on developed area as defined in *Assessment of thermal performance of out-of-plane rooflights NARM Technical Document NTD 2 (2010)*.

(3) Ratio between internal developed area and true area.

(4) Based on roof opening area.

(5) Ratio between internal developed area and developed area as defined in *Assessment of thermal performance of out-of-plane rooflights NARM Technical Document NTD 2 (2010)*.

Table 4 Thermal performance of complete pyramidal fixed rooflight with kerb

Pyramid size (minor dimension) (mm)	Internal rise of pyramid (mm)	Internal developed length of complete rooflight with kerb (m)	Skin	U value ⁽¹⁾ (W·m ⁻² ·K ⁻¹)	Developed U value ⁽²⁾ (W·m ⁻² ·K ⁻¹)	Surface area ratio ⁽³⁾	True U value ⁽⁴⁾ (W·m ⁻² ·K ⁻¹)	Surface area ratio ⁽⁵⁾
600	218	1.35	Triple	3.2	3.8	1.80	5.8	1.53
			Quadruple	2.9	3.3	1.80	5.2	1.58
750	273	1.53	Triple	3.2	3.7	1.70	5.5	1.49
			Quadruple	2.8	3.2	1.70	4.8	1.50
900	327	1.72	Triple	3.2	3.6	1.64	5.2	1.44
			Quadruple	2.8	3.1	1.64	4.6	1.48
1000	364	1.84	Triple	3.2	3.6	1.60	5.1	1.42
			Quadruple	2.8	3.0	1.60	4.4	1.47
1200	436	2.09	Triple	3.2	3.5	1.55	4.9	1.40
			Quadruple	2.7	3.0	1.55	4.2	1.40
1350	491	2.27	Triple	3.2	3.5	1.51	4.8	1.37
			Quadruple	2.7	2.9	1.51	4.1	1.41
1500	545	2.46	Triple	3.2	3.5	1.49	4.7	1.34
			Quadruple	2.7	2.9	1.49	4.0	1.38
1800 mm	655	2.83	Triple	3.2	3.4	1.45	4.6	1.35
			Quadruple	2.7	2.8	1.45	3.9	1.39

(1) Based on internal developed area of complete rooflight.

(2) Based on developed area as defined in *Assessment of thermal performance of out-of-plane rooflights NARM Technical Document NTD 2* (2010).

(3) Ratio between internal developed area and true area.

(4) Based on roof opening area.

(5) Ratio between internal developed area and developed area as defined in *Assessment of thermal performance of out-of-plane rooflights NARM Technical Document NTD 2* (2010).

7.3 The U values in Tables 3 and 4 of this Certificate will achieve the maximum individual element U value (3.3 W·m⁻²·K⁻¹) mentioned in the national Building Regulations. However, in order to achieve a lower area weighted U value (for all elements of the same type) in new buildings or for extensions/conversions, the additional heat loss should be compensated for by more demanding U values for windows and doors and/or other thermal elements.

7.4 Care must be taken in the design and detailing of kerb/roof junctions to minimise excessive heat loss.

8 Condensation risk



8.1 Modelling of the rooflights in accordance with BS EN ISO 10211 : 2007 indicates the temperature factors shown in Table 5 of this Certificate.

Table 5 Temperature factors⁽¹⁾

Rooflight type	Skin	Temperature factor f_{Rsi}
Dome fixed rooflight with kerb	Triple	0.51
	Quadruple	0.55
Pyramidal fixed rooflight with kerb	Triple	0.52
	Quadruple	0.57

(1) The ratio of temperature drop between the internal rooflight surface and the external environment and the total temperature drop between internal and external environments.

8.2 The risk of condensation forming on an internal surface of the rooflight is dependent on its temperature and the temperature and humidity of the adjacent air. The minimum temperature factor is dependent on the building type, external temperature and external relative humidity for the location and can be calculated for a particular situation in accordance with BS EN ISO 13788 : 2012. Alternatively, default critical temperature factors for limiting the risk of surface condensation values can be obtained from BRE Information Paper IP 1/06.

8.3 Where the temperature factors given in Table 5 are less than the calculated or default values for the relevant building type, there is a risk of surface condensation forming. However, limited intermittent condensation, appearing initially on the kerb, will not be detrimental to the rooflight. By way of comparison, minimum temperature factors for typical PVC-U windows are between 0.50 and 0.65.

8.4 In all cases, the risk of surface condensation can be reduced by limiting activities which produce large amounts of moisture and by providing means for adequate ventilation.

9 Strength and stability



9.1 The product can be selected to have adequate resistance to wind loads calculated in accordance with BS EN 1991-1-4 : 2005 and its National Annex.

9.2 Test conditions showed that rooflights withstood an imposed load of 1500 N·m⁻². The magnitude of the actual snow load imposed will depend upon a number of factors, such as height above sea level, geographical location, roof arrangement and type and configuration of rooflights. Therefore, it is recommended that BS EN 1991-1-3 : 2003 and its National Annex is used to calculate the actual snow load when the roof is used in situations where a load greater than 1500 N·m⁻² can be expected.

9.3 Details of the connections between the kerb and the roof must be determined by a suitably qualified and experienced individual. Guidance is available from the Certificate holder.

9.4 The polycarbonate rooflight material has a good resistance to impact from hard bodies, such as hailstones, or impacts due to vandalism. Tests on typical rooflight samples showed that an impact energy of 2.5 J did not cause damage when applied at various points of the rooflights.

9.5 Tests have shown that resistance to imposed snow loads and wind loads by the rooflights is dependent on size and configuration. As a guide, small pyramid-shape rooflights are more resistant to imposed loads, whilst large, domed rooflights are the least resistant. Rooflights, therefore, should be selected according to the loads expected for a particular location. The results of tests for selected rooflights carried out in accordance with BS EN 1873 : 2005 are given in Table 6 of this Certificate.

Table 6 Resistance to snow and wind loads

Rooflight type	Dimensions (mm)	Snow load (DL) (N·m ⁻²)	Wind load (UL) (N·m ⁻²)
Domed, fixed, triple-skin	900 x 2400	1500 ⁽¹⁾	1750 ⁽³⁾
Domed, Securilight, triple-skin	900 x 2400	3000 ^{(1) (2)}	2500 ^{(3) (4)}

(1) Downward load.

(2) The screws holding the metal brackets under the Securilight frame loosened slightly at 3000 Pa. Snow load was simulated by the use of air pressure.

(3) Upward load.

(4) Buckling occurred at -2000 Pa. Pressure was then reduced to -2500 Pa and the load held for 6 minutes; the shape of the rooflight was restored after the load was removed. Wind load was simulated by the use of air pressure.

9.6 Fixing the rooflight to the kerb is described in the *Installation* part of this Certificate. Adequate resistance to wind uplift is achieved by this type of fixing.

9.7 The product has adequate resistance to soft body impacts, such as a person accidentally falling against a rooflight. The results of tests for selected rooflights, carried out in accordance with BS EN 1873 : 2005 are given in Table 7 of this Certificate.

Table 7 Resistance to soft body impact

Rooflight type	Dimensions (mm)	Designation to BS EN 1873 : 2005
Domed, Securilight, triple-skin	600 x 600	SB 1200
Pyramidal, fixed, triple-skin	600 x 600	SB 1200

10 Weathertightness



10.1 When installed in accordance with the manufacturer's instructions and section 16 and 17 of this Certificate, the rooflights and kerbs will provide adequate resistance to the ingress of precipitation.

10.2 Particular attention must be paid to the correct fitting of all components and to the detailing of sealants and roofing materials.



10.3 The installation of vents⁽¹⁾ will affect the air permeability performance. The type of vent specified should take into account the prevailing weather conditions, for example, in locations when driving snow is likely.

(1) Outside the scope of this Certificate.

11 Behaviour in relation to fire



11.1 When classified in accordance with BS EN 13501-1 : 2007 the polycarbonate material (3 mm thick) achieved Class B-s2, d0.

11.2 Under European classifications the polycarbonate sheets can be regarded as having a B_{ROF}(t4) classification and will adequately resist the spread of flame over the roof and from one building to another.

11.3 For the purposes of classifying the performance of ceiling linings, the rooflights' internal glazing is classified as TP(a) rigid and the frame and kerbs need not be considered.

11.4 In respect of external fire spread on roofs, the rooflights' external glazing is classified as TP(a) rigid (and low vulnerability in Scotland). The product may therefore be used as follows:

England and Wales and Northern Ireland — the product may not be used over a protected stairway, or less than 6 m from a relevant boundary, but is otherwise unrestricted.

Scotland — the product is unrestricted by Mandatory Standard 2.8, with reference to clauses 2.8.1⁽¹⁾⁽²⁾, 2.C.3⁽¹⁾ and 2.F.3⁽²⁾.

(1) Technical Handbook (Domestic)

(2) Technical Handbook (Non-Domestic).

11.5 The external rating of the kerb will depend on the performance of the roof weatherproofing finish. The performance of individual roof weatherproofings is outside the scope of this Certificate.

12 Safety



12.1 Under no circumstances should anyone venture onto a polycarbonate rooflight. The external surfaces of the rooflight cannot be cleaned from the inside of the building. For maintenance and cleaning purposes special precautions must be taken, such as the provision of a catwalk, to allow safe access and to prevent the possibility of falling through the polycarbonate rooflight, even though the rooflight may support such a load.

12.2 If the rooflight is located on a roof which is generally accessible to the public, provision must be made to prevent people falling onto the glazed part (eg guard rails). If, as the result of an accidental fall, contact is made with the polycarbonate glazing, the polycarbonate material shows good resistance to impact (see section 9.7 of this Certificate).

12.3 When subjected to normal atmospheric agents, movement of the structure, hygrothermal stresses or vibrations, the polycarbonate rooflights will not collapse or result in falling debris that would cause injury to occupants or passers-by.

13 Security against intrusion

13.1 The rooflights are supplied with tamper-proof fixings to make removal of the rooflight from the kerb more difficult (see Figure 3).

13.2 Individual rooflights can be specified with a Securilight frame (a welded-aluminium framework) round the edge of the glazing (see Figure 2), thus providing a continuous concealed fixing between rooflight and kerb.

13.3 NaturalLight Rooflights resist the likely methods of intrusion by an opportunist intruder using basic hand tools, when tested according to PAS 24 : 2012, Annex C.4.3.

13.4 Polycarbonate rooflights have a good resistance to impact, making breakage very difficult.

14 Maintenance



14.1 If damage occurs, the rooflights can be re-glazed and the fixings replaced, but these operations should be carried out using the materials recommended by the Certificate holder and approved by the BBA.

14.2 Cleaning of the rooflights should be carried out using water containing household non-abrasive, neutral detergent. To avoid scratching the surface, only soft cloths should be used when cleaning.

15 Durability



15.1 The product will continue to function effectively for a period of at least 25 years.

15.2 After natural weathering, some slight change in colour of the polycarbonate will occur. However, the change will be even across the sheet and will not significantly decrease properties, although light transmittance haze may be slightly affected.

15.3 Under normal conditions in non-aggressive locations, the polyester powder coating will have an anticipated decorative life of at least 15 years in heavily polluted areas and at least 20 years in other areas.



15.4 Fittings, as described in this Certificate, may need to be replaced within the life of the rooflights, particularly when exposed to aggressive environments, such as coastal or industrial locations.

16 Reuse and recyclability

The product comprises PVC-U, aluminium and polycarbonate, each of which can be recycled.

17 General

- 17.1 Installation of the product must be carried out in accordance with the Certificate holder's installation instructions.
- 17.2 Prior to installation of the rooflight, the roof must be checked by means of calculations or testing to ensure that it can carry the additional loads the installation may impose, strengthening the roof if necessary. This work must be carried out by a suitably qualified and experienced individual.
- 17.3 The rooflight kerb should be checked dimensionally to ensure the fit, and the rooflight should be checked for size before the unit is lifted to the roof.
- 17.4 A rooflight should never be left in position without ensuring all of its fixings are present and fully tightened.
- 17.5 Where the roof covering is dressed below the rooflight and on top of an existing kerb, precautions should be taken to prevent bitumen damaging internal finishes.

18 Procedure

Fixing NLS L2 kerbs to roofs

18.1 The NLS L2 kerb is placed over the roof opening, pilot holes are drilled at approximately 150 mm from corners and at 300 mm centres and the kerb is fixed through the foot of the kerb using appropriate fixings⁽¹⁾.

(1) Outside the scope of this Certificate.

18.2 The roofing covering is installed as specified in the manufacturer's instructions, and laid up the side of the NLS L2 kerb, terminating against the lip beneath the kerb.

Fixing the NLS 220 Domes and NLS 200 Pyramids onto the NLS L2 kerbs

18.3 The single-sided adhesive tape, supplied with the rooflights, is placed in the centre of the kerb's fixing flange and the rooflight glazing is placed on top. Holes (using an 8 mm drill bit, if not already pre-drilled) are drilled through the skins of the polycarbonate glazing 150 mm from the corners and at 300 mm centres ensuring that the swarf is removed after drilling. The Seala washer is positioned onto the glazing and the screws are fitted through the hole followed by the Seala cap.

Technical Investigations

19 Tests

Tests were carried out on the NaturalLight Rooflight to determine:

- resistance to upward load
- resistance to downward load
- resistance to snow load
- resistance to impacts
- durability of hardware
- basic security
- suitability of materials.

20 Investigations

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

20.2 Thermal performance and temperature factors of glazed rooflights were assessed using thermal simulation.

20.3 An examination was made of existing data in relation to:

- performance in fire
- luminous transmittance
- air infiltration
- watertightness.

20.4 Components were assessed for resistance to corrosion.

Bibliography

- BS EN 410 : 1998 *Glass in building — Determination of Luminous and Solar Characteristics of Glazing*
- BS EN 1873 : 2005 *Prefabricated accessories for roofing — Individual roof lights of plastics — Specification and test methods*
- BS EN 1991-1-3 : 2003 *Eurocode 1 : Actions on structures — General actions — Snow loads*
- NA to BS EN 1991-1-3 : 2003 UK National Annex to Eurocode 1 : Actions on structures — General actions — Snow loads
- BS EN 1991-1-4 : 2005 *Eurocode 1 : Actions on structures — General actions — Wind actions*
- NA to BS EN 1991-1-4 : 2005 UK National Annex to Eurocode 1 : Actions on structures — General actions — Wind actions
- BS EN 13501-1 : 2007 *Fire Classification of Construction Products and Building Elements — Classification Using Test Data from Reaction to Fire Tests*
- BS EN ISO 10211 : 2007 *Thermal bridges in building construction — Heat flows and surface temperatures — Detailed calculations*
- BS EN ISO 13468-1 : 1997 *Plastics — Determination of the total luminous transmittance of transparent materials — Single-beam instrument*
- BS EN ISO 13788 : 2012 *Hygrothermal performance of building components and building elements — Internal surface temperature to avoid critical surface humidity and interstitial condensation — Calculation methods*
- PAS 24 : 2012 *Enhanced security performance requirements for doorsets and windows in the UK — External doorsets and windows intended to offer a level of security suitable for dwellings and other buildings exposed to comparable risk*
- BRE Information Paper IP 1/06 *Assessing the effects of thermal bridging at junctions and around openings*
- NARM Technical Document NTD 2 (2010) *Assessment of thermal performance of out-of-plane rooflights*

21 Conditions

21.1 This Certificate:

- relates only to the product/system that is named and described on the front page
- is issued only to the company, firm, organisation or person named on the front page — no other company, firm, organisation or person may hold or claim that this Certificate has been issued to them
- is valid only within the UK
- has to be read, considered and used as a whole document — it may be misleading and will be incomplete to be selective
- is copyright of the BBA
- is subject to English Law.

21.2 Publications, documents, specifications, legislation, regulations, standards and the like referenced in this Certificate are those that were current and/or deemed relevant by the BBA at the date of issue or reissue of this Certificate.

21.3 This Certificate will remain valid for an unlimited period provided that the product/system and its manufacture and/or fabrication, including all related and relevant parts and processes thereof:

- are maintained at or above the levels which have been assessed and found to be satisfactory by the BBA
- continue to be checked as and when deemed appropriate by the BBA under arrangements that it will determine
- are reviewed by the BBA as and when it considers appropriate.

21.4 The BBA has used due skill, care and diligence in preparing this Certificate, but no warranty is provided.

21.5 In issuing this Certificate, the BBA is not responsible and is excluded from any liability to any company, firm, organisation or person, for any matters arising directly or indirectly from:

- the presence or absence of any patent, intellectual property or similar rights subsisting in the product/system or any other product/system
- the right of the Certificate holder to manufacture, supply, install, maintain or market the product/system
- actual installations of the product/system, including their nature, design, methods, performance, workmanship and maintenance
- any works and constructions in which the product/system is installed, including their nature, design, methods, performance, workmanship and maintenance
- any loss or damage, including personal injury, howsoever caused by the product/system, including its manufacture, supply, installation, use, maintenance and removal
- any claims by the manufacturer relating to CE marking.

21.6 Any information relating to the manufacture, supply, installation, use, maintenance and removal of this product/system which is contained or referred to in this Certificate is the minimum required to be met when the product/system is manufactured, supplied, installed, used, maintained and removed. It does not purport in any way to restate the requirements of the Health and Safety at Work etc. Act 1974, or of any other statutory, common law or other duty which may exist at the date of issue or reissue of this Certificate; nor is conformity with such information to be taken as satisfying the requirements of the 1974 Act or of any statutory, common law or other duty of care.