



## Brett Martin Daylight Systems Ltd

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CI/SfB

(37.4) Xnó

**Agrément  
Certificate  
No 06/4385**

Designated by Government  
to issue  
European Technical  
Approvals

## BRETT MARTIN MARDOME ROOFLIGHTS AND KERBS

Lucarne  
Dachoberlicht

# Product



• THIS CERTIFICATE RELATES TO BRETT MARTIN MARDOME ROOFLIGHTS AND KERBS.


• The rooflights and kerbs are for use on flat roofs of domestic and commercial buildings, to provide natural light and ventilation.

• It is essential that the rooflights and kerbs are installed and used in accordance with the conditions set out in the Design Data and Installation parts of this Certificate.

These Front Sheets must be read in conjunction with the accompanying Detail Sheets, which provide information specific to particular rooflights and kerbs.

## Regulations — Detail Sheet 1

### 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 plastic rooflights can contribute in achieving compliance. In the opinion of the BBA, Brett Martin Mardome Rooflights and Kerbs, if used in accordance with the provisions of this Certificate, will meet or contribute to meeting the relevant requirements.

Requirement: A1

Comment:

Loading

When installed in accordance with the provisions of this Certificate, the products will have sufficient strength and stiffness to sustain the design load. See the tinted areas in the *Strength and stability* section of these Front Sheets.

Requirement: B2(1)

Comment:

Internal fire spread (linings)

The polycarbonate sheets used in the rooflights can be classified as Tp(a) rigid material. See the tinted areas in the *Behaviour in relation to fire* section of these Front Sheets.

Requirement: B4(2)

Comment:

External fire spread

The polycarbonate sheets used in the rooflights can be taken as classified Tp(a) material. See the tinted areas in the *Behaviour in relation to fire* section of these Front Sheets.

Requirement:	<b>C2(b)(c)</b>	Resistance to moisture
Comment:		When installed in accordance with this Certificate, the rooflights will not adversely affect the resistance of the roof to the passage of moisture. See the tinted areas in the <i>Weathertightness</i> section of these Front Sheets. Ventilators incorporated in the kerbs will provide airflow to alleviate surface condensation in the rooflights. See the tinted areas in the <i>Condensation risk</i> section of these Front Sheets.
Requirement:	<b>F1</b>	Means of ventilation
Comment:		Opening rooflights and, when fitted, ventilators incorporated in the kerbs can meet or contribute to meet the Requirement. See the tinted areas in the <i>Ventilation</i> section of these Front Sheets.
Requirement:	<b>L1(a)(i)</b>	Conservation of fuel and power
Comment:		The U values of some rooflights and kerbs exceed the limiting U values given in Approved Documents. See the tinted areas in the <i>Thermal insulation</i> section of these Front Sheets. The products can also contribute to daylighting and solar transmittance. See the tinted area in the <i>Light and solar transmittance</i> section of these Front Sheets.
Requirement:	<b>Regulation 7</b>	Materials and workmanship
Comment:		The products are acceptable when used in accordance with this Certificate. See the tinted area in the <i>Durability</i> section of these Front Sheets and the relevant accompanying Detail Sheets.

## 2 The Building (Scotland) Regulations 2004 (as amended)



In the opinion of the BBA, Brett Martin Mardome Rooflights and Kerbs, 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 the tinted area in the <i>Durability</i> section of these Front Sheets and the relevant accompanying Detail Sheets and the <i>Installation</i> part of the accompanying Detail Sheets.
Regulation:	8(2)	Fitness and durability of materials and workmanship
Comment:		The products can contribute to a construction satisfying this Regulation. See the tinted area in the <i>Durability</i> section of these Front Sheets.
Regulation:	<b>9</b>	<b>Building standards – construction</b>
Standard:	1.1(b)	Structure
Comment:		When installed in accordance with the provisions of this Certificate, the products will have sufficient strength and stiffness to sustain design loads, with reference to clause 1.1.1 <sup>(1)(2)</sup> . See the tinted areas in the <i>Strength and stability</i> section of these Front Sheets.
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 <sup>(1)(2)</sup> and 2.5.6 <sup>(1)(2)</sup> . See the tinted areas in the <i>Behaviour in relation to fire</i> section of these Front Sheets.
Standard:	2.8	Spread from neighbouring buildings
Comment:		The polycarbonate sheets used externally in the rooflights have been assessed as 'low vulnerability', with reference to clause 2.8.2 <sup>(1)(2)</sup> . See the tinted areas in the <i>Behaviour in relation to fire</i> section of these Front Sheets.
Standard:	3.10	Precipitation
Comment:		When installed in accordance with the provisions stated in this Certificate, the products will not adversely affect the resistance of the roof to the passage of moisture, with reference to clause 3.10.7 <sup>(1)(2)</sup> . See the tinted areas in the <i>Weathertightness</i> section of these Front Sheets.
Standard:	3.14	Ventilation
Comment:		Opening rooflights and, when fitted, ventilators incorporated in the kerbs can meet or contribute to meeting this Standard, with reference to clauses 3.14.2 <sup>(1)(2)</sup> and 3.14.3 <sup>(1)(2)</sup> . Additionally, the rooflights can be opened using manual or powered actuators fitted to the kerbs. See the tinted areas in the <i>Ventilation</i> section of these Front Sheets.

Standard:	3.15	Condensation
Comment:		The risk of surface condensation will depend on the environmental conditions. When fitted, ventilators incorporated in the kerbs will provide airflow to alleviate surface condensation on the rooflights, with reference to clause 3.15.4 <sup>(1)</sup> . See the tinted areas in the <i>Condensation risk</i> section of these Front Sheets.
Standard:	3.16	Natural lighting
Comment:		In calculating the contribution of the system to natural lighting, with reference to clauses 3.16.1 <sup>(1)</sup> and 3.16.3 <sup>(1)</sup> to this Standard, the area of glazing given in the tables in the <i>Thermal properties</i> section of the relevant accompanying Detail Sheets can be used.
Standard:	4.8(b)(c)	Danger from accidents
Comment:		The provisions described in clause 4.8.3 <sup>(1)(2)</sup> to this Standard regarding the safe cleaning of rooflights, must be taken into account.
Standard:	4.8(e)	Danger from accidents
Comment:		When fitted, manual or powered actuators incorporated in the kerbs can meet or contribute to meeting this Standard, with reference to clause 4.8.6 <sup>(2)</sup> .
Standard:	6.1(b)	Carbon dioxide emissions
Standard:	6.2	Building insulation envelope
Comment:		With reference to clauses 6.1.1 <sup>(1)</sup> , 6.1.2 <sup>(1)(2)</sup> , 6.1.3 <sup>(2)</sup> , 6.2.1 <sup>(1)(2)</sup> , 6.2.7 <sup>(1)</sup> , 6.2.8 <sup>(2)</sup> , 6.2.9 <sup>(1)</sup> and 6.2.10 <sup>(2)</sup> , see the tinted areas in the <i>Thermal insulation</i> and <i>Light and solar transmittance</i> sections of these Front Sheets.
		(1) Technical Handbook (Domestic).
		(2) Technical Handbook (Non-Domestic).

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



In the opinion of the BBA, Brett Martin Mardome Rooflights and Kerbs, if used in accordance with the provisions of this Certificate, will satisfy or contribute to satisfying the various Building Regulations as listed below.

Regulation:	B2	Fitness of materials and workmanship
Comment:		The products are acceptable when used in accordance with this Certificate. See the tinted area in the <i>Durability</i> section of these Front Sheets and the relevant accompanying Detail Sheets.
Regulation:	C4(b)	Resistance to ground moisture and weather
Comment:		When installed in accordance with the provisions stated in this Certificate, the products will not adversely affect the resistance of the roof to the passage of moisture. See the tinted areas in the <i>Weathertightness</i> section of these Front Sheets.
Regulation:	D1	Stability
Comment:		When installed in accordance with the provisions of this Certificate, the products will have sufficient strength and stiffness to sustain the design loads. See the tinted areas in the <i>Strength and stability</i> section of these Front Sheets.
Regulation:	E4(1)	Internal fire spread — Structure
Comment:		The polycarbonate sheets used in the rooflights can be classified as Tp(a) rigid material. See the tinted areas in the <i>Behaviour in relation to fire</i> section of these Front Sheets.
Regulation:	E5(b)	External fire spread
Comment:		The polycarbonate sheets used in the rooflights can be classified as Tp(a) rigid material. See the tinted areas in the <i>Behaviour in relation to fire</i> section of these Front Sheets.
Regulation:	F2(a)(i)	Conservation measures
Regulation:	F3(2)	Target carbon dioxide Emissions Rate
Comment:		The U values of some rooflights and kerbs exceed the limiting U values given in the technical booklets. See the tinted areas in the <i>Thermal insulation</i> and <i>Light and solar transmittance</i> sections of these Front Sheets.
Regulation:	K2	Means of ventilation
Comment:		Opening rooflights and, when fitted, ventilators incorporated in the kerbs can meet or contribute to meet the requirements of this Regulation. Additionally, the rooflights can be opened using manual or powered actuators fitted to the kerbs. See the tinted areas in the <i>Ventilation</i> section of these Front Sheets.

## 4 Construction (Design and Management) Regulations 2007

### Construction (Design and Management) Regulations (Northern Ireland) 1995 (as amended)

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

See section:

6 *Delivery and site handling* (6.1, 6.3 and 6.5) of these Front Sheets.

## Technical Specification

### 5 Description

#### Rooflights

5.1 Brett Martin Mardome Rooflights are fully described in the accompanying Detail Sheets.

#### Kerbs

5.2 The various Brett Martin Kerbs are fully described in the accompanying Detail Sheets.

5.3 Quality control checks on the units include:

- dimensional accuracy, including dome height
- visual inspection
- squareness
- suitability of fittings.

### 6 Delivery and site handling

6.1 The Certificate holder's recommendations for site handling and installation are provided with each delivery.

6.2 The rooflights and kerbs are delivered to site ready assembled or in kit form, wrapped in bubble wrap protective sheet ready for installation. Each rooflight carries a label bearing the company's mark and the job identification mark.

6.3 Smaller units may be manhandled to roof level but larger units will require cranes.

6.4 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 away from direct sunlight. Multi-skin rooflights must not be nested at any time.

6.5 Before installation the kerbs should be laid on timber packers placed on a level surface to avoid damage to finishes and accessories.

6.6 When selecting means of access, eg use of scaffolding, the safety of operatives, occupants and passers-by during the period of installation should be considered.

## Design Data

### 7 General

7.1 Brett Martin Mardome Rooflights and Kerbs are suitable for use on flat roofs of domestic or

commercial buildings to provide natural light and ventilation. Roofs should be designed in accordance with BS 6229 : 2003.


7.2 The rooflights and kerbs are suitable for most existing roofs but it is important that the roof is checked by a suitably-qualified person to ensure that the possible removal of roof supporting members will not cause any problems and that it can bear any possible additional loads imposed upon it by the installation of the products.

7.3 The rooflights are suitable for replacing existing rooflights. The suitability of existing upstands must be checked and be replaced if necessary. The rooflights should not be used without a kerb. The use of kerbs other than those described in the accompanying Detail Sheets is outside the scope of this Certificate.

### 8 Practicability of installation

The rooflights and kerbs are practicable to install using the methods and procedures within this Certificate and in accordance with the recommendations given in the Certificate holder's installation guide.

### 9 Strength and stability

 9.1 The products can be selected to have adequate resistance to wind loads calculated in accordance with BS 6399-2 : 1997.

9.2 Test conditions showed that rooflights withstood an imposed load of 1 125 Nm<sup>-2</sup>. 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, type and configuration of rooflights. Therefore, it is recommended that BS 6399-3 : 1988 is used to calculate the actual snow load when the roof is used in situations where a load greater than 1 125 Nm<sup>-2</sup> can be expected.

9.3 Details of the connections between the upstand and the roof must be entrusted to a suitably-qualified person. 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 1.

Table 1 Resistance to snow and wind loads

Rooflight type	Dimensions (mm)	Snow load (Nm <sup>-2</sup> )	Wind load (Nm <sup>-2</sup> )
Domed	1200 x 2400	DL1125 <sup>(1)(2)</sup>	UL1500 <sup>(3)</sup>
Pyramid	1500 x 1500	DL1750 <sup>(1)</sup>	UL3000 <sup>(3)</sup>

- (1) Downward load.  
 (2) Buckling occurred at this load, but the shape of the rooflight was restored after the load was removed. Snow load was simulated by the use of air pressure.  
 (3) Upward load.

9.6 Fixing the rooflight to the kerb is described in the *Installation* part of the accompanying Detail Sheets. 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 ACR[M]001 : 2005, are given in Table 2.

Table 2 Resistance to soft-body impact

Rooflight type	Dimensions (mm)	Classification (non-fragility)
Domed polycarbonate	1200 x 2400	Class B
Pyramid polycarbonate	605 x 605	Class B
Double-glazed glass	1250 x 1250	Class B <sup>(1)</sup>

- (1) Test results indicate a non-fragility rating of Class A. However, the Certificate holder claims only a Class B.

## 10 Weathertightness

10.1 When installed in accordance with the manufacturer's instructions and section 19 of these Front Sheets and sections 5 and 6 in the relevant Detail Sheets, the rooflights and kerbs will provide a weatherproof construction.

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 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, the selection of a closable vent is recommended.

## 11 Behaviour in relation to fire

11.1 The rigid, solid, 3 mm thick polycarbonate sheets used in the rooflights may be classified as Tp(a) rigid in accordance with the national Building Regulations:

### England and Wales

Approved Document B, Volume 1 *Dwellinghouses*, Appendix A, Sections 19 and 20 and Volume 2 *Buildings other than dwellinghouses*, Appendix A, Sections 19 and 20

### Scotland

Mandatory Standard, 2.5 clause 2.5.4<sup>(1)(2)</sup>

- (1) Technical Handbook (Domestic).  
 (2) Technical Handbook (Non-Domestic).

### Northern Ireland

Technical Booklet E, Section 2.5

11.2 Guidance on the limitations of use of these materials is given in the national Building Regulations:

### England and Wales

Approved Document B, Volume 1 *Dwellinghouses*, Section 10.6, Table 7 and Volume 2 *Buildings other than dwellinghouses*, Section 14.6, Table 18

### Scotland

Mandatory Standards 2.5, 2.8 and 2.9, clauses 2.5.6<sup>(1)(2)</sup>, 2.8.1<sup>(1)(2)</sup> and 2.9.17<sup>(2)</sup> respectively. The rigid, solid, 3 mm thick polycarbonate sheets can be classified as 'low vulnerability' in accordance with Standard 2, Annex 2D<sup>(1)</sup> and Annex 2F<sup>(2)</sup>.

- (1) Technical Handbook (Domestic).  
 (2) Technical Handbook (Non-Domestic).

### Northern Ireland

Technical Booklet E, Tables 2.2 and 4.8.

## 12 Light and solar transmittance

For design purposes, the approximate light transmission characteristics of new material at normal incidence are given in Table 3. These figures and the daylight opening areas given or directed in the *Thermal properties* section of the accompanying Detail Sheets may be used in SAP and SBEM<sup>(1)</sup> calculations.

- (1) Further guidance is given in *Designing with rooflights* supporting the guidance in Approved Documents L2A and L2B (issue 1, September 2006, published by NARM).

Table 3 Light and solar transmittance

Polycarbonate finish	Light transmittance			Solar transmittance <sup>(2)</sup> (g <sub>1</sub> )		
	Single skin <sup>(1)</sup>	Double skin	Triple skin	Single skin	Double skin	Triple skin
Clear	0.88	0.77	0.68	0.8	0.7	0.5
Opal	0.38	0.33	0.29	—	—	—
Bronze	0.58	0.51	0.45	—	—	—
Clear/textured	0.80	0.70	0.62	—	—	—

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

- (2) Default values taken from SBEM.



## 13 Ventilation



If fitted, ventilators installed in pairs on opposite sides of the long edges of kerbs will provide ventilation to the room below the rooflight. Additionally, the rooflights can be opened using manual or powered actuators fitted to the kerbs. The ventilator openings can provide or contribute to providing the background ventilation (trickle ventilation) open area requirements given in the national Building Regulations:

### England and Wales

Approved Document F, Tables 1.2 (a–d) are relevant for dwellings. The equivalent area of any background ventilator incorporated in the kerb should be determined at a 1 Pa pressure difference, using the appropriate test method given in Table 1.6 of the Approved Documents. Separate guidance for buildings other than dwellings is given in Tables 2.2 and 2.3

### Scotland

Mandatory Standard 3.14, clauses 3.14.2<sup>(1)(2)</sup>, 3.14.3<sup>(1)(2)</sup> and 3.14.5<sup>(1)</sup>.

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

### Northern Ireland

Technical Booklet K, Tables 2.1 and 2.2.

## 14 Thermal insulation

14.1 U values, based on internal surface area, for different combinations of rooflights and kerbs, are given in the relevant table in the accompanying Detail Sheets.



14.2 Any rooflight U value exceeding the limiting values in Table 4 do not comply with the requirements. When showing compliance, the U values and areas given in the relevant tables may be used to calculate the area-weighted U values for windows, rooflights and doors, which will need to be better than  $2.2 \text{ Wm}^{-2}\text{K}^{-1}$ .

Table 4 Limiting values

	Limiting U values ( $\text{Wm}^{-2}\text{K}^{-1}$ )	
	Double skin	Triple skin
England and Wales and Northern Ireland	3.8	3.6
Scotland	3.3	3.3

14.3 The thermal transmittance (U values) of the polycarbonate glazing skins of the rooflights according to BS EN 673 : 1998, when horizontal, are  $3.0 \text{ Wm}^{-2}\text{K}^{-1}$  for double-skin options and  $1.9 \text{ Wm}^{-2}\text{K}^{-1}$  for the triple-skin option (assuming average 25 mm wide cavity between skins).

14.4 Rooflight assemblies are permeable to air at the junctions between the rooflight and kerb, particularly where an opening mechanism is

present. Air permeability is beneficial for control of condensation but can also have an effect on thermal insulation properties. This may affect the airtightness of the building envelope.

## 15 Condensation risk



15.1 The risk of condensation forming on a surface is dependent on its temperature and the temperature and humidity of the adjacent air. This risk can be minimised by providing means for adequate ventilation and limiting activities which produce large amounts of moisture.

15.2 Surface temperatures and temperature factors ( $f_{\text{Rsi}}$ ) for the frame of the rooflight, in the worst-case configuration for each rooflight construction, have been modelled in accordance with BS EN ISO 10211-1 : 1996 and BS EN ISO 10211-2 : 2001 and are shown in Table 5.

Table 5 Temperature factors for Mardome rooflight frames

Construction	Temperature factor ( $f_{\text{Rsi}}$ )
Trade	0.62
Surefit	0.74
Ultra	0.77
Premier	0.24

15.3 Optional configurations (eg rooflights with vents and opening rooflights) include additional framing material which can increase the temperature factor. For example, vented Surefit or Trade include the lower vent frame inherent in an Ultra rooflight and will achieve the same performance as the Ultra given in Table 5.

15.4 Table 3 from BRE Information Paper IP 1/06 *Assessing the effects of thermal bridging at junctions and around openings* gives critical temperature factors for limiting the risk of surface condensation at potential cold spots due to thermal bridging. Products will adequately limit the risk of surface condensation when they are used in buildings or parts of buildings where the temperature factors ( $f_{\text{Rsi}}$ ) are not less than the critical temperature factors ( $f_{\text{CRsi}}$ ) given in Table 6.

15.5 Air flow from ventilators or opening rooflights will alleviate the risk of condensation even where the temperature factors ( $f_{\text{Rsi}}$ ) are lower than the critical temperature factors ( $f_{\text{CRsi}}$ ) given in Table 6.

15.6 The temperature factors shown in Table 5 apply to the whole of the frame of the rooflight. The performance of the frame is better than that of the glazing or kerb (not covered in BRE Information Paper IP 1/06). If condensation occurs (eg in a particularly high-humidity environment), it would appear initially on areas of glazing and/or kerb and would not be detrimental to the product as these materials are non-absorbent and will not promote mould growth.

Table 6 Critical temperature factors for limiting the risk of surface condensation<sup>(1)</sup>

Types of building	$f_{CRsi}$
Storage buildings	0.30
Offices, retail premises	0.50
Sports halls, kitchens, canteens; buildings heated with un-flued gas heaters	0.80
Buildings with high humidity (eg swimming pools, laundries and breweries)	0.90

(1) Rooflight kerbs with  $f_{Rsi} < 0.3$ , should only be used for unheated buildings or those heated for frost protection.

## 16 Safety

16.1 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 rooflight, the polycarbonate material shows good resistance to impact and the rooflight is rated a Class B non-fragile assembly (see section 9.7).

16.2 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.


## 17 Maintenance

17.1 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.

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

17.3 Under no circumstances should anyone venture onto a polycarbonate rooflight. For maintenance purposes special precautions must be taken to prevent the possibility of falling through the polycarbonate rooflight, even though the rooflight may support such a load.

## 18 Durability

 Available test data and knowledge of the materials suggest that the products, when installed in accordance with this Certificate, should have a life of at least 15 years for the polycarbonate material and 20 years for the PVC-UE kerb material in most non-corrosive environments. Minor changes in surface appearance and light transmission may occur during this period.

## Installation

### 19 General

19.1 Installation of the Brett Martin Mardome Rooflights and Kerbs should be carried out in accordance with the Certificate holder's installation instructions (see the *Installation* part of the relevant Detail Sheet).

19.2 Where a kerb adaptor is specified, supporting structures must have a suitable sealant applied to them before the base flange is positioned. The standard kerbs do not require sealing as they are protected by the roof covering.

19.3 When selecting means of access (eg by use of scaffolding), the safety of the operatives, the occupants and passers-by during the period of installation should be considered.

## Additional Information

The management systems of Brett Martin Daylight Systems Ltd have been assessed and registered as meeting the requirements of ISO 9001 : 2000 by SGS Yarsley Quality Assurance Certificate No GB92/Q1201.

## Bibliography

- BS 6229 : 2003 *Code of practice for flat roofs with continuously supported coverings*
- 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 673 : 1998 *Glass in building — Determination of thermal transmittance (U value) — Calculation method*
- BS EN 1873 : 2005 *Prefabricated accessories for roofing — Individual roof lights of plastics — Product specification and test methods*
- BS EN ISO 10211-1 : 1996 *Thermal bridges in building construction — Heat flows and surface temperatures — General calculation methods*
- BS EN ISO 10211-2 : 2001 *Thermal bridges in building construction — Calculation of heat flows and surface temperatures — Linear thermal bridges*
- BS EN ISO 13468-1 : 1997 *Plastics — Determination of the total luminous transmittance of transparent materials — Single-beam instrument*
- ISO 9001 : 2000 *Quality management systems — Requirements*
- Advisory Committee for Roofwork, ACR[M]001 : 2005 *Test For Non-Fragility of Profiled Sheeted Roofing Assemblies* [third edition]

## Conditions of Certification

### 20 Conditions

20.1 This Certificate:

- relates only to the product/system that is named and described on the front page
- is granted only to the company, firm or person named on the front page — no other company, firm or person may hold or claim any entitlement to this Certificate
- 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.

20.2 References in this Certificate to any Act of Parliament, Statutory Instrument, Directive or Regulation of the European Union, British, European or International Standard, Code of Practice, manufacturers' instructions or similar publication, are references to such publication in the form in which it was current at the date of this Certificate.

20.3 This Certificate will remain valid for an unlimited period provided that the product/system and the manufacture and/or fabrication including all related and relevant 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.

20.4 In granting this Certificate, the BBA is not responsible for:

- 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
- individual installations of the product/system, including the nature, design, methods and workmanship of or related to the installation
- the actual works in which the product/system is installed, used and maintained, including the nature, design, methods and workmanship of such works.

20.5 Any information relating to the manufacture, supply, installation, use and maintenance 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 and maintained. It does 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; 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. 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 manufacture, supply, installation, use and maintenance of this product/system.



In the opinion of the British Board of Agrément, Brett Martin Mardome Rooflights and Kerbs are fit for their intended use provided they are installed, used and maintained as set out in this Certificate. Certificate No 06/4385 is accordingly awarded to Brett Martin Daylight Systems Ltd.

On behalf of the British Board of Agrément

Date of issue: 29th June 2007

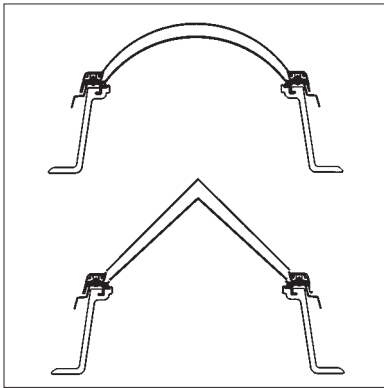
A handwritten signature in black ink, appearing to read 'G. A. Cooper', is written over a white background.

Chief Executive



## THE MARDOME ULTRA ROOFLIGHT

## Product



- THIS DETAIL SHEET RELATES TO THE MARDOME ULTRA ROOFLIGHT, INCLUDING MARDOME GLASS ROOFLIGHTS.

*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.*

## Technical Specification

## 1 Description

1.1 The Mardome Ultra Rooflight is designed and thermoformed from 3 mm minimum thick polycarbonate sheets, with a co-extruded Marlon FSX UV protection, for use in the exposure conditions described in this Detail Sheet.

1.2 The polycarbonate rooflights have PVC-U frame and a cellular PVC-U kerb and are available as single-, double- or triple-skin, in clear (smooth and textured finish), bronze and opal colours and are fixed using a 'lock-bolt' security system onto a cellular PVC kerb. The polycarbonate glazing is available in a curved dome or a pyramid profile. Kerb adaptors are available from the Certificate holder when non-standard roof openings exist in order to provide a suitable fit into the prepared builder's upstand. Roof lights are available in the styles and sizes listed in Table 1 and shown in Figure 1.

Table 1 Sizes and styles of rooflights

	Dome rectangular base (mm)	Pyramid (mm)
Square	600 x 600	600 x 600
	750 x 750	750 x 750
	900 x 900	900 x 900
	1050 x 1050	1050 x 1050
	1200 x 1200	1200 x 1200
	1350 x 1350	1350 x 1350
	1500 x 1500	1500 x 1500
	1800 x 1800	1800 x 1800
Rectangular	600 x 900	600 x 900
	600 x 1500	600 x 1500
	750 x 900	750 x 900
	900 x 1800	—
	1050 x 1500	1050 x 1500
	1200 x 600	1200 x 600
	1200 x 900	1200 x 900
	1200 x 1500	1200 x 1500
	1200 x 1800	—
	1200 x 2400	—

Figure 1 Mardome Ultra rooflights



1.3 Other sizes within this size range can also be fabricated on request and are covered by this Certificate.

1.4 The Mardome Ultra kerbs are manufactured from white, cellular PVC and installed with an aluminium frame concealing the 'lock-bolt' fixings from the opportunist intruder. The kerb height of 225 mm allows a roofing membrane to be brought over the top edge of the kerb, secured by the 'lock-bolt' security system making water ingress virtually impossible.

1.5 Rooflight frames may be unvented or may incorporate hit-and-miss vents or permanent trickle vents. Mardome Ultra rooflights can also be opened on hinges using manual or powered linear drives to create a large ventilation area, and telescopic stays to provide an access hatch (see Figure 2). The height of the cellular PVC kerb is 255 mm to the underside of the vent.

1.6 The full specifications and drawings for the materials and components covered by this Detail Sheet are retained by the BBA.

1.7 Rooflights can be supplied separately, for assembling on site or pre-assembled onto the Mardome Ultra PVC kerb.

1.8 To prevent ingress of moisture, the polycarbonate rooflights are fixed onto the kerb using a series of 'lock-bolts'. When engaged the 'lock-bolts' compress the foam seal located around the outside edge of the aluminium retainer frame (see Figure 3).

### Mardome Glass Rooflights

1.9 Mardome Glass Rooflights are available with a double-glazed glass unit as the rooflight section with a similar cellular kerb. The glass units are manufactured in accordance with the relevant parts of BS EN 1279.

Figure 2 Mardome Ultra ventilation options

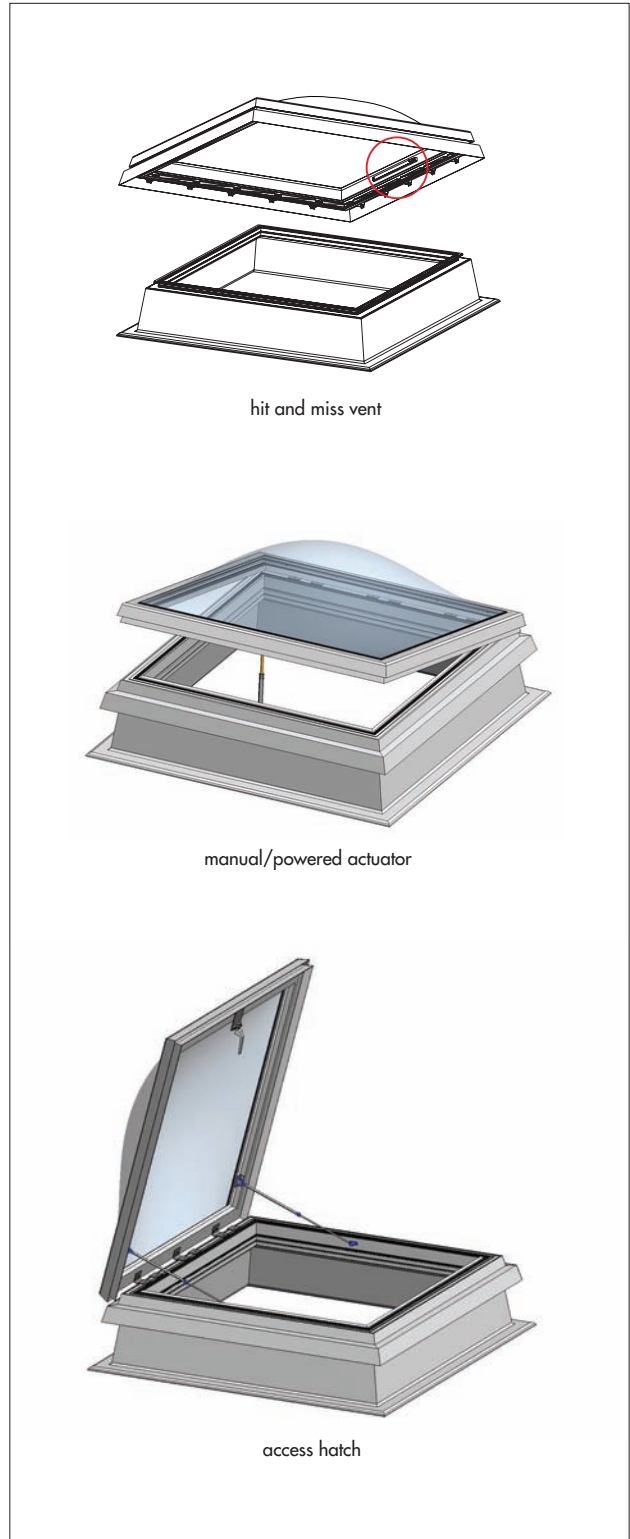
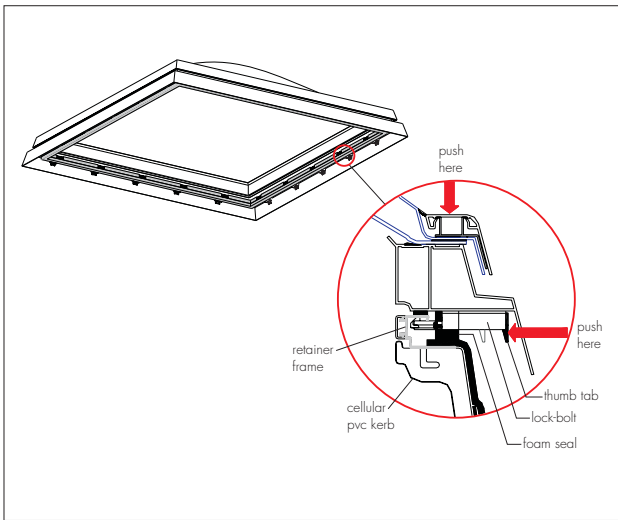


Figure 3 Lock-bolt mechanism



## Design Data

### 2 Thermal properties

The U values given in Tables 2 and 3 are based on the internal surface area of the rooflights, and the information supplied can be used as input in the Simplified Building Energy Model (SBEM) to calculate the energy used by non-domestic buildings. When required, for example in SAP calculations, the U values associated to the opening area in the roof can be calculated by multiplying the U value given in Tables 2 and 3 by the surface area ratio. The thermal linear transmittance of the kerb is  $0.7 \text{ Wm}^{-1}\text{K}^{-1}$ .

Table 2 Thermal transmittance (U values) of double- and triple-skinned dome rooflights

Size		Roof opening Area (projected) <sup>(1)</sup>	Surface area ratio <sup>(1)(2)</sup>	Rooflight U values ( $\text{Wm}^{-2}\text{K}^{-1}$ )	
Width	Length			Double skin <sup>(1)(2)</sup>	Triple skin <sup>(1)(2)</sup>
(m)	(m)	(m <sup>2</sup> )			
0.60	0.60	0.66	2.2	2.3	1.9
0.60	0.90	0.90	2.0	2.3	1.9
0.60	1.50	1.39	1.9	2.3	1.9
0.75	0.75	0.92	2.0	2.3	1.9
0.75	0.90	1.07	2.0	2.3	1.9
0.90	0.90	1.23	1.9	2.4	1.9
0.90	1.80	2.23	1.7	2.4	1.9
1.05	1.05	1.59	1.8	2.4	1.9
1.20	0.60	1.14	2.0	2.3	1.9
1.20	0.90	1.57	1.8	2.4	1.9
1.20	1.20	1.99	1.8	2.4	1.9
1.20	1.50	2.41	1.7	2.5	1.9
1.20	1.80	2.83	1.7	2.5	1.9
1.20	2.40	3.68	1.6	2.5	1.9
1.35	1.35	2.43	1.7	2.5	1.9
1.50	1.50	2.92	1.7	2.5	1.9
1.80	1.80	4.04	1.6	2.6	1.9

(1) SBEM input.

(2) SAP input = rooflight U value multiplied by the surface area ratio (ie roof opening U value).

Table 3 Thermal transmittance (U values) of double- and triple-skinned pyramid rooflights

Size		Roof opening Area (projected) <sup>(1)</sup>	Surface area ratio <sup>(1)(2)</sup>	Rooflight U values ( $\text{Wm}^{-2}\text{K}^{-1}$ )	
Width	Length			Double skin <sup>(1)(2)</sup>	Triple skin <sup>(1)(2)</sup>
(m)	(m)	(m <sup>2</sup> )			
0.60	0.60	0.66	2.2	2.3	1.9
0.60	0.90	0.90	2.1	2.3	1.9
0.60	1.50	1.39	1.9	2.4	1.9
0.75	0.75	0.92	2.1	2.3	1.9
0.75	0.90	1.07	2.0	2.3	1.9
0.90	0.90	1.23	1.9	2.4	1.9
0.90	1.80	2.23	1.7	2.4	1.9
1.05	1.05	1.59	1.8	2.4	1.9
1.20	0.60	1.14	2.0	2.3	1.9
1.20	0.90	1.57	1.8	2.4	1.9
1.20	1.20	1.99	1.8	2.4	1.9
1.20	1.50	2.41	1.7	2.5	1.9
1.20	1.80	2.83	1.6	2.5	1.9
1.20	2.40	3.68	1.6	2.5	1.9
1.35	1.35	2.43	1.7	2.5	1.9
1.50	1.50	2.92	1.6	2.5	1.9
1.80	1.80	4.04	1.6	2.6	1.9

(1) SBEM input.

(2) SAP input = rooflight U value multiplied by the surface area ratio (ie roof opening U value).

### 3 Security against intrusion

3.1 Mardome Ultra Rooflight is supplied with 'lock-bolts'. This security lock mechanism can only be opened with the use of a 'lock-bolt' security opening device. Manipulation of the 'lock-bolt' by an opportunist intruder without the opening device to open the rooflight is virtually impossible (see Figure 3).

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

## Installation

### 4 General

4.1 Installation of The Mardome Ultra Rooflight must be carried out in accordance with the Certificate holder's installation instructions.

4.2 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 person.

4.3 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.

4.4 A rooflight should never be left in position without ensuring all of its fixings are present and fully tightened.

4.5 Where the roof covering is dressed below the rooflight and on top of an existing upstand, precautions should be taken to prevent bitumen damaging internal finishes.

4.6 Fixings for fixing the Mardome Ultra kerbs or kerb adaptors onto the roof structure are supplied by the Certificate holder.

## 5 Procedure

5.1 The Mardome Ultra kerb is placed over the roof opening and fixed through the foot of the kerb using 55 mm fixings supplied by the Certificate holder, ensuring a secure base.

5.2 The roofing membrane is installed as specified in the manufacturer's instructions. For improved weathering, the roof covering cap sheet can be terminated horizontally on the top surface of the kerb. It is recommended that the membrane is mitred (rather than lapped) on the top surface at the corners to provide a flat surface for the rooflight to seal to.

5.3 The polycarbonate section is secured to the kerb by engaging a series of 'lock-bolts' (attached to the underside of the dome) to an aluminium Retainer Frame fastened to the top of the kerb. The 'lock-bolts' are engaged by pushing a 'thumb-tap' forward while simultaneously pushing the dome down directly above the 'lock-bolt'. A distinct click is heard when the latch engages. (See Figure 3).

## Technical Investigations

The following is a summary of the technical investigations carried out on The Mardome Ultra Rooflight.

## 6 Tests

Tests were carried out in accordance with BS EN 1873 : 2005 to determine:

- air infiltration
- watertightness
- effect of wind loads
- effect of snow loads
- effect of impacts
- light transmission and haze
- resistance to intrusion
- suitability of materials.

## 7 Investigations

7.1 The manufacturing process was examined, including the methods adopted for quality control, and details were obtained relating to the quality and composition of the materials.

7.2 Computer calculations for assessing the risk of condensation and calculating the thermal transmittance of the rooflights were carried out.

7.3 An examination was made of existing data in relation to the PVC-U kerb material and performance in fire.

7.4 Components were assessed for resistance to corrosion.

## Bibliography

BS EN 1279-2 : 2002 *Glass in building — Insulating glass units — Long term test method and requirements for moisture penetration*

BS EN 1873 : 2005 *Prefabricated accessories for roofing — Individual roof lights of plastics — Product specification and test method*



On behalf of the British Board of Agrément

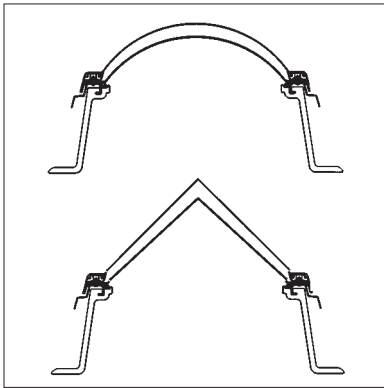
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Date of issue: 29th June 2007

Chief Executive

## THE MARDOME PREMIER ROOFLIGHT

## Product



- THIS DETAIL SHEET RELATES TO THE MARDOME PREMIER ROOFLIGHT.

*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.*

## Technical Specification

## 1 Description

1.1 The Mardome Premier Rooflight is designed and thermoformed from 3 mm minimum thick polycarbonate sheets, with a co-extruded Marlon FSX UV Protection, for use in the exposure conditions described in this Detail Sheet.

1.2 The polycarbonate rooflights have an aluminium frame and are available as single-, double- or triple-skin, in clear (smooth and textured finish), bronze and opal colours and are fixed by rivets or can be specified with a unique secret-fix system to deter vandalism (see Figure 3). The polycarbonate glazing is available in a curved dome or pyramid profile.

1.3 Mardome Premier rooflights are available in both kerb units and kerb converters. The kerb unit fits straight over the hole in the roof. The kerb section on these units can be either insulated aluminium, or extra height cellular PVC-U. For specifications with an existing builders' upstand, a kerb converter should be used in non-standard sizes for an exact fit.

1.4 Rooflights are available in the styles and sizes listed in Table 1 and shown in Figure 1.

Table 1 Sizes and styles of rooflights

	Dome rectangular base (mm)	Pyramid (mm)
Square	600 x 600	600 x 600
	750 x 750	750 x 750
	900 x 900	900 x 900
	1050 x 1050	1050 x 1050
	1200 x 1200	1200 x 1200
	1800 x 1800	1800 x 1800
Rectangular	1200 x 600	1200 x 600
	1200 x 900	1200 x 900
	1200 x 1800	1200 x 1800

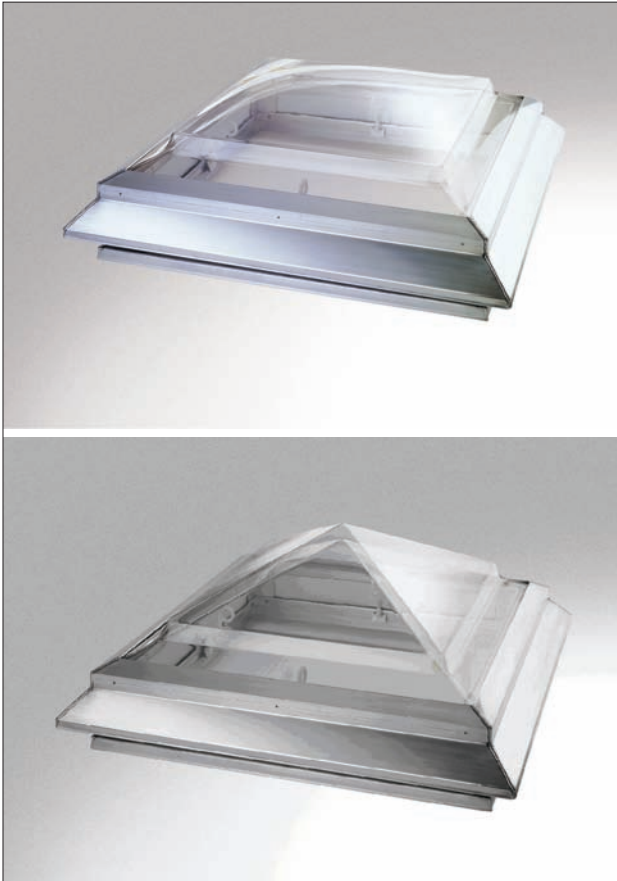
1.5 The aluminium frame is supplied in aluminium mill finish as standard, available powder coated to any RAL colour as an extra option.

1.6 Ventilation is provided as an option along each of the four sides of the aluminium frame either as hit and miss ventilator, manual or powered linear drives or access hatch specification (see Figure 2).

1.7 To prevent ingress of moisture the polycarbonate glazing is sealed into the aluminium frame using EPDM style gaskets giving added protection during transportation, installation and extended life.



Figure 1 Mardome Premier rooflights



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

1.9 Roof coverings are applied up to the external face of the kerb flange.

## Design Data

### 2 Thermal properties

2.1 The U values ( $\text{Wm}^{-2}\text{K}^{-1}$ ) of the rooflights with metal kerbs<sup>(1)</sup>, depending on size, are:

- double-skin 3.3 to 3.5
- triple-skin 2.6 to 3.1

(1) Rooflights can be supplied with PVC-U kerbs providing a better level of insulation.

2.2 These U values are based on the internal surface area of the rooflights, and can be used as input in the Simplified Building Energy Model (SBEM) to calculate the energy used by non-domestic buildings. When required, for example in SAP calculations, the U values associated to the opening area in the roof can be calculated by multiplying the U value by the surface area ratio. The thermal linear transmittance of the kerb is  $1.2 \text{ Wm}^{-1}\text{K}^{-1}$ .

2.3 These U values apply to rooflight/kerb assemblies as supplied; they will be improved when rooflights are installed on better insulated kerbs, or where performance of the kerb is assessed as part of the roof rather than the rooflight.

Figure 2 Mardome Premier ventilation options

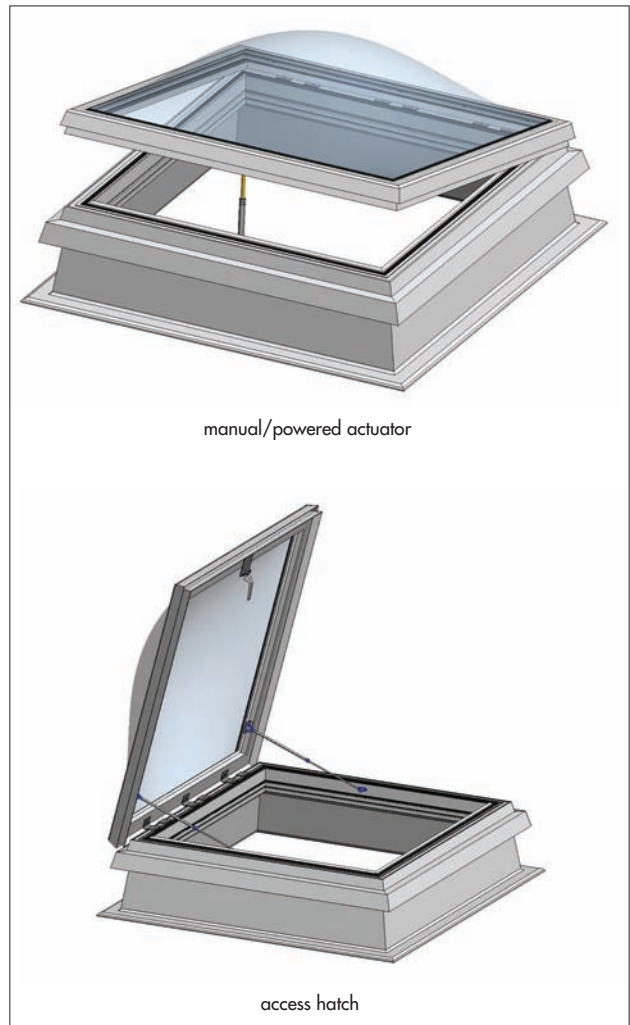


Figure 3 Security secret-fix option



### 3 Security against intrusion

3.1 Mardome Premier rooflights are fixed down with rivets or as an extra security option, using a secret-fix system to deter vandalism and make removal of the rooflight from the kerb more difficult (see Figure 3). Burglar bars are also available from the Certificate holder for added security.

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

### 4 Durability



4.1 Test results for resistance to artificial weathering (QUV) show that the powder coating from the aluminium frame section, when installed in accordance with this Certificate should have an anticipated life expectancy exceeding 30 years. It will have an anticipated decorative life of 15 years in heavily-polluted areas and 20 years in other areas.

4.2 Maintenance painting may be required if a high aesthetic standard is required. The Certificate holder should be consulted regarding suitable overcoating systems.

## Installation

### 5 General

5.1 Installation of The Mardome Premier Rooflight must be carried out in accordance with the Certificate holder's installation instructions.

5.2 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 person.

5.3 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.

5.4 A rooflight should never be left in position without ensuring all its fixings are present and fully tightened.

5.5 Where the roof covering is dressed below the rooflight and on top of an existing upstand, precautions should be taken to prevent bitumen damaging internal finishes.

5.6 Fixings for fixing the Mardome Premier rooflight onto the roof structure are supplied by the Certificate holder.

### 6 Procedure

6.1 The Mardome Premier kerb is placed over the roof opening and fixed through the foot of the kerb using 55 mm fixings supplied by the Certificate holder, ensuring a secure base.

6.2 The roofing membrane is installed as specified in the manufacturer's instructions. For improved weathering, the roof covering cap sheet can be terminated horizontally on the top surface of the kerb. It is recommended that the membrane is mitred (rather than lapped) on the top surface at the corners to provide a flat surface for the rooflight to seal to.

## Technical Investigations

The following is a summary of the technical investigations carried out on The Mardome Premier Rooflight.

### 7 Tests

Tests were carried out in accordance with BS EN 1873 : 2005 to determine:

- air infiltration
- watertightness
- effect of wind loads
- suitability of material
- light transmission and haze
- effect of impact.

### 8 Investigations

8.1 The manufacturing process was examined, including the methods adopted for quality control, and details were obtained relating to the quality and composition of the materials.

8.2 Computer calculations for assessing the risk of condensation and calculating the thermal transmittance of the rooflights were carried out.

8.3 An examination was made of existing data in relation to performance in fire.

8.4 Components were assessed for resistance to corrosion.

8.5 The coloured powder coating on the aluminium frame was assessed for resistance to QUV ageing.

## Bibliography

BS EN 1873 : 2005 *Prefabricated accessories for roofing — Individual roof lights of plastics — Product specification and test method*



On behalf of the British Board of Agrément

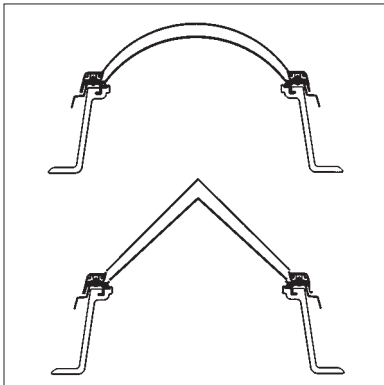
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Date of issue: 29th June 2007

Chief Executive

## THE MARDOME SUREFIT ROOFLIGHT

## Product



- THIS DETAIL SHEET RELATES TO THE MARDOME SUREFIT ROOFLIGHT.

*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.*

## Technical Specification

## 1 Description

1.1 The Mardome Surefit Rooflight is designed and thermoformed from 3 mm minimum thick polycarbonate sheets, with a co-extruded Marlon FSX UV protection, for use in the exposure conditions described in this Certificate.

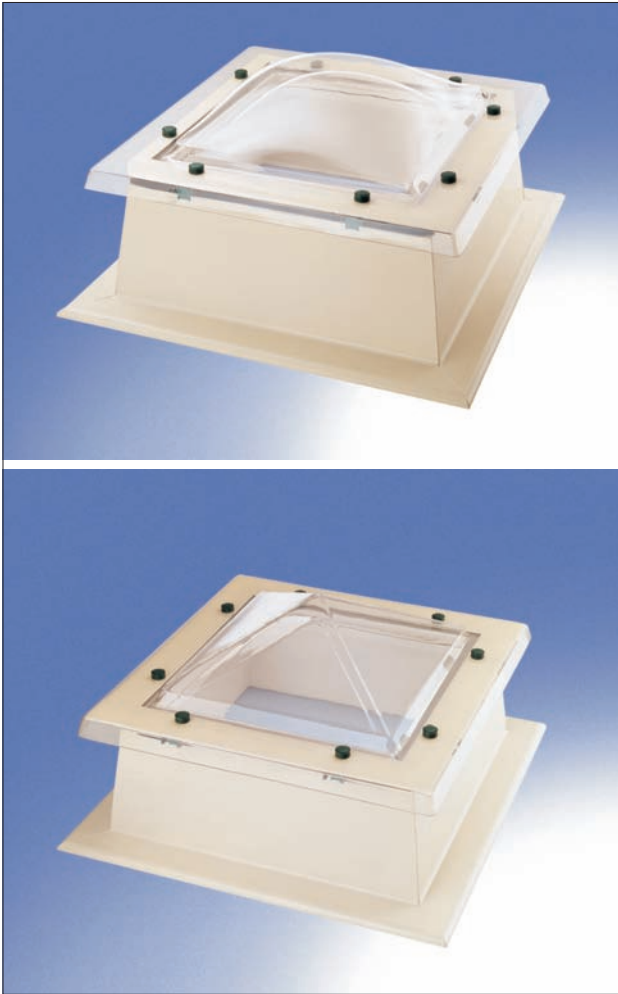
1.2 The polycarbonate rooflights have a cellular PVC-U kerb and are available as single-, double- or triple-skin, in clear (smooth and textured finish), bronze and opal colours and are fixed using a 'lock-bolt' security system onto a cellular PVC kerb. The polycarbonate glazing is available in a curved dome or a pyramid profile. Kerb adaptors are available from the Certificate holder when non-standard roof openings exist in order to provide a suitable fit into the prepared builders' upstand. Rooflights are available in the styles and sizes listed in Table 1 and shown in Figure 1.

Table 1 Sizes and styles of rooflights

	Dome rectangular base (mm)	Pyramid (mm)
Square	600 x 600	600 x 600
	750 x 750	750 x 750
	900 x 900	900 x 900
	1050 x 1050	1050 x 1050
	1200 x 1200	1200 x 1200
	1350 x 1350	1350 x 1350
	1500 x 1500	1500 x 1500
	1800 x 1800	—
Rectangular	600 x 900	600 x 900
	600 x 1500	600 x 1500
	750 x 900	750 x 900
	900 x 1800	—
	1050 x 1500	1050 x 1500
	1200 x 600	1200 x 600
	1200 x 900	1200 x 900
	1200 x 1500	1200 x 1500
	1200 x 1800	—
	1200 x 2400	—

1.3 Other sizes within this size range can also be fabricated on request and are covered by this Certificate.

Figure 1 Mardome Surefit rooflights



1.4 The Mardome Surefit kerbs are manufactured from white, cellular PVC-U and installed with an aluminium frame concealing the 'lock-bolt' fixings from the opportunist intruder. The height of the cellular PVC-U kerb is 225 mm and allows a roofing membrane to be brought over the top edge of the kerb, secured by the 'lock-bolt' security system making water ingress virtually impossible.

1.5 Rooflight frames may be unvented or may incorporate hit and miss vents or permanent trickle vents. Mardome Surefit rooflights can also be opened on hinges using manual or powered linear drives to create a large ventilation area, and telescopic stays to provide an access hatch (see Figure 2).

1.6 The full specifications and drawings for the materials and components covered by this Detail Sheet are retained by the BBA.

1.7 Rooflights can be supplied separately, for assembling on site or pre-assembled onto the cellular PVC-U kerb.

1.8 To prevent ingress of moisture, the polycarbonate rooflights are fixed onto the kerb using a series of 'lock-bolts'. When engaged, the 'lock-bolts' compress the foam seal located around the outside edge of the aluminium retainer frame (see Figure 3).

Figure 2 Mardome Surefit ventilation options

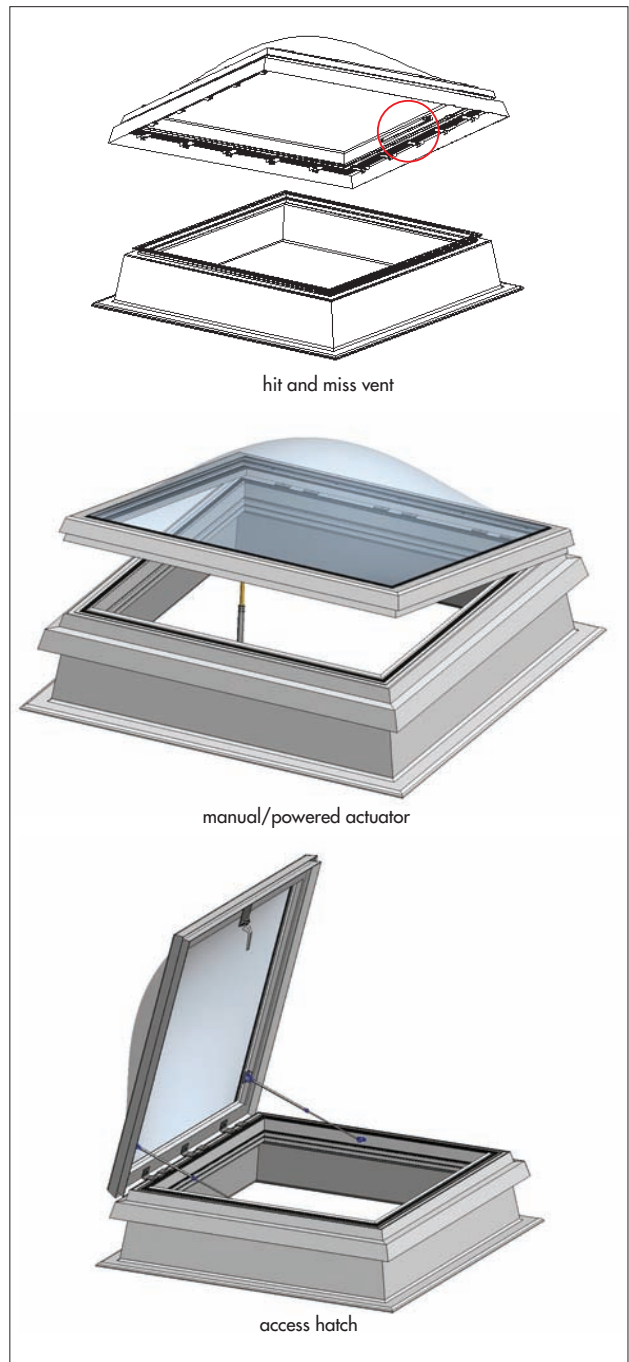
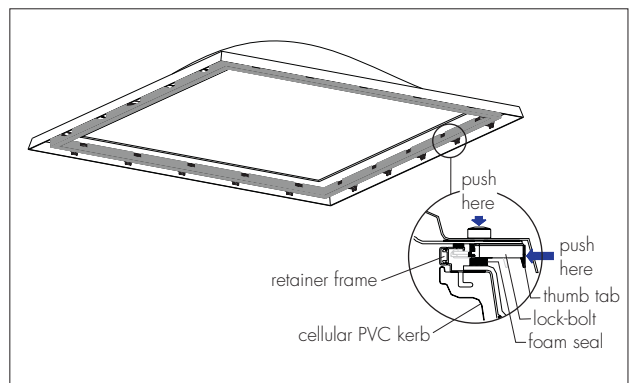


Figure 3 Lock-bolt mechanism



1.9 For extra security the rooflights fixings are concealed within security caps making removal and access extremely difficult (see Figure 4).



Figure 4 Mardome Surefit security caps



## Design Data

### 2 Thermal properties

The U values given in Tables 2 and 3 are based on the internal surface area of the rooflights, and the information supplied can be used as input in the Simplified Building Energy Model (SBEM) to calculate the energy used by non-domestic buildings. When required, for example in SAP calculations, the U values associated to the opening area in the roof can be calculated by multiplying the U value given in Tables 2 and 3 by the surface area ratio. The thermal linear transmittance of the kerb is  $0.6 \text{ Wm}^{-1}\text{K}^{-1}$ .

### 3 Security against intrusion

3.1 Mardome Surefit rooflights are supplied with 'lock-bolts'. This security-lock mechanism can only be opened with the use of a 'lock-bolt' security opening device. Manipulation of the 'lock-bolts' by an opportunist intruder without the opening device to open the rooflight is virtually impossible (see Figure 3).

Table 2 Thermal transmittance (U values) of double- and triple-skinned dome rooflights

Size		Roof opening Area (projected) <sup>(1)</sup>	Surface area ratio <sup>(1) (2)</sup>	Rooflight U values ( $\text{Wm}^{-2}\text{K}^{-1}$ )	
Width	Length			Double skin <sup>(1) (2)</sup>	Triple skin <sup>(1) (2)</sup>
(m)	(m)	( $\text{m}^2$ )			
0.60	0.60	0.63	1.9	2.4	2.0
0.60	0.90	0.87	1.8	2.4	2.0
0.60	1.50	1.35	1.7	2.5	2.0
0.75	0.75	0.89	1.8	2.4	2.0
0.75	0.90	1.03	1.8	2.5	2.0
0.90	0.90	1.20	1.7	2.5	2.0
0.90	1.80	2.18	1.6	2.5	2.0
1.05	1.05	1.55	1.7	2.5	2.0
1.20	0.60	1.11	1.8	2.4	2.0
1.20	0.90	1.53	1.7	2.5	2.0
1.20	1.20	1.94	1.6	2.6	2.0
1.20	1.50	2.36	1.6	2.6	2.0
1.20	1.80	2.78	1.5	2.6	2.0
1.20	2.40	3.62	1.5	2.6	2.0
1.35	1.35	2.38	1.6	2.6	2.0
1.50	1.50	2.87	1.5	2.6	2.0
1.80	1.80	3.98	1.5	2.7	2.0

(1) SBEM input.

(2) SAP input = rooflight U value multiplied by the surface area ratio (ie roof opening U value).

Table 3 Thermal transmittance (U values) of double- and triple-skinned pyramid rooflights

Size		Roof opening Area (projected) <sup>(1)</sup>	Surface area ratio <sup>(1) (2)</sup>	Rooflight U values ( $\text{Wm}^{-2}\text{K}^{-1}$ )	
Width	Length			Double skin <sup>(1) (2)</sup>	Triple skin <sup>(1) (2)</sup>
(m)	(m)	( $\text{m}^2$ )			
0.60	0.60	0.63	2.0	2.4	2.0
0.60	0.90	0.87	1.9	2.4	2.0
0.60	1.50	1.35	1.8	2.5	2.0
0.75	0.75	0.89	1.9	2.4	2.0
0.75	0.90	1.03	1.8	2.5	2.0
0.90	0.90	1.20	1.8	2.5	2.0
0.90	1.80	2.18	1.6	2.5	2.0
1.05	1.05	1.55	1.7	2.5	2.0
1.20	0.60	1.11	1.8	2.5	2.0
1.20	0.90	1.53	1.7	2.5	2.0
1.20	1.20	1.94	1.6	2.6	2.0
1.20	1.50	2.36	1.6	2.6	2.0
1.20	1.80	2.78	1.5	2.6	2.0
1.20	2.40	3.62	1.5	2.6	2.0
1.35	1.35	2.38	1.6	2.6	2.0
1.50	1.50	2.87	1.5	2.6	2.0
1.80	1.80	3.98	1.5	2.6	2.0

(1) SBEM input.

(2) SAP input = rooflight U value multiplied by the surface area ratio (ie roof opening U value).

3.2 Additionally, the rooflight fixings are concealed within security caps making removal and access extremely difficult (see Figure 4).

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

## Installation

### 4 General

4.1 Installation of The Mardome Surefit Rooflight must be carried out in accordance with the Certificate holder's installation instructions.

4.2 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 person.

4.3 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.

4.4 A rooflight should never be left in position without ensuring all of its fixings are present and fully tightened.

4.5 Where the roof covering is dressed below the rooflight and on top of an existing upstand, precautions should be taken to prevent bitumen damaging internal finishes.

4.6 Fixings for fixing the Mardome Surefit kerbs or kerb adaptors onto the roof structure are supplied by the Certificate holder.

### 5 Procedure

5.1 The Mardome Surefit kerb is placed over the roof opening and fixed through the foot of the kerb using 55 mm fixings supplied by the Certificate holder, ensuring a secure base.

5.2 The roofing membrane is installed as specified in the manufacturer's instructions. For improved weathering, the roof covering cap sheet can be terminated horizontally on the top surface of the kerb. It is recommended that the membrane is mitred (rather than lapped) to the top surface at the corners to provide a flat surface for the rooflight to seal to.

5.3 The polycarbonate section is secured to the kerb by engaging a series of 'lock-bolts' (attached to the underside of the dome) to an aluminium Retainer Frame fastened to the top of the kerb. The 'lock-bolts' are engaged by pushing the dome down directly above the 'lock-bolt'. A distinct click is heard when the latch engages (see Figure 3).

## Technical Investigations

The following is a summary of the technical investigations carried out on The Mardome Surefit Rooflight.

### 6 Tests

Tests were carried out in accordance with BS EN 1873 : 2005 to determine:

- light transmission and haze
- resistance to intrusion
- effect of impacts
- suitability of materials.

### 7 Investigations

7.1 The manufacturing process was examined, including the methods adopted for quality control, and details were obtained relating to the quality and composition of the materials.

7.2 Computer calculations for assessing the risk of condensation and calculating the thermal transmittance of the rooflights were carried out.

7.3 An examination was made of existing data in relation to the PVC-U material and performance in fire.

7.4 Components were assessed for resistance to corrosion.

## Bibliography

BS EN 1873 : 2005 *Prefabricated accessories for roofing — Individual roof lights of plastics — Product specification and test method*



On behalf of the British Board of Agrément

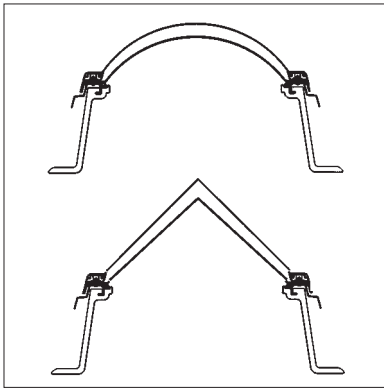
Date of issue: 29th June 2007

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

Chief Executive

## THE MARDOME TRADE ROOFLIGHT

## Product



- THIS DETAIL SHEET RELATES TO THE MARDOME TRADE ROOFLIGHT.

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.

## Technical Specification

## 1 Description

1.1 The Mardome Trade Rooflight is designed and thermoformed from 3 mm minimum thick polycarbonate sheets, with a co-extruded Marlon FSX UV protection for use in the exposure conditions described in this Certificate.

1.2 The polycarbonate rooflights have a cellular PVC-U upstand and are available as single-, double- or triple-skin, in clear (smooth and textured finish), bronze and opal colours and are screw fixed onto PVC-U kerbs.

1.3 The polycarbonate glazing is available in a curved dome or a pyramid profile and in a range of sizes listed in Table 1 and shown in Figure 1. Kerb adaptors are available from the Certificate holder when non-standard roof openings exist in order to provide a suitable fit into the prepared builders' kerb.

1.4 Other sizes within this size range can also be fabricated on request and are covered by this Certificate.

1.5 The Mardome Trade Rooflights are supplied as a cellular PVC-U kerb and pre-drilled glazing allowing the installer to screw fix the glazing into the kerb. Pre-drilled fixing holes are positioned accurately to ensure a reliable and accurate fit.

1.6 The height of the cellular PVC-U kerb is 225 mm and allows a roofing membrane to be brought over the top edge of the kerb and secured horizontally with the glazing fixings making water ingress virtually impossible.

Table 1 Sizes and styles of rooflights

	Dome rectangular base (mm)	Pyramid (mm)
Square	600 x 600	600 x 600
	750 x 750	750 x 750
	900 x 900	900 x 900
	1050 x 1050	1050 x 1050
	1200 x 1200	1200 x 1200
	1350 x 1350	1350 x 1350
	1500 x 1500	1500 x 1500
	1800 x 1800	—
Rectangular	600 x 900	600 x 900
	600 x 1500	600 x 1500
	750 x 900	750 x 900
	900 x 1800	—
	1050 x 1500	1050 x 1500
	1200 x 600	1200 x 600
	1200 x 900	1200 x 900
	1200 x 1500	1200 x 1500
	1200 x 1800	—
	1200 x 2400	—

1.7 Rooflight frames may be unvented or may incorporate hit and miss vents or permanent trickle vents. Mardome Trade Rooflights can also be opened on hinges using manual or powered linear drives to create a large ventilation area, and telescopic stays to provide an access hatch (see Figure 2).

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

1.9 Mardome Trade Rooflights are supplied separately for assembling on site.

1.10 For extra security the rooflight fixings are concealed within security caps making removal and access extremely difficult (see Figure 3).

Figure 1 Mardome Trade Rooflights



Figure 2 Mardome Trade ventilation options

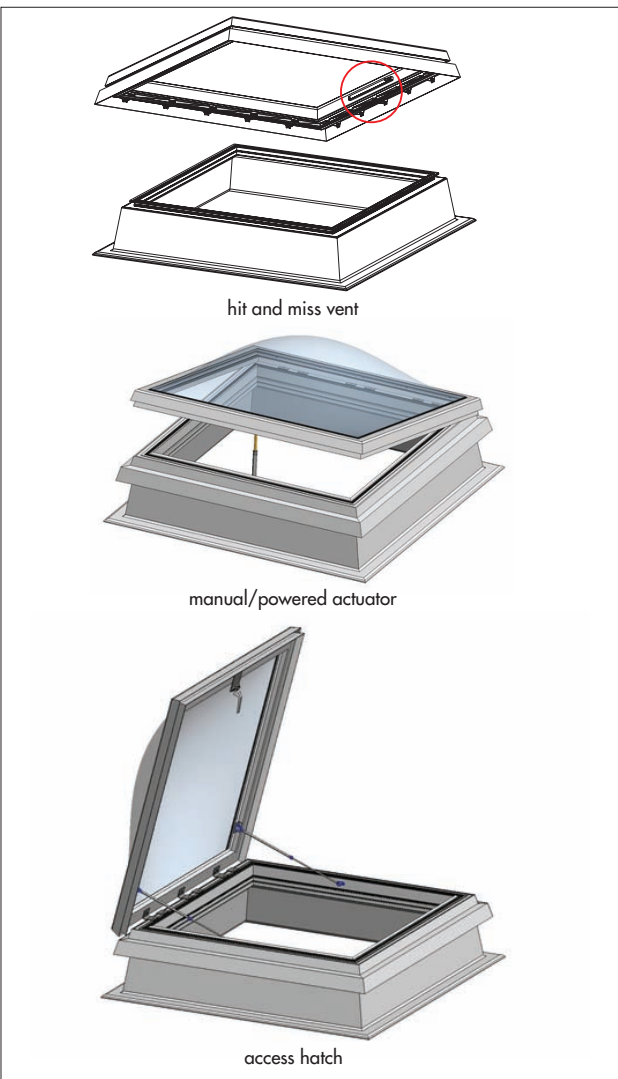


Figure 3 Showing security caps



## Design Data

### 2 Thermal properties

The U values given in Tables 2 and 3 are based on the internal surface area of the rooflights, and the information supplied can be used as input in the Simplified Building Energy Model (SBEM) to calculate the energy used by non-domestic buildings. When required, for example in SAP calculations, the U values associated to the opening area in the roof can be calculated by multiplying the U value given in Tables 2 and 3 by the surface area ratio. The thermal linear transmittance of the kerb is  $0.6 \text{ Wm}^{-1}\text{K}^{-1}$ .

**Table 2 Thermal transmittance (U values) of double- and triple-skinned dome rooflights**

Size		Roof opening Area (projected) <sup>(1)</sup>	Surface area ratio <sup>(1)(2)</sup>	Rooflight U values (Wm <sup>-2</sup> K <sup>-1</sup> )	
Width	Length			Double skin <sup>(1)(2)</sup>	Triple skin <sup>(1)(2)</sup>
(m)	(m)	(m <sup>2</sup> )			
0.60	0.60	0.63	1.8	2.5	2.1
0.60	0.90	0.87	1.7	2.5	2.1
0.60	1.50	1.35	1.6	2.6	2.1
0.75	0.75	0.89	1.7	2.6	2.1
0.75	0.90	1.03	1.7	2.6	2.1
0.90	0.90	1.20	1.7	2.6	2.1
0.90	1.80	2.18	1.5	2.6	2.1
1.05	1.05	1.55	1.6	2.6	2.1
1.20	0.60	1.11	1.7	2.6	2.1
1.20	0.90	1.53	1.6	2.6	2.1
1.20	1.20	1.94	1.6	2.7	2.1
1.20	1.50	2.36	1.5	2.7	2.1
1.20	1.80	2.78	1.5	2.7	2.1
1.20	2.40	3.62	1.4	2.7	2.0
1.35	1.35	2.38	1.5	2.7	2.1
1.50	1.50	2.87	1.5	2.7	2.1
1.80	1.80	3.98	1.4	2.7	2.0

(1) SBEM input.

(2) SAP input = rooflight U value multiplied by the surface area ratio (ie roof opening U value).

**Table 3 Thermal transmittance (U values) of double- and triple-skinned pyramid rooflights**

Size		Roof opening Area (projected) <sup>(1)</sup>	Surface area ratio <sup>(1)(2)</sup>	Rooflight U values (Wm <sup>-2</sup> K <sup>-1</sup> )	
Width	Length			Double skin <sup>(1)(2)</sup>	Triple skin <sup>(1)(2)</sup>
(m)	(m)	(m <sup>2</sup> )			
0.60	0.60	0.63	1.9	2.5	2.1
0.60	0.90	0.87	1.8	2.6	2.1
0.60	1.50	1.35	1.7	2.6	2.1
0.75	0.75	0.89	1.8	2.6	2.1
0.75	0.90	1.03	1.7	2.6	2.1
0.90	0.90	1.20	1.7	2.6	2.1
0.90	1.80	2.18	1.5	2.7	2.1
1.05	1.05	1.55	1.6	2.6	2.1
1.20	0.60	1.11	1.7	2.6	2.1
1.20	0.90	1.53	1.6	2.6	2.1
1.20	1.20	1.94	1.6	2.7	2.1
1.20	1.50	2.36	1.5	2.7	2.1
1.20	1.80	2.78	1.5	2.7	2.1
1.20	2.40	3.62	1.4	2.7	2.0
1.35	1.35	2.38	1.5	2.7	2.1
1.50	1.50	2.89	1.5	2.7	2.1
1.80	1.80	3.98	1.4	2.7	2.0

(1) SBEM input.

(2) SAP input = rooflight U value multiplied by the surface area ratio (ie roof opening U value).

### 3 Security against intrusion

3.1 The design of the rooflight is such that individual fixings are concealed inside security caps. Removal of these caps to gain access to the fixings is extremely difficult (see Figure 3).

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

## Installation

### 4 General

4.1 Installation of The Mardome Trade Rooflight must be carried out in accordance with the Certificate holder's installation instructions.

4.2 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 person.

4.3 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.

4.4 A rooflight should never be left in position without ensuring all of its fixings are present and fully tightened.

4.5 Where the roof covering is dressed below the rooflight and on top of an existing upstand, precautions should be taken to prevent bitumen damaging internal finishes.

4.6 Fixings for fixing the Mardome Trade kerbs or kerb adaptors onto the roof structure are supplied by the Certificate holder.

### 5 Procedure

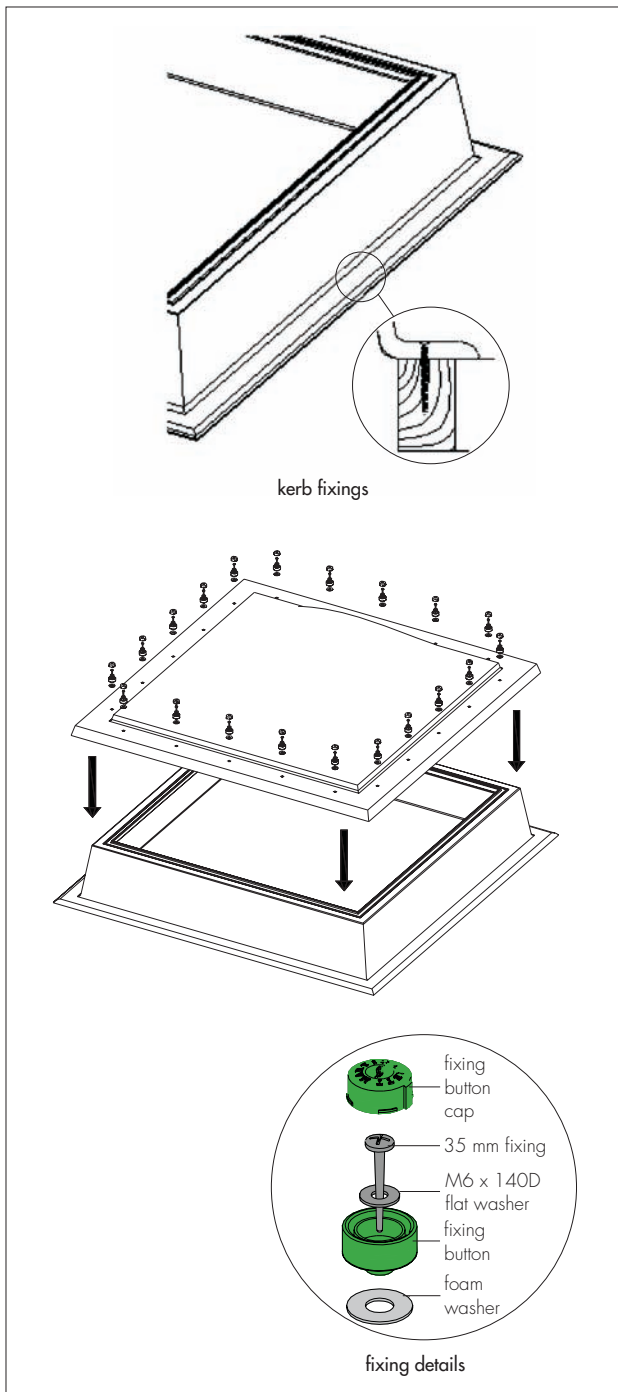
5.1 The Mardome Trade kerb is placed over the roof opening and fixed through the foot of the kerb using 55 mm fixings supplied by the Certificate holder ensuring a secure base.

5.2 The roofing membrane is installed as specified in the manufacturer's instructions. For improved weathering, the roof covering cap sheet can be terminated horizontally on the top surface of the kerb. It is recommended that the membrane is mitred (rather than lapped) on the top surface at the corners to provide a flat surface for the rooflight to seal to.

5.3 The polycarbonate section is placed squarely onto the kerb. The foam washer, fixing button and M6 flat washer are assembled together and the bottom fixing button section placed into the pre-drilled holes of the dome. The 35 mm fixing is inserted through the assembly and using a powered screwdriver, screwed down into the kerb. (If installing a timber upstand a 75 mm fixing is used). The fixing button cap is then snapped in place in the top of the fixing button (see Figure 4).



Figure 4 Typical installation detail



## Technical Investigations

The following is a summary of the technical investigations carried out on The Mardome Trade Rooflight.

### 6 Tests

Tests were carried out in accordance with BS EN 1873 : 2005 to determine:

- light transmission and haze
- resistance to intrusion
- endurance of rooflight open/close devices
- effect of impacts
- suitability of materials.

### 7 Investigations

7.1 The manufacturing process was examined, including the methods adopted for quality control, and details were obtained relating to the quality and composition of the materials.

7.2 Computer calculations for assessing the risk of condensation and calculating the thermal transmittance of the rooflights were carried out.

7.3 An examination was made of existing data in relation to the PVC-U material and performance in fire.

7.4 Components were assessed for resistance to corrosion.

## Bibliography

BS EN 1873 : 2005 *Prefabricated accessories for roofing — Individual roof lights of plastics — Product specification and test method*

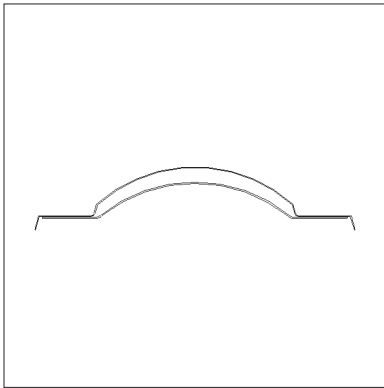


On behalf of the British Board of Agrément

Date of issue: 29th June 2007

Chief Executive

## Product



- THIS DETAIL SHEET RELATES TO THE MARDOME REFLEX POLYCARBONATE GLAZING UNIT.

*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.*

## Technical Specification

### 1 Description

1.1 Mardome Reflex Polycarbonate Glazing Unit is a 'glazing only' rooflight option, consisting of a wide flanged polycarbonate glazing unit designed for refurbishment projects where only the glazing is being replaced.

1.2 Available in 80 mm and 100 mm flat flanges, Mardome Reflex means that the rooflight can be mechanically fixed to existing kerbs of varying dimensions without the use of a kerb adaptor. A 60 mm sloped flange is also available and covered by this Certificate.

1.3 The polycarbonate glazing is available in a curved dome, circular dome or a pyramid profile in either clear, bronze or opal tints or a textured glazing option. A range of sizes in single-, double- and triple-skin polycarbonate glazing are listed in Table 1 and shown in Figure 1.

Table 1 Sizes and styles of Reflex Glazing Units

	Dome rectangular base (mm)	Pyramid (mm)
Square	600 x 600	600 x 600
	750 x 750	750 x 750
	900 x 900	900 x 900
	1050 x 1050	1050 x 1050
	1200 x 1200	1200 x 1200
	1350 x 1350	1350 x 1350
	1500 x 1500	1500 x 1500
	1800 x 1800	—
Rectangular	600 x 900	600 x 900
	600 x 1500	600 x 1500
	750 x 900	750 x 900
	900 x 1800	—
	1050 x 1500	1050 x 1500
	1200 x 600	1200 x 600
	1200 x 900	1200 x 900
	1200 x 1500	1200 x 1500
Circular	1200 x 1800	—
	1200 x 2400	—
	600	—
	750	—
	900	—
	1050	—
	1200	—
	1350	—
1500	—	
1800	—	

Figure 1 Mardome Reflex Polycarbonate Glazing Unit



1.4 The Mardome Reflex glazing units are designed and thermoformed from 3 mm minimum thick polycarbonate sheets with a co-extruded Marlon FSX UV protection for use in exposure conditions described in this Certificate.

1.5 The full specification and drawings for the materials and components covered by this Detail Sheet are retained by the BBA.

## Design Data

### 2 Thermal properties

U values of polycarbonate glazing skins are given in section 14.3 of the Front Sheets. Calculations of rooflight U values must take into account the internal surface area and linear transmittance of kerbs. Linear thermal transmittance values and temperature factors are found by thermal modelling kerbs in accordance with BS EN ISO 10211-2 : 2001.

### 3 Security against intrusion

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

## Installation

### 4 General

4.1 Installation of The Mardome Reflex Polycarbonate Glazing Unit must be carried out in accordance with the Certificate holder's installation instructions.

4.2 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 person.

4.3 The rooflight kerb should be checked dimensionally to ensure the fit of the Mardome glazing unit.

4.4 Fixings for fixing the Mardome Reflex glazing unit onto the rooflight kerb are supplied by the Certificate holder.

### 5 Procedure

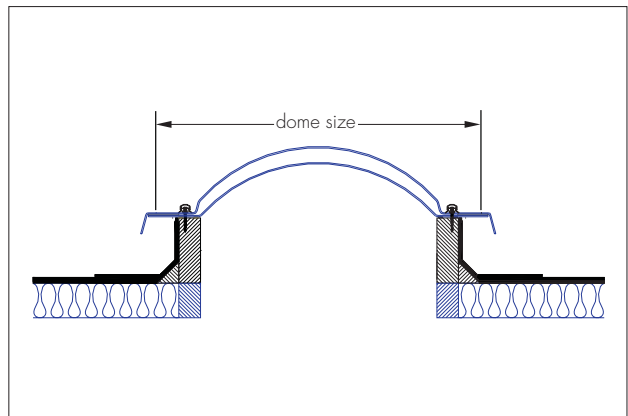
5.1 Mardome Reflex rooflights are designed to be fitted directly onto existing builders' upstands.

#### Direct fix (see Figure 2)

5.2 It is important that the builders' upstand is constructed within the dimensions shown in Figure 2.

5.3 Once foam sealant is applied to either the top surface of the upstand or the underside of the dome fixing flange, the rooflight is aligned squarely and pre-drilled through all layers of polycarbonate at each fixing point using 5 mm to 6 mm diameter drill bits. The fixings should be evenly spaced along each side.

Figure 2 Direct fix installation method

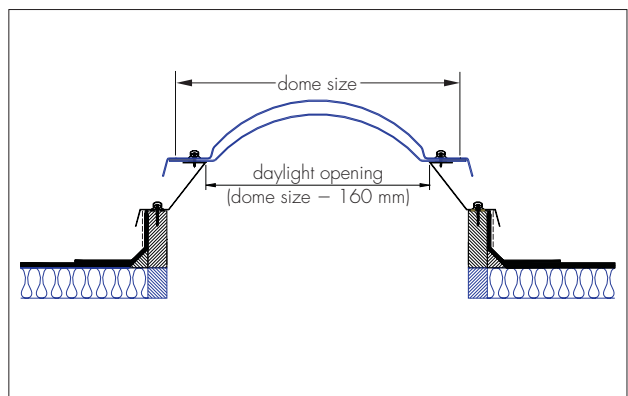


#### Standard kerb adaptor (see Figure 3)

5.4 Where an existing builders' upstand dimensions do not allow for direct fixing, Mardome Reflex rooflights can be fitted using standard kerb adaptors.

5.5 Once foam sealant is applied to either the top surface of the upstand or the underside of the kerb adaptor lower fixing flange, the kerb adaptor is pre-drilled and secured to the upstand using 55 mm screws with a clear plastic washer and cap. This method is repeated to attach the rooflight to the kerb adaptor.

Figure 3 Kerb adaptor installation method



## Technical Investigations

The following is a summary of the technical investigations carried out on The Mardome Reflex Polycarbonate Glazing Unit.

### 6 Tests

Tests were carried out in accordance with BS EN 1873 : 2005 to determine:

- light transmission and haze
- effect of impacts
- suitability of materials.

### 7 Investigations

7.1 The manufacturing process was examined, including the methods adopted for quality control, and details were obtained relating to the quality and composition of the materials.

7.3 An examination was made of existing data in relation to the polycarbonate material and performance in fire.

7.4 The polycarbonate was assessed for resistance to xenon ageing.

## Bibliography

BS EN 1873 : 2005 *Prefabricated accessories for roofing — Individual roof lights of plastics — Product specification and test method*

BS EN ISO 10211-2 : 2001 *Thermal bridges in building construction — Calculation of heat flows and surface temperatures — Linear thermal bridges*



On behalf of the British Board of Agrément

Date of issue: 29th June 2007

A handwritten signature in black ink, appearing to read 'G. A. Cooper', is written over a light grey background.

Chief Executive

