Polycarbonate Rooflights

Whitesales®
Rooflights & more...

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Whitesales®
Rooflights & more...

Whitesales has over 25 years' experience in the manufacture and distribution of speciality flat roofing products. As a company we have the dedication and resource to fulfil the most demanding of requirements throughout the UK. Our experienced and expert personnel have an in-depth knowledge of industry regulations, which ensures we provide up to date advice on fully compliant solutions. Also, we invest in ecologically friendly business processes meaning that our products are from sustainable sources.

Rooflights and more...

Whether you are a specifier, contractor or merchant, you will benefit from working with us. The following are just some of the reasons why you should choose Whitesales.

High quality products
Our speciality roofing products and accessories are tested to the highest standards and are suitable for use with most flat roof systems, including single ply, felt, hot-melt, asphalt, liquid, GRP and lead. Our tubular rooflights are ideal for use on pitched or flat roofs.

Nationwide coverage and next day delivery
With depots strategically located in England and Scotland, Whitesales offers nationwide next day delivery on our own transport or overnight carrier service. Deliveries can be direct to site or to contractor or merchant premises.

Technical advice and support
The Whitesales Customer Service Team is readily available to assist you, from your initial enquiry through to after sales support. This includes help with specification writing, site surveys, condition reports, budget costings and fully detailed quotations.

Guarantees
All products supplied are fully guaranteed including insurance backed guarantee on request.

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Whitesales is
renowned for proven product ranges,
industry leading levels of service and expertise.

Why is natural daylight so important?

Natural daylight has long been recognised as the most effective form of light. Building Regulation Approved Document L requires designers to provide adequate daylight '...where rooflight areas are reduced below 20%, the building designer must take special care to demonstrate daylight levels remain adequate...'

Flat roof rooflights are the most efficient means of providing natural daylight, providing up to three times more daylight than an equally-sized vertical window. The light from a rooflight is also more evenly distributed throughout the room, less likely to result in glare or compromise of privacy.

Natural daylight is an invaluable natural asset. The benefits of a naturally-lit workspace are well documented and include increased productivity, work satisfaction and cost reduction, as well as significant reduction of impact to the environment. From a building design perspective the use of rooflights is an excellent means by which both light and solar energy can be utilised to save energy and to reduce the carbon footprint of any property.

There are specific industry policies and guide documents to assist with introducing naturally-lit space into different building types (especially schools). Whitesales can offer support and advice on the requirements for specific applications.

Product selection roofscape

1

em-dome®

Em-Dome modular rooflights are high quality, durable polycarbonate thermoformed roof lights, designed to make optimum use of natural light. See pages 6-27.

2

em-tube™

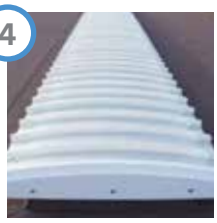
Em-Tube Tubular Skylights are a highly effective means of transmitting daylight into internal rooms or areas lacking in natural light. See pages 28-31 .

3

em-vault™

Em-Vaults are high quality continuous polycarbonate barrel vault rooflights designed to maximise natural light. See pages 32-41.

4



t-vault™

T-Vaults are high performance continuous GRP barrel vault rooflights designed to provide a functional, economical rooflight for roof spans up to 4m and of unlimited length. See pages 42-47.

5

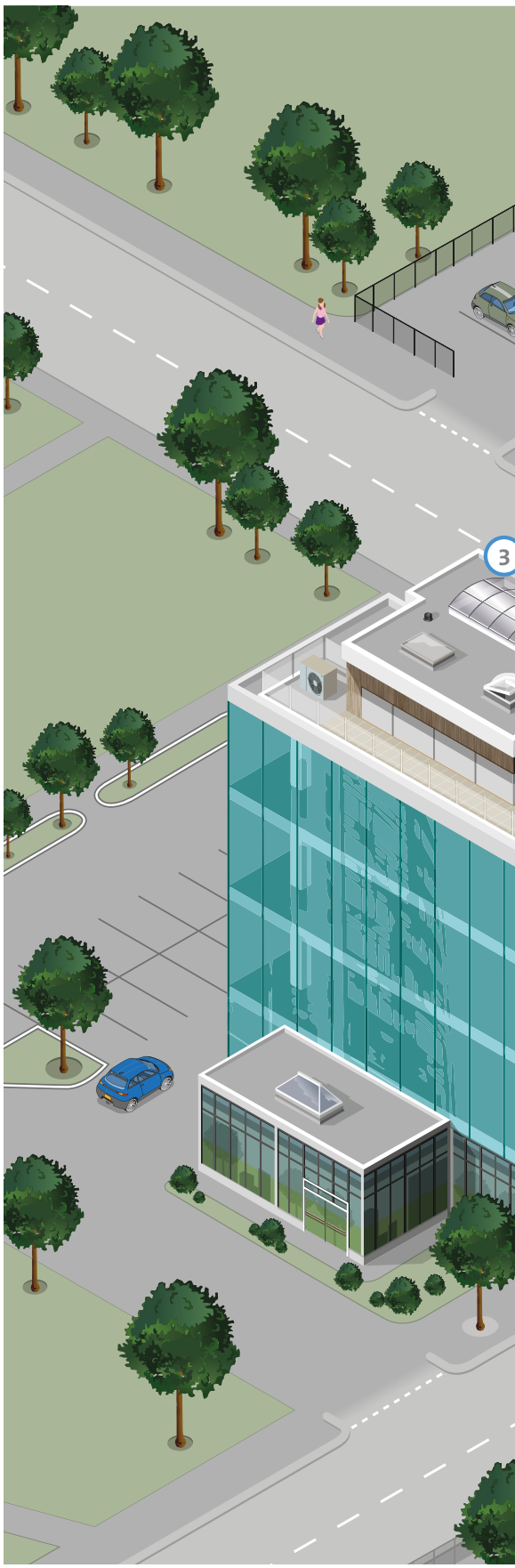
em-line™

Em-Line bespoke rooflights are rooflights with polycarbonate glazing and are designed and built specifically to your precise sizing and specification requirements and to maximize natural daylight. See pages 48-59.

6

em-line™

Em-Line Vertical glazing is a fast and simple to install, cost effective multiwalled polycarbonate cladding system for applications requiring excellent thermal value, light transmission and durability. See pages 58-59.



Whether you require design recommendations or have a project on site, Whitesales has the experience, products and service to meet that need.

em-dome®

Modular rooflights

High quality thermoformed rooflights designed to make optimum use of natural light. Em-Domes are offered in a wide range of sizes, shapes and glazing options to meet virtually any specifier and client requirement.

Em-Dome in opal diffused with Em-Curb PVC ECO 300mm upstand and rotating vents

Em-Dome pyramid in opal diffused with Em-Curb PVC ECO 300mm upstand

Description

Em-Dome rooflights are thermoformed from UV protected, co-extruded polycarbonate sheet and are available in single, double, triple, quad skin or ECO multiwall construction.

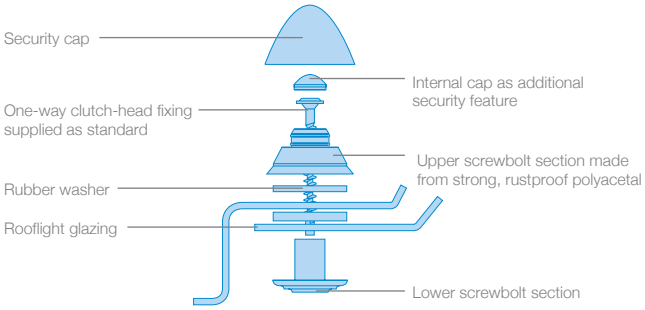
Polycarbonate Em-Domes use a minimum 3mm thick glazing and have been tested and certified according to EN1873:1200 Joules, and ACR(M): 001: 2005 Class B.

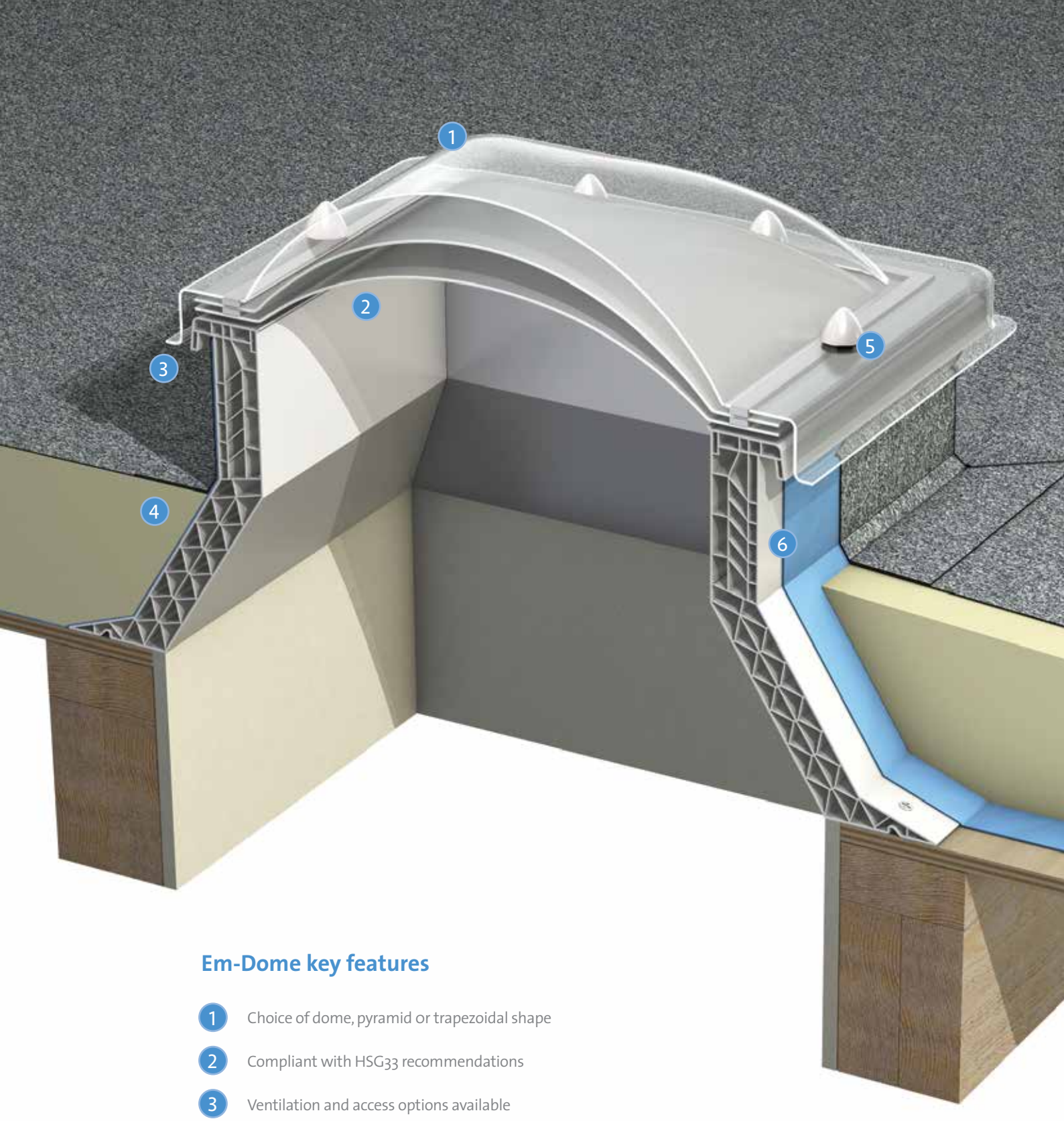
Em-Domes are tested to the highest standards and are proven suitable for use on most flat roofs, including single ply, felt, hot-melt, asphalt, liquid, GRP and lead. They are normally specified with our proprietary upstands (see page 14) but can also be installed on existing builder's upstands.

Higher security, access and ventilation options are available (See pages 16-21).

High security screwbolts

Unique to the Em-Dome are the patented high security screwbolts, supplied factory fitted as standard to all units. Once installed, the fixing cannot be removed using common tools. The screwbolt provides a high level of resistance to tampering or forced entry. The fixing screw or bolt is sleeved within the body of the screwbolt which avoids pressure being exerted on the rooflight glazing as the fixing is tightened. This virtually eliminates the risk of stress fractures caused by over-tightening.





Em-Dome key features

1. Choice of dome, pyramid or trapezoidal shape
2. Compliant with HSG33 recommendations
3. Ventilation and access options available
4. A range of upstands to accommodate new roof insulation
5. Patented high security screwbolt fixing
6. Em-Curb upstand provides tidy detailing

em-dome®

Glazing options

Features

Material
Polycarbonate

Skin
Single, double, triple, quad or multiwall construction

Glazing
Clear, opal diffused, bronze or HeatReflect

Shape
Square, rectangular or circular

Size
From 300 x 300mm to 1800 x 3000mm

Thermoformed glazing

Em-Domes are thermoformed from polycarbonate sheet and are available in single, double and triple skin plus certain sizes available in quad skin. Polycarbonate is virtually unbreakable, with an impact strength up to 250 times greater than glass.

Single skin | Double skin | Triple skin | Quad skin

Em-Domes can be supplied in clear, opal diffused, bronze or 'HeatReflect' (reflects up to 63% of the heat radiation) glazing.

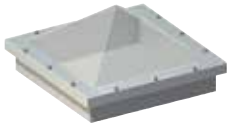
Clear | Opal diffused | Bronze | 'HeatReflect'

All polycarbonate Em-Domes have a minimum 3 mm outer thick glazing. Inner skin thickness may vary.

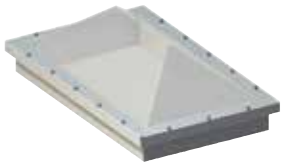
Shapes

Em-Domes are available in the following shapes:

Domed rooflight
(Square, rectangular or circular)



Pyramid rooflight
(Square)



Trapezoidal rooflight
(Rectangular units. A range of triangular shaped trapezoidal units is available)

Sizes

Offered in an extensive range of over 140 sizes from 300 x 300mm, through to 1800 x 3000mm. Many sizes are available ex-stock for immediate delivery. Where units are to replace existing rooflights a range of upstand adaptors are available.

See pages 26-27 for details on how to specify Em-Dome

Performance

When installed in accordance with the manufacturer's recommendations, Em-Domes are expected to exceed the life of the roof covering. Em-Domes are guaranteed against the effects of defective design, materials or construction for ten years, subject to certain conditions. 'Special Project' guarantees are available including 20 year and insurance backed.
For further details please contact Whitesales.

Performance of glazing materials

Typical values	Polycarbonate
Fire ratings To BS 476: Part 3 To BS 476: Part 7 To 1991 Building Regulations	 AA Class 1* Tp(a)
Service Temperature	-50 to +120°C

Information for 3mm thick glazing unless noted otherwise.
* Class 0 for Building Regulation purposes

Em-Dome in opal diffused with upstand

Certification

Whitesales' Em-Dome rooflights are 'out-of plane' rooflights, and provided they are specified with polycarbonate glazing, can be deemed to be 'non-fragile'.

- Em-Dome polycarbonate rooflights have undergone large body impact testing by an independent accredited test organisation and test certificates are available to demonstrate compliance to an energy level of 1200 Joules when tested to pr EN1873, and ACR(M)001: 2005 to Class B. They have also undergone hard body impact testing according to NBN EN 13964:2007.
- Polycarbonate Em-Domes are available with BBA Certificate No. 00/4691 and are manufactured to ISO 9001.
- Polycarbonate Em-Domes are manufactured in accordance with European standards and hold a CE mark according to EN1873.
- Em-Dome rooflights, Em-Curb upstands, hinged opening frames and rotating ventilators are certified as providing adequate resistance to precipitation, according to EN 1873 – Weathertightness.

Glazing specification

	Single Clear	Single Opal	Single Heat Reflect	Double Clear	Double Opal	Double Heat Reflect
Light transmission (LT %)	83%	58%	49%	77%	51%	43%
Solar heat gain factor (g %)	83%	60%	59%	69%	50%	40%
Sound reduction (dB)	12	12	12	20	20	20
Thermal transmission (W/m2K)	5.36	5.36	5.36	2.68	2.68	2.68

	Triple Clear	Triple Opal	Triple Heat Reflect	Quad Clear	Quad Opal	ECO 10mm Opal	ECO 16mm Opal
Light transmission (LT %)	70%	45%	40%	63%	58%	51%	39%
Solar heat gain factor (g %)	60%	43%	44%	52%	46%	43%	32%
Sound reduction (dB)	22	22	22	23	23	21	22
Thermal transmission (W/m2K)	1.78*	1.78*	1.70*	1.24	1.24	1.23	0.90

* Measured in hot box in the vertical BS EN ISO 12567-2: 2005

em-dome® eco

Enhanced thermal performance

The Em-Dome ECO rooflight is designed for buildings where environmental credentials and energy efficiency are a high priority.

Em-Dome ECO on Em-Curb ECO PVC 350mm upstand

Em-Dome ECO on Em-Curb ECO PVC 350mm upstand

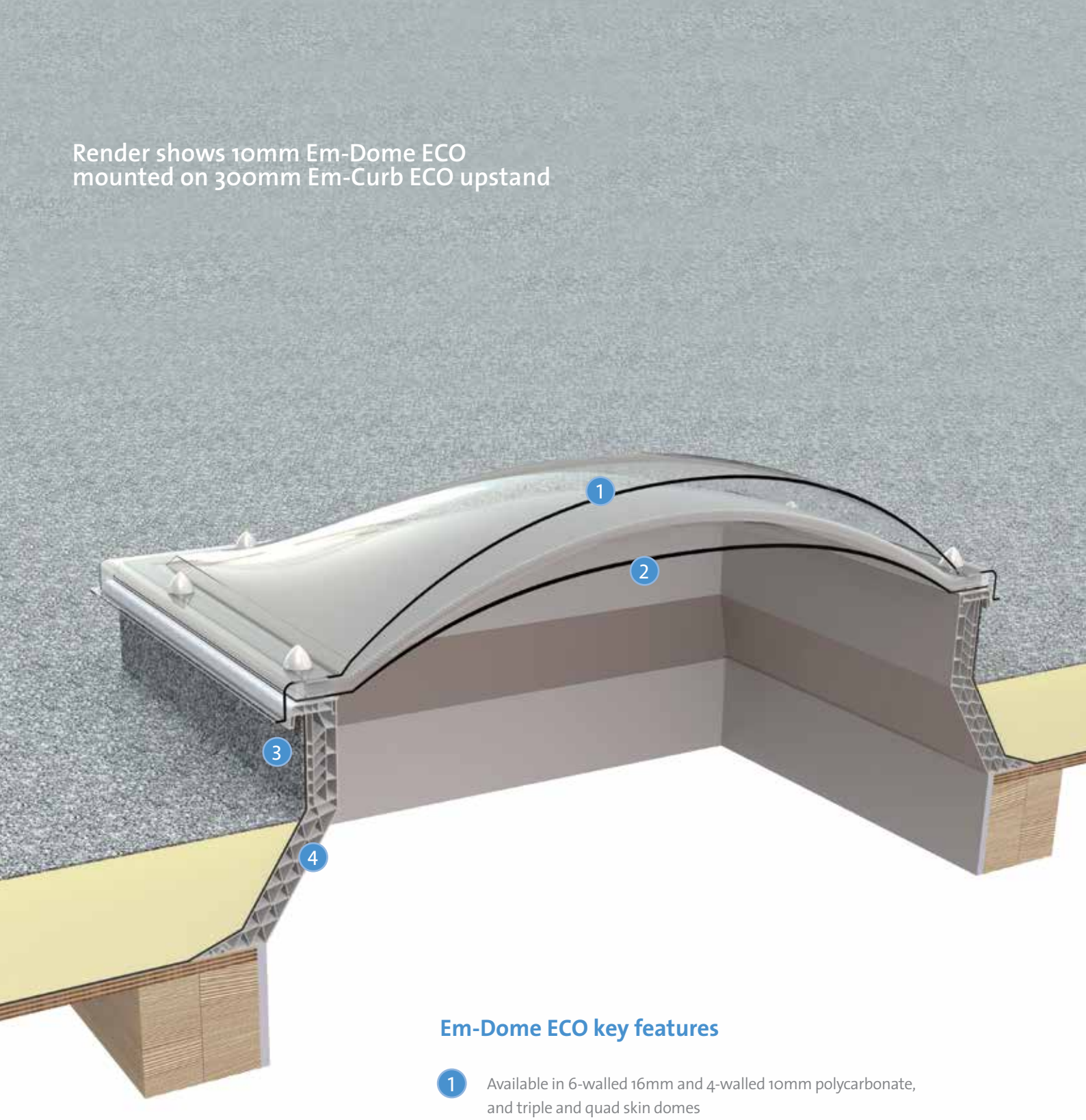
Description

Our engineers have taken our popular standard Em-Dome skylight and enhanced the thermal performance to bring down energy use and costs and reduce carbon footprint even further. The difference is in the glazing. The ECO range includes a choice of four levels of glazing: 4-walled 10mm and 6-walled 16mm polycarbonate, triple skin and quad skin domes.

The result is a rooflight with ISO 6946-compliant U-Values as low as 0.90 W/m2K. Since rooflights are chosen for their greater levels of natural light transmission over vertical glazing, the ECO range has not sacrificed light for thermal performance. Depending on your choice of insulation level and whether you opt for clear, diffused or heat-reflecting glazing, light transmission levels can be as high as 50% for increased occupant wellbeing and reduced artificial lighting dependency.

Security and safety are as strong as ever. Em-Dome ECO rooflights are all deemed non-fragile and tested to meet CE EN1873 standards. The polycarbonate shell is 250 times stronger than the equivalent thickness of glass and can withstand 1200 joules of impact.
In combination with its double-drip edge, it's watertight, windproof and highly secure. Every ECO rooflight is fitted with a patented one-way screwbolt security fixing system for additional security reassurance.

Render shows 10mm Em-Dome ECO
mounted on 300mm Em-Curb ECO upstand



Em-Dome ECO key features

1. Available in 6-walled 16mm and 4-walled 10mm polycarbonate, and triple and quad skin domes
2. Compliant with HSG33 recommendations
3. Ventilation and access options available
4. A range of ECO upstands that will comply with the highest U-Value requirements to accommodate new roof insulation

em-dome® eco

Materials and performance

Performance and options

The philosophy behind the Em-Dome ECO range of skylights is to deliver even greater thermal and acoustic performance while still maximising natural light ingress. It complies with CE EN1873, has U-Values in accordance with ISO 6946 and levels of light transmission levels that meet ISO 13468.

The multiwall construction provides a consistent thermal barrier, with U-Values as impressive as 0.90W/m²K. The Em-Dome ECO system is complemented by the Em-Curb ECO range of optional, high-insulation upstands, which may be specified according to roofing and insulation requirements.

The Em-Dome ECO can be specified as a fixed rooflight or feature manual or electrically-operated opening for convenient roof access or incorporation into a fire escape route.

In accordance with our focus on environmentally friendly living, any ECO rooflight can also feature passive ventilation with trickle vents or controllable rotating vents for steady replenishment of fresher air.

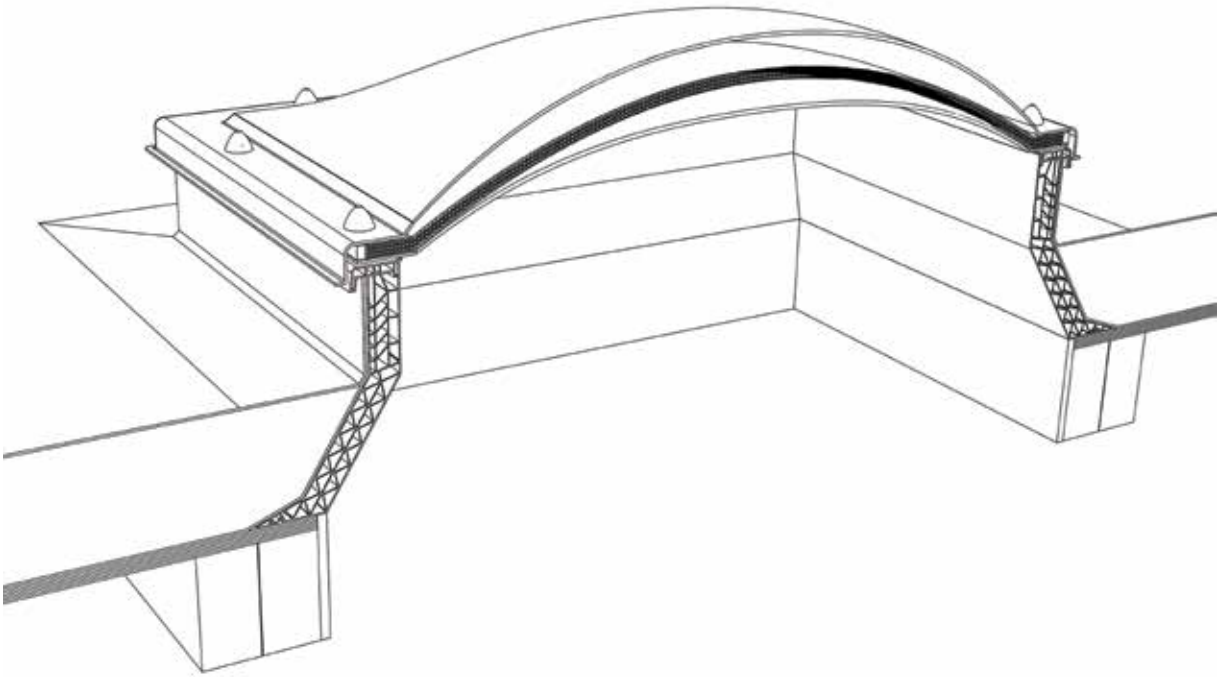
Materials
E (EN13501-1) acrylic sheet
M2 polycarbonate sheet
Class 1Y (BS 476) polycarbonate sheet
B S1-d0 polycarbonate sheet

Wide range of sizes available, please contact Whitesales for further details.

Glazing characteristics

ECO specification	U-Values (W/m²K)	Light transmission (LT %)		Sound reduction (dB)	Solar Heat Gain Factor (g %)	
		Clear	Diffused		Clear	Diffused
6-walled 16mm	0.85	-	39	22	-	32
4-walled 10mm	1.23	-	51	21	-	43
Quad-skin	1.24	63	58	23	52	46
Triple-skin	1.70	70	45	22	60	43

Impact resistance	250 times stronger than glass of equal thickness. No damage on shocks similar to an impact of a steel ball of 250 gr falling from a height of 1 m. Hard body impact test according to NBN EN1873. SB 1200- soft body impact test according to EN1873.
Attestations and certificates	- CE according to EN1873 - U-Values according to EN ISO 6946 - Light transmission according to EN ISO 13468 - dB values according to EN ISO 140-3 (report P902622-B) - 1200 Joule certificate Cebtp D313.9.823.1/2 and SB 1200 (EN1873)



em-dome®

Upstands for new installations...

Features

- Used in conjunction with Em-Dome and Em-Dome ECO rooflights
- Exceptional thermal efficiency
- Em-Curbs for new installations
- Enhance overall appearance of the rooflight
- Prefinished white internally
- Heights available 150, 300 and 350mm
- Available in white PVC or GRP

Em-Curb upstands

Em-Curbs are designed to be used in conjunction with Em-Dome and Em-Dome ECO rooflights to provide a thermally broken interface which in turn helps to improve the overall thermal efficiency of the roof. Em-Curbs represent excellent value for money, enhance the overall appearance of the rooflight and are prefinished white internally, therefore requiring no further decoration.

Splayed Em-Curb upstands give an excellent spread of light through the room whilst the vertical units are available where the dimensions of the roof aperture need to be maintained.

The standard Em-Curb ECO is made from extruded white PVC. The multi-chambered construction gives an exceptionally robust and thermally efficient performance. This curb is suitable for most roof finishes and is available in heights of 150, 300 and 350mm with other heights also available. All ventilation, access hatch and smoke vent options can be used in conjunction with Em-Curbs.

Em-Curbs can also be supplied in GRP which have integral 10mm polyurethane foam insulation and robust dome fixing and mounting flanges. They can be used with most roofing materials.

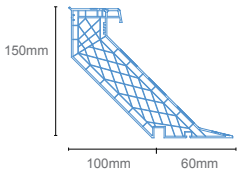
Values shown are the calculated U-Value, unless denoted otherwise. Complete unit U-Values are available on request.

Thermal transmission

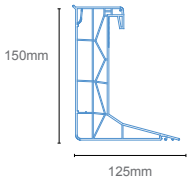
Typical values	U-Value (W/m²K)
Em-Curb ECO PVC 150mm splayed	0.92
Em-Curb ECO PVC 150mm vertical	1.00*
Em-Curb ECO PVC 300mm splayed	1.00*
Em-Curb ECO PVC 300mm vertical	1.00
Em-Curb ECO PVC 350mm splayed	0.89
Em-Curb GRP 150mm splayed	1.82

* Measured in hot box in the vertical BS EN ISO 12567-2: 2005

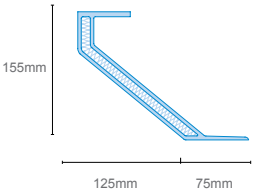
Em-Curb ECO PVC 150mm splayed



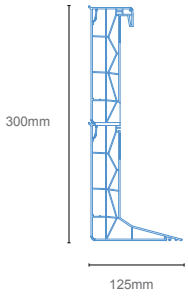
Em-Curb ECO PVC 150mm vertical



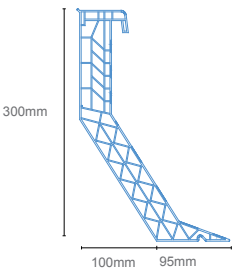
Em-Curb GRP 150mm splayed



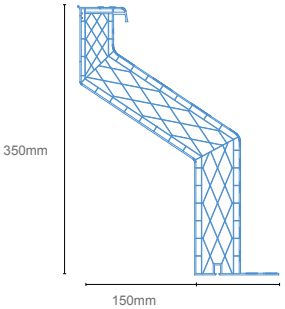
Em-Curb ECO PVC 300mm vertical



Em-Curb ECO PVC 300mm splayed



Em-Curb ECO PVC 350mm splayed



...and refurbishments

Em-Collar adaptors

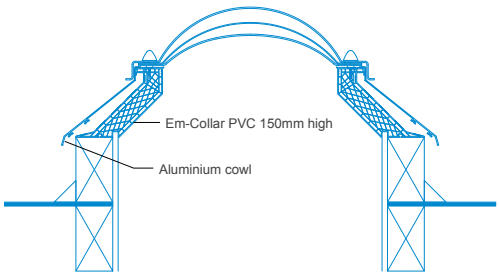
Em-Collars provide a thermally broken solution for replacing existing rooflights and would typically be installed to an existing builder's upstand. Consideration should be given to using the PVC 350mm splayed upstand to oversleeve existing site upstand as this reduces site work, especially where existing linings must not be disturbed, e.g. may contain asbestos.

T-Collar adaptors, collars and flanges

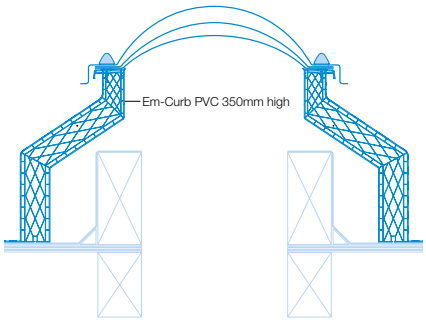
T-Collars are purpose made to fit any size or type of existing builder's curb or proprietary upstand and enable Em-Domes to be fitted where existing dimensions are irregular or a direct size match is not available.

Em-Collars and T-Collars are a flexible solution and can also incorporate all ventilation, access hatch and smoke vent options.

Em-Collar PVC adaptor collar



Em-Curb ECO PVC 350mm oversleeve upstand



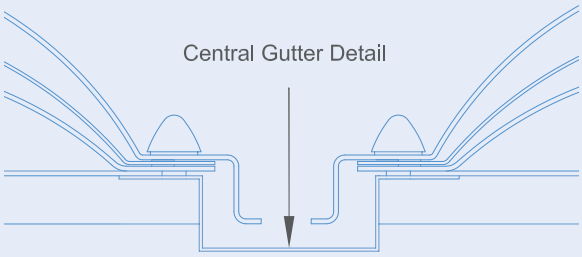
Multiple Em-Dome rooflights

For extra long applications, e.g. 3 to 6m, two or more Em-Domes can be installed together by means of linked T-Collar adaptors. These are self-supporting up to a span of 1m. For spans over 1m a structural support will be required. Where necessary, linked T-Collar adaptors are supplied in individual sections for jointing on site, utilising a standing seam detail.

Em-Curb upstands can also be used in conjunction with multiple rooflights.

For roof openings longer than 6m, we would normally recommend a continuous barrel vault rooflight (refer to the Whitesales 'Continuous rooflights' brochure).

Linked Em-Collar adaptor – jointing detail



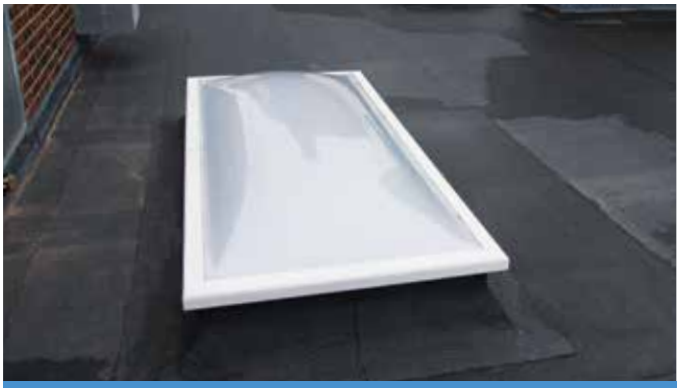
Em-Dome linked double units with Em-Collar and aluminium cowl

em-dome®

Security options: Em-Dome Plus

Features

- Fully enclosed tamper-proof frame
- High security fixing detail
- Simple to install
- Unobtrusive appearance with no visible fixings
- Completely weatherproof
- Self-draining



Em-Dome in opal diffused with 300mm ECO PVC upstand and 'Em-Dome Plus' security frame

Description

A fully enclosed, tamper-proof frame for a totally secure fixing, Em-Dome Plus is simple to install and provides a neat, unobtrusive appearance, with no visible fixings. The design of the frame allows for a completely weatherproof, self-draining construction, incorporating standard Em-Domes in single, double or triple skin construction. The Em-Dome Plus frame is made from aluminium extrusions to BS 1474, Quality 6063/T6, and is supplied in mill finish. Polyester powder coated frames are also available.

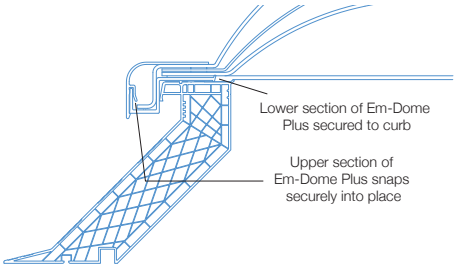
Performance

Em-Dome Plus security rooflights will not rust or be affected by atmospheric pollution. Once installed, they are maintenance free.

Sitework

The frame is supplied factory fitted to an Em-Curb or Em-Collar. For mounting to builder's upstand the frame will need to be supplied with an adaptor frame.

Fixing Em-Dome Plus to Em-Curb

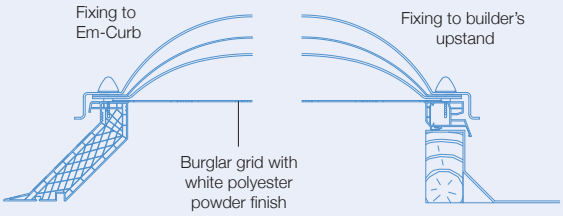


Burglar grid

Where a higher level of security is required a burglar bar grid is available for most sizes and permutations. Polyester powder coated frames are also available.

The grid provides extra strength to the complete installation whilst also acting as an extra visual deterrent to potential intruders.

Type of burglar bar grid varies according to size. Please consult Whitesales for exact details.



em-hatch™

Access options

Features

- Rooflight becomes means of access to roof
- Can be installed to existing upstand with Em-Collar
- Em-Curb upstands can be incorporated
- Provides a safe access route
- Telescopic gas or friction struts
- Remote electric operation units available

Em-Dome in opal diffused with Em-Curb ECO PVC 150mm splayed upstand

Description

Where the rooflight is to be used as a means of access on to a roof the hinged access hatch frame opens to 90° to provide a safe route for personnel and equipment, often avoiding the need to provide other external facilities. The access frame can be specified for mounting either direct to a builder's curb with Em-Collar and T-Collar adaptors or in conjunction with Em-Curb upstands.

Standard features include a locking handle to secure the rooflight in the closed position and telescopic struts to hold the rooflight in the open position. The telescopic struts are either gas assisted hydraulic operation or have adjustable friction control and can be set according to dome weight and prevailing site conditions.

Limitations of use

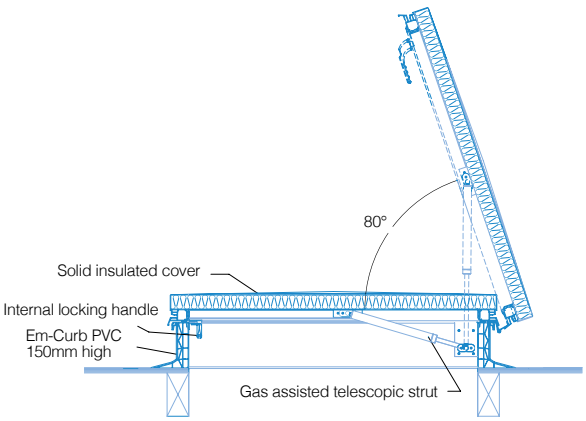
Access hatches are not recommended in sizes larger than 1160mm square or 860 x 1460mm rectangular.

Other options

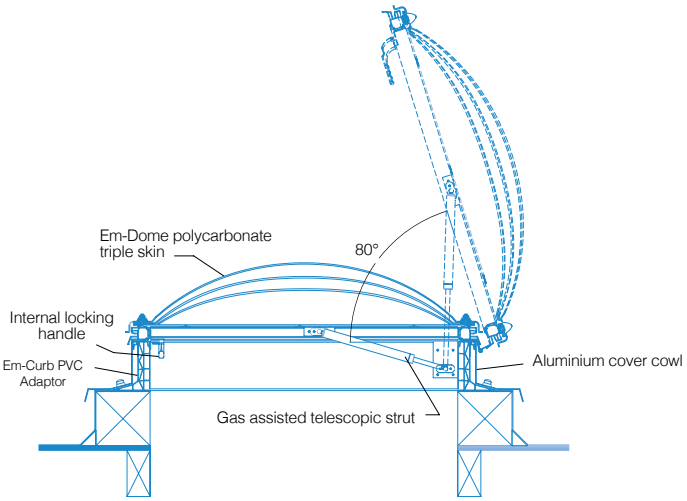
Remote electric operation opening units are also available (refer to Whitesales).

For more information please refer to Whitesales dedicated brochure 'Smoke Vents and Roofs Access Systems'.

Em-Hatch Solid Insulated Cover



Em-Hatch Triple Skin Polycarbonate Rooflight



em-dome®

Ventilation options

Features

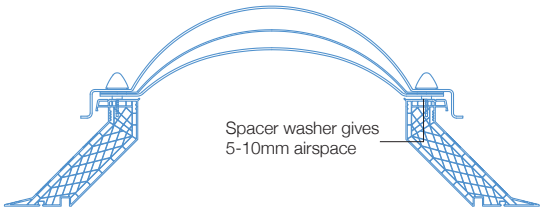
- Permanent Trickle
- Controllable Trickle
- Controllable Rotating
- Hinged Manual Spindle Opening
- Hinged Electric Actuator Opening
- Powered Extract Fan

Em-Dome in opal diffused with Em-Collar and hinged opener

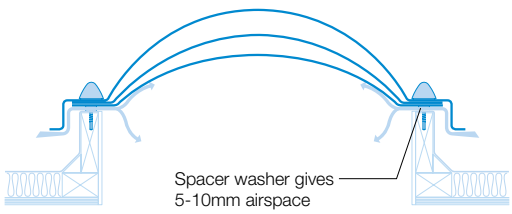
Permanent Trickle

Permanent ventilation is provided by means of spacer washers inserted in the Em-Dome fixings. This provides a continuous 5 to 10mm weatherproof vent around the perimeter of the rooflight which suits areas such as corridors and other areas where non-controllable background ventilation is required.

Fitted to Em-Curb or Em-Curb ECO



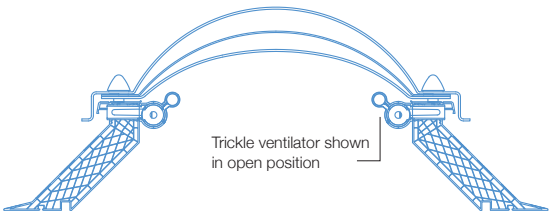
Fitted to builder's upstand



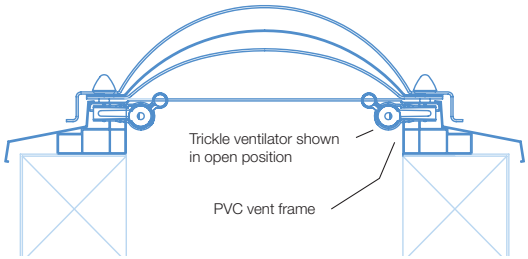
Controllable Rotating Trickle

Controllable rotating trickle ventilation is an easily adjustable vent which is fitted to two or four sides of a PVC Em-Curb or Em-Collar. With the vents on two sides the unit can provide 8000mm ventilation area which assists with Building Regulations compliance.

Fitted to Em-Curb or Em-Curb ECO



Fitted to builder's upstand



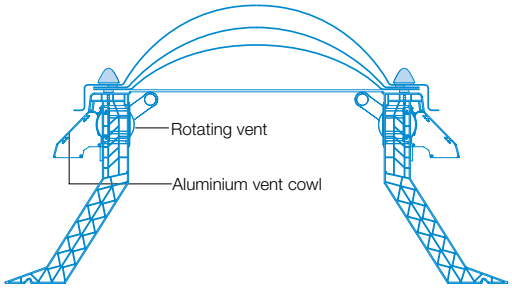
Em-Dome in opal diffused with rotating vents

Em-Dome clear with hinged opener

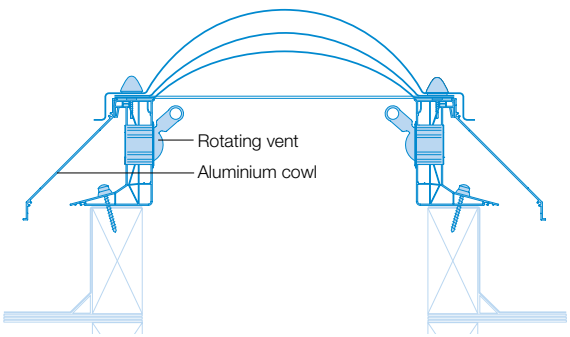
Controllable Rotating

Controllable rotating vents are a fully insulated unit with enhanced thermal properties and a greater vent area than the Trickle Vent options. The vents can be fitted to two or four sides of a PVC Em-Curb ECO or Em-Collar. With the vents on two sides, the unit will provide a minimum of 11,000mm2 ventilation area. This increases with the size of the rooflight. Tested and certified according to EN 1873 – Watertightness.

Fitted to Em-Curb or Em-Curb ECO



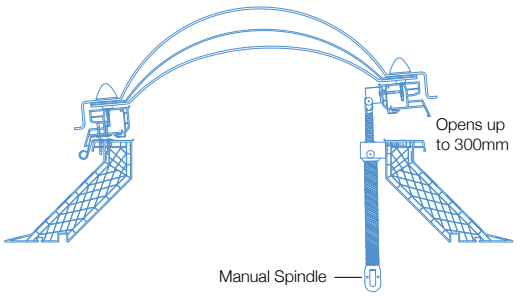
Fitted to Em-Collar



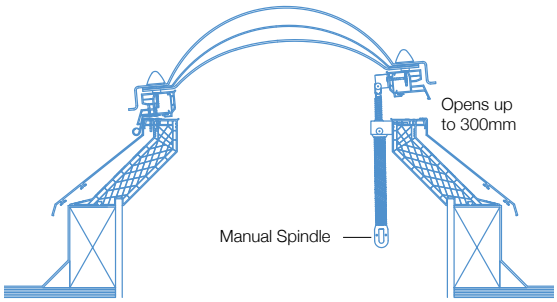
Hinged Manual Spindle Opening

Hinged opening vents provide the maximum ventilation area to allow rapid air movement. The manual spindle operation can be opened to any point up to 300mm and is operated by a Winding Rod available separately. Tested and certified according to EN 1873 – Watertightness.

Fitted to Em-Curb or Em-Curb ECO



Fitted to builder's upstand



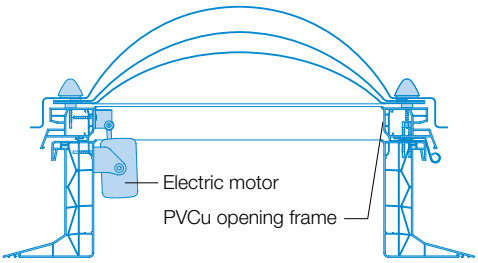
em-dome®

Ventilation options: continued

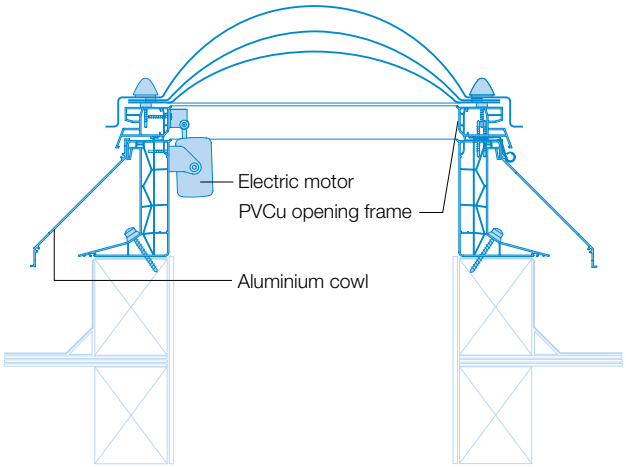
Hinged Electric Actuator Opening

Hinged opening vents provide the maximum ventilation area to allow rapid air movement. The electric actuator operation allows control by a wall mounted open/close switch and also options for wind, rain and temperature sensors with a range of control panels available separately. Actuators are either 24V DC or 230V AC with options to open to 400 or 600mm.

Fitted to Em-Curb or Em-Curb ECO



Fitted to Em-Collar

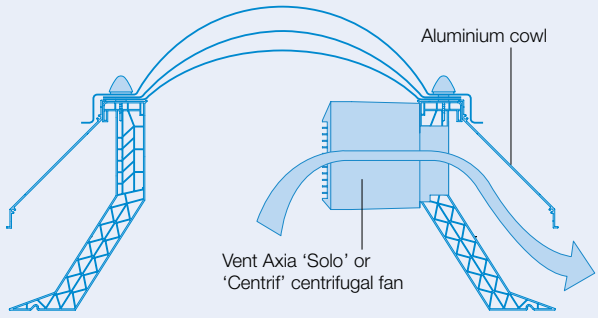


Powered ventilation

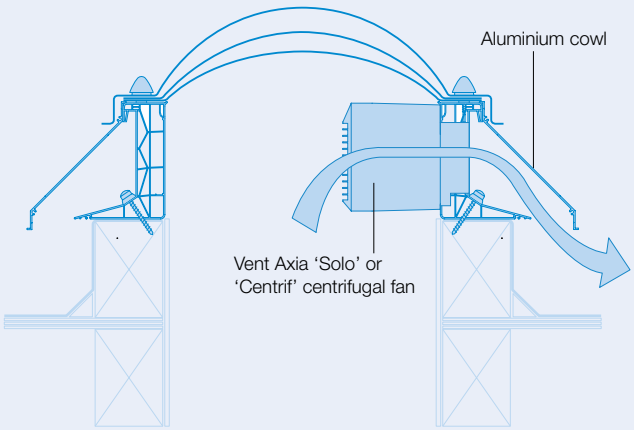
Where natural ventilation is insufficient, Em-Domes can be supplied with Vent Axia Solo or Centrif Duo centrifugal extract fans. These are mounted in the side wall of Em-Curb PVC 150mm vertical or Em-Curb PVC 300mm splayed.

These high performance extract fans are specifically designed for ventilating internal bathrooms, WCs and other small rooms. They have an extract performance of 85 m^3/hr (24 l/s) or 220 m^3/hr (61 l/s) respectively and can be fitted in one or more sides. Where greater air movement is required, white PVC lined fan collars with pre-cut apertures are available to enable fitting of larger axial fans (e.g. Vent-Axia T-series). This allows either new high capacity fans to be installed or existing fans to be reinstalled through the rooflight unit.

Fitted to Em-Curb or Em-Curb ECO

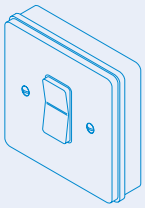


Fitted to Em-Collar



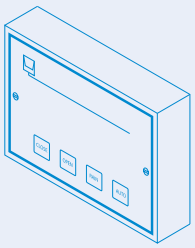
Ventilation controls

Controllers



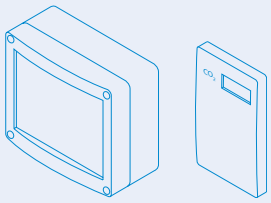
Open/Close

- Retractive switch – 240V as standard
- Surface mounted or flush
- Also available with transformer for 24V actuators
- Key switching available
- Waterproofing casing available



Control panel

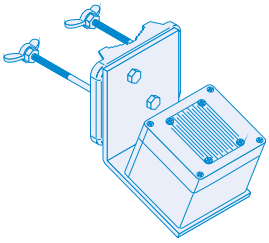
- Includes open/close manual overide switch
- Automated/controlled opening of actuators
- Opens electric actuator in conjunction with sensors shown below



CO2

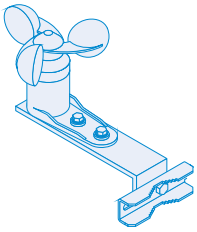
- Monitors CO2 concentration, indoor air quality to meet the requirement of Building Bulletin 101 – Ventilation in School Buildings – July 2005
- Traffic light system indicates CO2 level range (green – optimum, yellow – moderate, red – poor

Accessories/sensors



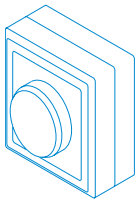
Rain detector

- Heated sensor area
- Rain signal stored for two minutes
- Includes mounting brackets



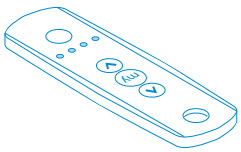
Wind sensor

- Aerial mast fastening
- Wind signal stored for ten minutes



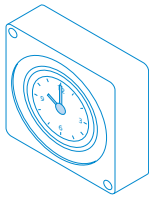
Humidity

- Ideal for washrooms, swimming pool areas and other high-humidity rooms



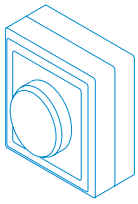
Remote

- Radio remote controller
- Choice of one or four channels
- Includes receiver and power pack



Timer

- Enable timer and set overide – ideal for end of day closure
- Can be used for open and close functions



Thermostat

- Control high temperature levels
- Use in conjunction with timer for optimum effectiveness

em-vent™

Smoke vent options

Features

- Fully certified to EN 12101-2
- Compliant with Building Regulation ADB and ADL
- Opens to 160° within 60 seconds
- Can incorporate roof access facility
- Provides natural comfort ventilation
- Impact resistant to EN 1873 1200 joules and are therefore certified non-fragile
- Available as square, rectangular or circular
- Available with a glazed or solid insulated lid
- Available with PVC upstands or direct to builder's upstand

Smoke vents

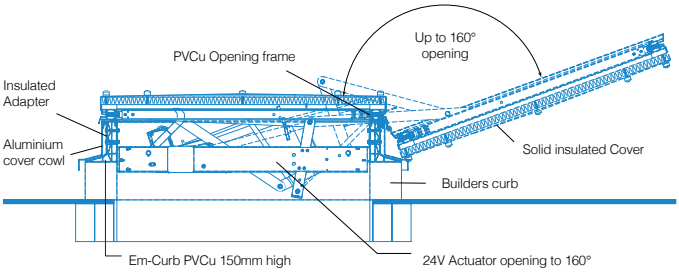
OVs (Opening Vents) and AOVs (Automatic Opening Vents) are required to meet the relevant Building Regulations for ventilating escape routes. The Regulations stipulate a minimum free ventilation area (normally 1.0m2 or 1.5m2), and require units to open to either 90° or 140° depending on a number of factors. Ventilation areas can be achieved with a variety of square or rectangular Em-Domes and can be used in conjunction with Em-Curb upstands or T-Collar and Em-Collar adaptors.

Opening the rooflight is by means of a 24V DC electric actuator. For OVs we can provide a stand alone control panel with a comprehensive range of accessories – for AOVs our control panel can interface with the main Building Management System (BMS) or accessories. Due to the variety of BMSs that are required to satisfy the relevant authorities, we recommend that a qualified mechanical and electrical company is employed to plan and install the system.

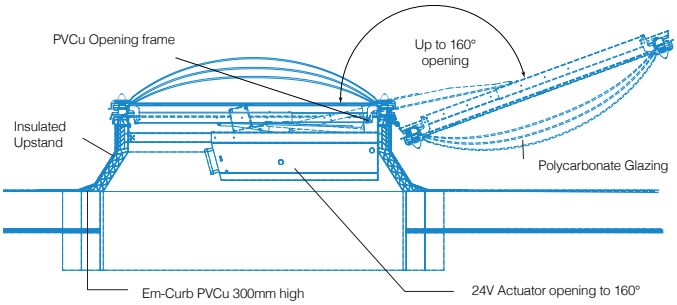
For more information please refer to Whitesales 'Smoke Vents and Roof Access Systems' brochure for full details.

Em-Vent smoke vent

Smoke vent – mounted to Em-Collar

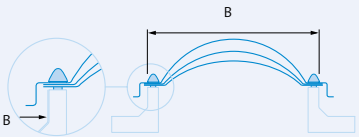
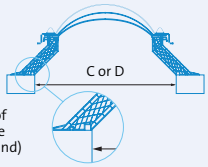
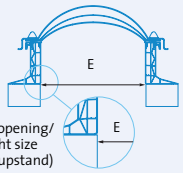
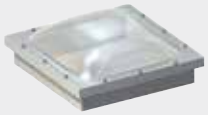
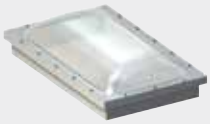


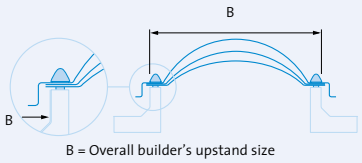
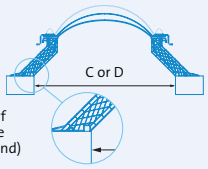
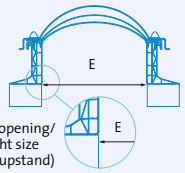
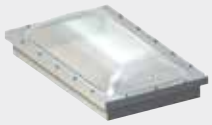
Smoke vent – mounted to Em-Curb



Case study	Lilian Baylis
Project type	Smoke ventilation on residential building conversion scheme
Products	Em-Vent smoke vents and control panels
Glazing	Triple-glazed polycarbonate

Em-Dome size chart

	Em-Dome rooflights				Em-Curb upstands		
	 B = Overall builder's upstand size				 C or D = Roof opening size (splayed upstand)  E = Roof opening/ daylight size (vertical upstand)	
Em-Dome shape	**Size Ref. No**	**Pyramid availability**	**ECO10 availability**	**Dimension B Overall builder's upstand size (mm)**	**Dimension C Roof opening size (PVC splayed upstand) (mm)**	**Dimension D Roof opening size (GRP splayed upstand) (mm)**	**Dimension E Roof opening size (PVC vertical upstand) (mm)**
Square sizes 	S0			400 x 400	500 x 500	500 x 500	300 x 300
	S1	Δ	●	500x 500	600 x 600	650 x 650	400 x 400
	S1A			550x550	650x650	N/A	450x450
	S2	Δ	●	600 x 600	700 x 700	750 x 750	500 x 500
	S3			650 x 650	750 x 750	750 x 750	550 x 550
	S4	Δ	●	700 x 700	800 x 800	850 x 850	600 x 600
	S5	Δ	●	800 x 800	900 x 900	950 x 950	700 x 700
	S6	Δ	●	850 x 850	950 x 950	1000 x 1000	750 x 750
	S7	Δ	●	900 x 900	1000 x 1000	1050 x 1050	800 x 800
	S7A			950x950	1050x 1050	N/A	850x850
	S8	Δ	●	1000 x 1000	1100 x 1100	1150 x 1150	900 x 900
	S9	Δ	●	1100 x 1100	1200 x 1200	1250 x 1250	1000 x 1000
	S10		●	1150 x 1150	1250 x 1250	1250 x 1250	1050 x 1050
	S10A	Δ	●	1200 x 1200	1300 x 1300	N/A	1100 x 1100
	S11	Δ	●	1300 x 1300	1400 x 1400	1450 x 1450	1200 x 1200
	S12	Δ	●	1400 x 1400	1500 x 1500	1550 x 1550	1300 x 1300
	S13	Δ	●	1500 x 1500	1600 x 1600	1650 x 1650	1400 x 1400
	S14	Δ		1600 x 1600	1700 x 1700	1750 x 1750	1500 x 1500
	S14A			1650x1650	1750x1750	N/A	1550x1550
	S15	Δ	●	1700 x 1700	1800 x 1800	1850 x 1850	1600 x 1600
	S15A	Δ		1800 x 1800	1900 x 1900	N/A	1700 x 1700
	S16	Δ		1900 x 1900	2000 x 2000	2050 x 2050	1800 x 1800
	S17	Δ		2100 x 2100	2200 x 2200	2250 x 2250	2000 x 2000
Circular sizes 	C1			500 dia	N/A	630 dia	N/A
	C2			600 dia	N/A	750 dia	N/A
	C3			700 dia	N/A	850 dia	N/A
	C4			800 dia	N/A	950 dia	N/A
	C5			900 dia	N/A	1050 dia	N/A
	C6			1000 dia	N/A	1150 dia	N/A
	C7			1100 dia	N/A	1250 dia	N/A
	C8			1200 dia	N/A	1350 dia	N/A
	C9			1400 dia	N/A	1550 dia	N/A
	C9A			1500 dia	N/A	N/A	N/A
	C10			1700 dia	N/A	1850 dia	N/A
Rectangular sizes 	R1A			400x900	500 x 1000	500x1000	300x800
	R1A			400 x 1000	500 x 1100	N/A	300 x 900
	R2			400 x 1400	500 x 1500	500 x 1500	300 x 1300
	R3	Δ		500 x 800	600 x 900	650 x 950	400 x 700
	R3A	Δ		500 x 1100	600 x 1200	650 x 1250	400 x 1000
	R3C			500 x 1400	600 x 1500	N/A	400 x 1300
	RCX			500x1600	600x1700	N/A	400x1600
	R3D			500 x 1700	600 x 1800	N/A	400 x 1600
	R3X			500 x 2000	600 x 2100	N/A	400 x 1900
	R3Y			500x2300	600x2400	N/A	400x2200
	R3Z			500x2900	600x3000	N/A	400x2800
	R3P			550 x 850	650 x 950	N/A	450 x 750
	R3R			550 x 1110	650 x 1250	N/A	450 x 1010
	R3B			600 x 800	700 x 900	750 x 950	500 x 700
	R4	Δ		600 x 900	700 x 1000	N/A	500 x 800
	R4X			600 x 1100	700 x 1200	750 x 1250	500 x 1000
	R4A	Δ		600 x 1200	700 x 1300	N/A	500 x 1100
	R4Y			600 x 1500	700 x 1600	N/A	500 x 1400
	R4B			600 x 1800	700 x 1900	N/A	500 x 1700
	R4E			600 x 2100	700 x 2200	N/A	500 x 2000
	R4Z			600 x 2400	700 x 2500	N/A	500 x 2300
	R5X			700 x 900	800 x 1000	N/A	600 x 800
	R5			700 x 1000	800 x 1100	850 x 1150	600 x 900
	R6			700 x 1300	800 x 1400	850 x 1450	600 x 1200
	R6A			700 x 1400	800 x 1500	800 x 1500	600 x 1300
	R6C			700 x 1600	800 x 1700	N/A	600 x 1500
	R6F			700 x 1900	800 x 2000	N/A	600 x 1800
	R6G			700 x 2000	800 x 2100	N/A	600 x 1900
	R6H			700 x 2100	800 x 2200	N A	600 x 2000

	Em-Dome rooflights				Em-Curb upstands		
	 B = Overall builder's upstand size				 C or D = Roof opening size (splayed upstand)  E = Roof opening/ daylight size (vertical upstand)		
Em-Dome shape	**Size Ref. No**	**Pyramid availability**	**ECO10 availability**	**Dimension B Overall builder's upstand size (mm)**	**Dimension C Roof opening size (PVC splayed upstand) (mm)**	**Dimension D Roof opening size (GRP splayed upstand) (mm)**	**Dimension E Roof opening size (PVC vertical upstand) (mm)**
Rectangular sizes (continued) 	R7	Δ	●	800x1100	900x1200	950x1250	700x1000
	R7A			800x1400	900x1500	950x1500	700x1300
	R7D			800 x 1600	900 x 1700	N/A	700 x 1500
	R7B			800 x 1700	900 x 1800	N/A	700 x 1600
	R7X			800 x 2100	900 x 2200	N/A	700 x 2000
	R7Y			800 x 2300	900 x 2400	N/A	700 x 2200
	R8X			850 x 1150	950 x 1250	N/A	750 x 1050
	R8	Δ		850 x 1350	950 x 1450	1000 x 1500	750 x 1250
	R9X			850 x 1750	950 x 1850	N/A	750 x 1650
	R9	Δ		850 x 1850	950 x 1950	1000 x 2000	750 x 1750
	R10			850 x 2350	950 x 2450	1000 x 2500	750 x 2250
	R10A	Δ		900 x 1200	1000 x 1300	N/A	800 x 1100
	R11	Δ	●	900 x 1400	1000 x 1500	1050 1550	800 x 1300
	R11X			900 x 1500	1000 x 1600	N/A	800 x 1400
	R11C			900 x 1700	1000 x 1800	N/A	800 x 1600
	R11A			900 x 1800	1000 x 1900	N/A	800 x 1700
	R12			900 x 1900	1000 x 2000	1000 x 2000	800 x 1800
	R12B			900 x 2100	1000 x 2200	N A	800 x 2000
	R13			900 x 2300	1000 x 2400	1050 x 2450	800 x 2200
	R14			900 x 2400	1000 x 2500	1000 x 2500	800 x 2300
	R14A			900 x 2600	1000 x 2700	N/A	800 x 2500
	R15			900 x 2900	1000 x 3000	1000 x 3000	800 x 2800
	R15M			950 x 2450	1050 x 2550	N/A	850 x 2350
	R16			1000 x 1300	1100 x 1400	1150 x 1450	900 x 1200
	R16A			1000 x 1600	1100 x 1700	1150 x 1750	900 x 1500
	R16B			1000 x 1900	1100 x 2000	1150 x 2050	900 x 1800
	R16E			1000 x 2200	1100 x 2300	N/A	900 x 2100
	R17	Δ	●	1100 x 1400	1200 x 1500	1250 x 1550	1000 x 1300
	R17A			1100 x 1600	1200 x 1700	N/A	1000 x 1500
	R18		●	1100 x 1700	1200 x 1800	1250 x 1850	1000 x 1600
	R18A			1100 x 2000	1200 x 2100	1250 x 2150	1000 x 1900
	R19		●	1100 x 2100	1200 x 2200	1250 x 2250	1000 x 2000
	R20			1100 x 2300	1200 x 2400	1250 x 2450	1000 x 2200
	R21			1100 x 2400	1200 x 2500	1250 x 2550	1000 x 2300
	R22			1100 x 2600	1200 x 2700	1250 x 2750	1000 x 2500
	R22A			1100 x 2900	1200 x 3000	N/A	1000 x 2800
	R22			1100 x 3100	1200 x 3200	N/A	1000 x 3000
	R22P			1150 x 1750	1250 x 1850	N/A	1050 x 1650
	R22R			1150 x 2350	1250 x 2450	N/A	1050 x 2250
	R22X			1200 x 1500	1300 x 1600	N/A	1100 x 1400
	R22B			1200 x 1800	1300 x 1900	N/A	1100 x 1700
	R22C			1200 x 2400	1300 x 2500	N/A	1100 x 2300
	R23W			1300 x 1500	1400 x 1600	N/A	1200 x 1400
	R23X			1300 x 1600	1400 x 1700	1450 x 1750	1200 x 1500
	R23			1300 x 1900	1400 x 2000	1450 x 2050	1200 x 1800
	R23A			1300 x 2200	1400 x 2300	1450 x 2350	1200 x 2100
	R23B			1300 x 2500	1400 x 2600	N/A	1200 x 2400
	R24			1400 x 1700	1500 x 1800	1550 x 1850	1300 x 1600
	R25			1400 x 2000	1500 x 2100	1550 x 2150	1300 x 1900
	R26			1400 x 2100	1500 x 2200	1550 x 2250	1300 x 2000
	R27			1400 x 2300	1500 x 2400	1550 x 2450	1300 x 2200
	R28			1400 x 2400	1500 x 2500	1550 x 2550	1300 x 2300
	R29			1400 x 2600	1500 x 2700	1550 x 2750	1300 x 2500
	R30			1400 x 2900	1500 x 3000	1550 x 3050	1300 x 2800
	R31X			1700 x 2000	1800 x 2100	1850 x 2150	1600 x 1900
	R31			1700 x 2100	1800 x 2200	1850 x 2250	1600 x 2000
	R32			1700 x 2300	1800 x 2400	1850 x 2450	1600 x 2200
	R32A			1700 x 2400	1800 x 2500	1850 x 2550	1600 x 2300
	R33			1700 x 2600	1800 x 2700	1850 x 2750	1600 x 2500
	R34			1700 x 2900	1800 x 3000	1850 x 3050	1600 x 2800
	R35			1900 x 2900	2000 x 3000	N A	1800 x 2800

How to specify checklist

Use the following checklist to help you consider the elements that need to be specified for your project and the Whitesales team will help you to apply this to a full specification.

1 Select shape of rooflight

(see page 8)

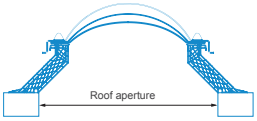
Square

Rectangular

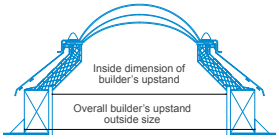
Circular

2 Take site measurements or choose ideal size

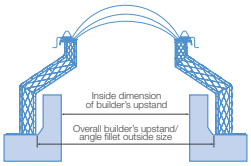
(see page 8)



With an upstand for a new installation



With an adaptor to fit an existing upstand

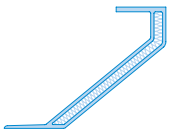


With an upstand to oversleeve an existing upstand

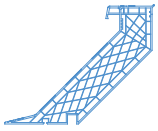
3 Select upstand

(see page 10-11)

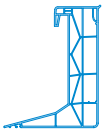
With an Em-Curb upstand for a new installation



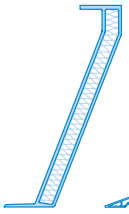
GRP 150mm splayed



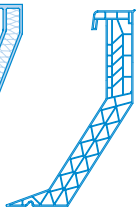
ECO PVC 150mm splayed



ECO PVC 150mm vertical

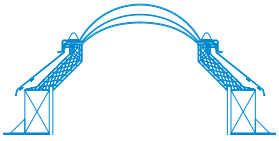


GRP 300mm splayed

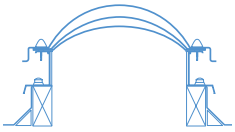


ECO PVC 300mm splayed

With a curb adaptor to fit an existing upstand

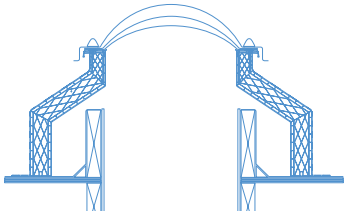


Em-Collar
ECO PVC Adaptor Collar



T-Collar Aluminium
Adaptor Collar

With a PVC upstand to oversleeve an existing upstand



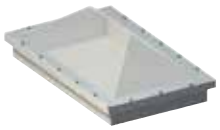
Em-Curb ECO PVC
Oversleeve Upstand

4 Select glazing

(see page 8)

Profile

Domed



Trapezoidal

Pyramid

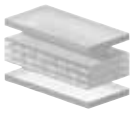
Type

Single skin
(5.36 W/m²K)

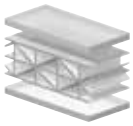
Double skin
(2.68 W/m²K)

Triple skin
(1.78 W/m²K)

Quad skin
(1.37 W/m²K)



Eco 10mm
(1.20 W/m²K)



Eco 16mm
(1.00 W/m²K)

Finish

Clear

Opal Diffused

Bronze

HeatReflect

5 Select ventilation and opening options

(see page 18-21)

Permanent Trickle Vent
Permanent non-controllable spacer washers for corridors and non-inhabited rooms.

Controllable Rotating Trickle Vent
Adjustable vent on two or four sides. Provides minimum 8000mm² vent to assist compliance with Building Regulations.

Controllable Rotating Vent
Fully insulated controllable vent for secure and effective through flow of air. Suited to living and working areas.

Hinged Manual Opener
Hinged opener controlled by operating rod. Provides high air movement and can be opened up to 300mm.

Hinged Electric Opener
Electrically operated hinged opener operated by switch of specialist control pack. Opens up to either 400 or 600mm.

Extract Fan
Centrifugal extract fan to remove air. Suited to cloakroom, kitchen and other high humidity areas

Smoke Vent
Electrically operated hinged openers to allow controlled smoke ventilation. Open to either 90° or 140°.

Access Hatch
Hinged and lockable access hatch to allow safe access to roof or plant areas.

6 Other options

(see page 16)

Specify from product literature
e.g. Burglar bar grid, Security frame.

Typical NBS clause

L10 – Windows / Rooflights / Screens / Louvres

460 – Rooflights

Manufacturer: Whitesales
Tel + 44 (0)1483 271371
E-mail sales@whitesales.co.uk
Web www.whitesales.co.uk

Product Reference: Em-Dome Thermoformed Modular Rooflight

Type: [Rectangular] [Square] [Circular]

Size: [Specify from Product literature or consult Whitesales]

Frame: High Security Screwbolt

Kerb: [Specify upstand height and type, or curb adaptor type]

Glazing details:

Material: Polycarbonate

Profile: [Dome] [Pyramid] [Trapezoidal]

Type: [single] [double] [triple] [quad] [multiwall] skin

Finish: [Clear] [Opal Diffused] [Bronze] [Heat-Reflect]

Ventilation and opening: [Permanent] [Controllable Trickle] [Rotating] [Manual hinged opener] [Electric hinged opener] [Extract Fan] [Smoke Vent] [Access Hatch]

Other requirements: [Burglar Bar Grid]

Fixing: [ConsultWhitesales for recommendations]

em-tube™

Tubular skylights

Em-Tube Tubular Skylights effectively transmit natural daylight to internal rooms or areas that do not receive adequate daylight. Natural daylight is captured at roof level and directed downwards through rigid or flexible tubes and then diffused at ceiling level.

Em-Tube with PVC 150mm upstand on flat roof

Before Em-Tube installation

After Em-Tube installation

Flat and pitched roof tubular skylights

Many buildings suffer from low levels of daylight. Occupants and workers in all types of building, e.g. residential and commercial buildings, schools and hospitals all benefit from increased levels of natural daylight.

Natural daylight in buildings reduces energy demand and provides the full colour spectrum, thus reducing eyestrain, improving concentration and increasing productivity.

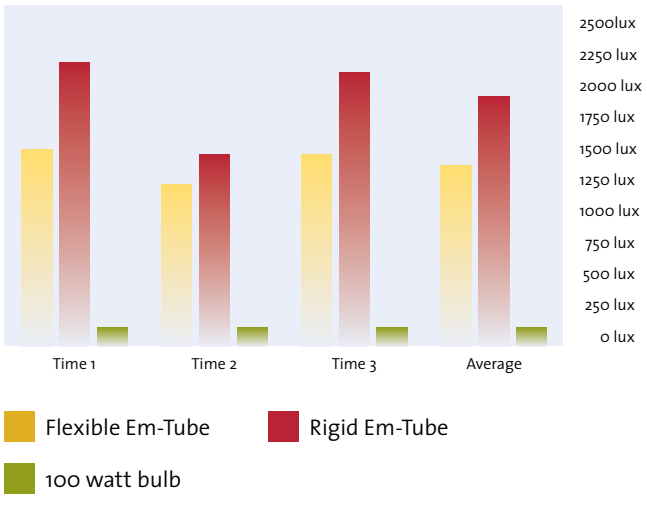
Em-Tube is an innovative and effective means of transmitting natural daylight to otherwise poorly lit areas and with the ventilation options available the units can assist compliance with Building Regulations.

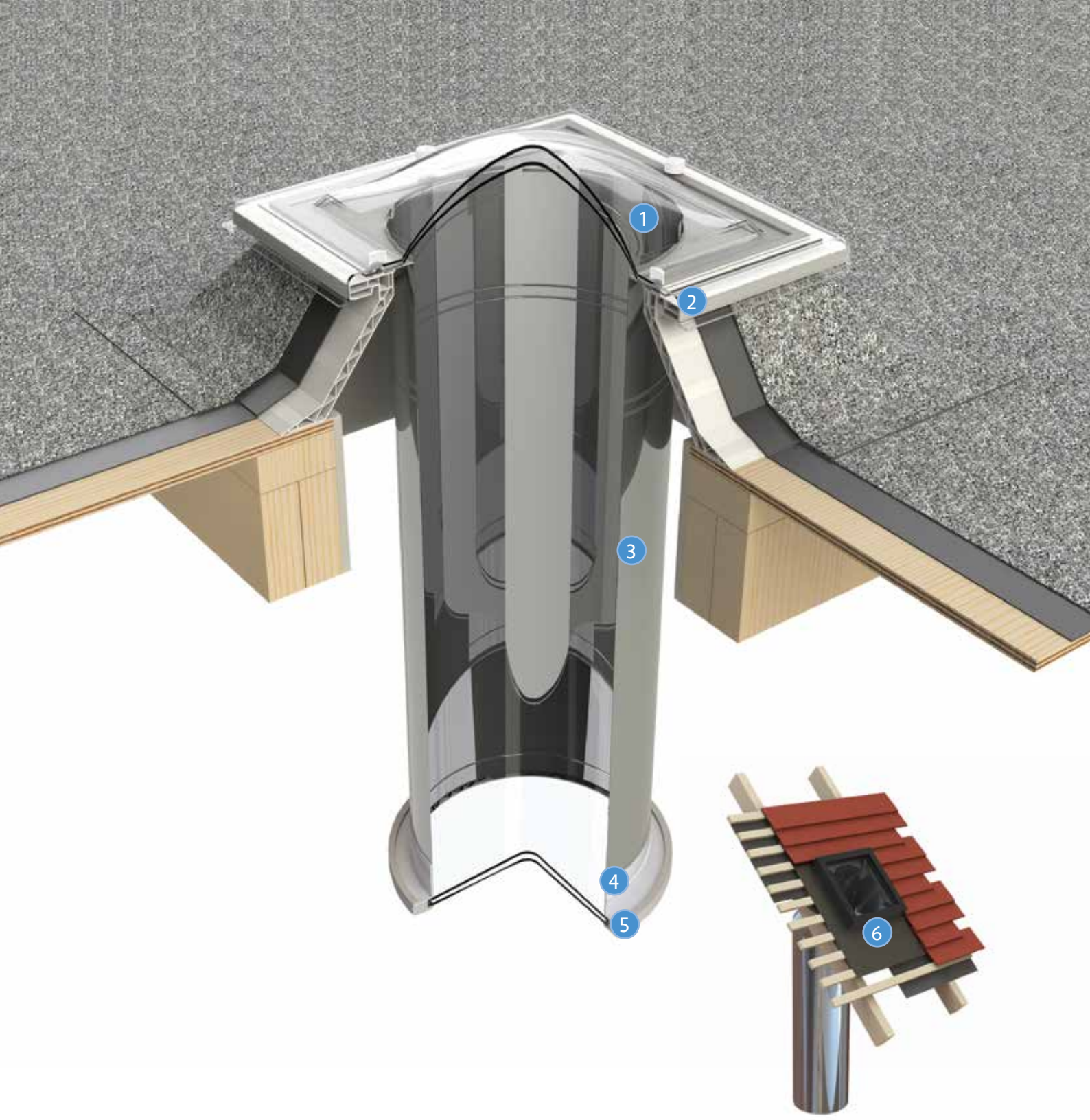
The skylights can be installed into new or existing roofs with ease and can be accommodated within most roof construction types.

How much light does Em-Tube transmit?

Tests carried out in the UK prove that anything up to fourteen times the equivalent of a 100 watt bulb can be achieved with 3m of flexible Em-Tube run on the 550mm diameter unit.

Light intensity at three times during one day





Em-Tube key features

1. UV protected polycarbonate dome or flat glass panel
2. Ventilation option
3. Flexible and rigid tube options
4. Lower tube ceiling mounting ring
5. Easy-fit magnetic, double glazed ceiling diffuser
6. Roof flashing panel for pitched roof application

em-tube™

Technical data

Features

- Up to 20 times more light than a 100w bulb
- Minimal disturbance to roof and ceiling
- Comprehensive range of sizes and accessories
- Double glazed ceiling diffuser
- Polycarbonate UV resistant dome on flat roof applications. Flat glass on pitched roof applications
- Flat, tile and slate roof options available
- 98% reflectivity on rigid tube system

Description

Em-Tube is an innovative and effective means of transmitting natural daylight to otherwise poorly lit areas. A passive ventilation system is included as a standard option and is available in rigid and flexible tube systems.

Rigid tube system
Offers 98% reflection on inner surface. Up to 20 times more light (2200 lux) than a 100w bulb (105 lux). Suitable for longer tube lengths.

Flexible tube system
Provides up to 14 times more light (1500 lux) than a 100w bulb (105 lux). Suitable for shorter tube length and is easier to install.

Availability

Standard Units	350	450	550
Tile roof	✔	✔	✔
Slate roof	✔	✔	✔
Flat roof	✔	✔	✔

Optional accessories	350	450	550
Twin-skin diffuser	✔	✔	✔
Electric Light	✔	✔	✔
PVC upstand for flat roof	✔	✔	✔

It is recommended that all tubular skylight tubes are lagged with insulation to minimise the risk of condensation.

Applications and limitations of use

For maximum daylight output the Em-Tube should be located on a south facing roof slope and/or as high as possible, out of any shadow of tall trees and buildings. It should also be installed to give the most direct run from roof to ceiling level.

No specific level of light transmission can be guaranteed because specific applications and external light conditions are beyond our control.

Pitched roofs
Tile Flashing Kits are available to suit plain/profiled tiles or slates:

Tile/slate thickness	Flashing Kit
8-16mm	'Slate Roof' kit
14-32mm	'Tile Roof' kit

Flat roofs
Whitesales recommends using Flat Roof Flashing Kits and installing to a PVC Em-Curb.

Size

Each Standard Em-Tube kit accommodates Rigid Tube System: up to 1.0m (0.7m for flat roof kits), Flexible Tube System: up to 3.0m, (2.0m for flat roof kits and 350mm size).

625mm and 1250mm extension pieces are available in rigid tube – these are suitable for extending the Flexible and Rigid Tube Systems.

Flexible extension tubing is also available. Please consult Whitesales for advice on optimum permutations and application.

Em-Tube sizes

Normal Size (diameter)	Space needed between joists or rafters	Max. room size Flexible tube	Max. room size Rigid tube	Features
350mm	345mm	2 x 2m	3 x 3	Suitable for very small rooms. Fits between most conventional rafters/joists, eliminating need for trimming work.
450mm	460mm	3.5 x 3.5m	4.5 x 4.5m	Suitable for bathrooms, hallways, landings, or corridors.
550mm	540mm	5 x 5m	6 x 6m	Suitable for living areas, kitchens, large landing, corridors, offices, retail areas or commercial areas.

For larger areas, use multiple units of optimum permutation. Transmitted light varies due to position on roof and adjacent trees or buildings.

Accessories

Em-Curb upstand for flat roof applications

- Economical and effective alternative to builder's upstand curb
- Compatible with most flat roof finishes
- Extruded PVCu
- 150mm high

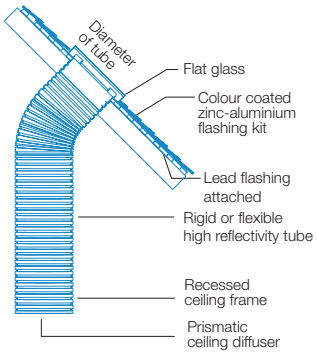
Em-Tube light kit

- Provides 24hrs single light source – no need for separate light fitting
- 240V 60watt
- Specially designed for Em-Tubes
- Cost effective

Typical installation details

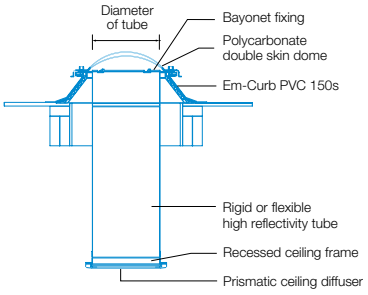
Pitched roof

Tile flashing kits are available to suit plain/profiled tiles or slates.



Flat roof

For installation to a timber builder's curb or PVCu upstand, use flat roof flashing kit.



em-vault™

Barrel vault rooflights

High quality continuous barrel vault rooflights designed to make optimum use of natural light. Em-Vaults are purpose made and are offered in a range of profiles and glazing options to meet virtually any specifier and client requirement.

Em-Vault with clear glazing

Em-Vault in opal diffused with multiwall glazing

Description

Em-Vaults are high quality continuous rooflights used to span openings up to 6m wide and unlimited length. Units consist of polycarbonate glazing and extruded aluminium cill sections, pre-formed curved glazing bars and capping profiles and are available with solid single, double or triple, or multiwall glazing.

Em-Vaults use polycarbonate glazing and may be independently tested and certified according to EN14963: 2006: 1200 Joules, and ACR(M): 001: 2005 Class B and be deemed Non-Fragile in accordance with (HSE) Health and Safety in Roofworks. Em-Vaults are tested to the highest standards and are proven suitable for use on most flat roofs, including single ply, felt, hot-melt, asphalt, liquid, GRP and lead.

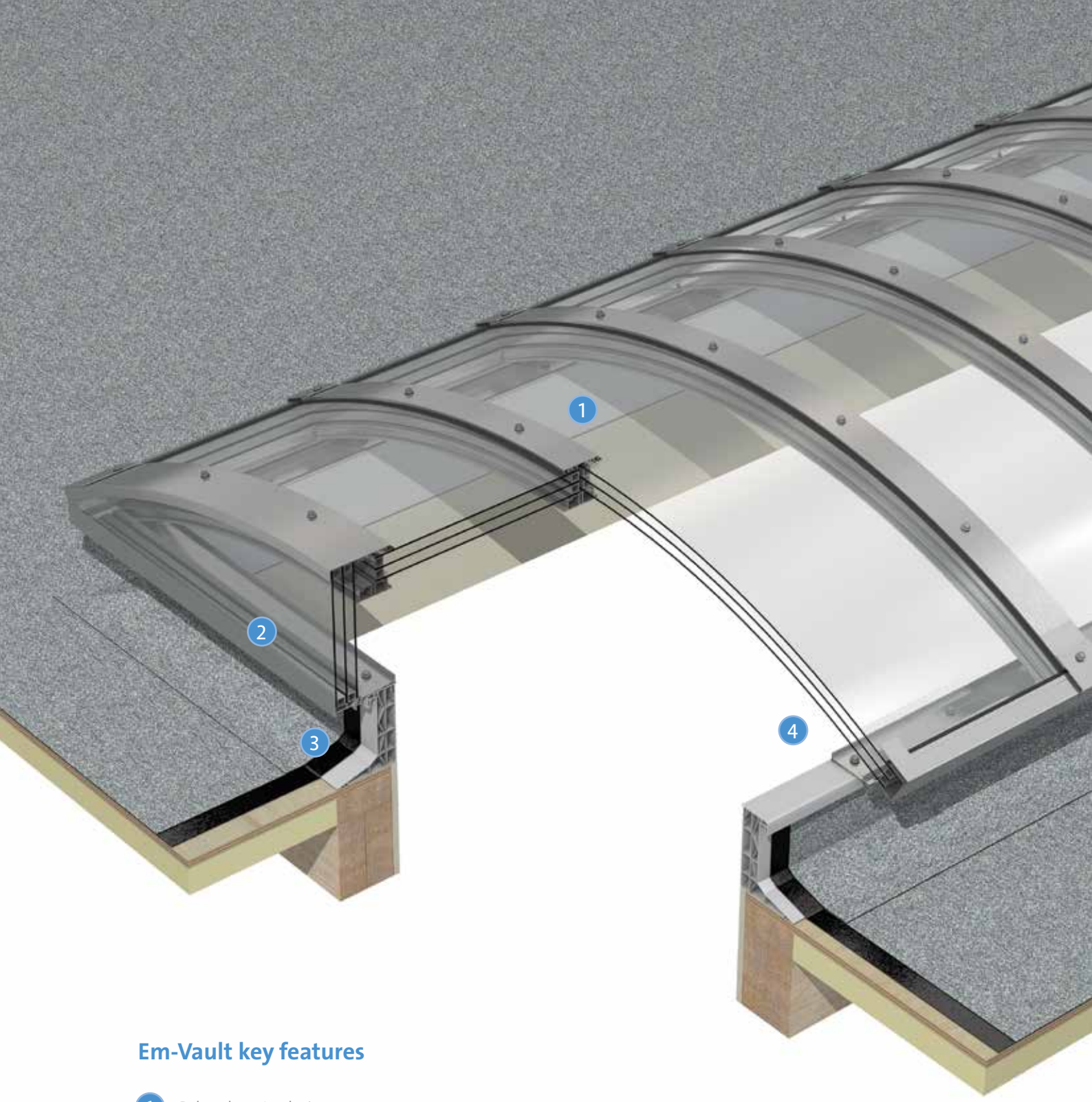
Em-Vaults are normally specified to fit to a site formed builder's curb, although subject to loading calculations, can be supplied with the Em-Curb PVC range of upstands (see page 34).

Opening and ventilation options are available (see page 36).

Certification

Whitesales' Em-Vaults are 'out-of plane' rooflights.

- Where 'Non-Fragile' Em-Vault polycarbonate rooflights have undergone large body impact testing by an independent accredited test organisation. Test certificates are available to demonstrate compliance to an energy level of 1200 Joules when tested to EN14963:2006, and ACR(M)001: 2005 to Class B.
- Polycarbonate Em-Vaults are manufactured in accordance with European standards.
- Em-Curb and Em-Curb ECO upstands and rotating ventilators are certified as providing adequate resistance to precipitation, according to EN1873 – Weathertightness.



Em-Vault key features

1. Polycarbonate glazing
2. Glazed or solid vertical end panel
3. Em-Curb ECO PVC upstand
4. Perimeter cill section

em-vault™

Glazing options

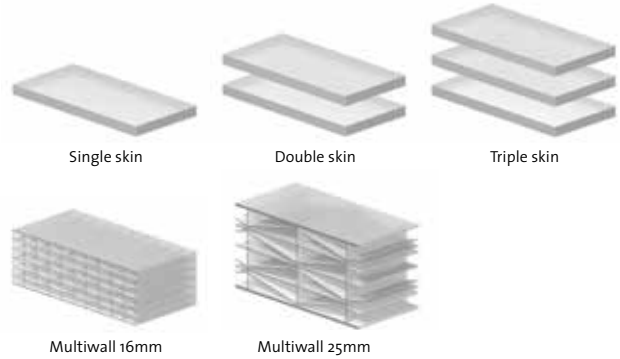
Features

- 'Non-fragile' version available, tested to 1200J
- Solid, single, double, triple skin or multiwall
- Spans up to 6.0m and unlimited length
- Suited to new buildings and refurb applications
- High light efficiency giving excellent light distribution
- Available in low rise (1/6) and high rise (1/2)
- Building Regulation ADL compliant options

Em-Vault in opal diffused with multiwall glazing

Glazing

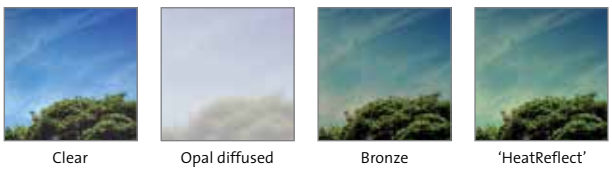
Em-Vaults are constructed from polycarbonate sheet and are available in single, double and triple skin solid polycarbonate and in multiwall construction. Polycarbonate is virtually unbreakable, with an impact strength up to 250 times greater than glass. Aerogel is a multiwall polycarbonate filled with translucent aerogel granules, giving an even spread of diffused light and excellent thermal properties.



Single skin | Double skin | Triple skin

Multiwall 16mm | Multiwall 25mm

Em-Vaults can be supplied in clear, opal diffused, bronze or 'HeatReflect' (reflects up to 68% of the heat radiation) glazing.



Clear | Opal diffused | Bronze | 'HeatReflect'

All solid polycarbonate Em-Vaults have a minimum 3 mm thick outer glazing. Inner skin thickness may vary.

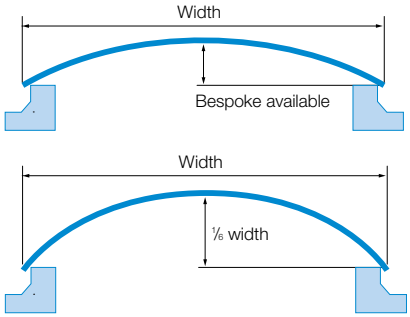
Size

Em-Vaults are purpose-made and available in widths from 0.6m (Multiwall 1.5m) to 6.0m and in unlimited length.

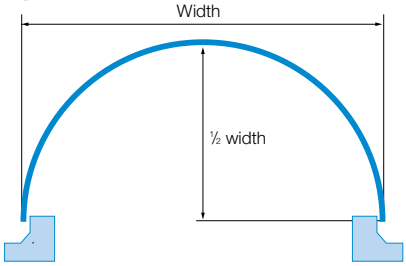
Profiles

The standard profile is a rise 1/6 of the width although a higher rise and bespoke profiles are also available on certain sizes.

Low rise profiles



High rise profile



Frame structure

The structural frame is assembled from extruded aluminium sections. Units with solid glazing are constructed with factory assembled cassettes. For multiwall glazed units, the glazing is held between pre-formed curved glazing bars and capping profiles, securing all four sides of the glazing and accommodating thermal movement.

End panels are fully glazed, and for wider installations incorporate vertical glazing bar(s).

The aluminium sections are supplied with a mill finish as standard. They can also be supplied with a polyester powder coating to any RAL or BS colour number and finish.

Em-Vault in clear with solid glazing

Vertical and horizontal forces

Vertical force

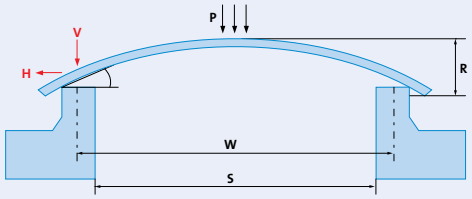
$V = \frac{P \times S}{2}$ where:

V = vertical force per metre (N/m)
P = snowload + deadweight (N/m²)
S = clear span (m)

Horizontal force

$H = \frac{P \times W^2}{8R}$ where:

H = horizontal force per metre (N/m)
P = snowload + deadweight (N/m²)
W = barrel width (fixing centres) (m)
R = barrel rise (m)



Performance of glazing materials

Typical values	Polycarbonate
Fire ratings	
To BS 476: Part 3	AA
To BS 476: Part 7	Class 1*
To 1991 Building Regulations	Tp(a)
Service Temperature	-50 to +120°C

Information for 3mm thick glazing unless noted otherwise.
* Class 0 for Building Regulation purposes

Glazing speciification

	Single Clear	Single Opal	Single Heat Reflect	Double Clear	Double Opal	Double Heat Reflect Opal	Triple Clear
Light transmission (LT %)	88%	58%	56%	76%	53%	49%	66%
Solar heat gain factor (g %)	83%	60%	46%	67%	49%	38%	55%
Thermal transmission (W/m2K)	5.36	5.36	5.36	2.95	2.95	2.95	2.03

	Triple Opal	Triple Heat Reflect Opal	Multiwall 16 Clear	Multiwall 16 Opal	Multiwall 25mm Clear	Multiwall 25mm Opal
Light transmission (LT %)	46%	46%	59%	51%	57%	49%
Solar heat gain factor (g %)	40%	40%	58%	52%	65%	54%
Thermal transmission (W/m2K)	2.03	2.03	1.88	1.88	1.51	1.51

em-vault™

Upstand options

Features

- Used in conjunction with Em-Vault rooflights
- Exceptional thermal efficiency
- Em-Curbs for new installations
- Enhance overall appearance of the rooflight
- Prefinished white internally
- Heights available 150, 300 and 350mm
- Constructed in ECO PVC

Em-Vault triple glazed solid in HeatReflect finish

Em-Vaults are normally specified to fit to a site-formed builder's upstand, although, subject to loading calculations, can be supplied with the Em-Curb PVC range of upstands.

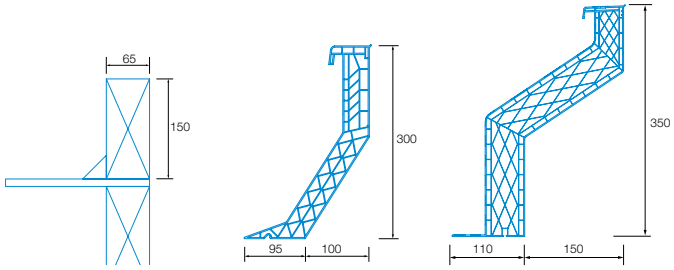
Em-Curb upstands

Em-Curbs are designed to be used in conjunction with Em-Vault rooflights to provide a thermally broken interface which in turn helps to improve the overall thermal efficiency of the roof. Em-Curbs represent excellent value for money, enhance the overall appearance of the rooflight and are prefinished white internally, therefore requiring no further decoration.

Splayed Em-Curb upstands give an excellent spread of light through the room whilst the vertical units are available where the dimensions of the roof aperture need to be maintained.

The Em-Curb ECO is made from extruded white PVC. The multi-chambered construction gives an exceptionally robust and thermally efficient performance. This curb is suitable for most roof finishes and is available in heights of 150, 300 and 350mm with other heights also available. All ventilation options can be used in conjunction with Em-Curbs.

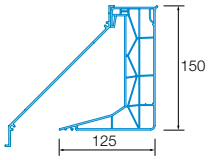
For wide and multiwall Em-Vault units, we would recommend that a builder's upstand is formed, rather than a proprietary PVC upstand.



Builder's upstand | Em-Curb ECO PVC 300mm splayed | Em-Curb ECO PVC 350mm splayed

Em-Collar adaptors

Em-Collars provide a thermally broken solution for replacing existing rooflights and would typically be installed to an existing builder's upstand. Consideration should be given to using the PVC 350mm splayed upstand to oversleeve existing site upstand as this reduces site work, especially where existing linings must not be disturbed, e.g. may contain asbestos.



Em-Collar PVC 150mm vertical

Case study	Leisure Centre
Project type	Refurbishment
Products	Em-Vault
Glazing	Multiwall, opal diffused
Upstand	Existing

em-vault™

Ventilation options

Features

- Permanent Trickle
- Controllable Trickle
- Controllable Rotating
- Hinged Electric Actuator Opening
- Hinged Manual Spindle Opening
- Powered Extract Fan
- Electric hit and miss

Em-Vault in solid with manual opening sections

Ventilation options

All Em-Vaults have fixed glazing as standard. Options listed above can be incorporated in most permutations of Em-Vault installations.

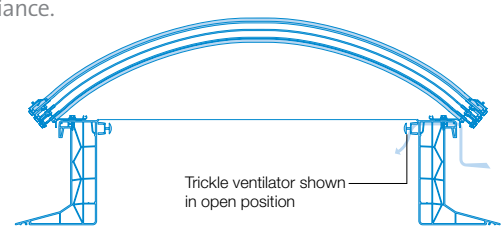
The Permanent Trickle option provides a permanent background vent by means of a fixing spacer.

Hinged manual spindle opening allows rapid air movement whilst being an economical option.

Powered extractor fans can be incorporated in the vertical end panels, depending on the available height.

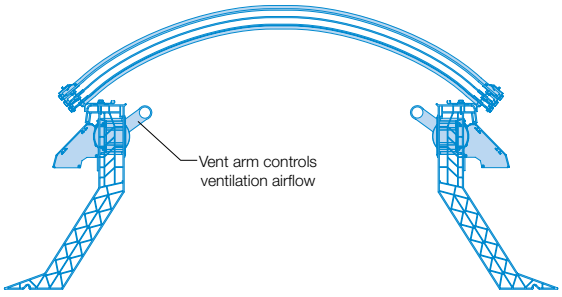
Controllable Trickle

Controllable trickle ventilation is a slot vent which is fitted to two or four sides of an Em-Curb ECO PVC upstand or Em-Collar. With the vents on two sides the unit will provide a minimum of 8000mm² ventilation area which assists with Building Regulation compliance.



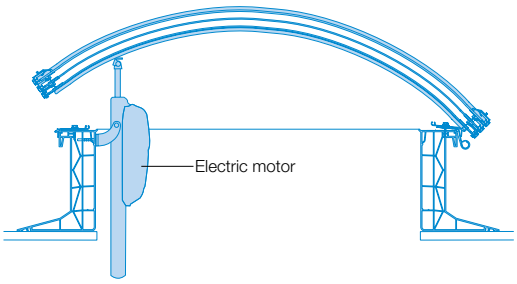
Controllable Rotating

Controllable rotating vents are a fully insulated unit with enhanced thermal properties and a greater vent area than the Trickle Vent options. The vents can be fitted to two or four sides of an Em-Curb ECO PVC upstand or Em-Collar. All units are supplied with external weathering cowls. Tested and certified according to EN1873 Watertightness.



Hinged Electric Spindle Opening

Hinged opening sections provide the maximum ventilation area to allow rapid air movement. The electric actuator operation allows control by a wall mounted open/close switch and also options for wind, rain and temperature sensors with a range of control panels available separately. Actuators are either 24V DC or 230V AC and open to 400mm.



Case study	Vehicle Workshop
Project type	Refurbishment
Products	Em-Vault
Glazing	Solid, clear
Upstand	Existing metal

em-vault™

Installation & operation

Whitesales rooflights and accessories can generally be regarded as 'maintenance free'. However, the following guidelines should be followed to optimize their usefulness. Any maintenance of rooflights must of course be carried out strictly in accordance with the relevant 'Health and Safety' regulations.

Em-Vault

Operation
Em-Vaults are fixed at installation stage to the relevant upstand, and are a means of allowing natural light into the area below.

Polycarbonate rooflights are available as 'Non-Fragile', but should not be trafficked.

Maintenance
Wash only with warm soapy water. DO NOT USE strong detergents or abrasives.

Physically check Barrel Vaults annually to ensure fixings are secure.

Em-Curb ECO

Operation
Normally manufactured in Extruded PVC.

Em-Curbs provide a proprietary upstand detail for Em-Vaults.

Maintenance
Maintenance free.

Passive ventilation

Operation
Normally by means of 'Trickle', 'Louvre' or 'Rotating' vents, to provide background ventilation. Trickle vents are adjusted by hand. Louvre and Rotating vents are adjusted by a proprietary operating rod – available in 1.5, 2, 3 or 4m lengths.

Maintenance
Maintenance free.

Em-Vault with Multiwall glazing in opal diffused

Opening ventilation

Operation
Operated electrically by means of 24V DC or 240V AC electric actuators. Electric actuators must be installed by a qualified electrician.

Maintenance
Test annually by an Approved Electrical Installations Testing Company. Physically check fixing brackets to ensure fixings are secure.

Extractor Fans

Operation
These are fitted to the relevant rooflight component and connected to an unswitched Fused-Spur.

A switched electrical supply should be connected by a qualified electrician.

Maintenance
Test annually by an Approved Electrical Installations Testing Company.

Case study	Riding School
Project type	New Build
Products	Em-Vault
Glazing	Multiwall in opal diffused
Upstand	Site formed

t-vault™

Barrel vault rooflights

Economical barrel vault rooflights designed to provide a functional solution for covering larger areas. T-Vaults are purpose made to suit either new or refurbishment applications and are available with a range of glazing and ventilation options.

T-Vault in opal diffused

T-Vault in opal diffused

Description

T-Vaults are high performance continuous rooflights suitable for spans up to 4m and unlimited length. They are constructed from a series of interlocking curved and profiled GRP panels. The GRP panels have a high light transmittance and an outer protective Melinex® film providing guaranteed protection against UV degradation.

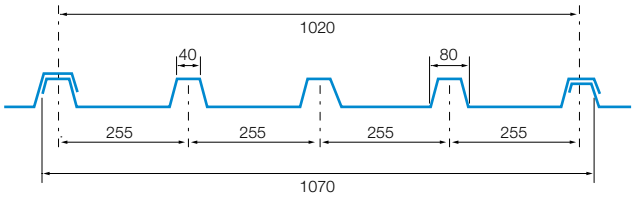
T-Vaults use a Glass reinforced Polyester (GRP) glazing and have been tested and certified according to EN 14963: 2006 – Non-Fragile and ACR(M): 001: 2005 Class B. T-Vaults are tested to the highest standards and are proven suitable for use on most flat roofs, including single ply, felt, hot-melt, asphalt, liquid, GRP and lead. They are normally specified with our proprietary curbs (see page 45) but can also be installed on existing builder's curbs.

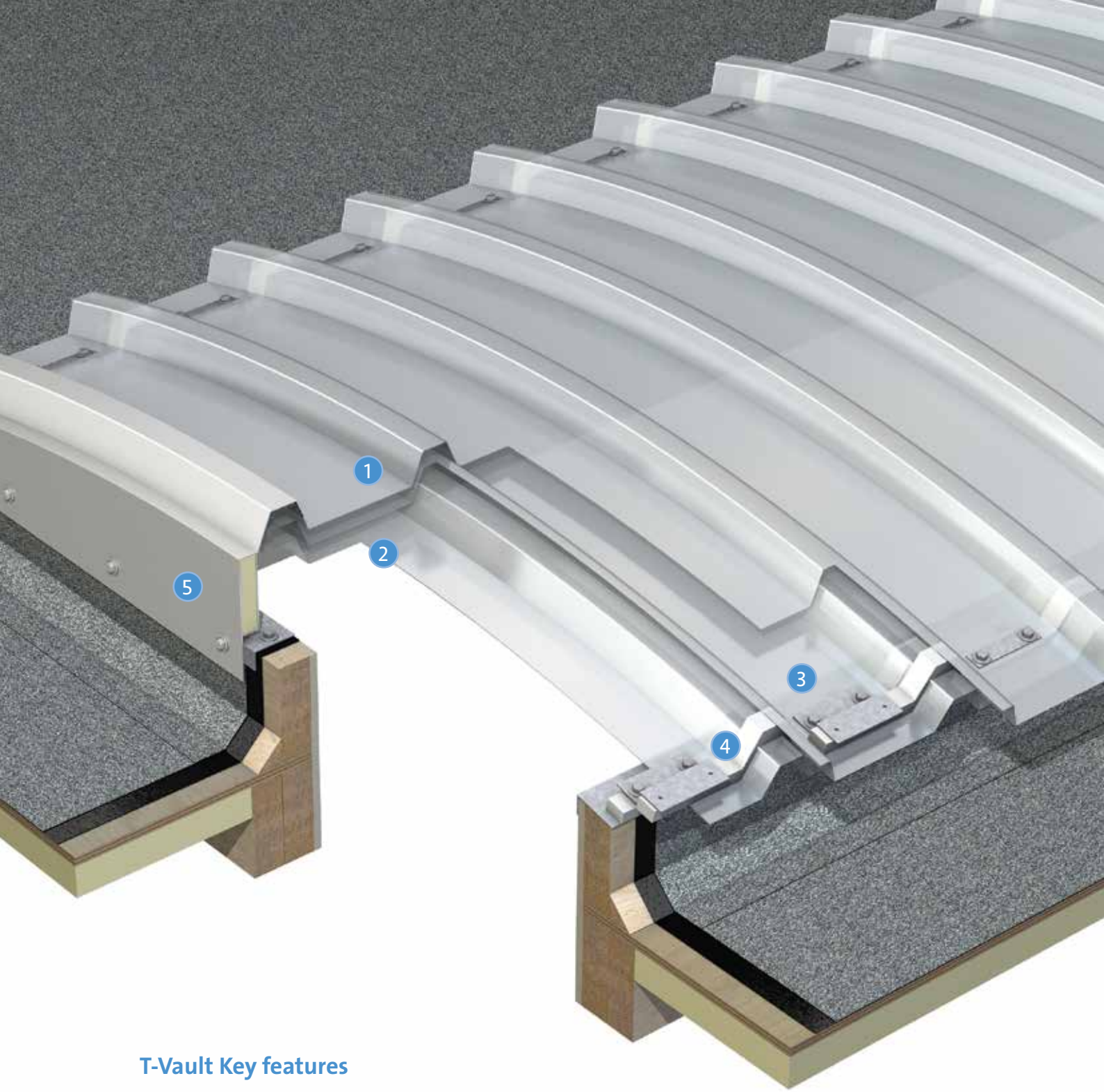
Ventilation options are available (see page 46).

Performance

The system has a very high resistance against chemical influences and weather conditions and carries a 20 year hailproof guarantee. Fire tests have been carried out and the units are certified according to EN1187.

T-vault barrel vault standard section sheet dimensions





T-Vault Key features

1. Profiled GRP outer skin
2. Profiled GRP inner skin
3. Z-Plate fixing
4. Profiled foam seal
5. Insulated end panel

t-vault™

Glazing options

Features

- 'Non-fragile' version available tested to 1200 J – EN 14963: 2006
- Available in single, double or triple skin GRP
- Spans up to 4m wide and unlimited length
- 20 years hailproof guarantee
- Extremely high chemical resistance suited to industrial conditions
- European Technical Agrément certificated (ATG No. 96/1873)
- Building Regulations ADL compliant options

Glazing

Continuous barrel vault rooflights, available in single, double or triple skin versions. The barrel vault is made up of a series of curved and interlocking profiled GRP sheets. The sheets are 1070 mm wide and have a bending radius of 3150mm.

All outer sheets are supplied in Longlife GRP which are UV stabilised and finished with a protective film that provides an extremely high level of UV stabilisation to maintain transparency and prevent ageing.

Single skin

Double skin

Triple skin

Glazing Finish

Clear

Opal diffused

'HeatReflect'

T-Vaults in opal diffused

Size

T-Vaults are purpose-made and available in widths from 1.0m to 4.0m and in unlimited length.

Performance of GRP glazing

Typical values	standard	fire retardant
Fire ratings To BS 476: Part 3 To BS 476: Part 7	AB Class 3	AB Class 1
Service temperature	-50 to +120°	-50 to +120°
Resistance to wind load	Class 2	Class 2
Air Permeability	Class 2	Class 2
Resistance to water penetration	Class 9a	Class 9a
Impact test	1200 J	1200 J
Wind driven rain/snow 600Pa	Pass	Pass

Glazing speciification

	Single Clear	Single Opal	Single Heat Reflect	Double Clear	Double Opal	Double Heat Reflect	Triple Clear	Triple Opal	Triple Heat Reflect
Light transmission (LT %)	87%	63%	86%	76%	54%	66%	66%	48%	57%
Solar heat gain factor (g %)	0.77	0.47	0.45	0.67	0.41	0.39	0.58	0.36	0.34
Thermal transmission (W/m2K)	5.74	5.74	5.74	3.13	3.13	3.13	2.16	2.16	2.16

t-vault™

Upstands

T-Vaults in opal diffused

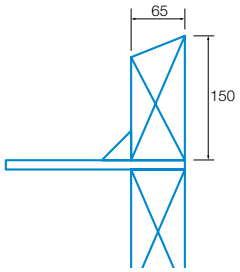
Upstands

The T-Vault is normally fixed directly to a splayed top builder's upstand, which can be made of timber, concrete or metal. Dead and imposed loadings plus lateral thrust calculations can be calculated according to the information below.

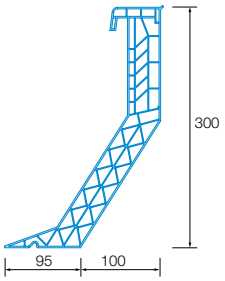
Fixings

The sheets are installed with corrosion resistant fixings located centrally between crowns. All fixings and synthetic foam fillers are included as well as the mounting accessories for the end panels.

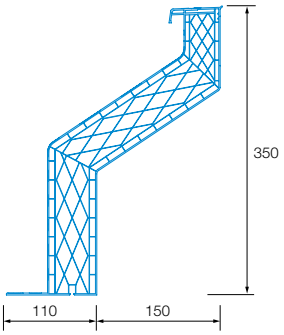
The Z-Fixing system ensures that the inner and outer skins are kept a constant distance apart.



Builder's upstand



Em-Curb ECO PVC 300mm splayed



Em-Curb ECO PVC 350mm splayed

Upstand angle

Span (m)	Angle (a)
1.0	10°
1.5	15°
2.0	20°
2.5	25°
3.0	30°
3.5	35°
4.0	40°

Note: On the long sides the upstand top should be splayed as noted in the table above. Upstands at each end of the rooflight should be horizontal.

Vertical and horizontal forces

Vertical force

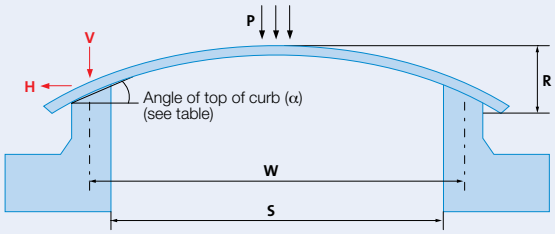
$V = \frac{P \times S}{2}$ where:

V = vertical force per metre (N/m)
P = snowload + deadweight (N/m2)
S = clear span (m)

Horizontal force

$H = \frac{P \times W2}{8R}$ where:

H = horizontal force per metre (N/m)
P = snowload + deadweight (N/m2)
W = barrel width (fixing centres) (m)
R = barrel rise (m)



t-vault™

Ventilation options

Features

- Permanent
- Controllable rotating
- Controllable trickle
- Opening sections

T-Vault in clear

Permanent

Permanent background ventilation is made possible with space plates. This provides a continuous weatherproof vent around the perimeter of the rooflight which suits areas such as corridors and storage where non-controllable background ventilation is required.

Controllable rotating

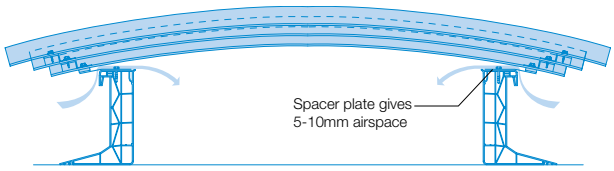
Controllable rotating vents are a fully insulated unit with enhanced thermal properties and can be fitted to two or four sides of an Em-Curb ECO PVC upstand or Em-Collar. With the vents on two sides, the unit will provide a minimum of 11,000mm2 ventilation area. This increases with the length of the rooflight. Tested and certified according to EN1873 –Watertightness.

The fully adjustable rotating vents are operated by means of a hooked rod, available in lengths of 1.5, 2, 3 or 4m.

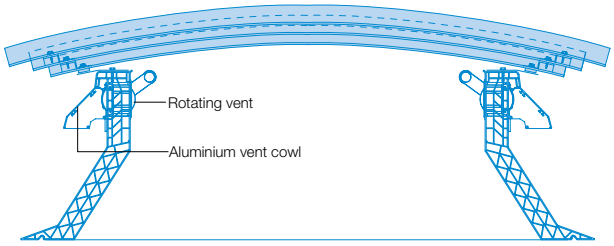
Operation and Maintenance

Please refer to Em-Vault Operation and Maintenance information on page 40.

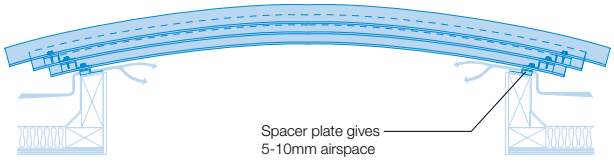
Fitted to Em-Curb



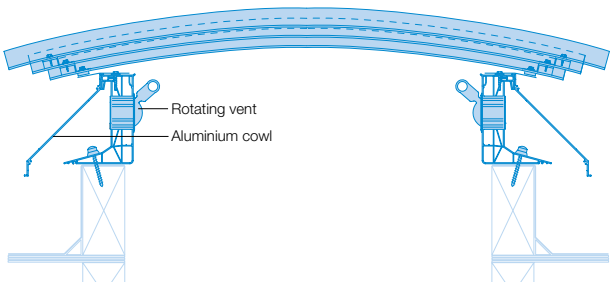
Fitted to Em-Curb

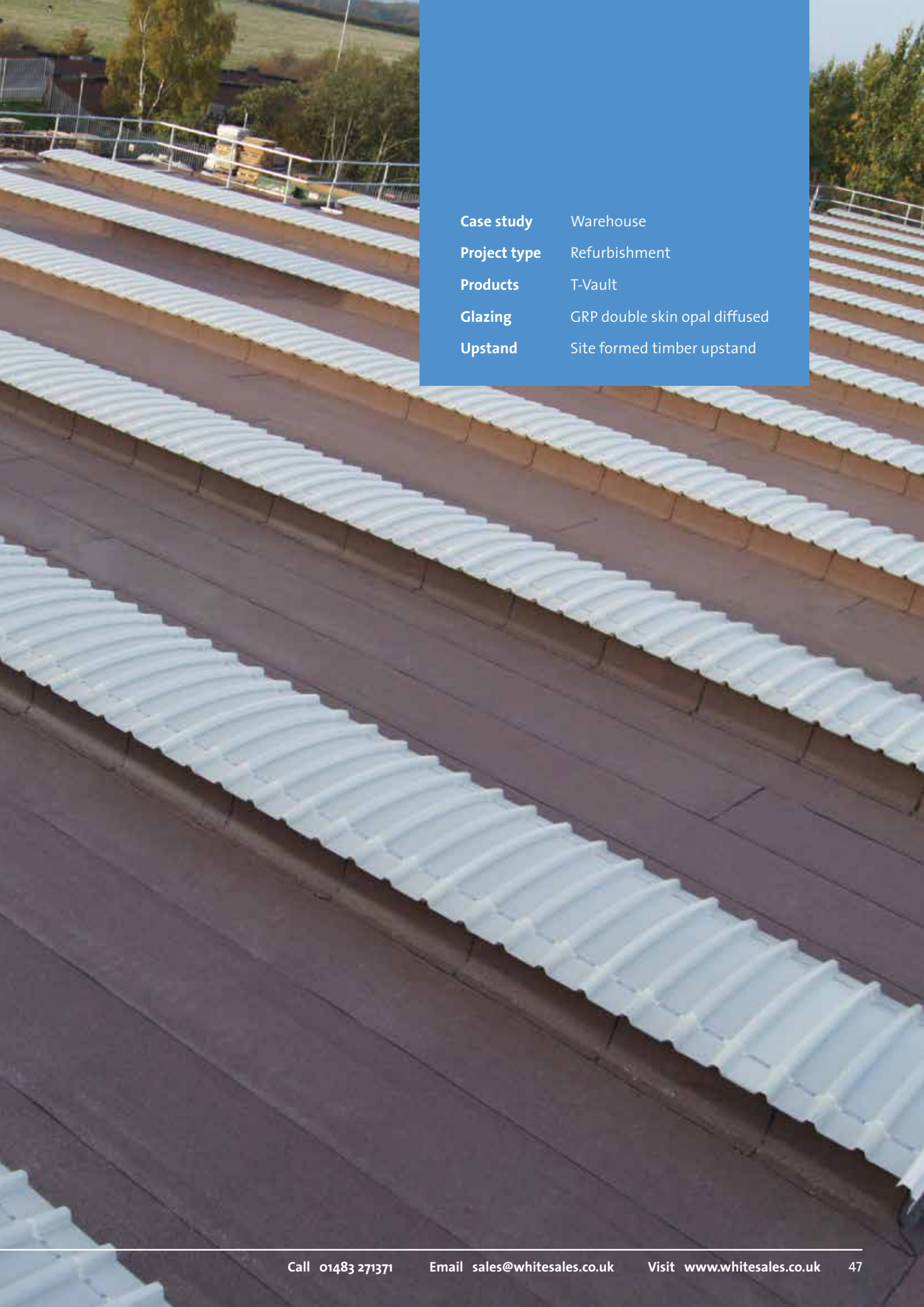


Fitted to builder's upstand



Fitted to builder's upstand





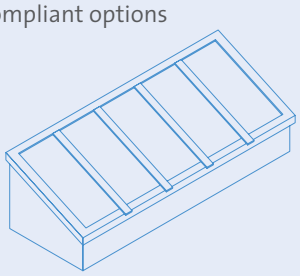
Case study	Warehouse
Project type	Refurbishment
Products	T-Vault
Glazing	GRP double skin opal diffused
Upstand	Site formed timber upstand

em-line™

Bespoke polycarbonate monopitch rooflights

Features

- Choice of glazing
- Ventilation options
- Building Regulation ADL compliant options
- Purpose made
- Size 0.6m to 6m span
- Unlimited length



Description

Monopitch (out-of-plane) rooflights are purpose-made continuous rooflights and are available in 0.6m to 6m sloped lengths, and are suited to a curb slope pitch of between 15-75°.

Monopitch rooflights are manufactured from proprietary aluminium extrusions. Available with polycarbonate glazing systems the rooflights are installed on site into the aluminium system.

Each rooflight run is terminated with either a capping or a wall abutment section. Bays are designed at equal centres of up to 1000mm, which will be sized in accordance with the required dimensions.

Units can incorporate opening vents, operated manually or by 24 or 230V electric actuators, for comfort ventilation.

Installation

Installed onto a waterproofed builder's upstand

Options

A variety of options are available including self cleaning, solar control and fire rated. Aerogel is a multiwall polycarbonate filled with translucent aerogel granules, giving an even spread of diffused light and excellent thermal properties.

Performance of glazing materials

Typical values	Polycarbonate
Fire ratings To BS 476: Part 7 To 1991 Building Regulations	Class 1 Tp(a)
Non-fragile option available ACR(M)001: 2005	Class B
Pitch Angle	15° minimum
Loadings	Wind - 640 N/m² Snow - 750 N/m²

Glazing

There are many glazing options available – some of which are shown below. Special requirements can normally be accommodated.

Double skin polycarbonate

Triple skin polycarbonate

Multiwall 16mm

Multiwall 25mm

Please refer to Whitesales Glass brochure for all bespoke products with glass glazing.

Glazing speciification

	Polycarbonate Double Solid Clear	Polycarbonate Triple Solid Clear	Polycarbonate Multiwall 25mm Clear	Polycarbonate Multiwall 25mm Opal
Light transmission (LT %)	76%	66%	57%	49%
Solar heat gain factor (g %)	67%	55%	65%	54%
Sound reduction (dB)	20	22	23	2.3
Thermal transmission (W/m2K)	2.95	2.03	1.51	1.51

Key features

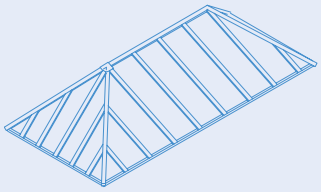
1. Wall abutment detail
2. Many glazing options
3. Polyester powder coated

em-line™

Bespoke polycarbonate gable & hip ended ridglights

Features

- Choice of glazing
- Ventilation options
- Building Regulation ADL compliant options
- Purpose made
- Size 0.6m to 7m span
- Unlimited length



Description

Gable and Hip Ended rooflights are purpose-made continuous rooflights and are available in spans of 0.6m up to 7m, and slope pitch of 15° to 60° although 30° is supplied as standard.

Gable and Hip Ended rooflights are manufactured from proprietary aluminium extrusions. Available with polycarbonate glazing systems the rooflights are installed on site either to a site formed upstand or to a proprietary Em-Curb upstand.

Each rooflight run is terminated with glazed gable ends, hipped ends, wall abutments or open ends. Bays are designed at equal centres, which will be sized in accordance with the required dimensions. Units can incorporate angles and other specialist detailing.

Units can incorporate opening vents, operated manually or by 24 or 230V electric actuators, for comfort or Smoke Ventilation

Installation

Installed onto a PVC Em-Curb ECO upstand or waterproofed builder's upstand.

Options

A variety of options are available including self cleaning, solar control and fire rated. Aerogel is a multiwall polycarbonate filled with translucent aerogel granules, giving an even spread of diffused light and excellent thermal properties.

Performance of glazing materials

Typical values	Polycarbonate
Fire ratings To BS 476: Part 7 To 1991 Building Regulations	Class 1 Tp(a)
Non-fragile option available ACR(M)001: 2005	Class B
Pitch Angle	15° minimum
Loadings	Wind: 640 N/m² Snow: 750 N/m²

Glazing

There are many glazing options available – some of which are shown below. Special requirements can normally be accommodated.

Double skin polycarbonate

Triple skin polycarbonate

Multiwall 16mm

Multiwall 25mm

Please refer to Whitesales Glass brochure for all bespoke products with glass glazing.

Glazing speciification

	Polycarbonate Double Solid Clear	Polycarbonate Triple Solid Clear	Polycarbonate Multiwall 25mm Clear	Polycarbonate Multiwall 25mm Opal
Light transmission (LT %)	76%	66%	57%	49%
Solar heat gain factor (g %)	67%	55%	65%	54%
Sound reduction (dB)	20	22	23	2.3
Thermal transmission (W/m2K)	2.95	2.03	1.51	1.51

Key features

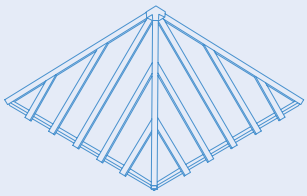
1. Hip ended (gable also available)
2. Self supporting
3. 30° pitch as standard

em-line™

Bespoke polycarbonate pyramid rooflights

Features

- Choice of glazing
- Ventilation options
- Building Regulation ADL compliant options
- Purpose made
- Size 0.6m to 7m span



Description

Pyramid rooflights are purpose-made, self supported rooflights and are available in spans of 0.6m up to 7m, and slope pitch of 15° to 60° although 30° is supplied as standard.

Pyramid rooflights are manufactured from proprietary aluminium extrusions. Available with hermetically sealed glass units or polycarbonate glazing systems the rooflights are installed on site either to a site formed upstand or to a proprietary Em-Curb upstand.

Each rooflight is designed as having four equal sloped sides. Bays are designed at equal centres, which will be sized in accordance with the required dimensions.

Units can incorporate opening vents, operated manually or by 24 or 230V electric actuators, for comfort or Smoke Ventilation

Installation

Installed onto a PVC Em-Curb ECO upstand or waterproofed builder's upstand.

Options

A variety of options are available including self cleaning, solar control and fire rated. Aerogel is a multiwall polycarbonate filled with translucent aerogel granules, giving an even spread of diffused light and excellent thermal properties.

Performance of glazing materials

Typical values	Polycarbonate
Fire ratings To BS 476: Part 7 To 1991 Building Regulations	Class 1 Tp(a)
Non-fragile option available ACR(M)001: 2005	Class B
Pitch Angle	30° as standard with 15-60° also available
Loadings	Wind: 640 N/m² Snow: 750 N/m²

Glazing

There are many glazing options available – some of which are shown below. Where glass is specified, the thickness and type is determined by the size and configuration of the rooflight unit. Special requirements can normally be accommodated.

Double skin polycarbonate

Triple skin polycarbonate

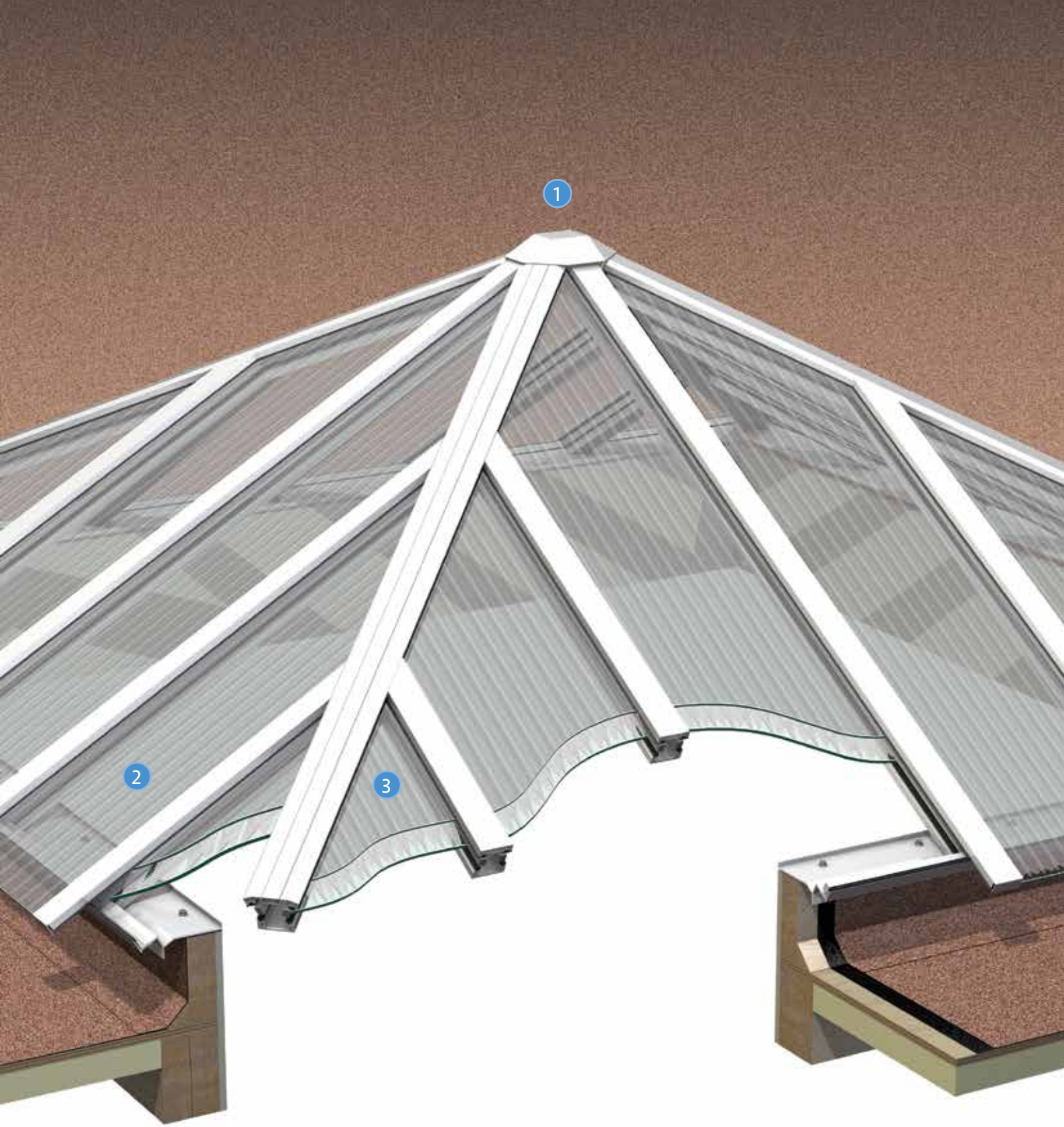
Multiwall 16mm

Multiwall 25mm

Please refer to Whitesales Glass brochure for all bespoke products with glass glazing.

Glazing speciification

	Polycarbonate Double Solid Clear	Polycarbonate Triple Solid Clear	Polycarbonate Multiwall 25mm Clear	Polycarbonate Multiwall 25mm Opal
Light transmission (LT %)	76%	66%	57%	49%
Solar heat gain factor (g %)	67%	55%	65%	54%
Sound reduction (dB)	20	22	23	2.3
Thermal transmission (W/m2K)	2.95	2.03	1.51	1.51



Key features

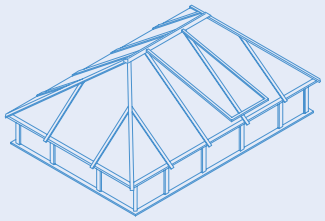
1. Self supporting
2. 30° pitch as standard
3. Many glazing options

em-line™

Bespoke polycarbonate lantern lights

Features

- Choice of glazing
- Gable or hip ends
- Ventilation options
- Building Regulation ADL compliant options
- Purpose made
- Size 1m to 3m span
- Vertical glazed side skirt
- Unlimited length



Description

Lantern lights are purpose-made continuous rooflights and are available in 1m to 3m spans, and slope pitch from 15° to 60° although 30° is supplied as standard.

Lantern lights are manufactured from proprietary aluminium extrusions. Available with polycarbonate glazing systems the rooflights are installed on site into the aluminium system.

Each rooflight run can be supplied with gable or hip ends. Bays are designed at equal centres, which will be sized in accordance with the required dimensions.

Units can incorporate opening vents, operated manually or by 24 or 230V electric actuators, for comfort or Smoke Ventilation.

Installation

Installed onto a waterproofed builder's upstand.

Options

A variety of options are available including self cleaning, solar control and fire rated. Aerogel is a multiwall polycarbonate filled with translucent aerogel granules, giving an even spread of diffused light and excellent thermal properties.

Performance of glazing materials

Typical values	Polycarbonate
Fire ratings To BS 476: Part 7 To 1991 Building Regulations	Class 1 Tp(a)
Non-fragile option available ACR(M)001: 2005	Class B
Pitch Angle	30° as standard with 15-60° also available
Loadings	Wind: 640 N/m² Snow: 750 N/m²

Glazing

There are many glazing options available – some of which are shown below. Special requirements can normally be accommodated.

Double skin polycarbonate

Triple skin polycarbonate

Multiwall 16mm

Multiwall 25mm

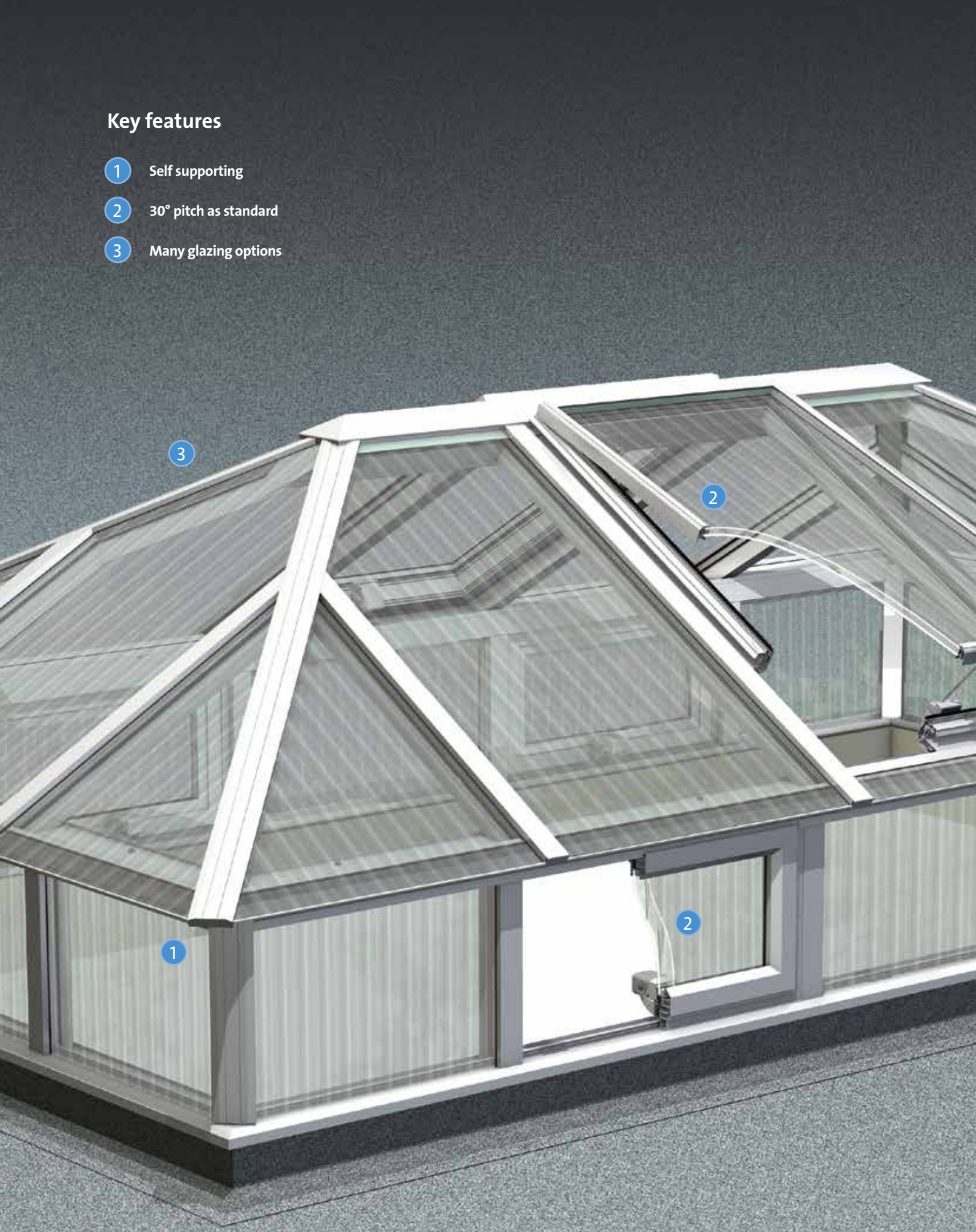
Please refer to Whitesales Glass brochure for all bespoke products with glass glazing.

Glazing speciification

	Polycarbonate Double Solid Clear	Polycarbonate Triple Solid Clear	Polycarbonate Multiwall 25mm Clear	Polycarbonate Multiwall 25mm Opal
Light transmission (LT %)	76%	66%	57%	49%
Solar heat gain factor (g %)	67%	55%	65%	54%
Sound reduction (dB)	20	22	23	2.3
Thermal transmission (W/m2K)	2.95	2.03	1.51	1.51

Key features

1. Self supporting
2. 30° pitch as standard
3. Many glazing options

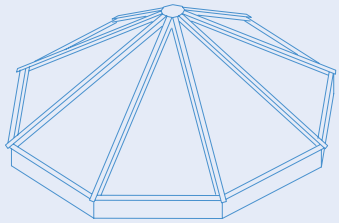


em-line™

Bespoke design rooflights

Features

- Choice of glazing
- Polygon, domed and flat options
- Building Regulation ADL compliant options
- Purpose made



Description

Specialist rooflights are purpose-made bespoke rooflights designed to accommodate an extensive range of shape and size requirements. Whilst polygon and domed shapes are more common there are many other possibilities such as elliptical and other curved designs.

Specialist rooflights are manufactured from proprietary aluminium extrusions. Available with polycarbonate glazing systems the rooflights are installed on site into the aluminium system.

Each rooflight will include bespoke flashing and cill details to suit the design requirements.

Ventilation options can often be incorporated within the rooflights.

Installation

Installed onto a waterproofed builder's upstand.

Options

A variety of options are available including self cleaning, solar control and fire rated. Aerogel is a multiwall polycarbonate filled with translucent aerogel granules, giving an even spread of diffused light and excellent thermal properties.

Performance of glazing materials

Typical values	Polycarbonate
Fire ratings To BS 476: Part 7 To 1991 Building Regulations	Class 1 Tp(a)
Non-fragile option available ACR(M)001: 2005	Class B
Pitch Angle	30° as standard with 15-60° also available
Loadings	Wind: 640 N/m² Snow: 750 N/m²

Glazing

There are many glazing options available – some of which are shown below. Special requirements can normally be accommodated.

Double skin polycarbonate

Triple skin polycarbonate

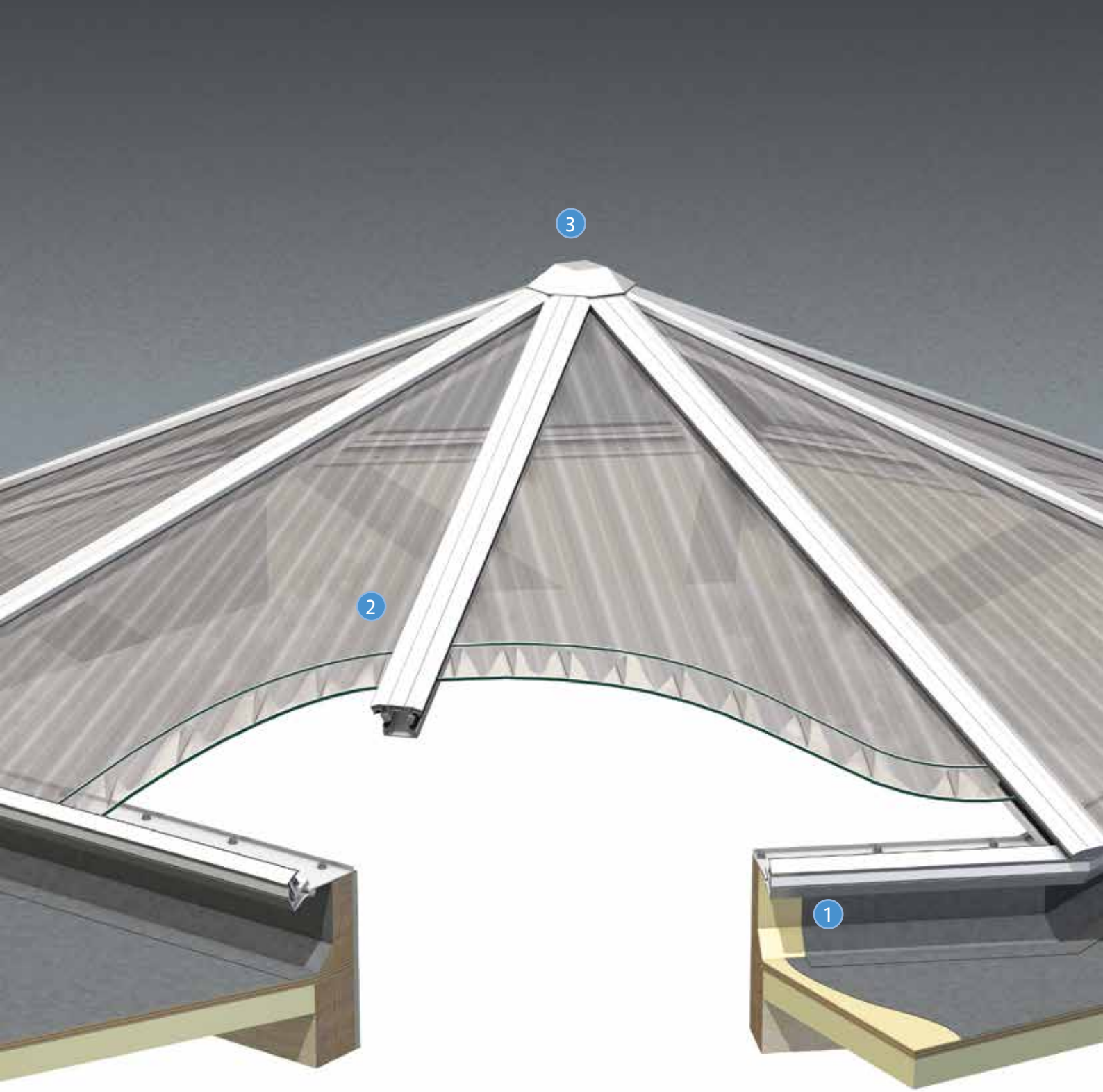
Multiwall 16mm

Multiwall 25mm

Please refer to Whitesales Glass brochure for all bespoke products with glass glazing.

Glazing speciification

	Polycarbonate Double Solid Clear	Polycarbonate Triple Solid Clear	Polycarbonate Multiwall 25mm Clear	Polycarbonate Multiwall 25mm Opal
Light transmission (LT %)	76%	66%	57%	49%
Solar heat gain factor (g %)	67%	55%	65%	54%
Sound reduction (dB)	20	22	23	2.3
Thermal transmission (W/m2K)	2.95	2.03	1.51	1.51



Key features

1. Custom design
2. Octagonal shape
3. Self supporting

em-line™

Em-Line Vertical glazing

Em-Line Vertical is a cost-effective multiwalled polycarbonate glazing system that provides excellent thermal value, maximum light transmission and a long lifespan.

Features

- Eliminates the need to remove existing glazing
- Cost-effective – especially against the cost of replacement glazing
- Fast and easy to install
- Minimises time on site, disruption, health & safety risks and waste disposal costs
- Thermally efficient – and can accommodate up to 200mm of insulation
- Superior U-Values help lower heating bills and reduce carbon footprint
- Suitable for use with most roofing membranes, including single ply, torch-on felt, hot melt, asphalt, GRP and liquid systems
- Wind-resistant and impact-resistant up to sports centre test standards
- No internal access required for installation
- Maintenance-free – can be cleaned with diluted, mild detergent.

Description

Em-Line Vertical is particularly well suited to situations where existing glazing can't be removed or when costs would be prohibitive – usually buildings with clerestory and vertical glazing, tank rooms and façades with cladding materials such as asbestos.

The design of Em-Line Vertical's patented connection system makes it fast and simple to install: it fits like an oversleeve to an existing structure, seated on a new Em-Curb upstand which is waterproofed to the same specification as the flat roof. Its low cost, simplicity, rapid installation times and low-profile aesthetic makes Em-Line Vertical a popular solution for otherwise challenging roofing projects at schools, sports halls, shopping centres, showrooms and industrial buildings.

Performance and options

Em-Line Vertical and its associated products have been rigorously tested for durability, safety, thermal performance and compatibility with industry-standard roofing materials.

The multiwall construction of the Em-Line Vertical provides a consistent thermal barrier with excellent U-Values of 0.99W/m²K. The Em-Line Vertical system includes a choice of upstands dependent on window detail and insulation requirements.

For ventilation within the upstand, there are both trickle vent or controllable rotating vent options.

The maximum length of sheet is 7m. Units are designed for vertical applications from 75° to 90°.

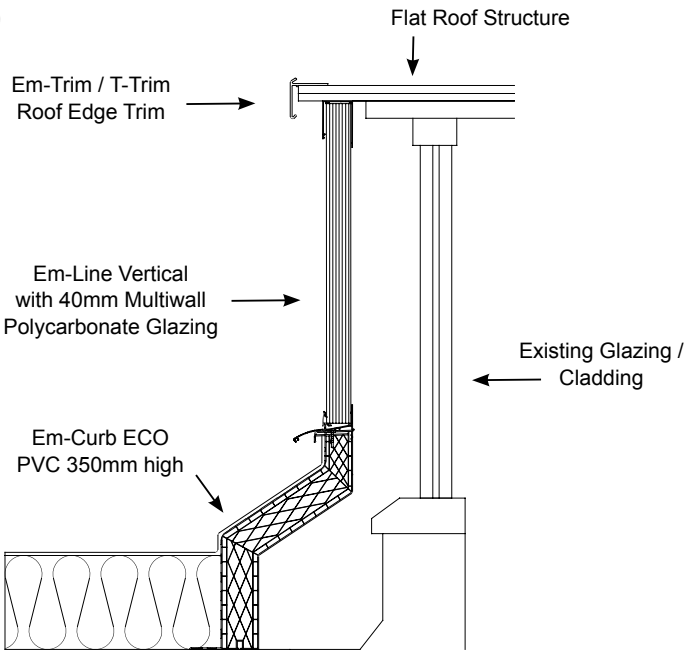
The Em-Line Vertical is available in translucent clear or translucent opal finish. The aluminium framework is available in mill finish, polyester powder-coated white or to any RAL colour by special order. Bespoke corner flashings and wall abutment details are available in aluminium pressings to suit.

Specification

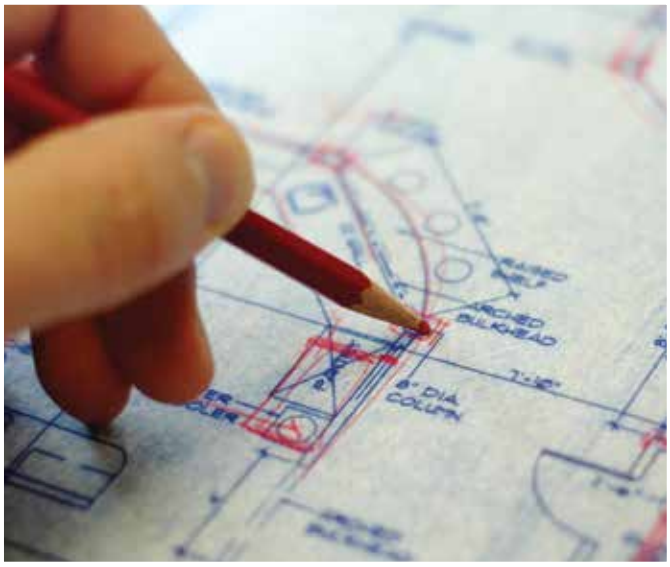
Sheet thickness	40mm
Multi-walled	9-walled
Sheet width (useful)	435mm
Sheet length	Lengths on request (up to 7m)
Free Length	2.10m (>2.10m use horizontal reinforcements + clips)
Application temperature	-40°C to +120°C
Thermal characteristics (U-Value)	0.99W/m²K (calculation according EN ISO 6946:1997)*
Light transmission	Transluscent clear: 62.5%, Transluscent opal: 53.85% according EN1013-1
Dilation coefficient	0.065mm/m°K
Air permeability	0.33m³h/m² according UNI EN1026: 2001 Class 4 according UNI EN12207: 2000
Frame profile	Water permeability class 6A (EN12208)
Sheet	Water permeability class 9A (EN12208)
Wind load	A1 (EN12210)
Impact resistance	I 5 (14351-1)
Density	1200g/m³
Weight per m2	4.1kg

* 1.20W/m²K (test according EN674:1999)

Diagram shows 350mm high upstand. Also compatible with 150mm splayed and vertical upstands and 300mm splayed upstand



Design considerations



Whitesales is able to advise on current requirements and regulations. The following pages summarise some of the key considerations that should be taken into account when specifying rooflights.

Approved Document L 2010:

Conservation of fuel and power

Introduction

This Approved Document, which takes effect on 1 October 2010, deals with energy efficiency requirements in the Building Regulations (as amended) and is made up of four distinct publications which are summarised below. It should be noted that Approved Documents are guidance publications and there is some provision for trade-off with other building elements – any proposal should be checked with the relevant building control body. U-Values should be calculated in accordance with BRE 2006. The document also covers areas such as Materials and Workmanship including a requirement to demonstrate appropriate use of products with CE marking, British Standards and European Technical Approvals. Whitesales Em-Dome rooflights have undergone stringent and extensive testing and are certified to these standards.

Solar heat gain

Approved Documents L1A and L2A include requirements to limit solar gains through the summer period. The inside of the building can heat up during daylight hours due to the sun. This is termed as solar heat gain. To reduce this effect, solar control glass can be adopted to reflect heat and reduce glare from the sun's rays. This lessens the burden on air-conditioning systems thus reducing CO_2 emissions. In simple form, this may be body tinted glass in blue, green or bronze or more sophisticated, coated clear glass that allows maximum light transmission, but at the same time substantially reduces heat gain. For Em-Dome values, see page 9 of this brochure – Solar heat gain factor (g%).

Optimum rooflight provision

A building's design will affect the contribution rooflights can make. The optimum area of rooflights will therefore vary for each building. However, research has shown that a rooflight area of 15-20% will contribute to an overall reduction in CO_2 emissions in most buildings. Rooflights are up to three times more effective at supplying daylight than vertical windows. Where artificial lighting is controlled by daylight sensors, installing rooflights can result in a significant reduction in the energy used for lighting. Energy consumed in lighting a building is often greater than that used to heat it. In addition, the SAP and SBEM software programs take account of the contribution made by passive solar gains through rooflights. Solar gains help to offset the increased heat loss of rooflights compared to the insulated main roof.

Air permeability

Air permeability is the physical property used to measure airtightness of the building fabric. It is defined as air leakage rate per hour per square metre of building envelope at the test reference pressure differential across the building envelope of 50 Pascal ($50N/m^2$). The limiting air permeability is the worst allowable air permeability. The design air permeability is the target value set at design stage, and must always be no worse than the limiting value. The assessed air permeability is the value used in establishing the BER, and is based on a specific measurement of the building concerned.

ADL 1A: New dwellings

This document sets a minimum energy performance requirement called the 'Target CO_2 Emission Rate' (TER), and 'Dwelling CO_2 Emission Rate' (DER). The aim is to improve the overall building envelope rather than specific elements hence improvements in one area can be used to offset other areas of poorer performance. Section 4.20 covers 'Window, roof window, glazed rooflight, curtain walling and pedestrian door'. Specifically rooflights must conform to a U-value of no more than $2.00W/m^2K$ and the calculation is based on the value of the complete rooflight unit rather than the values of any one component part.

ADL 1B: Existing dwellings

Section 4.19 covers 'Window, roof window or rooflight' The document states that where windows, roof windows or rooflights are to be provided, the reasonable provision – in normal cases – would be the installation of draught-proofed units whose performance is no worse than a U-value of 1.6W/m2K or complying with the Window Energy Rating System, B and C.

ADL 2A: New buildings other than dwellings

This document sets a minimum energy performance requirement called the 'Target CO_2 Emission Rate' (TER), and 'Building CO_2 Emission Rate' (BER). The aim is to improve the overall building envelope rather than specific elements hence improvements in one area can be used to offset other areas of poorer performance. Section 4.30 covers 'Window, roof window, glazed rooflight, curtain walling and pedestrian door'. Specifically rooflights must conform to a U-value of no more than 2.2W/m2K. The calculation is based on the developed area of the rooflights rather than the roof aperture and is the value of the complete rooflight unit rather than the values of any one component part. Also included are 'Roof ventilators (inc. smoke vents)' which must conform to a U-value of no more than $3.5W/m^2K$.

ADL 2B: Existing buildings other than dwellings

Section 4.23 covers 'Window, roof window and glazed rooflight' and 'Plastic rooflight'. Specifically plastic rooflights must conform to a U-value of no more than 1.8W/m²k. Also included are 'Roof ventilators (inc. smoke vents)' which must conform to a U-value of no more than 3.5W/m²K.

Approved Document B 2006: Fire Safety

Approved Document B places certain limitations on the use of rooflights, which are dependent on glazing material and site circumstances, such as building size, use of area below rooflights, rooflight size and proportion of total roof area, distance from boundary etc. The relevant information is set out in Volume 1: Sections 3 and 10; Volume 2: Sections 6, 12 and 13 of Approved Document B, 2006 Edition. Where applicable, the responsibility for determining that any building component complies with the relevant Regulations rests solely with the customer or specifier.

Approved Document E 2003 (amended): Resistance to the passage of sound

This document requires that buildings are designed and constructed to provide resistance to sound and reverberation. The aim is to limit noise disturbance by including sufficient acoustic properties and insulation in areas such as internal and external walls, floors and other elements. Rooflights should perform in accordance with these requirements and the decibel reduction value can be used in calculations for this purpose. For Em-Dome acoustic values see page 9 of this brochure and for Em-Glaze Modular see page 6 of Glass brochure. Further information is available in Building Bulletin 93 – Acoustic Design for Schools.

Approved Document F: Means of ventilation

This document places the responsibility on the designer to comply with ventilation requirements to new and existing buildings. It states ventilation types including extract, whole building and purge and gives minimum ventilation requirements. Rooflights are often a useful means of complying with the requirements especially where no other external aperture is available. See pages 18-20 of this brochure for Em-Dome ventilation options. Further information is available in Building Bulletin 101 – Ventilation of School Buildings.

BS 6229

BS 6229: 1982, Code of Practice for flat roofs with continuously supported coverings, requires rooflights to incorporate upstands to raise them at least 150mm above the uppermost roof surface to which the roof covering is bonded or dressed. The designer should ensure that the builder's curb is at least 150mm high.

BRE BR443

Various standards deal with the calculation of U-values of building elements. The conventions provide guidance on the use of the standards, indicating the methods of calculation that are appropriate for different constructional types, providing additional information about using the methods and providing data relevant to typical UK constructions.

The U-value conventions were originally published by the BRE in 2002 and the 2006 edition is an update which provides additional information and reflects changes in the underlying British Standards. The U-Value calculation methods are also referred to in Approved Documents L1A, L1B, L2A and L2B.

> "Rooflights are up to **three times more effective** at supplying daylight than vertical windows."

Condensation

Condensation occurs where warm moist air meets cold surfaces. As warm air rises, the risk of condensation forming at rooflight level is relatively greater than at lower level. The risk can be minimised by specifying triple skin Em-Domes and Em-Curb insulated upstands. The provision of ventilation may also assist (see options on pages 18-20). However, because temperature and humidity levels are clearly beyond our control, no guarantee can be given against the formation of condensation.

Condensation between the skins can also occur when the room below has high humidity levels, for example during construction from new plaster or paintwork. Polycarbonate is hygroscopic and allows water molecules to filter through – the water pressure forces its way through the lower skin and condenses inside the cavity. However, once the humidity level in the room is restored to normal this condensation dissipates through the breathable seals.

Limitations on use

Whitesales modular rooflights are designed for use in normal circumstances on flat roofs up to 15° pitch (on flat roofs Em-Tube can be used up to 15° and on pitched roofs above 15°). For applications in excess of 15° or in unusual circumstances (e.g. extreme temperature or climatic conditions) please refer to Whitesales. Please note that all information supplied is based on our best knowledge and general experience. Because of factors outside our control which can affect installation and use of products, no warranty is given or implied in respect of information provided. A policy of continuous product improvement applies and Whitesales therefore reserve the right to alter specifications without prior notice.

Health & Safety

Construction (Design & Management) Regulations 2007

According to the Health and Safety Executive, almost 20% of deaths in the construction industry are caused by falls from or through roofs. The majority of these falls are through fragile materials such as asbestos cement roofing or old/fragile rooflights.

The Construction (Design and Management) Regulations 2007 places a duty on designers and specifiers to give proper consideration to eliminating or reducing risks at the design stage. Health and Safety Executive (HSE) Health and Safety in Roof Work draws attention to the responsibilities of those specifying rooflights.

(HSE) Health and Safety in Roof Work states that where rooflights are required, designers should consider:

- Specifying rooflights that are Non-Fragile.
- Fitting rooflights designed to project above the plane of the roof and which cannot be walked on (these reduce the risk but they should be capable of withstanding a person falling onto them).
- Protecting rooflight, e.g. by means of mesh or grids fitted below or above the rooflight
- Specifying rooflights with a design life that matches that of the roof, taking account of the likely deterioration due to ultraviolet exposure, environmental pollution and internal and external building environment.

For specifiers the key message is to eliminate 'fragile' materials from roof design. For contractors, provide effective fall arrest equipment or safety netting.

Non-fragile rooflights

Whitesales Em-Dome rooflights are out-of-plane rooflights, and provided they are specified with polycarbonate glazing, can be deemed to be 'non-fragile'.

- Polycarbonate Em-Domes have been independently tested according to EN1873 2005 [E] to an energy of 1200J and to ACR[M] 001: 2005 and can be classified as Class B 'Non-Fragile'.
- Whitesales offers a 10 year warranty against discolouration of Em-Domes glazing material and, in the case of polycarbonate, loss of impact strength underwritten by the sheet material supplier.
- Whitesales polycarbonate Em-Domes have been awarded BBA Certification or are manufactured to ISO 9001.
- Whitesales offers a post-forming warranty backed by the sheet manufacturer.

Man-safe

Man-safe is a term often used within the construction industry to mean that the product can withstand foot traffic. However man-safe has no recognised definition and 'non-fragile' does not qualify a product to be used as a thoroughfare.

Whilst glazing and other accessories may be designed to safely resist the impact of a human body falling against it, the wilful act of walking on any kind of roof glazing must be forbidden at all times.

The act of walking upon a glazed structure can cause microscopic damage that, in time, may have a detrimental effect upon the impact performance of the system.

Walking upon glazing may encourage a practice that could lead to general disregard for the rating of said glazing, with catastrophic consequences.

Safety data sheets are available on request.

Sitework

Handling and storage

While all Whitesales modular rooflights and associated products are suitably packaged to avoid damage care should be exercised when handling.
For moving larger items, two or more people may be needed.
All products should be stored on edge in flat dry conditions.

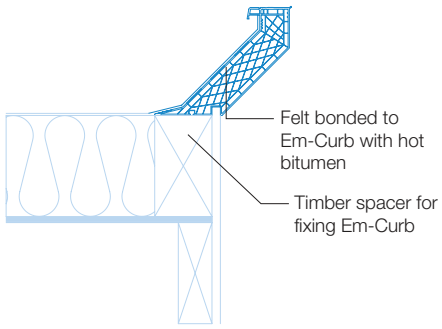
Installation

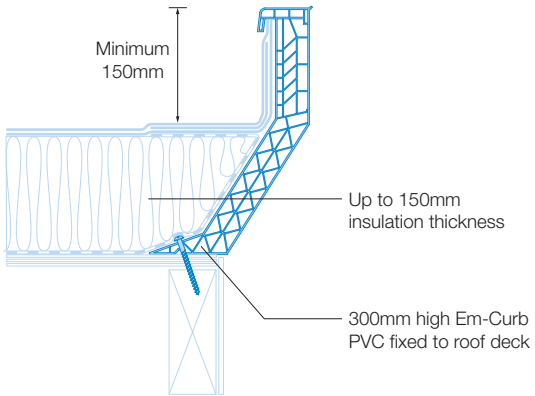
All Em-Dome rooflights are supplied ready assembled and pre-drilled complete with security screwbolts and factory applied sealing tape where applicable and are delivered to site in protective packaging. Full instructions and fixings are included with all products, and should be carefully studied prior to installation.

Fixing upstand curbs

For fixing curbs to the roof structure, drill holes in the bottom flange, 100mm from each corner and at maximum 300mm centres and screw to roof structure. Typical installation details are shown below. The PVC Em-Curb ECO is suitable for use with most flat roof systems including single ply, felt, hot-melt, asphalt, liquid and lead.

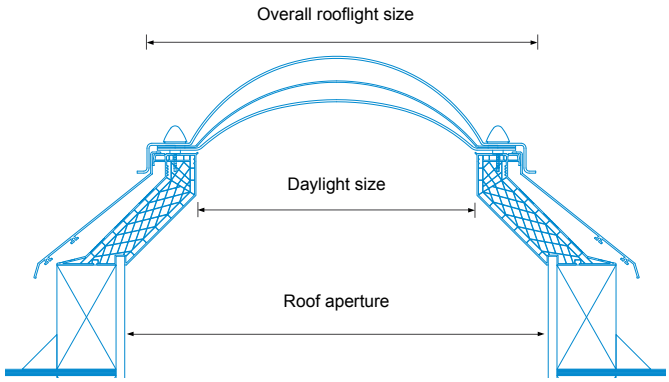
Where asphalt is specified, Whitesales recommend the use of ECO PVC-u upstands with pre-fixed sheathing felt and expanded metal lathe. This must be specified if required.





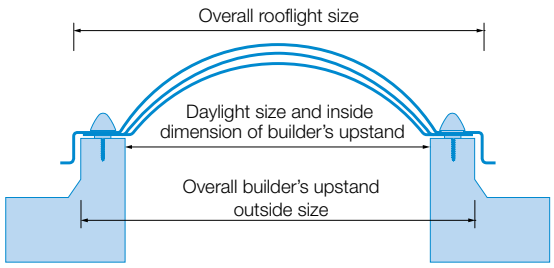
Fixing Em-Domes to Em-Curbs

The Em-Dome should be accurately positioned on the Em-Curb and the screwbolt fixing positions marked on the Em-Curbs. The fixing holes are drilled in the Em-Curb and the Em-Dome is simply placed in position and fixed using the screwbolt fixings supplied.



Fixing Em-Domes to builder's upstands

The Em-Dome overall rooflight size should be 60mm bigger than the outside dimensions of the upstand. Holes should be pre-drilled in the upstand to accept the tamper-proof screws provided for use with the screwbolt fixings. The fixing positions can be located by accurately placing the dome over the upstand, with the screwbolt caps removed, and marking the position of the fixings.



Em-Tube installation

Refer to page 29.

Operation and maintenance

Whitesales rooflights and accessories can generally be regarded as 'maintenance free'. However, the following guidelines should be followed to optimize their usefulness.

Any maintenance of rooflights must of course be carried out strictly in accordance with the relevant 'Health and Safety' regulations.

Checks should be carried out on all products annually.

Project specific data is available on request.

Em-Dome and Em-Line

Operation: Em-Domes are fixed at installation stage to the relevant upstand, and are a means of allowing natural light into the area below.

Polycarbonate rooflights are 'Non-fragile', but should not be trafficked.

Maintenance: Wash only with warm soapy water. DO NOT USE strong detergents or abrasives.

Em-Curb

Operation: Normally manufactured in extruded PVC, or GRP. Em-Curbs provide a proprietary upstand detail for Em-Domes.

Maintenance: Maintenance free.

GRP Em-Curbs may be decorated internally if required.

Em-Tube

Operation: Em-Tubes are fixed at installation stage to the relevant upstand, and are a means of allowing natural light into the area below. They are 'Non-fragile', but should not be trafficked.

Maintenance: Wash only with warm soapy water. DO NOT USE strong detergents or abrasives.

Em-Vault and T-Vault

For Operation and Maintenance information for Em-Vault and T-Vault products, please refer to page 40.

Passive ventilation

Operation: Normally by means of 'Trickle', 'Louvre' or 'Rotating' vents, to provide background ventilation. Trickle vents are adjusted by hand. Louvre and Rotating vents are adjusted by a proprietary operating rod – available in 1.5, 2 or 3m lengths. Louvre vents require a sharp upwards push to fully close.

Maintenance: Maintenance free.

Opening ventilation

Operation: Operated manually by spindle and proprietary winding rod, or electrically by means of 24V DC or 240V AC electric box motors. Manual operation opens to 300mm. Electric motors must be installed by a qualified electrician.

Maintenance: Test annually by an Approved Electrical Installations Testing Company. Physically check fixing brackets to ensure fixings are secure.

Access units

Operation: For means of access onto roof area. Only to be used by authorised personnel. Unit is opened by opening the locking cockspur handle and pushing the unit into the open position. If the unit has frictional struts, they should be adjusted to ensure unit is safely held in the open position. DO NOT use as a means of ventilation. DO NOT USE in windy conditions. ONLY USE in accordance with relevant Health and Safety Regulations.

Maintenance: Check brackets, struts, locking handle, etc., to ensure operation is correct and fixings are secure.

Extract fans

Operation: These are factory fitted to the relevant rooflight component and connected to an unswitched Fused-Spur.

A switched electrical supply should be connected by a qualified electrician.

Maintenance: Test annually by an Approved Electrical Installations Testing Company.

Case study	Kirkby Market
Project type	Market street rooflight installation
Products	Em-Vault
Ventilation	Incorporates natural ventilation
Glazing	Polycarbonate multiwall

Support services

Technical services

Advice and technical assistance on the application and specification of all rooflights and accessories is readily available from Whitesales.

Full technical advice is available, including technical specification writing, site surveys, condition reports and budget costings or fully detailed quotations.

A comprehensive library of product data sheets and CAD drawings is available along with NBS specifications.

For projects where we have undertaken a rooflight site survey we offer a CAD roof plan drawing service.

The Whitesales Customer Service Team works to respond immediately to customer request.

For more information, please contact us on:

Tel 01483 271371
Fax 01483 271771

E-mail sales@whitesales.co.uk
www.whitesales.co.uk

Nationwide coverage and next day delivery

Whitesales offers next day delivery on their own transport or overnight carrier service nationwide, including deliveries to site, to contractors and merchants.

With depots strategically located in England and Scotland, the service driven team is readily available, from your initial enquiry through to after sales support.

Project and larger consignments are delivered on Whitesales' own transport and delivery periods are determined on a per order basis.

Guarantees

All Em-Dome rooflights, when installed on Em-Curbs, Em-Collars or T-Collars and in accordance with manufacturer's instructions, are guaranteed against the effects of defective design, materials or construction for a period of ten years from date of supply by Whitesales. Furthermore, the glazing element of all Em-Domes is warranted against discolouration for ten years subject to certain conditions. A 20 year 'special projects' guarantee is also available. Further details available on request.

Em-Dome rooflights have an expected life of at least 25 years which would normally exceed the life of the roof waterproofing materials.

All other products (e.g. T-Collars, Em-Curbs, ventilation systems, electrical components and other accessories) are guaranteed for 12 months from date of supply by Whitesales.

Whitesales holds Professional Indemnity Insurance, covering our designs and recommendations. Full details available on request.

Environment

Our responsibility

The environment and the effect we have upon it is one of the key issues facing the construction industry.

There is a growing demand for construction solutions which minimise the consumption and use of natural resources. Whitesales recognises the impact that we can have on the environment and is managing activities to maximise our contribution towards the protection of the environment and preservation of natural resources. This includes constant reviews of our manufacturing operations and distribution chain.

Sustainability

Sustainable developments ensure a better quality of life for everyone, now and for future generations. To be environmentally sustainable a product must be manufactured and used in a way that minimises its impact on the environment.

Sustainability covers all aspects of a product's impact on the environment. This includes original source of raw materials, the manufacturing process, transportation, construction, life span of the product and eventual disposal and re-use of the material.

Environmental policy

In maintaining and developing our business, products and services, we will pay careful attention to the following measures:

- Comply immediately with all applicable laws and regulations concerning the environment.
- Develop manufacturing processes and operational procedures that minimise, as far as practically possible, pollution risks to the environment.
- Reduce waste generated by our activities and encourage energy conservation, recycling and re-use.
- Provide training and support to employees to enable them to maximise their contribution towards the protection of the environment.
- Encourage suppliers, contractors and customers to share in our aims to promote good environmental management.

Whitesales®
Rooflights & more...

Whitesales Europa House Alfold Road Cranleigh GU6 8NQ

Tel 01483 271371 Fax 01483 271771
E-mail sales@whitesales.co.uk www.whitesales.co.uk

September 2016