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# Xtralite Specification Guide

## Daylight by Design

Xtralite ROOFLIGHTS

# Xtralite Specification Guide

This Guide is designed to help professional specifiers gain a full understanding of the key issues surrounding specification of rooflights. It also provides information on Xtralite and its product ranges covering all forms of rooflights, roof glazing and ventilation systems—supported by project examples that Xtralite has worked on over the years.

The early sections of this guide provide an essential information resource on all aspects of rooflights with useful background, as well as the context in which specific products can be selected. The following Product Portfolio sections are each arranged to suit the procurement process, guiding the user stage by stage and building up product specifications.

The latest updates on product information, newsletters and technical bulletins addressing topical issues can be found on **www.xtralite.co.uk**. If you have any queries on the issues covered in this Guide or require help, contact us on **01670 354157** or email **sales@xtralite.co.uk**.



Xtralite ROOFLIGHTS

# Introduction



Xtralite ROOFLIGHTS

Introduction

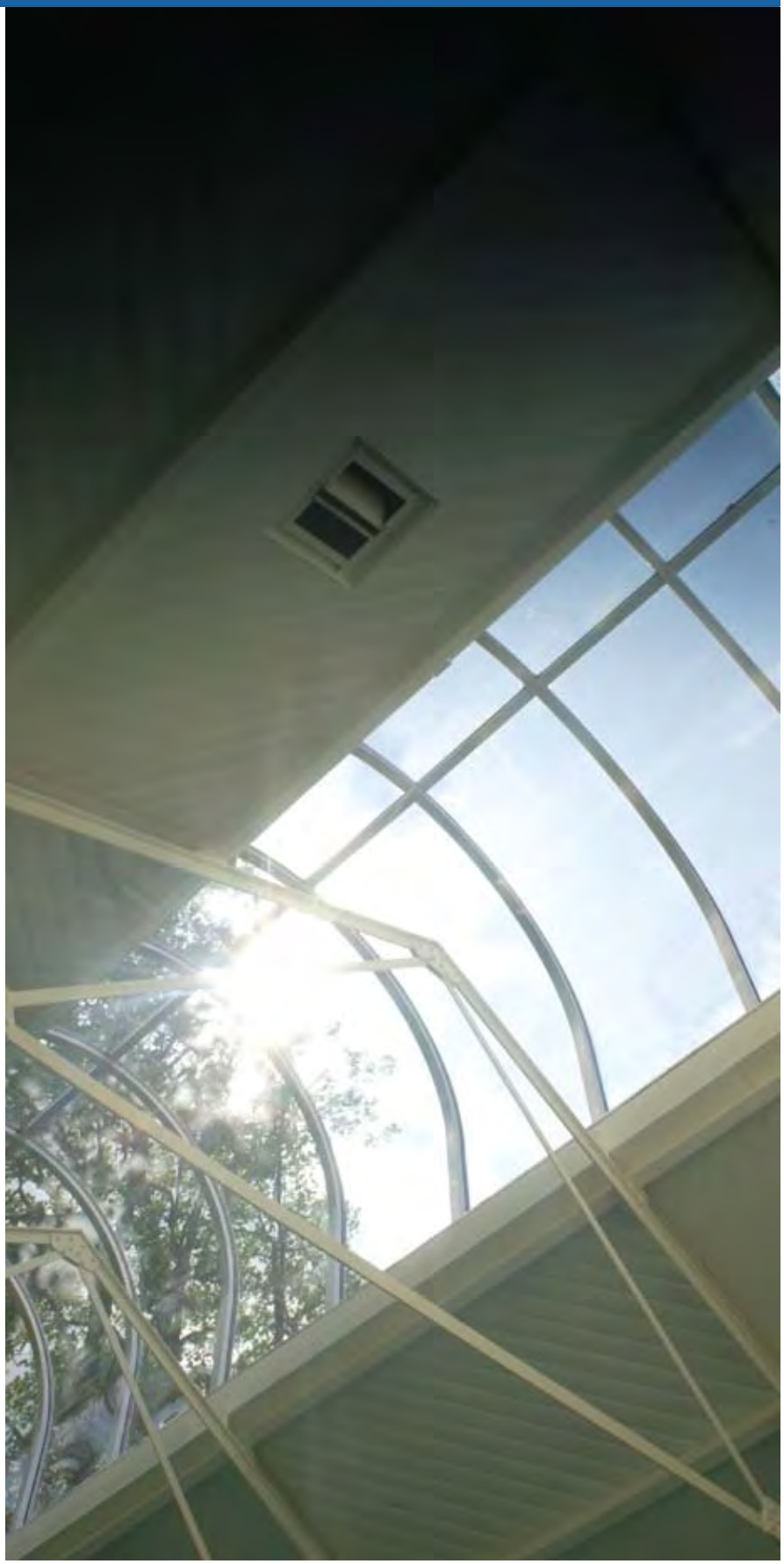
# The Case for Rooflights

For many years the rooflight has been recognised as an essential and the most efficient device for introducing daylight into buildings. However, nowadays there is a growing appreciation that rooflights have a far more profound impact on the economics of running a building and also on the way that users react to the building.

Modern rooflights of the type made by Xtralite are extremely effective in reducing a building's energy consumption. Rooflights can be positioned to make a significant contribution to the illumination of a building interior and so save on lighting costs during daylight hours. They can be made of materials that reduce solar gain inside the building and thus save on mechanical cooling costs. They can also be insulated so that, in cooler climates, the gain in natural interior illumination does not equate to a rise in heating demand.

In addition to the benefits of energy efficiency, rooflights also offer significant aesthetic qualities. A view of clear blue sky or the reassurance offered by natural diffused daylight from a building's interior adds immeasurably to the sense of well being. Equally, detailed research in educational, medical and commercial environments has shown that people perform far better in buildings where daylight is a major factor.

In the past rooflights were often regarded as accessories. Today, the informed architectural approach is to take full advantage of the economic and aesthetic benefits and build rooflights into the core design proposition. The wide range of rooflight solutions available from Xtralite enables and actively encourages such an approach.



# About Xtralite



Since its foundation in 1993, Xtralite has sought to deliver the highest levels of professionalism, expertise and innovation to specifiers, installers and users of rooflights. By 1995 the company had the largest technical team for rooflights in the UK, with BBA accreditation for its entire range of standard and modular rooflights the following year and, by 1997, Xtralite had become the leading independent producer of rooflights in the country. Xtralite has always invested in technical expertise, product development and manufacturing capability. The company is committed to the principle of independently-tested performance characteristics—including 'hot box' testing of products by the National Physical Laboratory to establish accurate U values.

The diverse systems available range from simple 'dome on a kerb' units to the most technically demanding, custom-designed structural glazing. The company continues to lead the industry, developing new innovations such as Nanogel® sheet technology. Xtralite is consulted on and provides solutions for many of our major buildings—such as the Millennium Dome and Newcastle United's state-of-the-art football stadium. Our senior team members work with RIBA in providing specification details for the NBS programme and also give RIBA accredited presentations as part of the CPD lecture resource. Xtralite is an active member of the National Association of Rooflight Manufacturers (NARM).

In recognition of the company's dedication to quality, Xtralite is ISO 9001:2000 accredited for design, manufacturing and customer satisfaction. Xtralite is also leading the industry drive toward sustainability—and not just with energy saving products—its manufacturing capabilities are energy efficient and it aims for 95% of its product materials to be recyclable after end of life. Xtralite is involved with all building types and market sectors, whether new-build or refurbishment. In 2002, the company became the first in its industry to offer insurance-protected product guarantees.

# Partnerships with Industry Bodies—NARM



NARM is the National Association of Rooflight Manufacturers of which Xtralite is not only a member but also plays a leading role. NARM represents a complete cross section of the rooflight design and material type manufacturers in the UK.

This includes: in-plane profiled rooflights, continuous barrel vaults, modular domes and pyramids, panel glazing systems and architectural glazing systems for skylights, lantern lights and atria.

The association promotes co-operation between member companies, in order to develop and maintain standards and codes of practice—and to provide an authoritative information portal for rooflight specifiers.

All Full and Associate Members of the National Association of Rooflight Manufacturers are:

- Focussed on quality and have obtained, or are working towards, BS EN ISO 9001:2000 registration.
- Committed to staff training and development.
- Able to offer balanced advice on the use of rooflights, rooflight materials and rooflight systems without misrepresentation.
- Dedicated to customer satisfaction through the development and supply of quality rooflights, rooflight materials and systems.
- Supplying only those products which comply with relevant UK and European Standards and Building Legislation.
- Promoting good business practice and publish clear statements on terms of sale and product warranties.

A NARM spokesman reflects on their role and the design of rooflights:

*"Omitting rooflights from a building is often seen as a short-term (but misguided) cost saving measure. This totally ignores the major benefits natural daylight can bring. Natural daylight is a freely available resource; through a carefully designed daylighting scheme, rooflights can utilise that resource, bringing lifecycle cost savings in terms of less power for artificial lighting, therefore benefiting the environment. Improved efficiency through natural daylight also brings the benefit of increased productivity and therefore improving investment 'pay back' times. Health benefits of natural daylight are well documented. NARM's mission must therefore be to continue the promotion of daylight in buildings, through the use of rooflights.*

*Our strengths, as an Association, lie with our Members and a very well respected Technical Team. We'll continue to be active in research and development and will regularly produce and publish technical documents and bulletins. Rather than just following legislation we are, as a Trade Association, looking to lead the way in contributing to its development."*

NARM members are united in their vision of NARM as an active organisation and not a passive, administrative function. For instance:

- NARM has a continuing working function in European Standardisation, leading UK representation on the CEN Working Groups revising and developing European Standards such as EN1013, EN1873 and WI 00128038, and chairing the BSI B/542/8 mirror committee to CEN/TC128/9.
- The Technical Committee has commissioned a research report from the Institute of Energy and Sustainable Development at De Montfort University, to provide supporting data for Part L of the Building Regulations. This is now available on the NARM website: **www.narm.org.uk**.
- NARM is regularly involved with governmental working groups considering on-going revisions to Part L of the Building Regulations.
- NARM is represented on the Advisory Committee for Roofwork (ACR) which works on roof safety issues, and NARM is currently developing further recommendations for long-term non-fragility of inplane rooflights, published in a document, NARM 2004/1. Details are posted on our website.
- NARM has been heavily involved with development of new harmonised European fire tests, contributing to various PII projects with government departments, and continue to be involved with BSI FSH/22/8 committee and development work with BRE FRS.

Xtralite fully endorses NARM's views and, as exemplified by this Guide, hopes to raise both the level of design and rooflight specification by actively working with specifiers throughout all the stages of specification.

Introduction

# Partnerships with Industry Bodies—Constructionline & CHAS

Xtralite is a member of Constructionline and accredited with Contractors Health and Safety Scheme (CHAS) to make life a little easier for customers and contractors.

Constructionline is the UK's premier register of pre-qualified local and national construction and construction-related contractors and consultants. Owned and endorsed by the Department for Business, Enterprise & Regulatory Reform (formerly the DTI), Constructionline is a contributor to the Rethinking Construction initiative.

Constructionline helps contractors and consultants by reducing the need for them to fill in pre-qualification forms for every tender, allowing them to use one 'site' to choose the range of suppliers for a particular project based on their suitability for the job.

Xtralite has been certified by CHAS which assesses Xtralite's compliance with—and sound management of—current health and safety legislation. This certification adds to Xtralite's ongoing pursuit of good business practice which gives further confidence to the industry when selecting Xtralite as a rooflight supplier.

# Partnerships with Industry Bodies—BBA



Xtralite's goal of ensuring quality product design and installation is reflected in our pursuit of achieving recognition both within the industry and for the industry.

BBA BRITISH BOARD OF AGRÉMENT
CERTIFICATE No 02/3890

This is exemplified in the work with the BBA (British Board of Agrément), the organisation partnered with Government and whose Governing Board includes representation on behalf of Government.

The BBA's Agrément Certificates have been providing authoritative and independent information on the performance of building products for over 35 years.

In relation to Xtralite, the BBA's Sales and Marketing Director, Alan Thomas says,

*'The increasing use of rooflights to introduce natural light and ventilation into buildings is giving a lift to all kinds of properties throughout the UK. As ever though, it is important to ensure that the rooflight system chosen is up to the job; and I am delighted that Xtralite has sought and gained BBA Approval for its range. The BBA assessment included resistance to weathering, wind and snow loads as well as rain, along with thermal performance. Condensation risks were also evaluated along with soft body tests for non-fragility.*

*Xtralite's BBA certificate allows specifiers and purchasers nationwide to specify and select Xtralite rooflights in the knowledge that they have been put through the mill at the BBA and have been shown to be fit for purpose. And of course our interest in a product doesn't end with the award of the BBA Certificate: we carry out surveillance visits throughout the validity of the Certificate to make sure the product specification is exactly the same as we originally approved—another good reason for selecting BBA Approved products.'*

# Partnerships with Industry Bodies—NBS



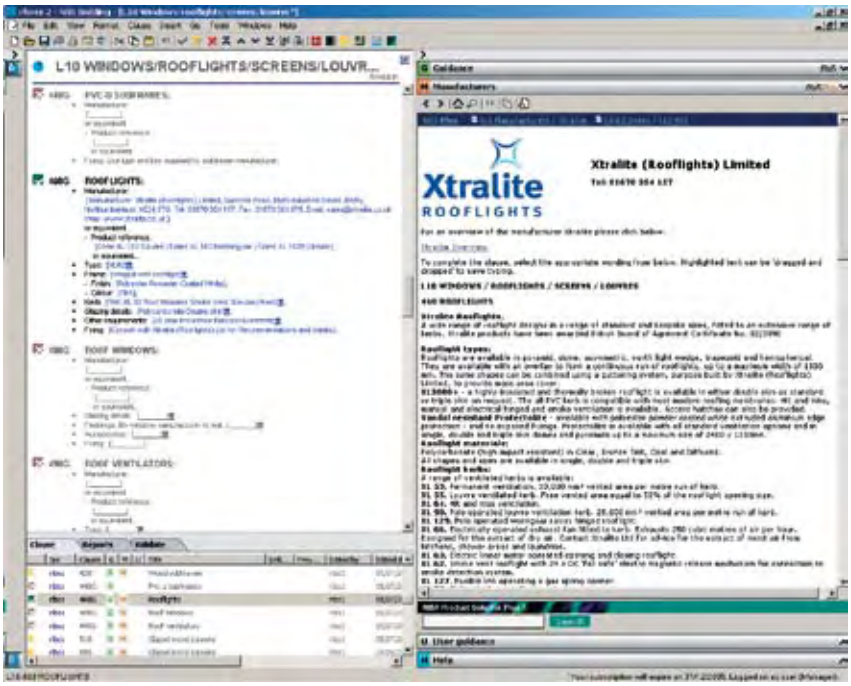
NBS Building is the most widely used specification system suitable for a wide variety of construction projects. It is available in three levels of service depending upon projects undertaken.

NBS brings together the specifier and the NBS library of technical product information which is managed and updated by a team of RIBA specialists. Information is standardised and therefore recognised throughout the industry facilitating an understandable and easier specification process.

Xtralite are members of the NBS specification system assisting specifiers with rooflight specification across the two main categories of rooflight—structural and standard.

Xtralite Rooflight and Continuous Rooflight products usually come under the NBS heading of L10 WINDOWS/ ROOFLIGHTS/SCREENS/LOUVRES, part 460 Rooflights (L10/460).

Xtralite Panelised Glazing and Specialist Roof Glazing products usually come under the heading of H10 PATENT GLAZING, part 115 Patent Glazing (H10/115).


Images taken from the NBS Specification Writer System.

# Partnerships with Industry Bodies—NPL



The National Physical Laboratory (NPL) is the United Kingdom's national measurement laboratory, an internationally respected and independent centre of excellence for R&D, and knowledge transfer in measurement and materials science. It is UKAS accredited—as recognised by the Building Regulations—and offers comprehensive test facilities to measure thermal resistance, including a rotatable hot box which is particularly suited to full-scale testing of rooflights.

Xtralite is firmly committed to providing specifiers with accurate U value data on all its thermally-efficient products, based on testing by NPL. Xtralite does not endorse claimed U values based solely on desk-top calculation using thermal transmittance values for component materials. Although this is a complex area, it is of fundamental importance to ensuring that our buildings actually perform as designed in terms of energy efficiency. A Rooflight Technical Bulletin is available via the Xtralite website **www.xtralite.co.uk** providing full information on this important topic.

The National Physical Laboratory hot box apparatus provides an accurate method of measuring actual U values for rooflights. It can be rotated into any orientation, enabling measurements to be carried out in the orientation that the product will be used.

# Partnerships with Industry Bodies—RIBA

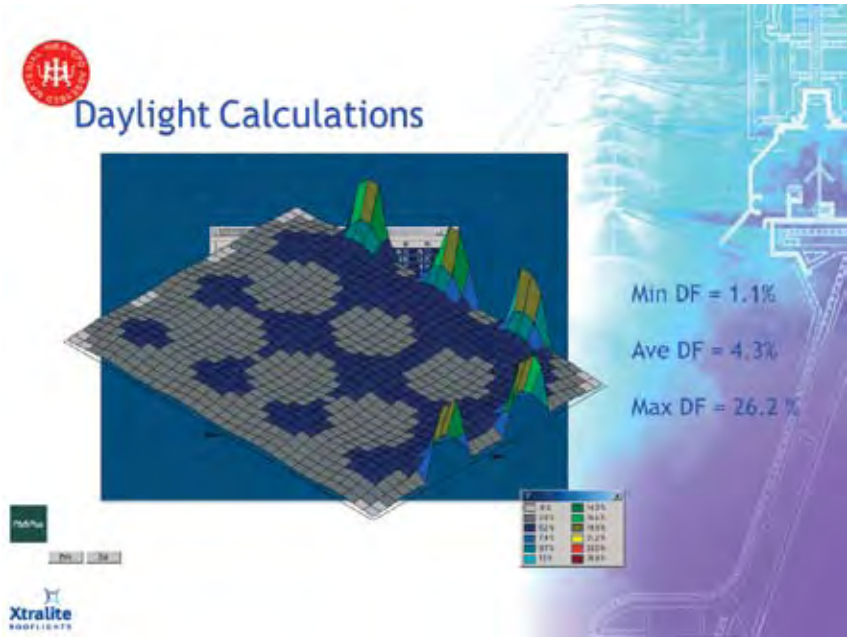


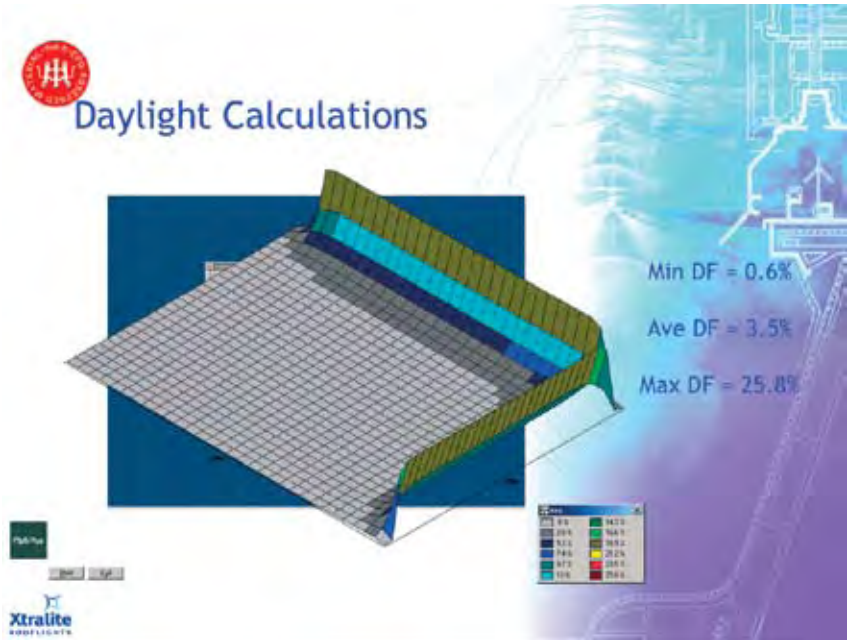
The Royal Institute of British Architects (RIBA) requires its members to carry out Continuing Professional Development (CPD) and assesses CPD material submitted by manufacturers and others.

Xtralite is a member of the RIBA CPD Providers Network and offers a comprehensive support programme for rooflight specification including an expanding series of RIBA assessed CPD seminars. The *'Rooflight Solutions'* seminar explores the benefits that 'designed' daylight can offer, then considers various common—and some unusual—problems with rooflights and how to solve them. Testing and legislative requirements are also covered, including energy efficiency.

A second seminar *'Overhead Glazing—the Choices to be made'* gives an objective outlook on the rationale behind specifying rooflights. The presentation takes an informative and illustrated overview of typical overhead glazing projects whilst balancing the advantages and disadvantages of different shapes, glazing materials and systems. The most recent seminar—*'Advanced Fenestrations'*—looks in detail at the use of natural daylight and the latest technologies for high-performance rooflights, including Nanogel® translucent aerogel granules. A fourth seminar dealing with the detailed implications of Part L of the Building Regulations will also be available shortly.

To book an Xtralite CPD seminar, call **01670 354157** or email **cpd@xtralite.co.uk**.




Images are taken from the *'Rooflight Solutions'* presentation.

# Designing with Daylight



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ROOFLIGHTS

# Overview



Until the advent of gas and then electric lighting, building designers were always striving to find a balance between the need for large windows to allow daylight access and small windows to minimise heat loss. Today, even allowing for the many different types of artificial lighting, it is accepted that natural daylight is a vital element in creating a more efficient and eminently more rewarding interior environment.

The different colour spectra provided by the various types of light have psychological and physiological effects on humans. Research conducted by Ott Biolight Systems Inc. in 1997 showed that the body uses light as a nutrient for metabolic processes in a similar way to its use of food and water. Natural light stimulates biological functions that are essential to human health. On cloudy days or in poorly lit environments, the inability to perceive colours from light can affect an individual's mood and energy levels.

# Benefits for Buildings of all Types



Rooflights can offer real benefits in all types of buildings. They can form part of an effective technical lighting scheme, particularly in conjunction with efficiently-controlled artificial lighting, to produce specified illumination levels for particular tasks. According to leading consultants, horizontal rooflights provide two and a half times more light than vertical windows. In the next section we shall see how this approach can save energy and reduce the carbon footprint of any building type.

In addition to satisfying objective technical requirements, rooflights can also add to the more subjective qualities of spaces as an integral part of the building's architecture. They can provide views of the sky and promote a sense of well-being and connection with the outside without the distractions encountered with views through vertical windows. Introducing daylight into a building has been proven to be crucial for the well-being, safety and efficiency of the people using the building. Workplace (Health, Safety and Welfare) Regulations 1992 state that: *'Every workplace shall have suitable and sufficient lighting which shall, so far as is reasonably practicable, be by natural light'*. This is restated in the HSG38 'Lighting at Work' booklet.

Unlike most building types, for schools specific guidance on natural lighting and rooflights is available, in Building Bulletin 90—'Lighting Design for Schools'. This provides essential guidance for both primary and secondary schools, whether for new or refurbishment projects, and helpful background for other similar building types. It stresses that natural lighting during daylight hours should always be the major source, supplemented by electric light when needed. Designers should assume that daylighting will be the prime means of lighting in all areas unless there are specific, over-riding reasons for artificial lighting in certain rooms. BB90 contains a comprehensive section covering lighting design, including rooflights. As it points out, rooflights let in light from the brightest part of the sky and are not generally affected by external obstructions, such as trees or other buildings. They also provide a more even pattern of light than vertical windows.

Rooflights are favoured in areas where vertical windows with views are not possible, so that 'daylight contact' is maintained. Guidance is included on avoiding discomfort glare, which can occur if the rooflight glazing can be seen directly from normal viewing positions at less than 35° above the horizontal. Rooflights with 'coffers' or kerbs help to avoid this, particularly with high reflectance sides to 'soften' light distribution. When recommended daylight levels cannot be achieved throughout a space, supplemental electric lighting can be introduced with suitable control systems, which probably need to be separate from night-time electric lighting controls.

Specific applications where rooflights may be particularly helpful are cited in BB90. For example, where Display Screen Equipment (DSE) is used, vertical windows can be problematic for users and rooflighting offers an alternative, higher-level light source. Various examples of room lighting designs are also included, exploring alternatives such as adding rooflights above the furthest wall from a window to even-out natural lighting and use of central rooflights to give consistent light distribution. Rooflights are also regarded as important for—often internal—communal spaces such as atria and circulation 'streets'.

# Design Principles



## Definition of Daylight

The CIE (Commission Internationale de l'Eclairage) Overcast Sky is the standard used throughout northern Europe for all daylighting calculations.

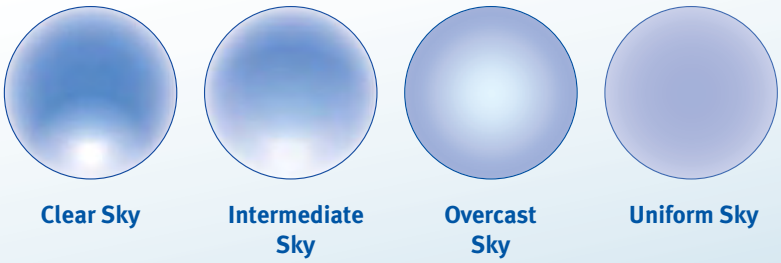
- Daylight is classified as the natural light from an overcast sky.
- Sunlight is the natural light from a direct sunbeam, not obscured by clouds.

The standard CIE Overcast Sky is considered to be:

- Three times as bright overhead than it is on the horizon.
- Of the same brightness in all compass directions.

Convention assumes that if a building is designed for daylighting according to the CIE Overcast Sky conditions then when outdoor illuminance is brighter, the natural lighting performance will be significantly better.

It is assumed that the minimum yearly average outdoor illumination is 5,000 lux for 85% of a normal working day. This represents a dull day. By the same standard a sunny day is assumed to be 100,000 lux—the maximum design illuminance.




## Clear Sky

The luminance of the standard CIE Clear Sky varies over both altitude and azimuth. It is brightest around the sun and dimmest opposite it. The brightness of the horizon lies in between those two extremes.

## Intermediate Sky

The standard CIE Intermediate Sky is a somewhat hazy variant of the clear sky. The sun is not as bright as with the clear sky and the brightness changes are not as drastic.

## Overcast Sky

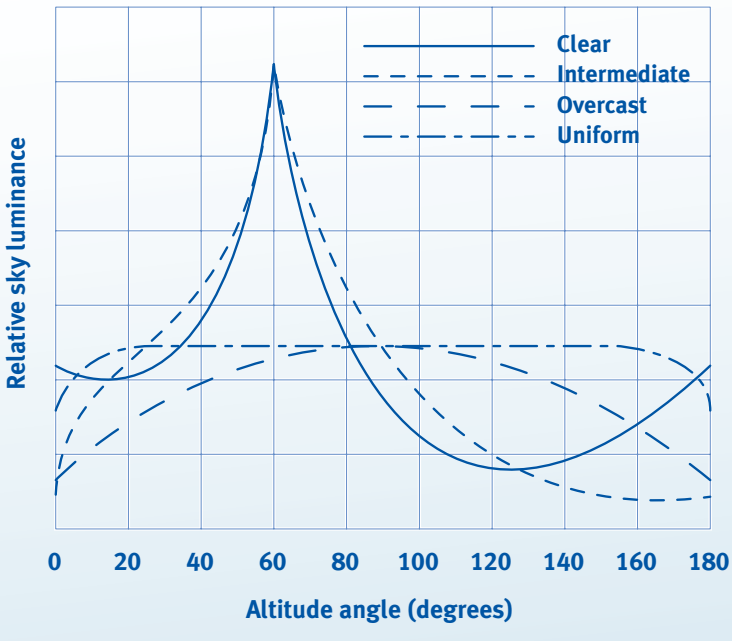
The luminance of the standard CIE Overcast Sky changes with altitude. It is three times as bright in the zenith as it is near the horizon. The overcast sky is used when measuring daylight factors. It can be modelled under an artificial sky.

## Uniform Sky

The standard Uniform Sky is characterised by a uniform luminance that does not change with altitude or azimuth. It is a remnant from the days when calculations were done by hand or with tables. Today, it is hardly used at all.

## Sky Distributions

The sky distributions graphs were generated with the RADIANCE synthetic imaging system. The sun was assumed to be at an altitude of 60° due South. The sky luminance was then mapped between the Southern (0°) and the Northern (180°) horizon passing through the zenith (90°). Please note that graphs should not be compared to one another, i.e. it is not correct to say that uniform and overcast skies always have the same zenith brightness.

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# Design Principles



## The Daylight Factor

The daylight factor is the CIE recommended method for determining the performance of a daylighting system. It is useful for estimating the amount of glazing needed to daylight a space.

The daylight factor uses a ratio between indoor and outdoor illuminance levels which, in turn, is dependent on the rooflight design and location.

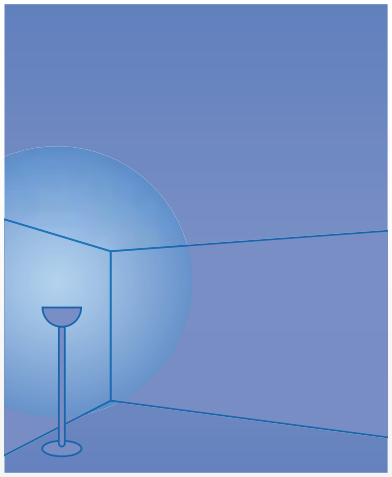
The daylight factor does not have a specific value of illuminance. It is defined as *'the ratio of interior illuminance on a horizontal surface to the exterior illuminance on a horizontal surface from the CIE Overcast Sky'*.

The greater the amount of light entering through a rooflight, relative to the outside illuminance, the higher the daylight factor will be.

The illuminance in a daylit interior will vary, depending on the sky luminance, but the daylight factor remains the same.

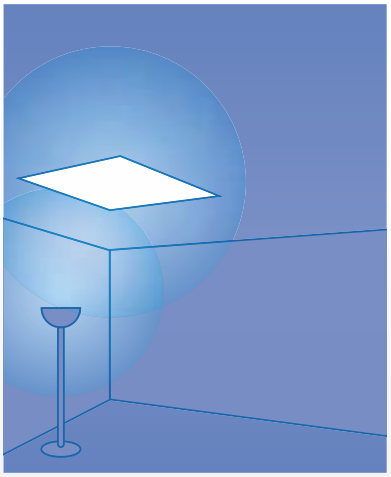
The daylight factor is affected by aspects such as maintenance and cleanliness of the rooflight, internal decorative finishes and surface distance from the opening.

### Practical Examples of Daylight Factors



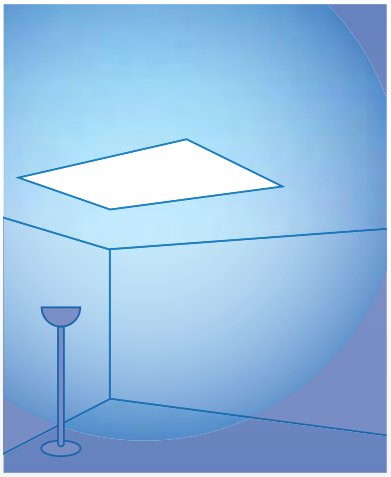
#### Daylight Factor less than 2%

- Room looks gloomy
- Often needs full artificial lighting during the day
- Decor is dominated by the appearance of artificial lights



#### Daylight Factor between 2 – 5%

- The optimum range of daylighting for efficient energy use
- Room appears to be predominantly lit by daylight
- Artificial lighting is required away from rooflights and on dull days



#### Daylight Factor greater than 5%

- Room appears to be strongly lit by daylight
- Artificial lighting rarely required during the day
- Potential solar gain is a consideration and therefore careful specification is required

## Predicting Daylight

During the early periods of design it may be desirable to ascertain the area of glazing required to give a set daylight factor. Predicting daylight can be estimated using the daylight factor equation. This uses the following formula to calculate the daylight factor at a single point in the centre of the room:

$$DF = \frac{A_W}{A} \frac{\theta T}{(1\text{-}R^2)}$$

Where:

**DF** is the daylight factor (%).

**Aw** is the glazed area ($m^2$).

**A** is the total area of all the surfaces in the room (including glazed area).

**T** is the transmittance of the glazing to diffuse light; it includes the maintenance factor (to account for dirt on the glazing).

**Θ** is the angle of visible sky, measured in section from a point in the centre of the glazing (degrees).

**R** is the area-weighted mean reflectance of the room surface.

Additional practical information can be found in CIBSE's Lighting Guide *LG10: 1999 — 'Daylighting and window design.'*

# Xtralite Consulting Service



Using the formula at the end of Design Principles, calculating the daylight factor for a single point in a room cannot always be relied on to ensure that rooflights and windows are positioned to greatest effect within a room. Xtralite has recognised this and offers customers a free consulting service in which an advanced computer modelling system is used to predict the best location and size of rooflights and windows. Using the Xtralite service a designer can confidently build rooflights into the architectural proposition and ensure their ideal positioning to achieve the desired level of daylighting.

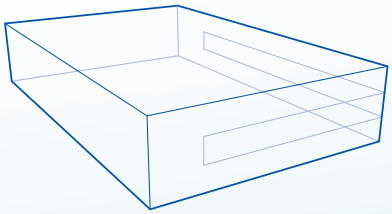
For example, diagram 1A illustrates a standard-sized room featuring windows along two sides. When this is analysed within the Xtralite modelling system it can be seen in diagram 1B that the daylight factor is exceptionally high close to the widows and low in the rest of the room.

Diagram 2A shows the same sized room but with a series of smaller windows along two sides and an even distribution of rooflights in the roof. Using the Xtralite modelling system it can be seen in diagram 2B that daylight is distributed much more evenly.

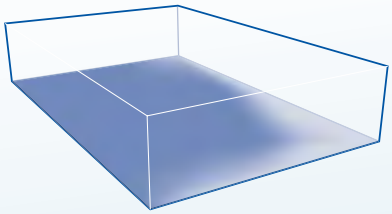
Comparing the two layouts, the window and rooflight configuration in 2A/2B has a smaller glazed area than 1A/1B and yet produces a higher average daylight factor, therefore representing better daylighting throughout the room.

To take advantage of the Xtralite consulting service email **sales@xtralite.co.uk** or visit our website **www.xtralite.co.uk**

**1A**

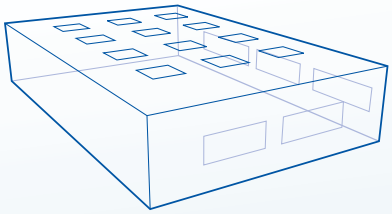


**1B**

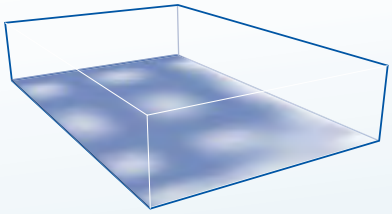


| | |
|---|---|
| Room dimensions: | 20 m x 15 m x 3 m |
| Windows: | 18 m x 1.2 m and 13 m x 1.2 m |
| Total glazed area: | 37.2 $m^2$ |
| Minimum daylight factor: | 0.6% |
| Average daylight factor: | 3.5% |
| Maximum daylight factor: | 25.8% |

**2A**



**2B**



| | |
|---|---|
| Room dimensions: | 20 m x 15 m x 3 m |
| Windows: 5 windows, each being 2 m x 1.2 m. Total area: | 12 $m^2$ |
| Rooflights: 12 rooflights, each being 1.2 m x 1.2 m. Total area: | 17.28 $m^2$ |
| Total glazed area: | 29.28 $m^2$ |
| Minimum daylight factor: | 1.1% |
| Average daylight factor: | 4.3% |
| Maximum daylight factor: | 26.2% |

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# Designing with Daylight
# Illumination Levels

The onus is on the building designer to select the light level most appropriate to the intended use of the building. Recommended illuminances for specific activities are contained within the CIBSE Guide for interior lighting 1994.

Examples include:

| Daylight Factor % | Standard maintained illuminance (lux) | Interior / activity | Examples |
|---|---|---|---|
| 2 – 3 | 50 – 100 | Interiors used occasionally, with visual tasks confined to movement, limited perception of detail. | Corridors, bulk stores. |
| 3 – 4 | 150 – 200 | Continuously occupied interiors, visual tasks not requiring perception or detail. | Loading bays, plant rooms. |
| 6 – 10 | 300 – 500 | Moderately-difficult visual tasks, colour judgement may be required. | Packing, general offices, engine assembly, retail shops. |
| 12 – 20 | 750 – 1000 | Difficult visual tasks, accurate colour judgement required. | Drawing offices, chain stores, general inspection, electronic assembly, supermarkets. |
| 30 – 40 | 1500 – 2000 | Extremely difficult visual tasks. | Precision assembly, fabric inspection. |

A standard overcast sky is generally represented as 5000 lux. However, this is not constant for all times of the day or parts of the year.

## Horizontal or Vertical Measurements?

For greatest relevance, light levels can be measured vertically or horizontally depending on the use of the building.

- In office and manufacturing environments it is usually best to measure light levels horizontally because the tasks being undertaken tend to happen in a regular horizontal plane.
- In warehouses or storage areas where racking is used, it is better to analyse light levels vertically.

# Maximising Energy Efficiency



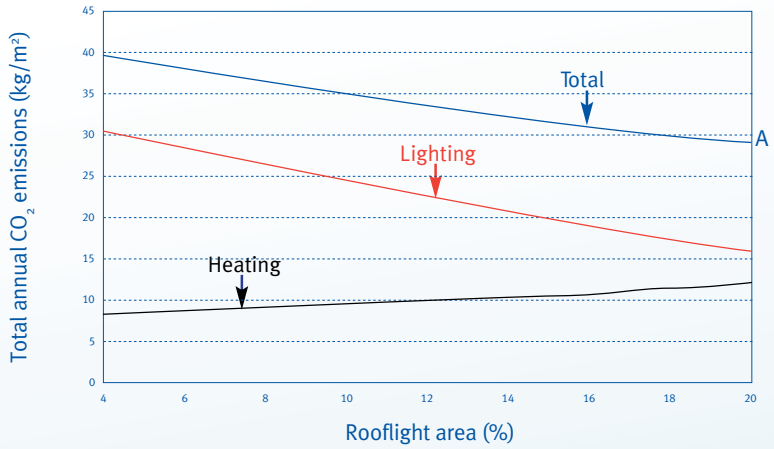
Taken at face value, the Building Regulations Part L Approved Documents (and other similar national regulatory guidelines) seem to approach rooflights purely from the perspective of limitation due to a lower insulation value than typical roof constructions, as we shall see later. This approach ignores rooflights as an effective light source in their own right, with substantial potential for reduction in energy used by artificial lighting.
A more holistic approach is needed, as exemplified by recent research.

Carried out by De Montfort University, the research brings together thermal effects with energy used for heating and illumination effects with energy used for artificial lighting—applied to a range of buildings. The findings proved conclusively that rooflights provide an overall energy benefit—with the level of that benefit depending on various factors, particularly the total area of rooflights, design illumination level, type of artificial lighting control used and the pattern of building use. Increasing the rooflight area reduces the need for artificial light, cuts the energy requirement of the building and reduces $CO_2$ emissions. It is therefore a straightforward means of meeting a building's target emission levels under the current Building Regulations and reducing its carbon footprint.

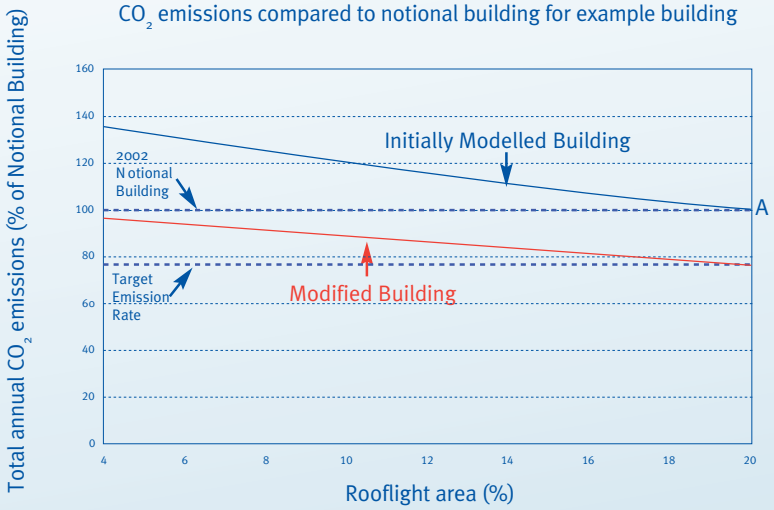
By considering insulation values alone, it might be expected that heating requirements would grow as rooflight area increased. However, the research proves that for a building occupied primarily during the day this is not the case, as passive solar gain through the rooflights actually balances the insulation value. Therefore, heating requirements are barely affected and the most dominant effect by far is the decreasing requirement for artificial light as rooflight area is increased, as illustrated in the graph.

In the case of a building occupied between 9am – 5pm every day of the year, with a lighting requirement of 300 lux, some 23 kg $CO_2/m^2$—a massive 85%—saving in emissions will result from using 20% rooflights. For a building occupied 24 hours a day—the worst case scenario for rooflights, with no night-time benefits from natural light or passive solar gain—they still provide a very significant energy benefit. In almost all cases, a rooflight area of 15% – 20% will achieve almost all the available savings in overall energy use and $CO_2$ emissions. To maximize these benefits, designers need to carefully consider interaction with artificial lighting, which will be essential during parts of the working day—particularly in the winter months—and specifically in working areas where light levels need to remain constant. Automatic controls will be needed to minimise the use of artificial lighting, so maximising energy savings from daylight.

Effect of Rooflight are on $CO_2$ emissions for example building




$CO_2$ emissions compared to notional building for example building




Xtralite ROOFLIGHTS

Designing with Daylight

# Properties of Glazing Materials and Configurations

In addition to allowing the passage of daylight, the material used in a rooflight must be durable and meet the regulatory requirements for thermal, fire and safety performance. In the UK the main rooflight materials are glass and polycarbonates and these are the only glazing materials used in Xtralite products.

## Polycarbonate

Polycarbonate is a clear thermoplastic formed under heat and fixed in shape by cooling. It can be recycled and reused by re-heating to a plastic state.

- Exceptional impact resistance
- High levels of light transmission
- High levels of UV resistance
- Good fire resisting properties
- Wide range of clear, tinted, patterned and opaque finishes
- Co-extruded UV protection eliminates up to 95% of UV radiation from the inside of the building
- Can be moulded into many different shapes including domes and pyramids

## Glass

Safety glass is commonly used in atria for commercial and retail environments and also in traditional pitched roofs. Glass provides the benchmark against which the optical performance of other glazing solutions are measured.

- Excellent fire retarding properties
- Good impact performance
- High light transmission
- Long life expectancy with no UV discolouration
- Can be supplied with various laminates, surface treatments and interlayers to provide coloured and textured surfaces, for obscure and diffused finishes, solar control and total UV protection

## Other Thermoplastics

PVC is rarely used in industrial, domestic, commercial or retail environments because it has poor impact resistance, limited UV resistance and is susceptible to degradation, discolouration and demoulding.

Acrylic does not meet the UK standards for fire resistance.

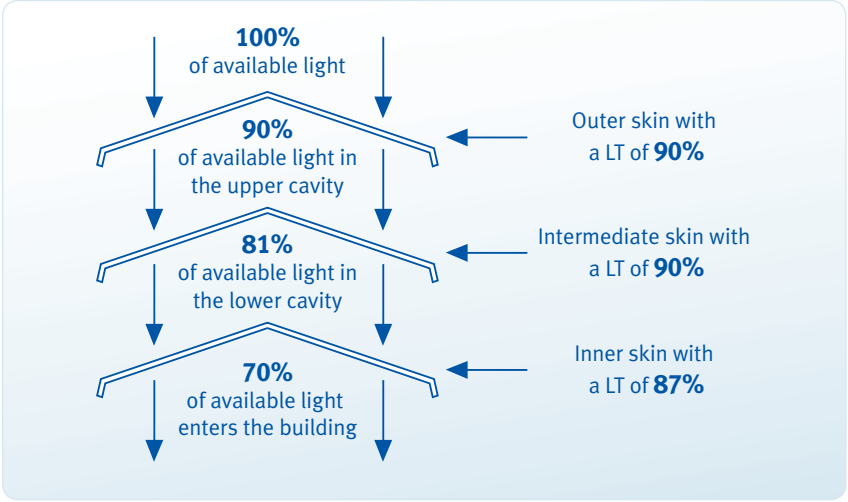
PET is a high impact thermoplastic with good clarity but it has a low temperature distortion value, which makes it unsuitable for rooflights.

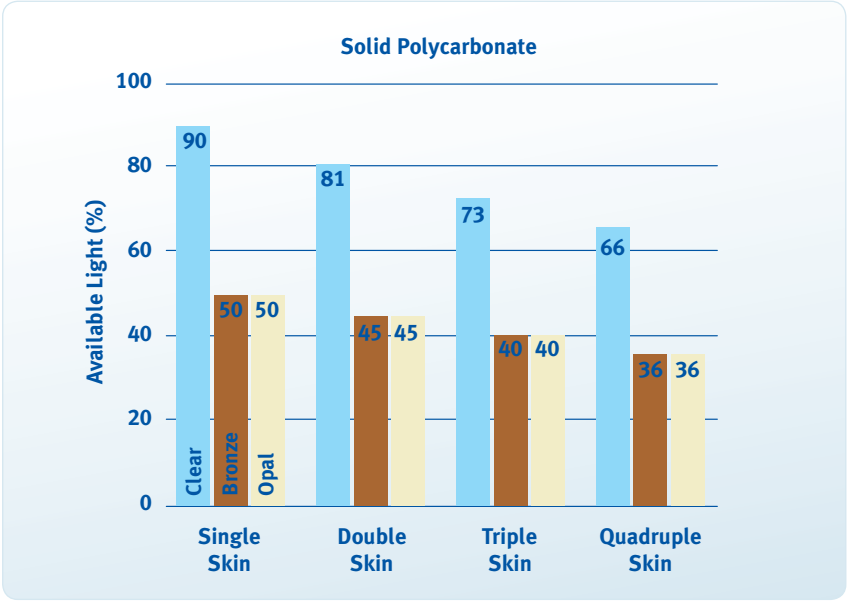
## Nanogel® Sheet Technology

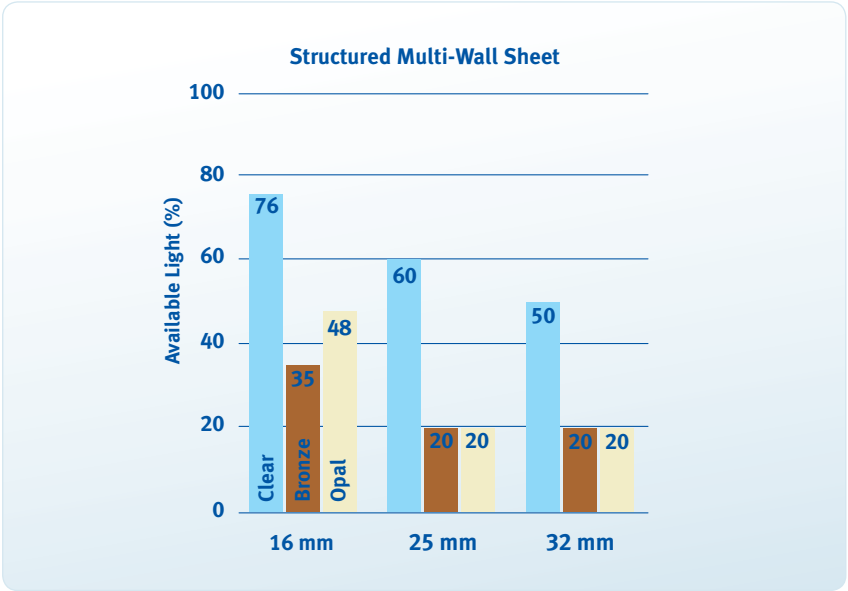
Xtralite has introduced innovative Nanogel®technology which combines impressive thermal, light transmission and acoustic characteristics. Nanogel® consists of translucent aerogel granules—filling clear polycarbonate multi-wall rooflight constructions—that allow light to pass through whilst serving as a highly effective thermal insulation. The extremely small pore size means that air molecules collide with the silica lattice, rather than each other, transferring energy to it, substantially limiting heat conduction. So, insulation performance is vastly improved, with U values for a triple-walled rooflight reduced from 2.4 W/m²K without Nanogel® to 1.3 W/m²K with the new technology. Nanogel® also offers excellent light transmission with diffusion giving a ‘shadow-less’ light quality, as well as a 25% reduction in sound transmittance (at 1,000Hz frequency).

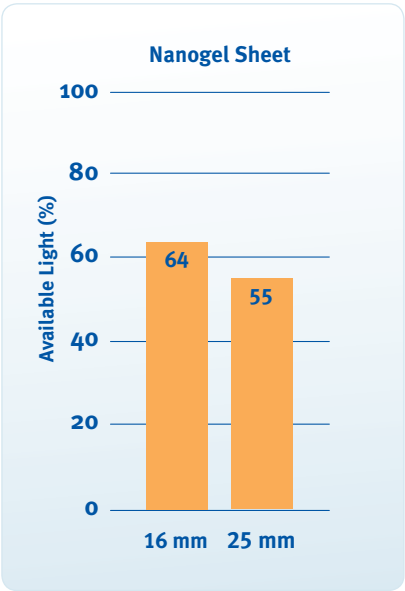
# Light Transmission






The light transmission (LT) qualities of complete rooflights vary according to the glazing configuration and the LT of materials used. As it passes through each layer, the light transmitted is reduced cumulatively, as shown in the example.

The four charts show the percentage reduction in available light within a building using various rooflight materials and configurations, as follows. Where appropriate, intermediate and inner skins are assumed to be clear polycarbonate.

## Solid Polycarbonate

- Single skin—only recommended for unheated areas.
- Double skin—non-preferred as it does not meet current Part L requirements.
- Triple skin—meets Part L and gives improved sound insulation.
- Quadruple skin—further improvement of performance characteristics.

There are substantial differences between various types of polycarbonate with 'Opal' giving only half the LT of clear, while the popular 'Diffused' transmits just 1% less than clear with a very good light spread.

## Structured Multi-Wall Sheet

Available in three thicknesses to suit thermal and other requirements.

## Nanogel® Sheet

The latest advanced glazing technology with excellent thermal, light transmission and acoustic performance characteristics.

Xtralite ROOFLIGHTS

# Designing with Daylight
# Types of Daylight

The materials specified in rooflights can play a major role in determining the type of light, either direct or diffused, and amount of light entering a building. If direct light and diffused light materials have the same light transmission rating they will let equal amounts of light into a building, the light is simply distributed in a different way.

## Direct Light

Direct light passes through rooflight glazing without any disruption or interference and enters the building as a straight beam.

Polycarbonate and clear glass materials may provide direct light.

Direct light:

- Gives strong light in the area of the beam but less general light in the surrounding areas.
- Produces shadows and glare on sunny days.
- Is ideal for environments where the designer wants to create a natural environment and allow the sky to be viewed.
- Gives uninterrupted external vision.

## Diffused Light

Diffused light is when the light passing through rooflight glazing is diffused (scattered) by the materials used for the rooflight.

Polycarbonate, Nanogel® and some patterned and opal-tinted glass materials diffuse light.

Diffused light:

- More evenly distributes light into the building.
- Is useful for creating ambient light over a larger area with minimal shadows.
- Is commonly used for industrial, commercial and sporting facilities.
- Provides privacy.

# Performance Characteristics and Legislation



Xtralite ROOFLIGHTS

# Overview



In the previous section we considered the role of rooflights as an important, energy-efficient lighting source. There are no specific regulatory requirements determining lighting levels as such, although guidelines are available for specific applications and building types—for example Building Bulletin 90—*'Lighting Design for Schools'*, discussed earlier. Also, useful information can be found in CIBSE's *Lighting Guide LG10: 1999—'Daylighting and window design.'*

The following aspects are discussed in more detail later in this section. Directly linked to lighting performance is Energy Efficiency, which is the subject of Building Regulations. Similarly, certain aspects of rooflights can influence the Fire Safety of buildings, again controlled by Building Regulations. Although not covered by Building Regulations, Non-Fragility of rooflights is an important consideration for building designers where responsibilities for safety are determined by the Construction (Design and Management)—CDM—Regulations 2007.

As a secondary consideration, rooflights may be required to provide ventilation, perhaps to meet the requirements of Building Regulations Part F. Where ventilation is a **primary** consideration for energy-efficient environmental management or smoke control during fires, refer to the **Smoke & Ventilation Systems** section later in this Guide.

There are a number of other regulations and standards detailing the required performance of rooflights not covered here:

- Wind load suitability is defined by *BS 6399: Part 2:1997—'Code of Practice for Wind Loads.'*
- Support for snow loadings is defined by *BS 6399:Part 3: 1988—'Code of Practice for Imposed Roof Loads.'*
- BS 8217 (formerly CP144-3) advises a minimum 150 mm clearance from the top of the finished roof to the top of the upstand or the underside of a vent module.

In this section, detailed reference is made to the current Building Regulations for England and Wales. In many cases—for example Energy Efficiency—similar principles will apply to the other national regulations guidelines:

- Scottish Building Standards Agency—Domestic and Non-Domestic Handbooks.
- Northern Ireland Government—Technical Booklets.
- Government of Ireland—Technical Guidance Documents.

If you have specific queries about the requirements for rooflights in any of these documents, contact us on **01670 354157** or email **sales@xtralite.co.uk**.

Xtralite ROOFLIGHTS

# Explaining Part L



Despite the complex array of building regulations that apply around the British Isles, those related to energy saving and reduction of carbon emissions are becoming more unified. Primarily, this is because they must all conform with the European Directive on the Energy Performance of Buildings—2002/91/EC.

At first sight, the 2006 Building Regulations Approved Document L2A—*'Conservation of Fuel and Power in New Buildings other than Dwellings'*—and other national regulations appear to take a limiting approach to rooflights as less well insulated elements than roofs. Rooflights are limited to 20% of floor area and the area-weighted average U value of all the rooflights must not exceed 2.2 W/m²K, whilst the U value in an array must not exceed 3.3 W/m²K, providing the average U value overall does not exceed 2.2 W/m²K. So, if all the rooflights across a roof are the same, they must all have a U value of 2.2 W/m²K or better.

It is important to remember that the 2.2 W/m²K applies to the average insulation value of the entire rooflight, after allowing for the effects of any glazing bars, kerbs or other thermal bridges. Actual U values for rooflights should be established in accordance with BRE publication BR 443 (2006 Edition) *'Conventions for U value calculations'* which can be particularly difficult unless independent, accredited testing has been carried out. A Rooflight Technical Bulletin is available via the Xtralite website **www.xtralite.co.uk** providing full information on this important topic.

The Directive methodology and Part L will generally be satisfied using certain calculation software such as the Simplified Building Energy Model (SBEM). This creates the target carbon dioxide emissions rate (TER). Once the designer is satisfied that all the input data accurately reflects the proposed building design, a Building Emissions Rate (BER) is created. BER must be equal to or less than TER for compliance to be achieved.

It is important to note that the SBEM software recognises the need for greater use of electric lighting if rooflight area reduces from 20% and calculates an increase in energy demand and carbon emissions—making it more difficult for the building to comply with less rooflights. So, use of 20% rooflights with properly verified low U values combined with good artificial lighting control is an important step towards meeting the required TER. This corresponds with the independent research discussed earlier (in **Designing with Daylight—Maximising Energy Efficiency**) which is being promoted by NARM. Approved Document L2A also recommends that: 'for guidance on daylighting see BS 8206 Part 2 and NARM technical guidance.'

For extensions and refurbishment work, Approved Document L2B provides detailed, complex guidance. If you have a specific query on works to existing buildings, contact us on **01670 354157** or email **sales@xtralite.co.uk**.

**Xtralite has developed a comprehensive range of rooflights and other glazed products that not only meet, but exceed the minimum requirements of building regulations.**

# Fire Safety



## Context

Building fire safety rules are set out in the Building Regulations Approved Document B (2006 Edition, updated 2007). Within this, the key aspects affecting rooflights are:

- *'That sufficient provision is made in the design of a building that, in the event of a fire, the occupants can escape to a place of safety by their own efforts.'*

  Therefore it is incumbent on the building designer to ensure that if rooflights form any part of the escape route (in the ceiling above the route or if the route is across a roof featuring rooflights) then the rooflights must meet the appropriate standards. For instance, if a rooflight has acrylic glazing, the acrylic materials could ignite and cause burning droplets to fall on the escape route below.

  The only specification that will satisfy this situation is a rooflight with a 30 minute or one hour fire rating. Glass is the main glazing material to achieve this.

- *'That the internal linings of a building do not support a rapid spread of fire.'*

  Modern rooflights are usually double or triple skinned in thermoplastic or double glazed in glass. The internal skin and the inside faces of the rooflight upstand are internal linings and therefore within the scope of section B2. This states that the internal linings shall inhibit the spread of fire within a building and resist the flame over their surfaces. It also states that *'they shall if ignited have a rate of energy release which does not significantly contribute to the fire'*.

- *'That the structure of the building should not collapse prematurely and should slow the spread of fire through the building and in unseen cavities and voids by providing fire-resisting walls and partitions where necessary.'*

  Correctly made and fitted rooflights do not impact on the structural integrity of a building.

- '*That the spread of fire between buildings be discouraged by spacing them apart sufficiently and by controlling the number, size and performance of the openings on boundaries.'*

  This can be affected by the choice of glazing materials. The building regulations are very clear about applicable restrictions.

- '*That the building be designed in such a way that it aids the emergency services to fight the fire and effect rescue of persons caught inside.'*

There is mixed opinion as to the role of rooflights in aiding the emergency services. One opinion is that the inclusion of polycarbonate in a roof will aid the situation by melting and producing a vent for the escape of hot and toxic fumes from the fire below. Conversely, others argue that the opening of a vent in the roof will feed the fire with oxygen and thus make the situation worse.

**It is reassuring to know that the polycarbonates used in Xtralite rooflights give off very low toxicity fumes in a fire and do not produce flaming droplets that could spread a fire to a lower level.**

**Xtralite does not use acrylic materials due to poor fire ratings and fragility.**

Xtralite ROOFLIGHTS

# Fire Safety



Personal interpretation enables rooflights to be classified from two different perspectives: either it is an insertion into a roof and therefore clearly a rooflight, or it may be viewed as an integral part of the roof construction. Different requirements cover each opinion. However, the common requirements for each are very similar:

- BS 476 part 7: Test for surface spread of flame.

  This tests the flammability of a material and its ability to spread a fire and so endanger life. Materials are classified class 1, class 2, class 3 or class 4 with class 4 being the worst and class 1 the best.

  All polycarbonate thickness' from 1.5 mm up to 6 mm have either a class 1 or class 1Y rating (dependent on the test date: earlier tests are rated 1, later tests are rated 1Y).

- BS 476 part 6: Test for fire propagation.

  This measures the contribution that the tested material will make to a fire in the event of it burning.

  The material performance is calibrated into sub-indices of i1 and i2. An acceptable result gives an i1 rating of less than 6 and an i2 rating of less than 12.

  All material thickness' from 1.5 mm up to 6 mm have performance results where i1 is less than 6 and i2 is less than 12.

- Class 0

  This gives an overall indication of fire performance and can only be applied to materials that have achieved the appropriate standards. The classification was created as part of the 1985 Building Regulations approved document B but is not part of the British Standard fire testing regime. A material is classified as class 0 if it achieves:

  BS 476 part 7: class 1

  BS 476 part 6: where i1 is less than 6 and i2 is less than 12.

  Although still referred to, the class 0 classification is no longer current.

- TPa

  This classification was developed to allow for anomalies in the test methods described above that do not wholly suit the testing of thermoplastic materials. Any material classified as TPa may be regarded as class 0.

  All polycarbonate materials 3 mm or thicker are classified as TPa according to the building regulations (PVC is also thus classified).

  Multiwall polycarbonates may be classified as TPa if it has BS 476 part 7 class 1 performance.

- TBb

  This includes all polycarbonates that cannot be classified as TPa.

## Restrictions

- Rooflight linings

  Class 0 materials can be used without exemption. No area limit.

  TPa materials can be used over any space except protected stairwells. No area limit.

  TPb materials can only be used up to certain maximum areas.

- Roof coverings

  Rooflights, and particularly Xtralite systems, are considered to be roof coverings or part of the roof. Therefore all of the polycarbonate materials used by Xtralite are tested to BS 476 part 3. BS 476 provides a designation for the performance of the assembly with AA, AB and AC being the highest performance and DD the worst. Building regulations regard polycarbonates with a class 1 rating as having an AA designation and thus may be used up to boundaries without restriction.

**Xtralite uses only polycarbonate—with TPa and AA ratings—or glass for its rooflights and other glazed products.**

# Non-fragility



The Health and Safety at Work Act and the Construction (Design and Management) Regulations 2007 both require that worker safety should be addressed within the design of a building. This applies during the construction of the building and, once built, its maintenance, repair and demolition.

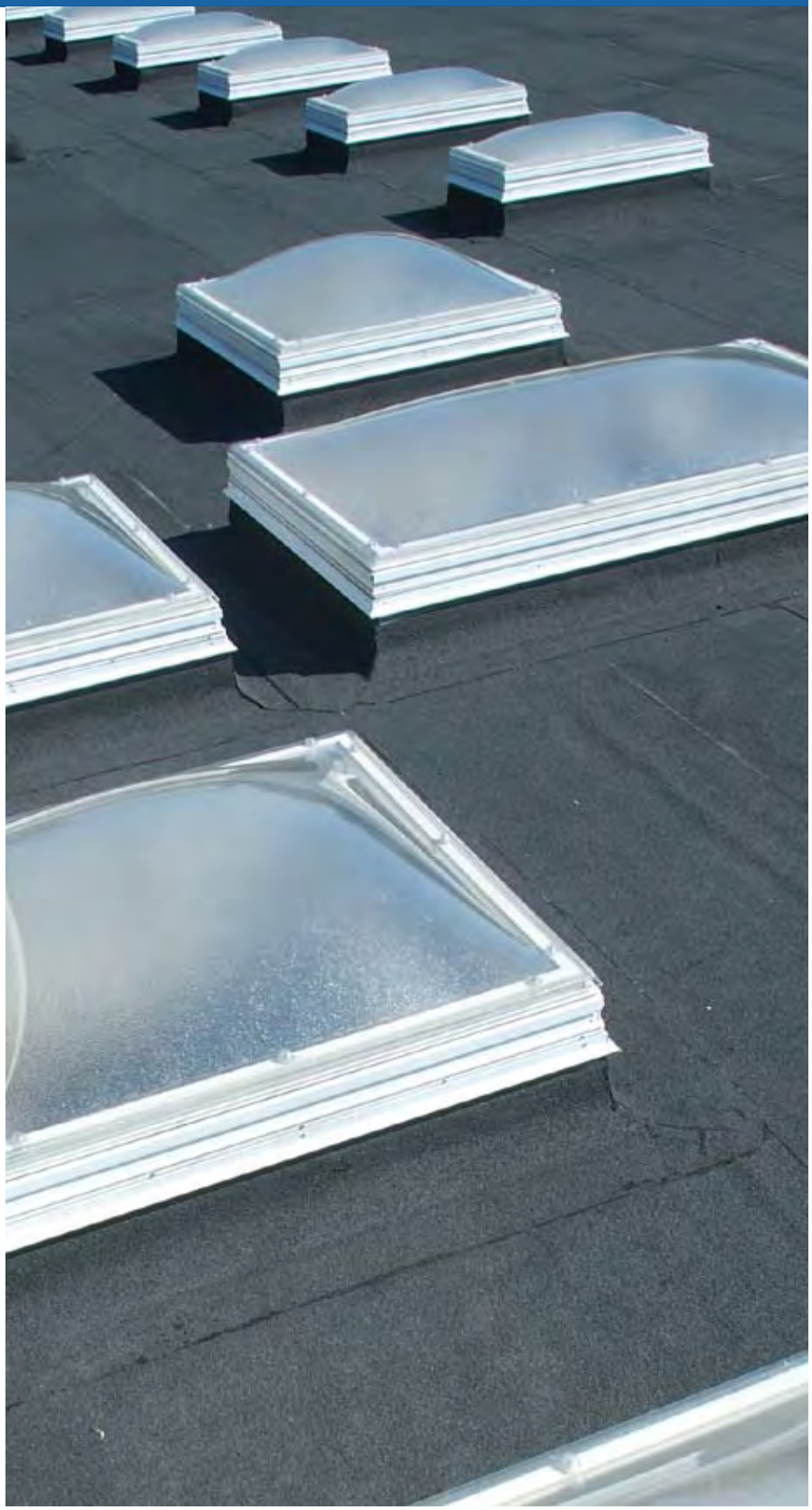
The HSG33 Health and Safety in Roofwork booklet specifically states that:

'Where rooflights are required, it is obligatory for designers to 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 still be capable of withstanding a person falling onto them).

Rooflights, including modular units should be classified to ACR[M]001:2005 *'Test For Non-Fragility of Profiled Sheeted Roofing Assemblies'*, Edition 3—the "Red Book". Consideration to prEN1873 is also required (using 1200 joules energy rating). Barrel vaulting and patent glazing derivatives can be also be classified but will require negotiation with the customer.

Rooflights are not intended for walking on and the fragility criteria relate to accidental access—clearly to be avoided and discouraged. Even non-fragile rooflights are susceptible to damage by impact and are not usually intended to support foot traffic—crawling boards must be used. Micro scratches can affect the thin UV protective layer resulting in deterioration over time, potentially rendering 'non-fragile' rooflights fragile. Therefore, any rooflights which have been impacted should be replaced – which is why it is unrealistic for rooflights to be classified as 'Class A' (i.e. "no signs of significant damage that will affect the long terms strength" following the test).



**When tested to the Red Book test procedure, all Xtralite modular rooflights have been rated as 'Non-fragile, Class B'. Any technical issues highlighted by non-fragility should be discussed with us.**

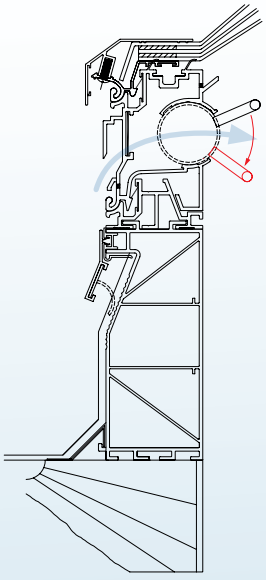
Xtralite ROOFLIGHTS

# Ventilation



This section refers to rooflights which, as a secondary consideration, may be required to provide ventilation, perhaps to meet the requirements of Building Regulations Part F. Where ventilation is a primary consideration for energy efficient environmental management or smoke control during fires, refer to the **Smoke & Ventilation Systems** section later in this Guide.

Rooflights, as well as introducing light to the interior of a building can be used to provide ventilation, extraction of stale and the introduction of fresh air. Xtralite provide a range of differing systems with varying performance levels, see table below.



**Rotary vent**

A unique rotary action vent controller offers variable ventilation, distinctive internal appearance and smooth, silent operation, and prevents 'in-blown' roof debris and water ingress.

**Rotary Ventilation Performance Chart**

| Rooflight Side Length | Max Number of Vents / Side | Total Area Per Rooflight (2 Sides Vented) cm² |
|---|---|---|
| 450 | 1 | 70 |
| 500 | 1 | 70 |
| 600 | 1 | 70 |
| 750 | 1 | 70 |
| 800 | 1 | 70 |
| 900 | 1 | 70 |
| 1000 | 2 | 140 |
| 1100 | 2 | 140 |
| 1200 | 2 | 140 |
| 1250 | 2 | 140 |
| 1350 | 2 | 140 |
| 1500 | 3 | 210 |
| 1800 | 3 | 210 |
| 2000 | 4 | 280 |
| 2400 | 4 | 280 |

Total area for each rotary vent = 35 cm². Should a greater degree of ventilation be required, vents can be added to the other 2 sides. Obviously, this will double the quoted ventilation areas/rooflight, and will affect the price. Please specify number of vents required.

**Xtralite offers a wide choice of product options to achieve the ventilation performance levels shown in the table— see PRODUCT PORTFOLIO section.**

## Mechanical Ventilation

There are occasions when a more positive form of ventilation, with a known, and quantifiable air exchange performance may be required, under such circumstances a power fan can be fitted to the rooflight unit. There are two ways of achieving this:

- With a power fan unit built into the polycarbonate glazing skins. This option allows either a 150 mm or 225 mm power fan unit to be specified.
- With a smaller fan mounted into the side wall of the kerb. In such an arrangement the kerb will necessarily be higher, to provide the required 150 mm clear upstand height to the base of the fan unit.

The choice of which fan option to use, is entirely at the discretion of the specifier. Such a decision could be based upon performance.

A requirement for an air movement above 230 $m^3/h$ will, by inspection of the table below, dictate a power fan set into the dome. Alternatively, if noise is a consideration, the 225 mm power fan provides the quietest performance.

**Ventilation Performance Chart**

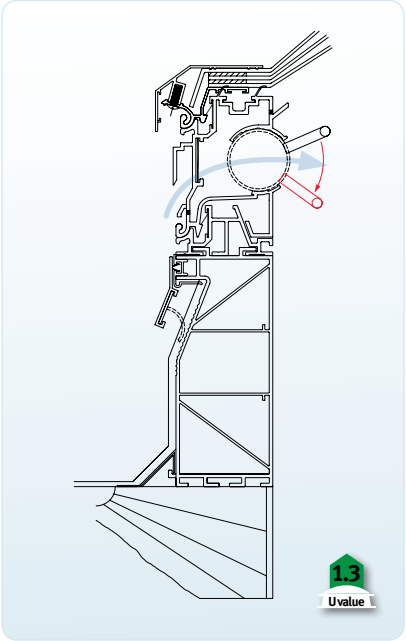
| Rooflight Size mm | Permanent $cm^2$ | Hit and Miss $cm^2$ | Controlled Louvre $cm^2$ | Hinged $m^2$ |
|---|---|---|---|---|
| 600 x 600 | 80 | 46 | 240 | 0.36 |
| 750 x 750 | 80 | 46 | 240 | 0.45 |
| 900 x 900 | 160 | 92 | 480 | 0.54 |
| 900 x 600 | 160 | 92 | 480 | 0.45 |
| 1050 x 1050 | 160 | 92 | 480 | 0.63 |
| 1200 x 1200 | 160 | 92 | 480 | 0.72 |
| 1350 x 1350 | 160 | 92 | 480 | 0.81 |
| 1500 x 1500 | 160 | 92 | 480 | 0.90 |
| 1800 x 1800 | 240 | 138 | 720 | 1.08 |
| 1200 x 600 | 160 | 92 | 480 | 0.54 |
| 1200 x 900 | 160 | 92 | 480 | 0.63 |
| 1350 x 900 | 160 | 92 | 480 | 0.68 |
| 1500 x 900 | 160 | 92 | 480 | 0.72 |
| 1500 x 1200 | 160 | 92 | 480 | 0.81 |
| 1800 x 900 | 320 | 184 | 960 | 0.81 |
| 1800 x 1200 | 320 | 184 | 960 | 0.90 |
| 1800 x 1200 | 320 | 184 | 960 | 0.90 |
| 2000 x 1000 | 320 | 184 | 960 | 0.90 |
| 2400 x 1200 | 320 | 184 | 960 | 1.08 |

**Mechanical Ventilation Performance Chart**

| Fan Options | Air Displacement Litres/sec | Volume $m^3/h$ | Sound db(A) |
|---|---|---|---|
| 150 mm power fan in dome | 105 | 380 | 49.6 |
| 225 mm power fan in dome | 194 | 700 | 43.6 |
| 150 mm side-mounted in kerb | 69 | 248 | 40.0 |

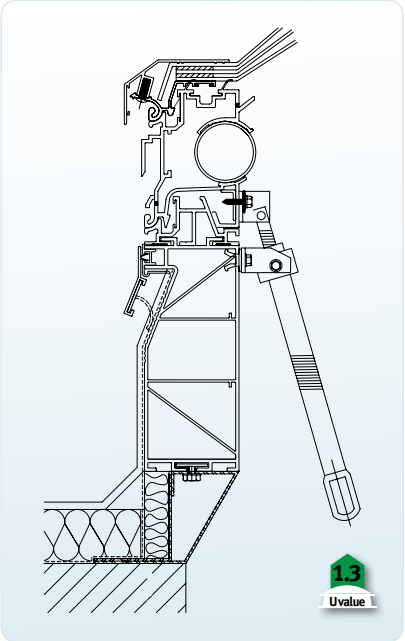
# Ventilation





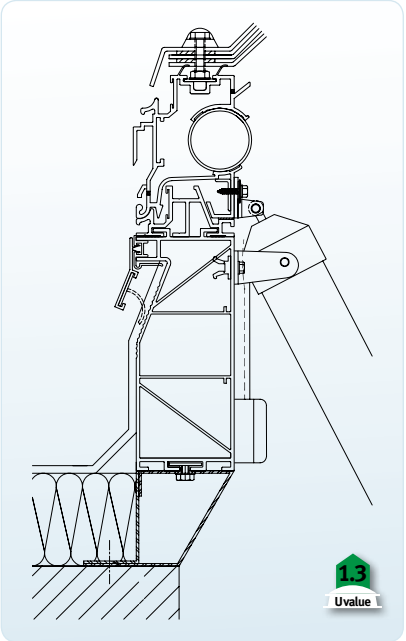

## Rotary vent

A unique rotary action vent controller offers variable ventilation, distinctive internal appearance and smooth, silent operation, and prevents 'in-blown' roof debris and water ingress.



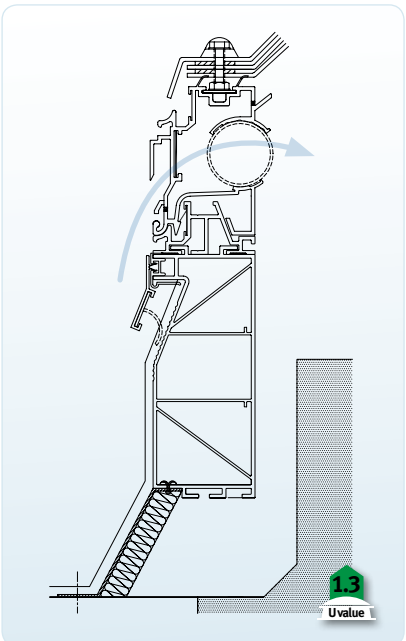

## Manual Hinge Vent

The whole rooflight top hinges to allow ventilation through the open vent area.



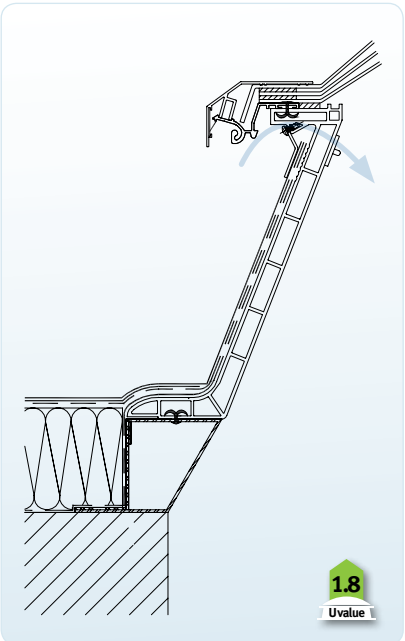

## Electrical Hinge Vent

The whole rooflight top hinges to allow ventilation through the open vent area.



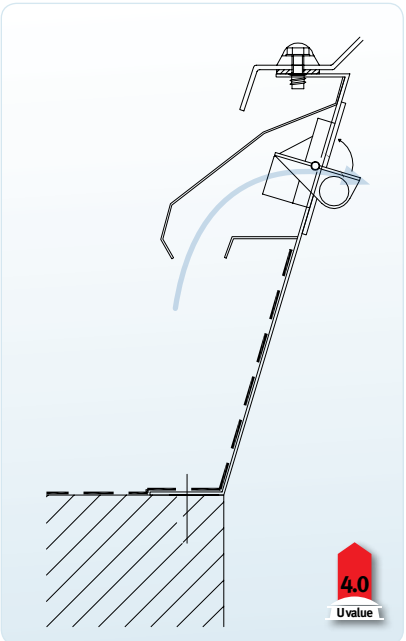

## Permanent Vent

As the name suggests, this option is permanently open and shielded from the elements by an external shroud which cannot be tampered with.




## Hit and Miss Vent

Low level ventilation for 'background' air change.

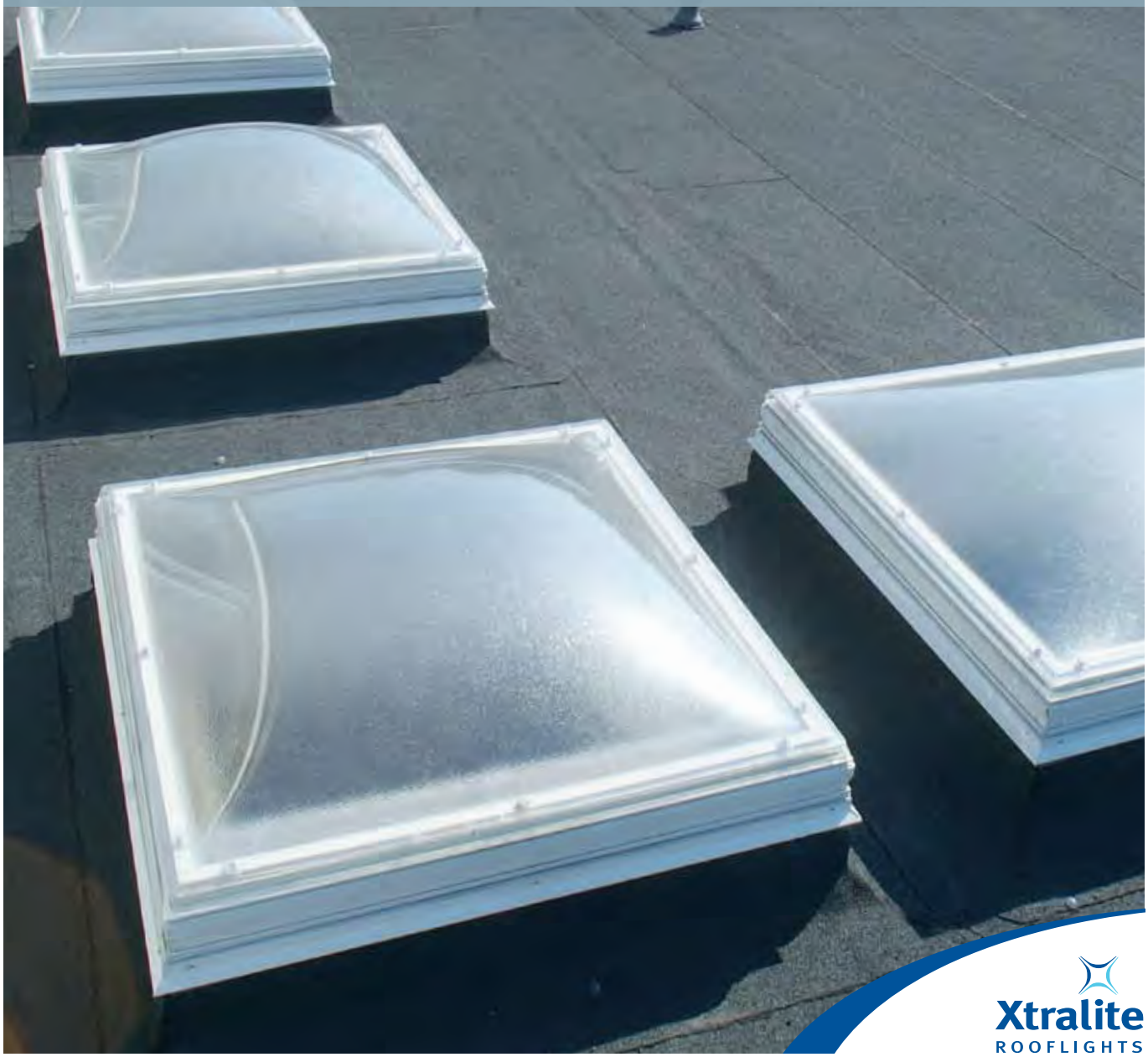



## Controlled Louvre

Louvre inset into side wall of unit, this can be manually operated to provide anything from 'trickle' to 'full on'.

# Product Portfolio
# Rooflights

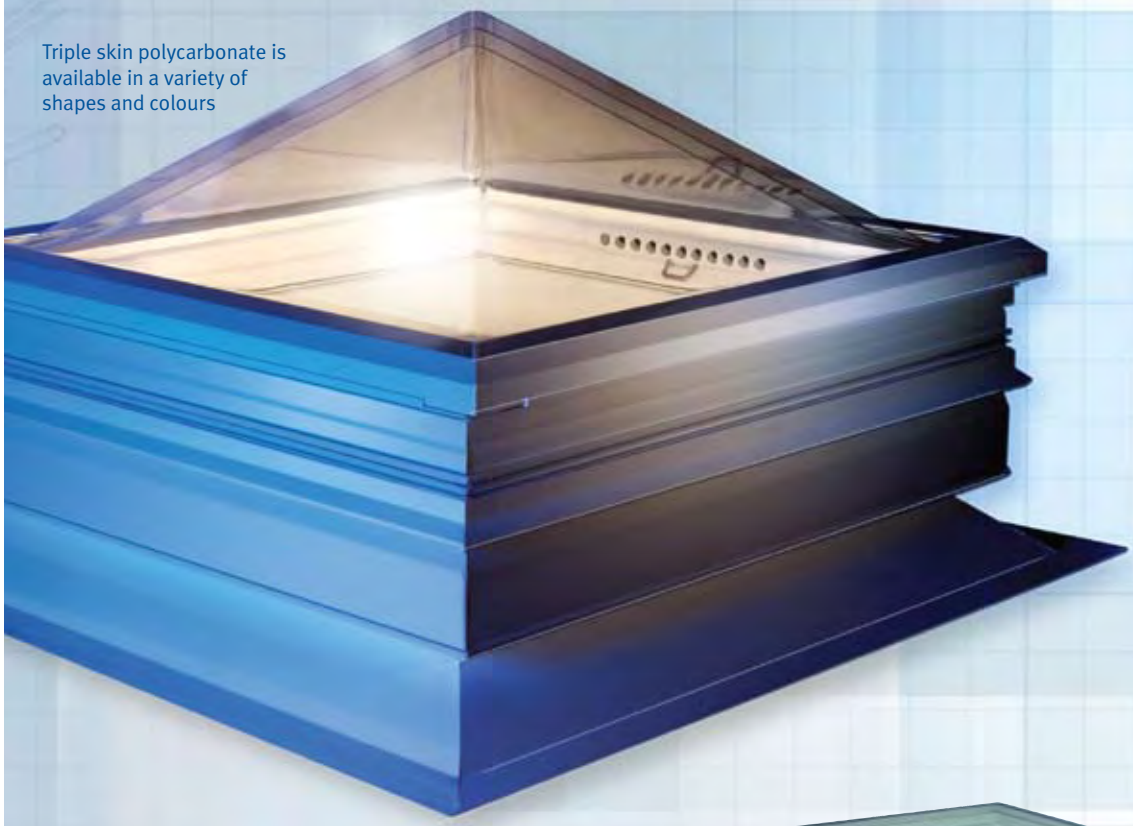




Xtralite
ROOFLIGHTS

# Overview

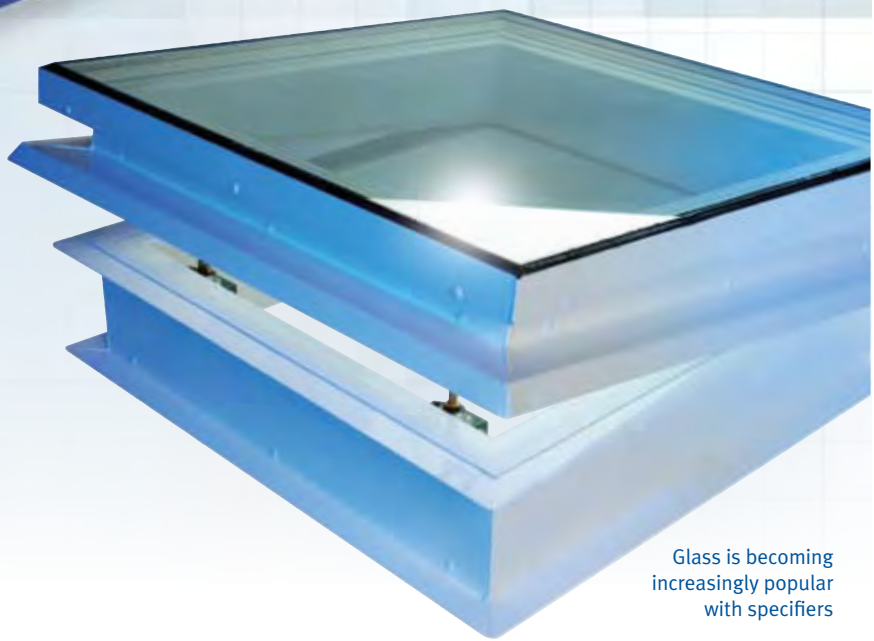




Triple skin polycarbonate is available in a variety of shapes and colours

## Introducing the range

This section looks in detail at individual rooflights, generally with polycarbonate glazing but also glass in metal frames. As the leading independent manufacturer, Xtralite offers the widest range of rooflights available, suitable for all applications and building types. All Xtralite rooflights are individually manufactured to order and so are effectively bespoke products, offering the widest possible flexibility. However, to help designers build up specifications to suit their specific needs, products are categorised from X-One to X-Five as summarised in the table (overleaf). Options and accessories for each range are illustrated with relevant product codes.

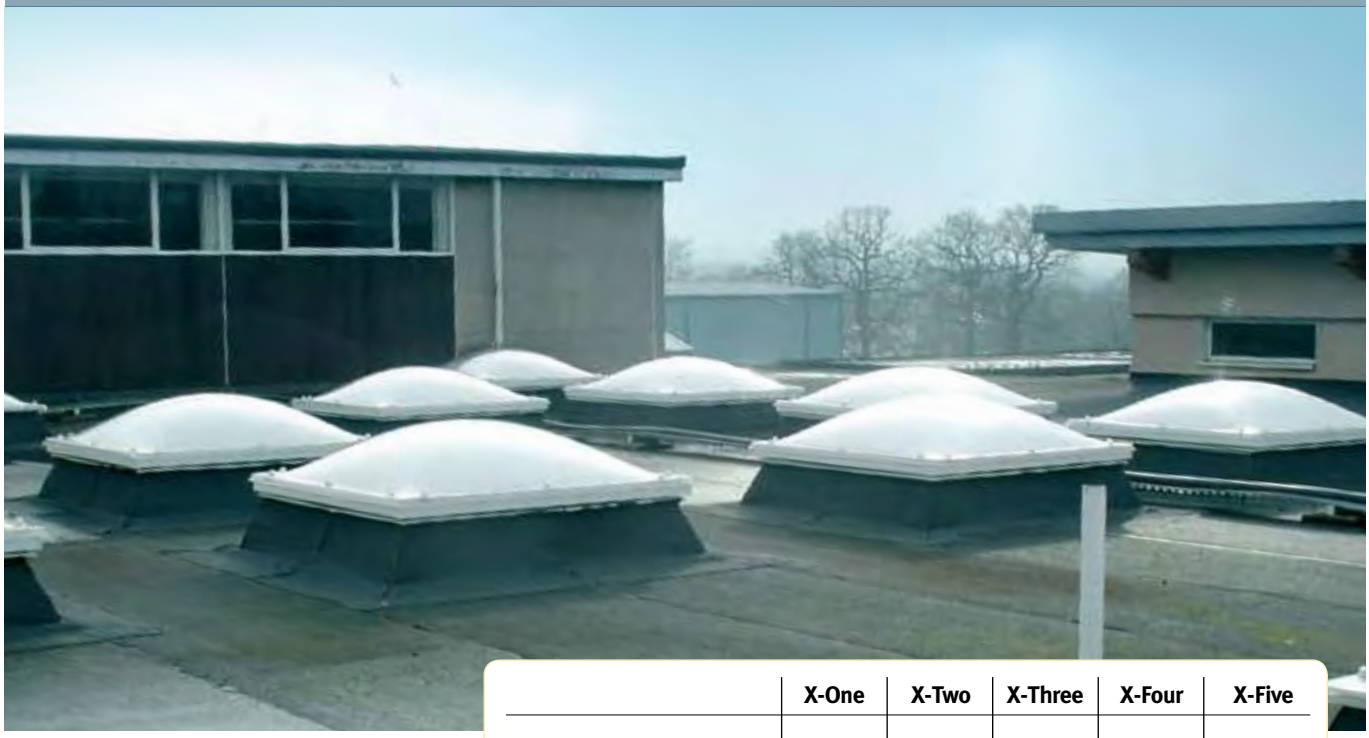


Glass is becoming increasingly popular with specifiers

**Xtralite rooflights are manufactured at the company's UK plant and a full 20–year insurance protected guarantee is available (refer to our terms and conditions).**

Xtralite ROOFLIGHTS

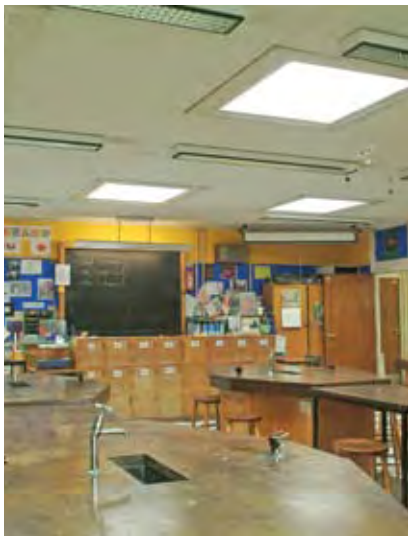
# **Product Portfolio** Rooflights
# Specifying the Right Rooflight



## Categorisation by thermal efficiency

The range primarily reflects the level of thermal efficiency (U value) and hence its suitability for particular applications. It is recommended that the appropriate range be selected first, followed by required size, shape and glazing, then options and accessories—so building up the specification. Cross referencing to the earlier technical sections of this guide will prove helpful in guiding you through the specification process.

To more accurately specify your rooflight please refer to the specification charts located at the back of this section.



| | | X-One | X-Two | X-Three | X-Four | X-Five |
|---|---|---|---|---|---|---|
| **U value** (2.2 required for Part L) | | 1.3 Uvalue | 1.8 Uvalue | 2.2 Uvalue | 2.2 Uvalue | 4.0 Uvalue |
| **Shape** | | | | | | |
| Rectangular/Square | | • | • | • | | • |
| Circular | | | | • | • | • |
| **All Glazing Colours** | | • | • | • | • | • |
| **Glazing Material*** | | | | | | |
| Polycarbonate | Single | | | | | • |
| | Double | | | | | • |
| | Triple | • | • | • | • | |
| Glass | Single | | | | | • |
| | Double | • | • | • | • | |
| **Ventilation** | | • | • | • | | • |
| **Security** | | | | | | |
| Security Screws | | • | • | • | • | • |
| Security Frame | | • | • | • | | • |
| Intruder Grid | | • | • | • | • | • |
| **Kerbs** | | | | | | |
| PVC | | • | • | | | |
| Metal | | | | • | | • |
| GRP | | | | | • | |
| **Flexible Base Adapter** | | • | • | | | |

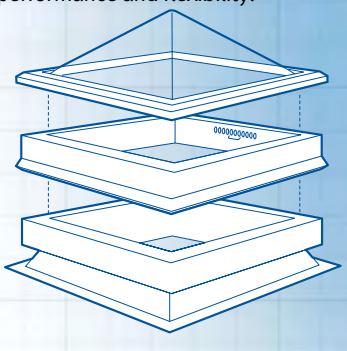
*Glazing options are only those that we recommend to achieve the U value figures shown. Other options are available on request.

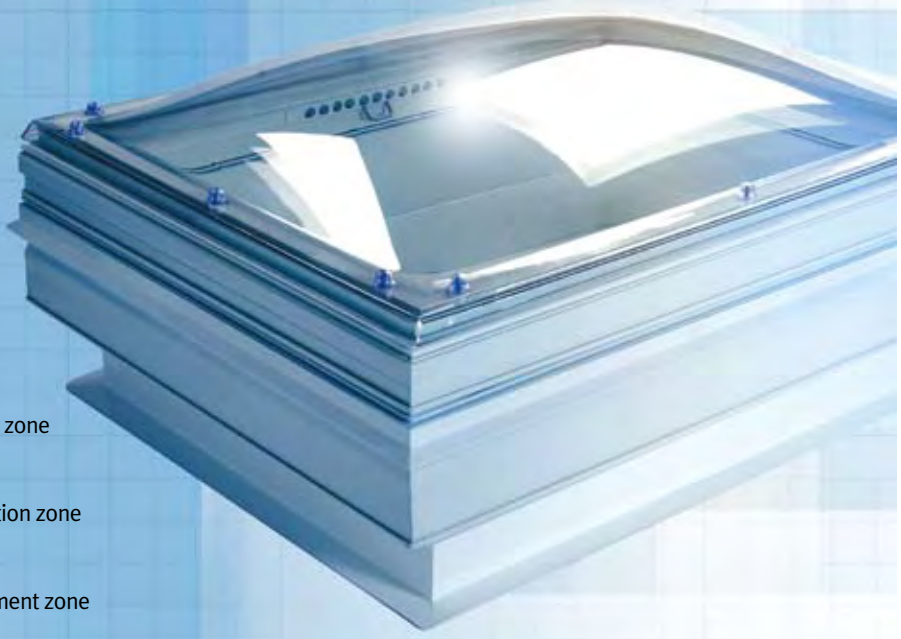
# X-One



## The Future of Rooflights

This latest range from Xtralite represents the future of rooflights, with an exceptionally low U value of 1.3 (see page 7 of this section) exceeding the requirements of Part L.
The X-One also benefits from low air leakage rates. Unlike other rooflights, the X-One rooflight is designed and constructed in three distinct zones to clarify specification and maximize performance and flexibility:



## Glazing Zone

The X-One is triple glazed as standard and formed from enhanced UV protected polycarbonate with breathing airspaces between the glazing elements. The integral cascade water management system ensures that moisture drains to the outside of the building.

## Ventilation Zone

This feature is the key element that ensures compliance with Part L and gives X-One its unique capability in terms of environmental control. The frame is constructed from a single, highly complex, PVC profile designed to efficiently 'dock' between the glazing module and either the kerb adaptor profile or the kerb, creating a secure, weathered and warm connection with no cold bridges.

The ventilation zone arrangement is flexible depending on the specifiers requirements. For example it can include the following features:

- A unique continuous hinge is available which facilitates the opening of the ventilation zone and glazing (manually or electrically actuated). This allows for high-volume air ventilation.
- A PVC extruded profile rotary ventilator system can be mounted in the sidewall of the accessory frame. The cylindrical shape protects it from the outside elements using a continuous cowl feature and can be protected with integral insect mesh. The design of the vent ensures that there is no cold bridging between the outer and inner surfaces. When the vent is closed it forms a virtual triple skin chamber with both air leakage and sound attenuation performance second to none. The ventilation system is simply operated by rotating the operating handle. Refer to the Rotary Vent drawing in the Ventilation and Roof Attachment section for more information.

## Attachment Zone

Xtralite has developed unique mounting systems to aid attachment and make the process of incorporation easy.

A versatile metal foot will allow for varying thicknesses of roof insulation, whilst allowing 'flexible' matching of rooflight to roof opening as well as 'cut to falls' variable depth insulation systems.

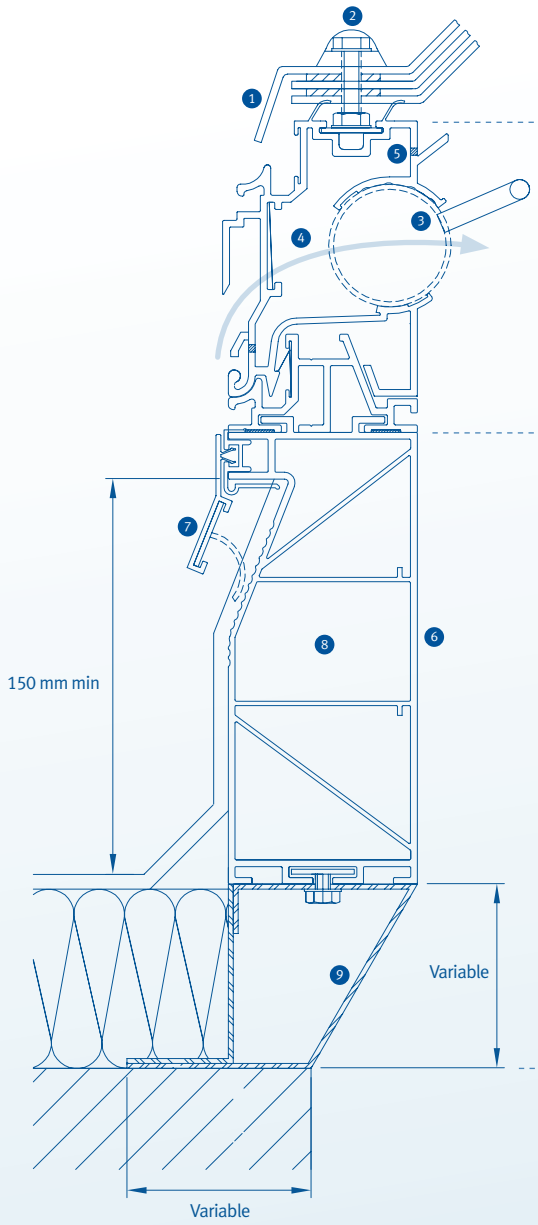
Fixing direct to the roof deck allows for the kerb to be attached direct to the supporting structure which could be above the insulation layer or by using a kerb adaptor direct to any pre-constructed builders kerb.

The kerb has three main insulating chambers ensuring not only compliance with current regulations but also with projected future changes, by the addition of high performance insulation to the chambers. The kerb is designed to be equally suitable for, and compatible with, both polymeric and PVC roofing membrane systems, bituminous membrane and mastic asphalt systems (Contact Xtralite for suitable bonding agents).

The rooflight assembly includes a unique termination detail to ensure that the 'top edge' of the roofing membrane is fully protected. A special 'key' finish to the PVC-U kerb increases roof membrane fixing options and the PVC-U kerb is torch-on system friendly. Simplified assembly allows the roofing finish to be applied to the upstand prior to clipping the glazing zone and ventilation zone into position. This procedure minimises damage and the need for protection, and eliminates dressing around the vents.

# X-One Features






| Feature | Benefit |
|---|---|
| 1 Triple skin supplied as standard | Minimises U Value |
| 2 Delivered fully assembled or with glazing/vent detached | Prevents onsite damage whilst upstand is being installed |
| 3 A unique rotary action vent controller | Offers variable ventilation and smooth, silent operation and prevents 'inblown' roof debris and water ingress |
| 4 Insect mesh | Prevents insect ingress |
| 5 Integral water management system | Ensures any moisture is drained to the outside of the building |
| 6 Fully thermally-broken white PVCu | Externally keyed allowing easy bonding during the installation process and is fully compatible with all roofing membranes |
| 7 Weather bar | Protects the exposed edge of the waterproofing membrane |
| 8 Cellular construction | No cold bridging, reducing the risk of condensation and ensuring good insulation and low U values |
| 9 Flexible metal foot termination | Can be manufactured to offer total flexibility in terms of height, insulation configuration and angle of splay to suit any roof opening size |


Set into the side wall of the ventilation zone, the rotary vent allows for precise ventilation control. The vent module is fully protected from wind-borne water, debris and insect ingress by means of an integral continuous weather cowl. The vents appear on two sides of the frame and when closed form a virtual triple skin chamber ensuring air leakage is kept to a minimum.

**X-One was independently tested by NPL and revealed a U value of just 1.3 (see page 7 of this section)**

# Glazing Size, Shape and Colour

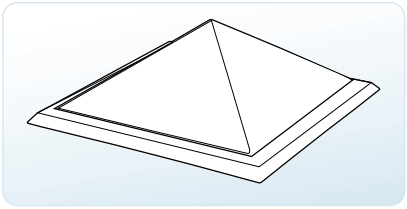


## Size and Shape

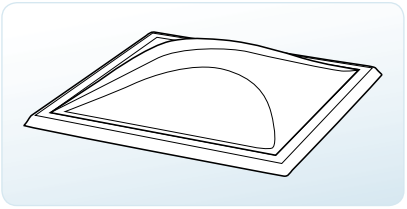
Xtralite rooflights are bespoke products and a range of shapes is available including those shown here. Similarly, virtually any sizes can be accommodated—up to a maximum of 1200 mm x 2400 mm—although designers may wish to consider the guide sizes shown (which also relate to other characteristics—such as ventilation—discussed elsewhere in this Guide).

**Guide Sizes (mm)**

| Square | | Rectangular | |
|---|---|---|---|
| 600 x 600 | 1200 x 1200 | 600 x 900 | 900 x 1800 |
| 750 x 750 | 1350 x 1350 | 600 x 1200 | 900 x 2400 |
| 900 x 900 | 1500 x 1500 | 600 x 1500 | 1000 x 1500 |
| 1000 x 1000 | 1800 x 1800 | 600 x 1800 | 1000 x 2000 |
| 1050 x 1050 | | 600 x 2400 | 1200 x 1500 |
| | | 900 x 1200 | 1200 x 1800 |
| | | 900 x 1350 | 1200 x 2400 |
| | | 900 x 1500 | |



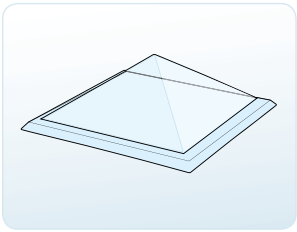
Pyramid (PY)



Dome (DM)

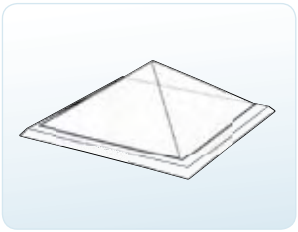
## Glazing Colour

The various glazing layers in Xtralite rooflights can be supplied in four types or colours: clear, opal, bronze or diffused—with the characteristics described below. For information on the light transmission of different types of polycarbonate rooflight glazing in various configurations, refer to the earlier section: **Designing with Daylight—Properties of Glazing Materials and Configurations**. In addition, all ranges are 'Non-fragile, Class B' rating classified to ACR[M]001:2005 *'Test For Non-Fragility of Profiled Sheeted Roofing Assemblies'*, Edition 3 – the "Red Book".



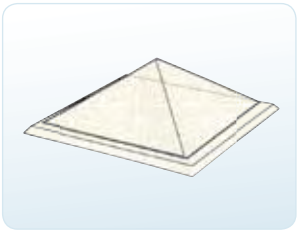
### Clear

- High light transmission.
- Placement where glare may occur is a consideration.
- Allows full vision of views and objects.



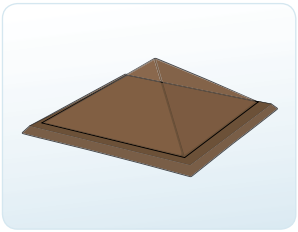
### Diffused

- Maximises privacy.
- High levels of light transmission into a building.
- Diffuses light transmission and so avoids glare and shadows.
- Prevents vision of views and objects.



### Opal

- Maximises privacy.
- Diffuses light transmission and so avoids glare and shadows.
- Prevents vision of views and objects.

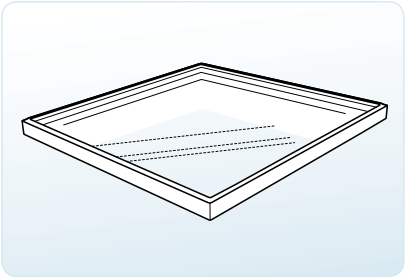


### Bronze

- Reduces solar heat gain.
- Reduces light transmission into a building.

## Alternative Glazing Materials—Glass (IGL)

Offered in lieu of polycarbonate. Double glazed insulated glass units will provide a low U value alternative. Selection of high specification glass can also be used to reduce such things as solar gain and rain noise whilst retaining non-fragile status. Contact Xtralite to discuss your requirements.

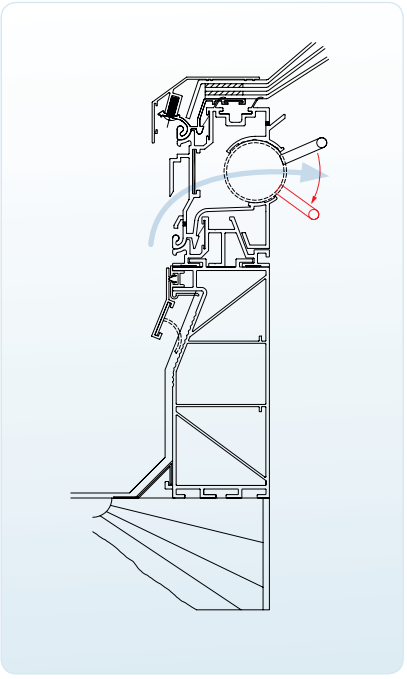


Xtralite ROOFLIGHTS

# Ventilation Options

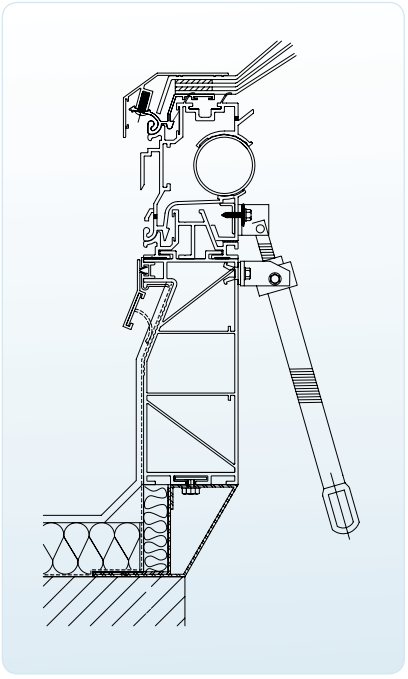


Xtralite rooflights can incorporate a range of ventilation and access systems. For more background information and performance levels of the various systems shown below, refer to the earlier section: **Performance Characteristics and Legislation—Ventilation**. Where ventilation is a primary consideration for energy efficient environmental management or smoke control during fires, refer to the **Natural Smoke and Ventilation Systems** section later in this Guide.



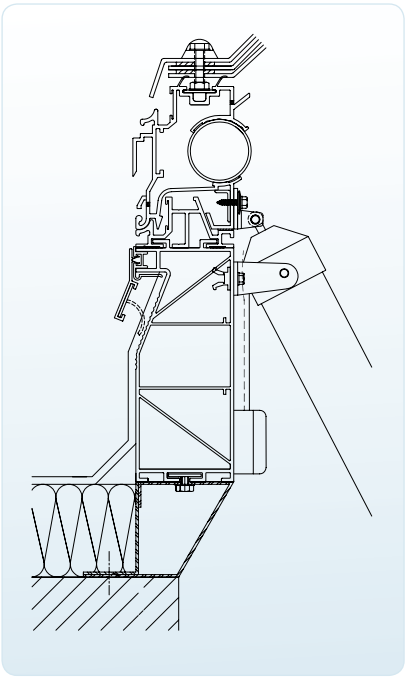
## Rotary Vent (02)

A unique rotary action vent controller offers variable ventilation, distinctive internal appearance and smooth, silent operation, and prevents 'in-blown' roof debris and water ingress.



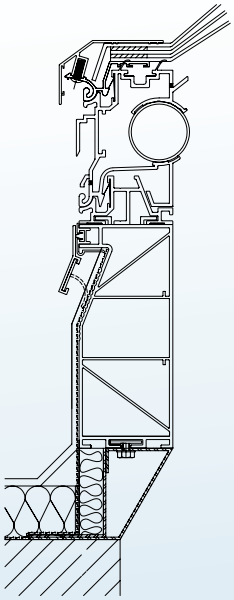
## Manual Wormgear Vent (03)

The whole rooflight top hinges to allow ventilation through the open vent area.



## Linear Motor Vent (06)

The whole rooflight top hinges to allow ventilation through the open vent area.



## Unventilated (00)

Often referred to as a 'fixed' rooflight, ideal for situations where ventilation is not required.

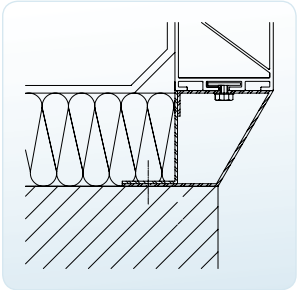
NOTE: Before specifying this option it is as well to check that the ventilation required by AD Part 'L' & AD Part 'F' for the room below, is provided by other means, thus ensuring the risk of condensation is minimised.

# Roof Attachment and Security Options



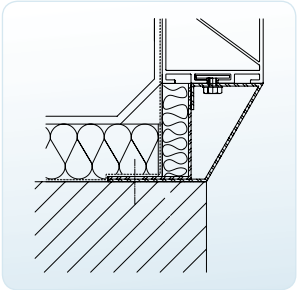
## Roof Attachment

Xtralite has developed unique mounting systems to aid attachment and make the process of incorporation easy.



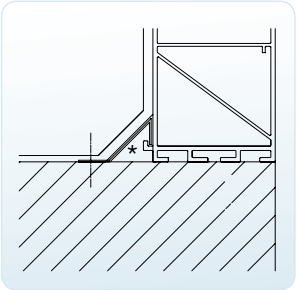
### Flexible Metal Foot (A)

This roof attachment can be manufactured to accommodate varying thicknesses of roof insulation, whilst allowing 'flexible' matching of rooflight to roof opening.



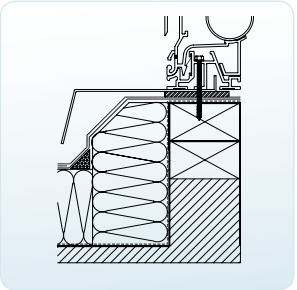
### Insulated Metal Foot (B)

Provides the same adaptability as the flexible metal foot whilst allowing for 'cut to falls' variable depth insulation systems.



### Direct to Roof Deck (C)

Allows for the kerb to be attached direct to the supporting structure. It is possible that this may be above the insulation layer.
* Features a unique fixing clip that also forms the angle fillet—supplied by Xtralite.

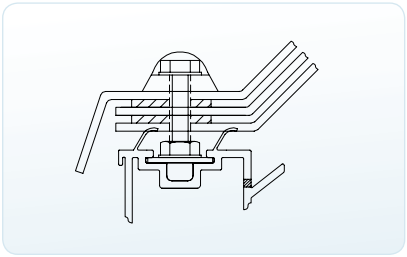


### Adaptor Kerb (D)

Allows the rooflight to be fixed to new/existing builder's kerbs and can incorporate various ventilation options.

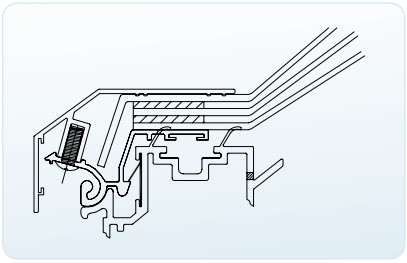
## Security

Xtralite offers a range of security options to prevent unauthorised access, depending on the level of security required and product range selected.



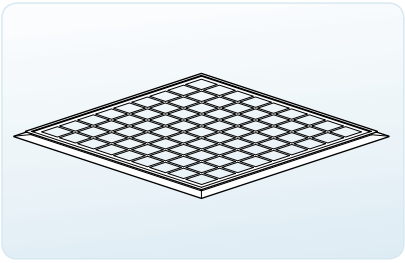
### Security Screws (SS)

Thread assemblies into which the security screws locate are totally inaccessible.



### Security Frame (SF)

A purpose-designed, robust, extruded aluminium framing system that encloses and secures the outer vulnerable edge of the glazing and clips onto the lower assembly.



### Intruder Grid (IG)

Intruder grid systems may be added to all rooflights in the Xtralite range. They are positioned between the upstand and the roof structure and consist of a 3 mm diameter, solid steel fully-welded mesh in a 75 mm grid. This system will resist entry even when the rooflight has been compromised or removed.

## U Value Calculation

The U value of a rooflight is calculated by dividing the heat transfer across the system (measured in Watts) by the environmental temperature difference across the test element (measured in degrees K) multiplied by the area of the aperture in the surround panel—called the projected area (measured in $m^2$). This latter dimension is equivalent to the opening in the building envelope. One consequence of this is that the U value of the product will increase as it gets deeper, despite the thermal properties of the individual components staying the same.

The building energy software SBEM uses the actual area (often called the developed area) of the product, to calculate the heat transfer through the product.

To show what this value is, a 'supplemental' U value has been calculated using developed area and it is this relevant value that we quote in this document.

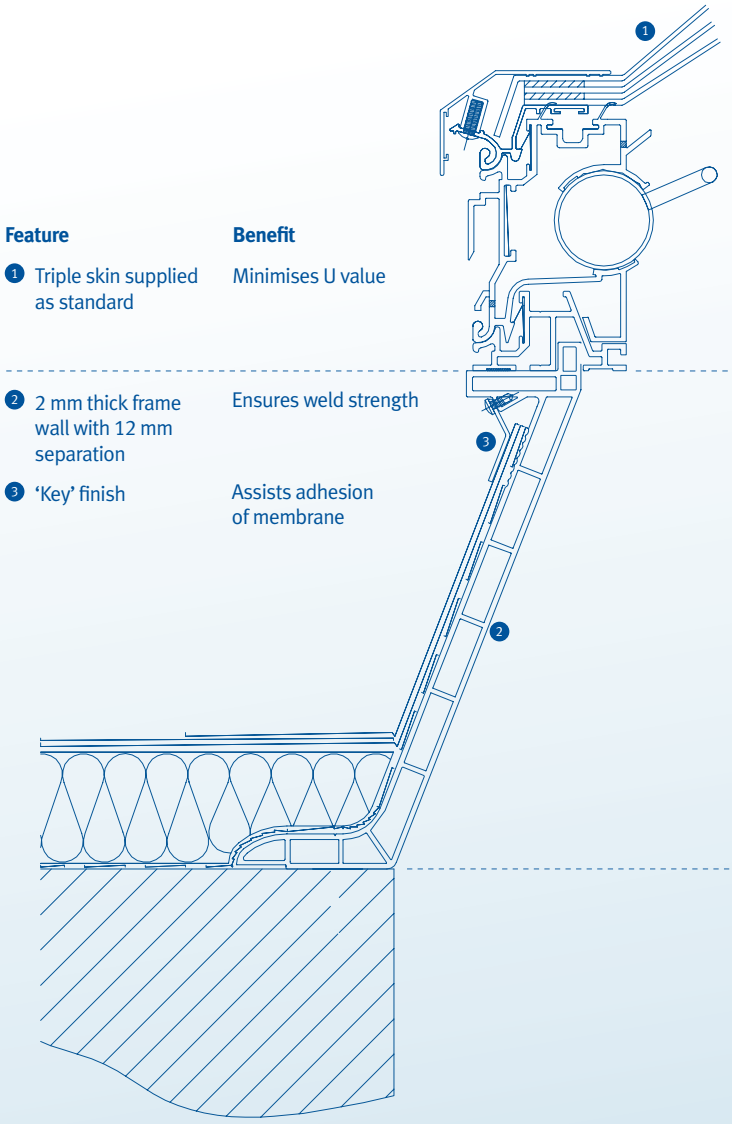
# Product Portfolio Rooflights
# X-Two

1.8 Uvalue

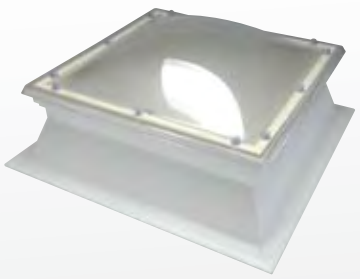
This range also meets and beats the requirements of Part L with an impressive 1.8 U value (see page 11 of this section) using 'all thermoplastic construction' for outstanding thermal efficiency, high resistance to weathering and low maintenance. The X-Two is formed from enhanced UV protected polycarbonate with vented airspaces. The integral Cascade water management system ensures that moisture drains to the outside of the building and air leakage meets Part L criteria. Key features include:

- Aluminium trim and extruded gasket sections
- Steel security insert housed within the PVC-U section
- Available in four versions—fixed; worm-gear opening; hit and miss; access hatch—see **Ventilation and Access section** later in this Guide.

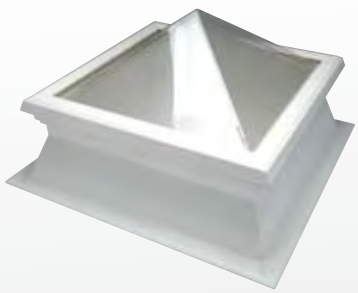
A 2 mm thick wall thickness ensures weld strength and a weather seal on all opening rooflights maintains weather-tightness. A special 'key' finish to the PVC-U kerb assists adhesion of membrane and the PVC-U kerb is torch-on system friendly. X-Two can be delivered in two parts for easy handling and more efficient installation.



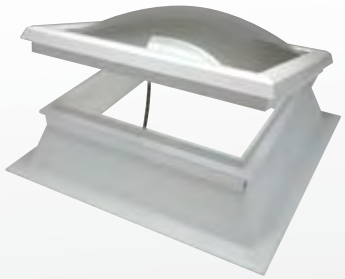

## Example X-Two Configurations



Triple skin diffused dome with standard security fixing



Triple skin diffused pyramid with security frame



Triple skin diffused dome with security frame and wormgear operated ventilation

# Glazing Size, Shape and Colour



## Size and Shape

Xtralite rooflights are bespoke products and a range of shapes is available including those shown here. Similarly, virtually any sizes can be accommodated—up to a maximum of 1200 mm x 2400 mm—although designers may wish to consider the guide sizes shown (which also relate to other characteristics—such as ventilation—discussed elsewhere in this Guide).

**Guide Sizes (mm)**

| Square | | Rectangular | |
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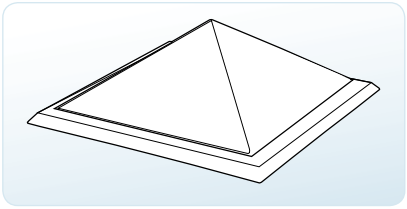
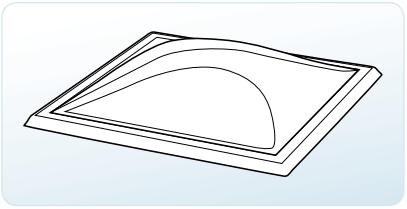
| 1000 x 1000 | 1800 x 1800 | 600 x 1800 | 1000 x 2000 |
| 1050 x 1050 | | 600 x 2400 | 1200 x 1500 |
| | | 900 x 1200 | 1200 x 1800 |
| | | 900 x 1350 | 1200 x 2400 |
| | | 900 x 1500 | |



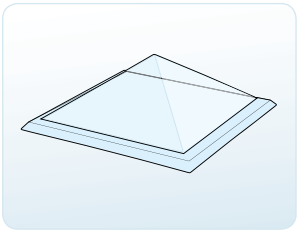
Pyramid (PY)



Dome (DM)

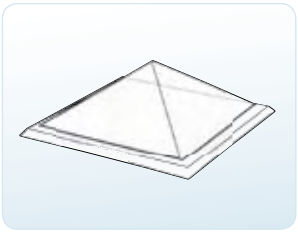
## Glazing Colour

The various glazing layers in Xtralite rooflights can be supplied in four types or colours: clear, opal, bronze or diffused—with the characteristics described below. For information on the light transmission of different types of polycarbonate rooflight glazing in various configurations, refer to the earlier section: **Designing with Daylight**—Properties of Glazing Materials and Configurations. In addition, all ranges are 'Non-fragile, Class B' rating classified to ACR[M]001:2005 *'Test For Non-Fragility of Profiled Sheeted Roofing Assemblies'*, Edition 3 – the "Red Book".



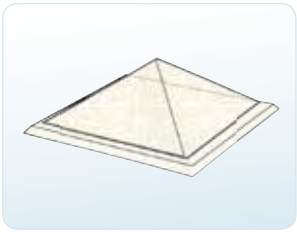
### Clear

- High light transmission.
- Placement where glare may occur is a consideration.
- Allows full vision of views and objects.



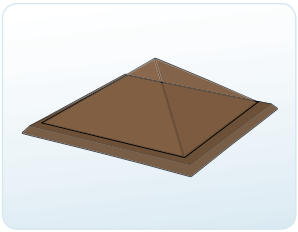
### Diffused

- Maximises privacy.
- High levels of light transmission into a building.
- Diffuses light transmission and so avoids glare and shadows.
- Prevents vision of views and objects.



### Opal

- Maximises privacy.
- Diffuses light transmission and so avoids glare and shadows.
- Prevents vision of views and objects.

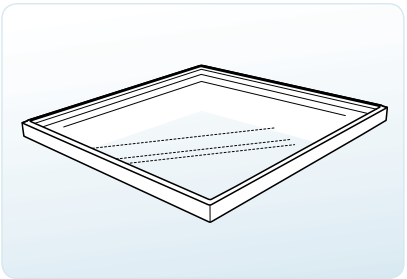


### Bronze

- Reduces solar heat gain.
- Reduces light transmission into a building.

## Alternative Glazing Materials—Glass (IGL)

Offered in lieu of polycarbonate. Double glazed insulated glass units will provide a low U value alternative. Selection of high specification glass can also be used to reduce such things as solar gain and rain noise whilst retaining non-fragile status. Contact Xtralite to discuss your requirements.

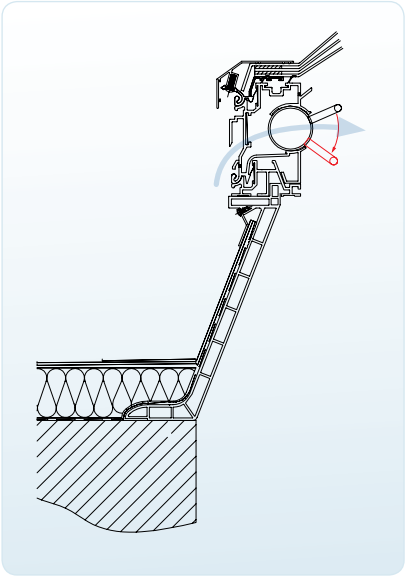


Xtralite ROOFLIGHTS

# Product Portfolio Rooflights—X-Two
# Ventilation and Access

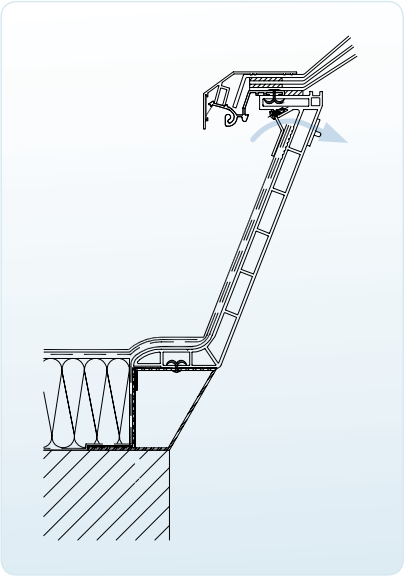
1.8 Uvalue

Xtralite rooflights can incorporate a range of ventilation and access systems. For more background information and performance levels of the various systems shown below, refer to the earlier section: **Performance Characteristics and Legislation – Ventilation**. Where ventilation is a primary consideration for energy efficient environmental management or smoke control during fires, refer to the **Natural Smoke and Ventilation Systems** section later in this Guide.



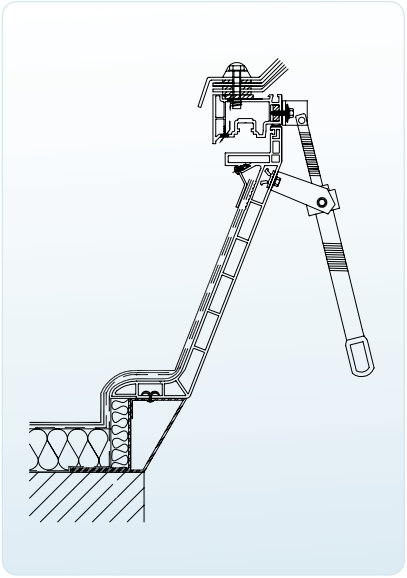
### Rotary Vent (02)

A unique rotary action vent controller offers variable ventilation, distinctive internal appearance and smooth, silent operation, and prevents 'in-blown' roof debris and water ingress.



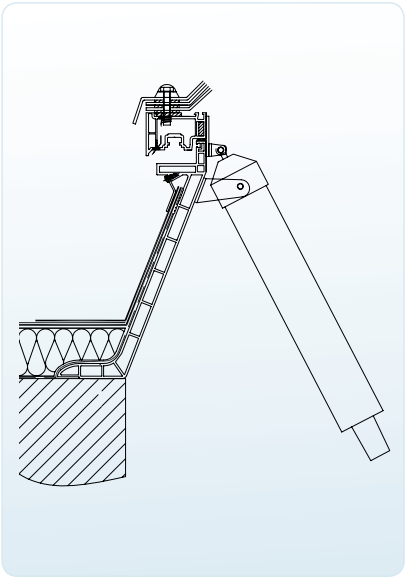
### Hit and Miss Vent (01)

Provides minimal background ventilation



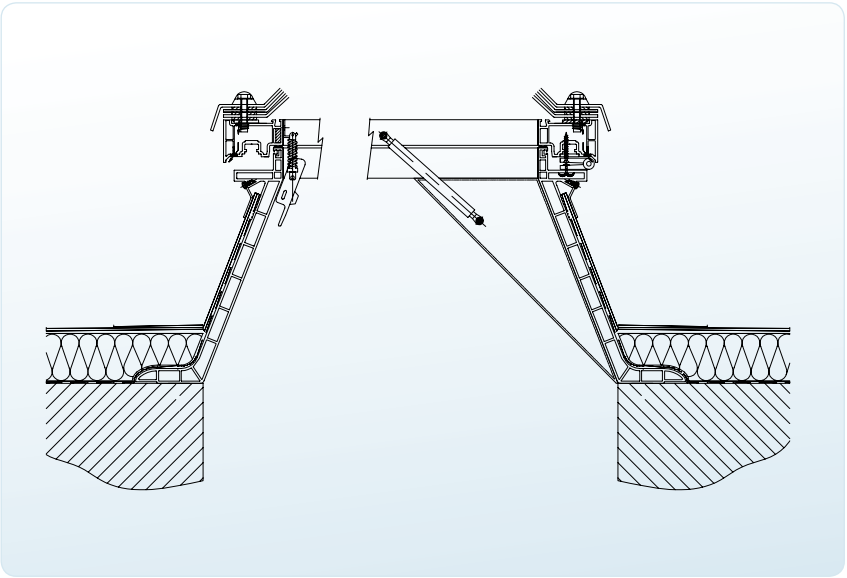
### Manual Wormgear Vent (03)

The whole rooflight top hinges to allow ventilation through the open vent area.



### Linear Motor Vent (06)

The whole rooflight top hinges to allow ventilation through the open vent area.



### Access Hatch (04G)

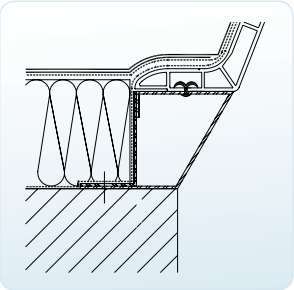
Gas springs assist opening to 90° for access. Please refer to Xtralite for specific health and safety information.

# Roof Attachment and Security



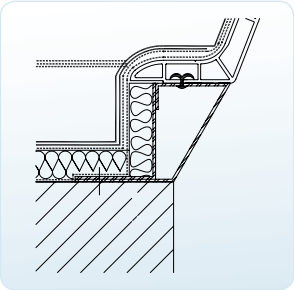
## Roof Attachment

Xtralite has developed unique mounting systems to aid attachment and make the process of incorporation easy.



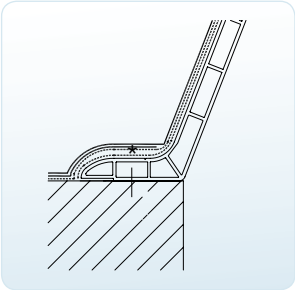
### Flexible Metal Foot (A)

This roof attachment can be manufactured to accommodate varying thicknesses of roof insulation, whilst allowing 'flexible' matching of rooflight to roof opening.



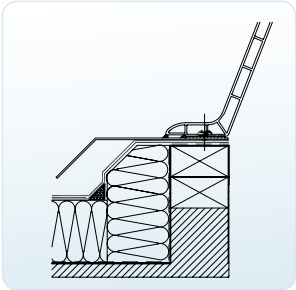
### Insulated Metal Foot (B)

Provides the same adaptability as the flexible metal foot whilst allowing for 'cut to falls' variable depth insulation systems.



### Direct to Roof Deck (C)

Allows for the kerb to be attached direct to the supporting structure. It is possible that this may be above the insulation layer.

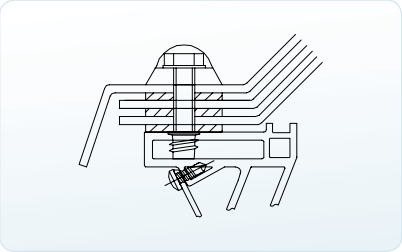


### Adaptor Kerb (D)

Allows the rooflight to be fixed to new/existing builders kerbs and can incorporate various ventilation options.

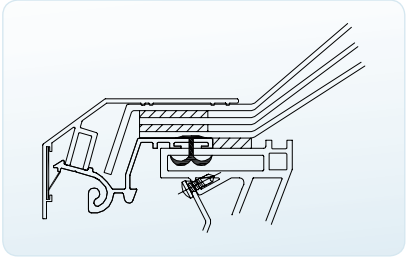
## Security

Xtralite offers a range of security options to prevent unauthorised access, depending on the level of security required and product range selected.



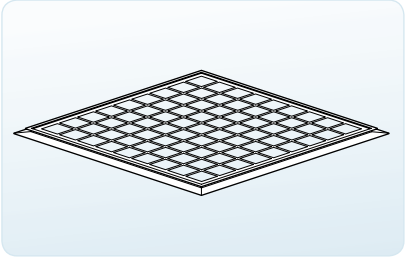
### Security Screws (SS)

Thread assemblies into which the security screws locate are totally inaccessible.



### Security Frame (SF)

A purpose-designed, robust, extruded aluminium framing system that encloses and secures the outer vulnerable edge of the glazing and clips onto the lower assembly.



### Intruder Grid (IG)

Intruder grid systems may be added to all rooflights in the Xtralite range. They are positioned between the upstand and the roof structure and consist of a 3 mm diameter, solid steel fully-welded mesh in a 75 mm grid. This system will resist entry even when the rooflight has been compromised or removed.

### U Value Calculation

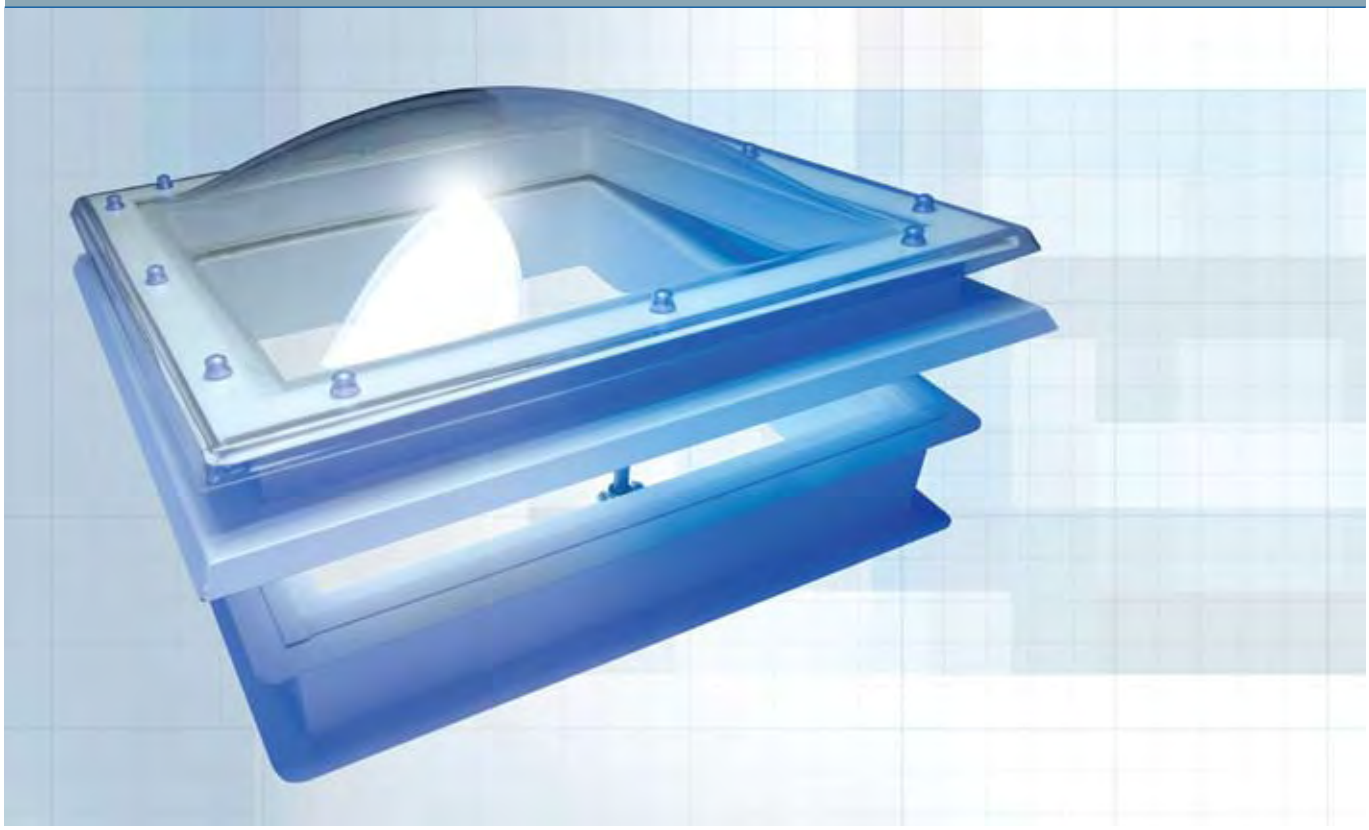
The U value of a rooflight is calculated by dividing the heat transfer across the system (measured in Watts) by the environmental temperature difference across the test element (measured in degrees K) multiplied by the area of the aperture in the surround panel—called the projected area (measured in $m^2$). This latter dimension is equivalent to the opening in the building envelope. One consequence of this is that the U value of the product will increase as it gets deeper, despite the thermal properties of the individual components staying the same.

The building energy software SBEM uses the actual area (often called the developed area) of the product, to calculate the heat transfer through the product.

To show what this value is, a 'supplemental' U value has been calculated using developed area and it is this relevant value that we quote in this document.

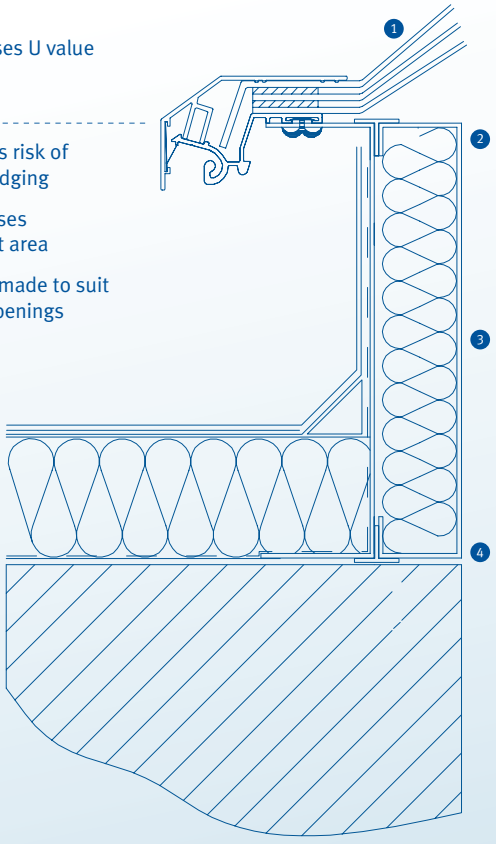
# **Product Portfolio** Rooflights
# X-Three

2.2 Uvalue



This thermally broken, metal system offers considerable flexibility whilst complying with the maximum allowable (under Part L) U value of 2.2 W/m²K (see page 15 of this section). Frames and kerbs are finished in white as standard but coloured kerbs are also available. X-Three rooflights can be double glazed glass or triple glazed in polycarbonate. The integral Cascade water management system ensures that moisture drains to the outside of the building and air leakage meets Part L criteria. The security frame is also available as an option.

| Feature | Benefit |
|---|---|
| 1 Triple skin supplied as standard | Minimises U value |
| 2 Thermally-broken metal kerb | Reduces risk of cold bridging |
| 3 Vertical | Maximises daylight area |
| 4 Robust construction | Can be made to suit large openings |



# Glazing Size, Shape and Materials

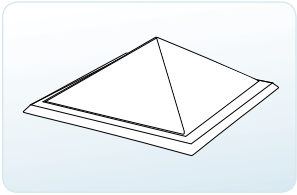


## Size and Shape

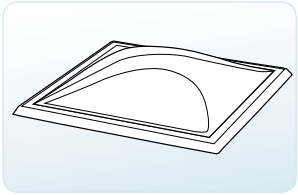
Xtralite rooflights are bespoke products and a range of shapes is available including those shown here. Similarly, virtually any sizes can be accommodated—up to a maximum of 1200 mm x 2400 mm—although designers may wish to consider the guide sizes shown (which also relate to other characteristics—such as ventilation—discussed elsewhere in this Guide).

**Guide Sizes (mm)**

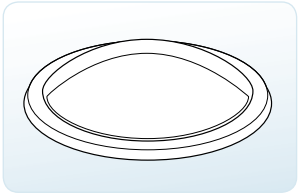
| Square | | Rectangular | | Circular (Diameter) | |
|---|---|---|---|---|---|
| 600 x 600 | 1200 x 1200 | 600 x 900 | 900 x 1800 | 600 | 900 |
| 750 x 750 | 1350 x 1350 | 600 x 1200 | 900 x 2400 | 1200 | 1500 |
| 900 x 900 | 1500 x 1500 | 600 x 1500 | 1000 x 1500 | 1800 | |
| 1000 x 1000 | 1800 x 1800 | 600 x 1800 | 1000 x 2000 | | |
| 1050 x 1050 | | 600 x 2400 | 1200 x 1500 | | |
| | | 900 x 1200 | 1200 x 1800 | | |
| | | 900 x 1350 | 1200 x 2400 | | |
| | | 900 x 1500 | | | |



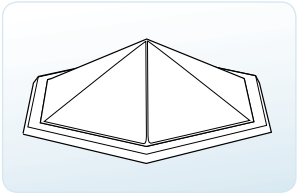
Pyramid (PY)



Dome (DM)



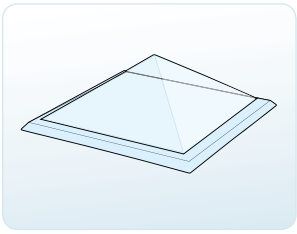
Circular (CIR)



Hexagonal (HEX)

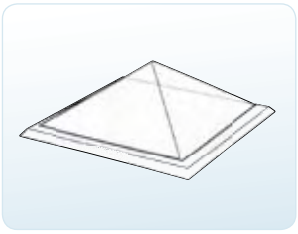
## Glazing Colour

The various glazing layers in Xtralite rooflights can be supplied in four types or colours: clear, opal, bronze or diffused—with the characteristics described below. For information on the light transmission of different types of polycarbonate rooflight glazing in various configurations, refer to the earlier section: **Designing with Daylight**—Properties of Glazing Materials and Configurations. In addition, all ranges are 'Non-fragile, Class B' rating classified to ACR[M]001:2005 *'Test For Non-Fragility of Profiled Sheeted Roofing Assemblies'*, Edition 3 – the "Red Book".



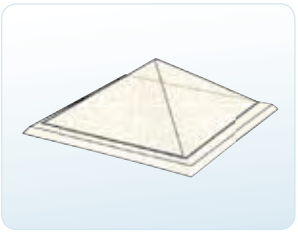
### Clear

- High light transmission.
- Placement where glare may occur is a consideration.
- Allows full vision of views and objects.



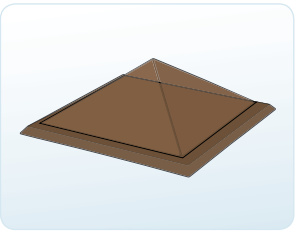
### Diffused

- Maximises privacy.
- High levels of light transmission into a building.
- Diffuses light transmission and so avoids glare and shadows.
- Prevents vision of views and objects.



### Opal

- Maximises privacy.
- Diffuses light transmission and so avoids glare and shadows.
- Prevents vision of views and objects.

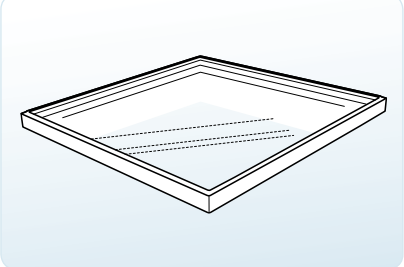


### Bronze

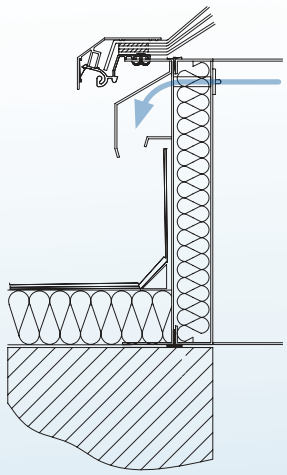
- Reduces solar heat gain.
- Reduces light transmission into a building.

## Alternative Glazing Materials—Glass (IGL)

Offered in lieu of polycarbonate. Double glazed insulated glass units will provide a low U value alternative. Selection of high specification glass can also be used to reduce such things as solar gain and rain noise whilst retaining non-fragile status. Contact Xtralite to discuss your requirements.

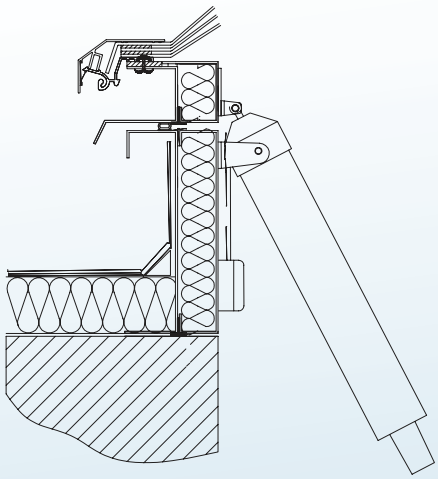


Xtralite rooflights can incorporate a range of ventilation and access systems. For more background information and performance levels of the various systems shown below, refer to the earlier section: **Performance Characteristics and Legislation – Ventilation**. Where ventilation is a primary consideration for energy efficient environmental management or smoke control during fires, refer to the **Natural Smoke and Ventilation Systems** section later in this Guide.



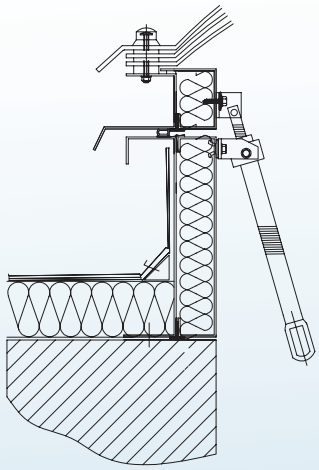
### Hit and Miss Vent (01)

Provides minimal background ventilation



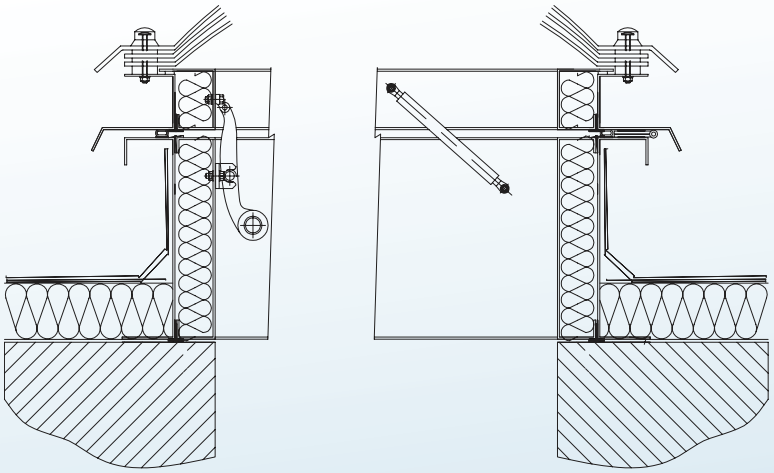
### Linear Motor Vent (06)

The whole rooflight top hinges to allow ventilation through the open vent area.



### Manual Wormgear Vent (03)

The whole rooflight top hinges to allow ventilation through the open vent area.



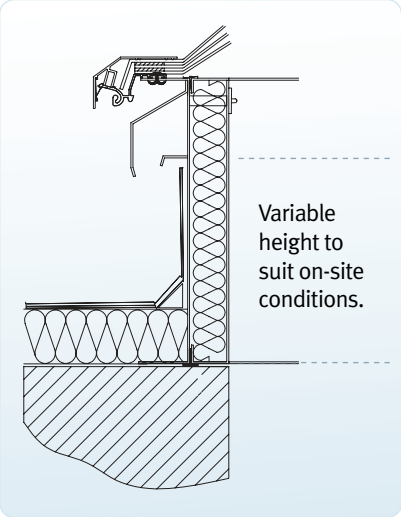
### Gas Spring Vent (04G)

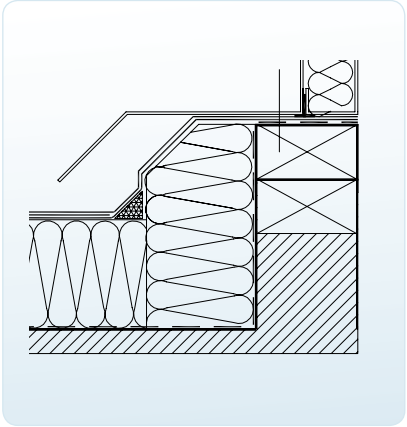
Gas springs assist opening to 90° for access. Please refer to Xtralite for specific health and safety information.

# Roof Attachment and Security



## Roof Attachment



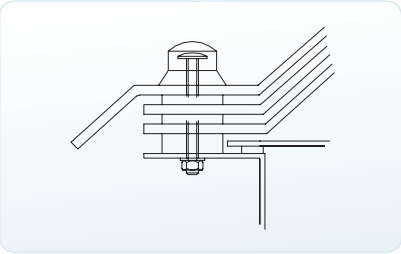



### Adaptor Kerb (D)

Allows the rooflight to be fixed to new/existing builders kerbs and can incorporate various ventilation options.

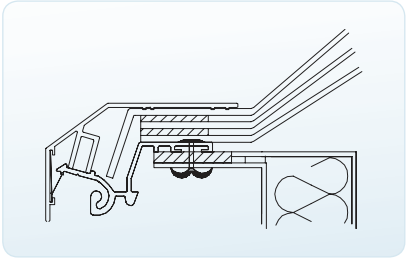
## Security

Xtralite offers a range of security options to prevent unauthorised access, depending on the level of security required and product range selected.



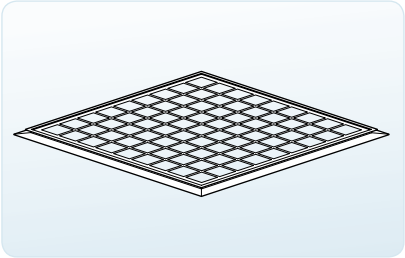
### Security Screws (SS)

Intrusion is hampered as the thread assemblies into which the security screws locate are not easily accessed once the glazing is fixed.



### Security Frame (SF)

A purpose-designed, robust, extruded aluminium framing system that encloses and secures the outer vulnerable edge of the glazing and clips onto the lower assembly.



### Intruder Grid (IG)

Intruder grid systems may be added to all rooflights in the Xtralite range. They are positioned between the upstand and the roof structure and consist of a 3 mm diameter, solid steel fully-welded mesh in a 75 mm grid. This system will resist entry even when the rooflight has been compromised or removed.

### U Value Calculation

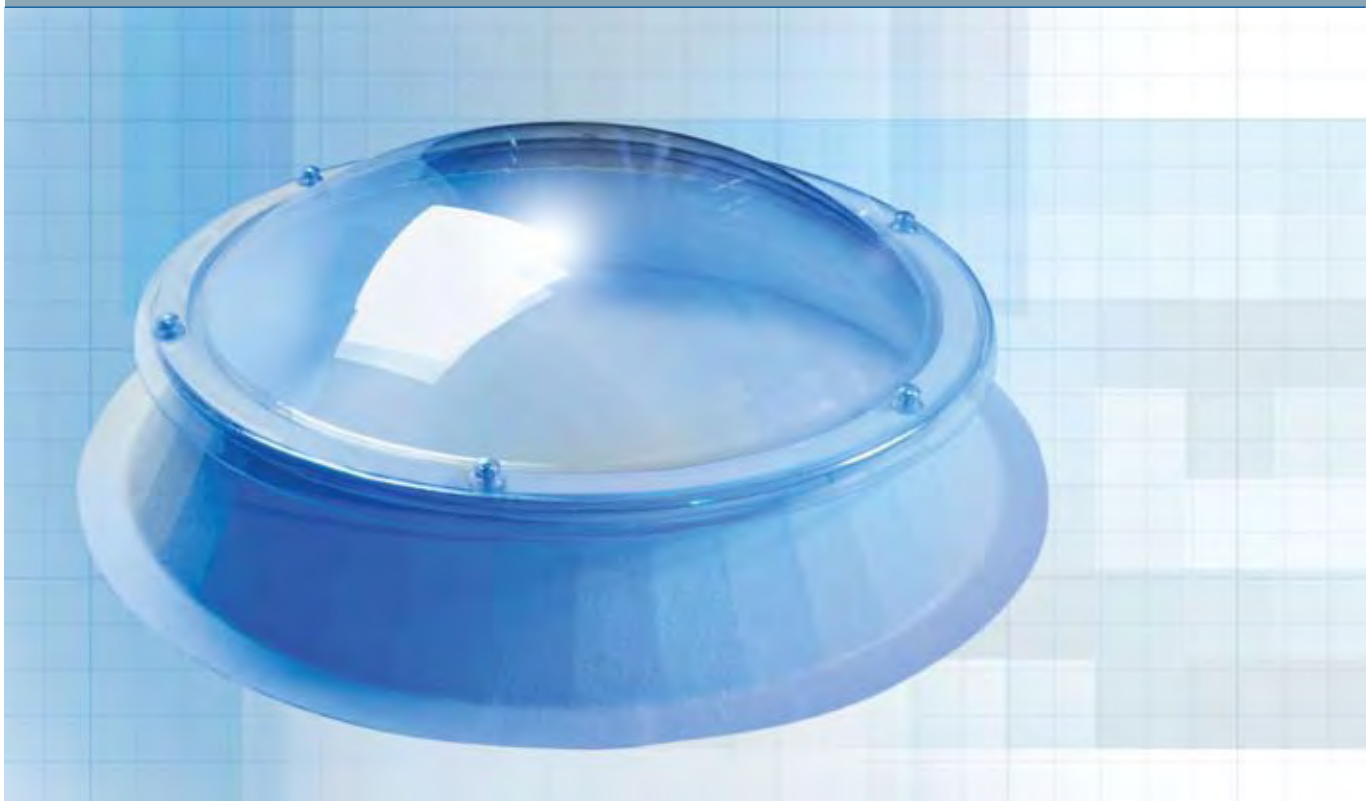
The U value of a rooflight is calculated by dividing the heat transfer across the system (measured in Watts) by the environmental temperature difference across the test element (measured in degrees K) multiplied by the area of the aperture in the surround panel—called the projected area (measured in $m^2$). This latter dimension is equivalent to the opening in the building envelope. One consequence of this is that the U value of the product will increase as it gets deeper, despite the thermal properties of the individual components staying the same.

The building energy software SBEM uses the actual area (often called the developed area) of the product, to calculate the heat transfer through the product.

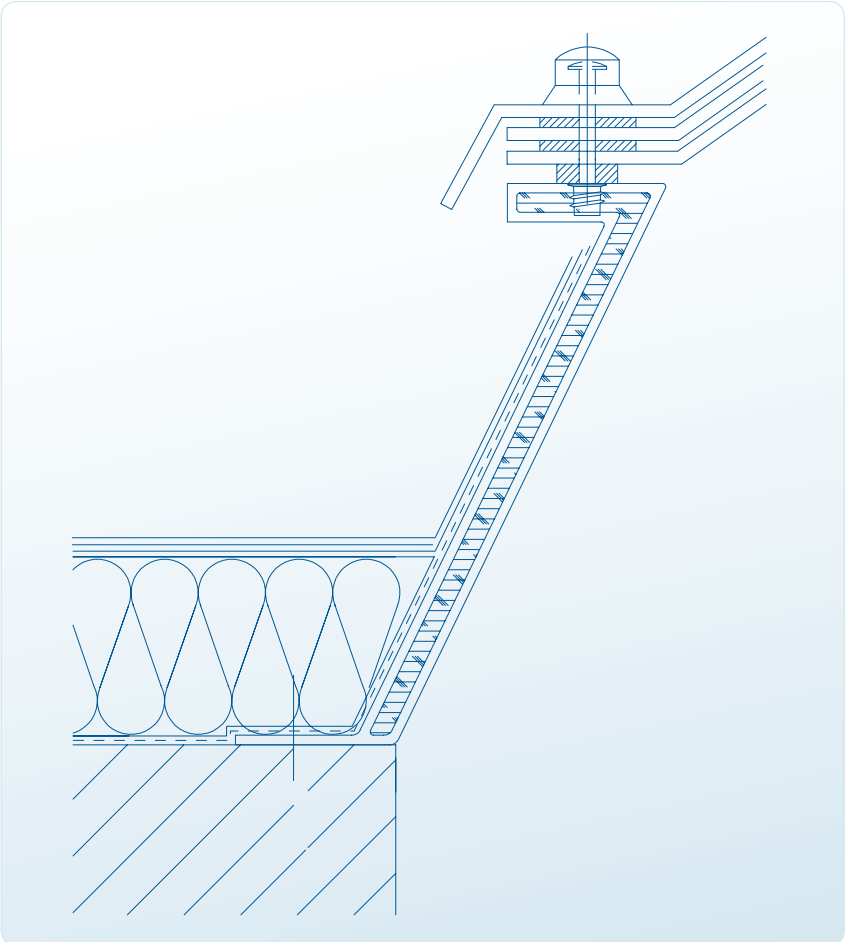
To show what this value is, a 'supplemental' U value has been calculated using developed area and it is this relevant value that we quote in this document.

# **Product Portfolio** Rooflights
# X-Four

2.2 Uvalue



This GRP kerbed system is designed for circular rooflights whilst also complying with the maximum allowable U value (under Part L) of 2.2 (see page 18 of this section). Rooflights are triple glazed as standard with enhanced UV protected polycarbonate and vented airspaces, and air leakage meets Part L criteria.



# Glazing Size, Shape and Materials



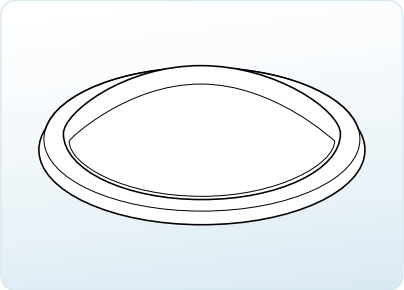
## Size and Shape

Xtralite rooflights are bespoke products and a range of shapes is available including those shown here. Similarly, virtually any sizes can be accommodated—up to a maximum diameter of 1800 mm.

**Guide Sizes (mm)**

**Circular (Diameter)**

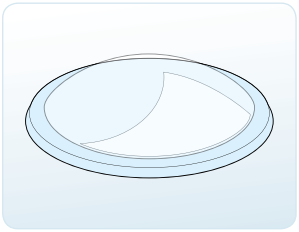
600
900
1200
1500
1800



**Circular (CIR)**

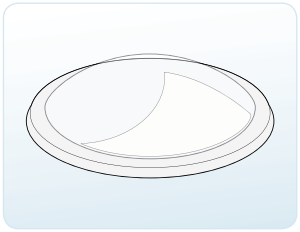
## Glazing Colour

The various glazing layers in Xtralite rooflights can be supplied in four types or colours: clear, opal, bronze or diffused—with the characteristics described below. For information on the light transmission of different types of polycarbonate rooflight glazing in various configurations, refer to the earlier section: **Designing with Daylight**—Properties of Glazing Materials and Configurations. In addition, all ranges are 'Non-fragile, Class B' rating classified to ACR[M]001:2005 *'Test For Non-Fragility of Profiled Sheeted Roofing Assemblies'*, Edition 3 – the "Red Book".



### Clear

- High light transmission.
- Placement where glare may occur is a consideration.
- Allows full vision of views and objects.

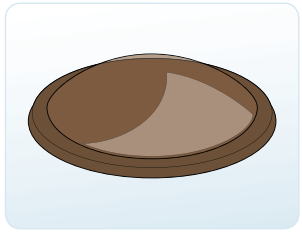


### Diffused

- Maximises privacy.
- High levels of light transmission into a building.
- Diffuses light transmission and so avoids glare and shadows.
- Prevents vision of views and objects.

### Opal

- Maximises privacy.
- Diffuses light transmission and so avoids glare and shadows.
- Prevents vision of views and objects.

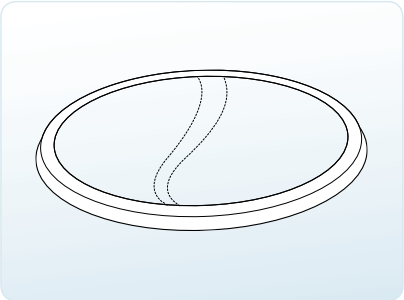


### Bronze

- Reduces solar heat gain.
- Reduces light transmission into a building.

## Alternative Glazing Materials—Glass (IGL)

Offered in lieu of polycarbonate. Double glazed insulated glass units will provide a low U value alternative. Selection of high specification glass can also be used to reduce such things as solar gain and rain noise whilst retaining non-fragile status. Contact Xtralite to discuss your requirements.



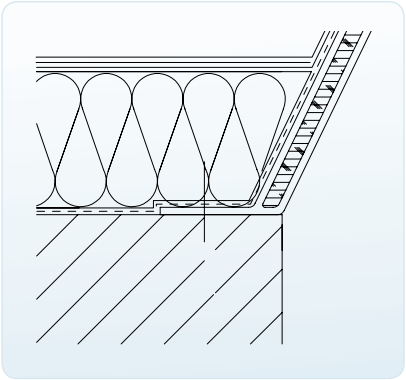
# Roof Attachment and Security





## Roof Attachment

Xtralite has developed unique mounting systems to aid attachment and make the process of incorporation easy.

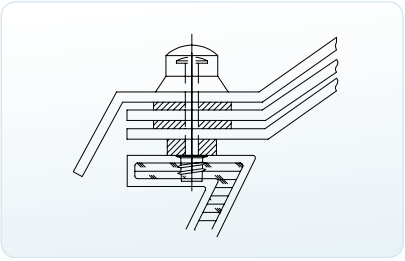


### Direct to Roof Deck (C)

Allows for the kerb to be attached direct to the supporting structure. It is possible that this may be above the insulation layer.

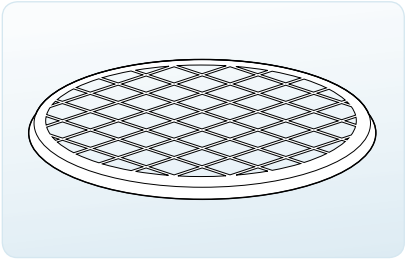
## Security

Xtralite offers a range of security options to prevent unauthorised access, depending on the level of security required and product range selected.



### Security Screws (SS)

Thread assemblies into which the security screws locate are totally inaccessible.



### Intruder Grid (IG)

Burglar bar systems may be added to all rooflights in the Xtralite range. They are positioned between the upstand and the roof structure and consist of a 3 mm diameter, solid steel fully-welded mesh in a 75 mm grid. This system will resist entry even when the rooflight has been compromised or removed.

## U Value Calculation

The U value of a rooflight is calculated by dividing the heat transfer across the system (measured in Watts) by the environmental temperature difference across the test element (measured in degrees K) multiplied by the area of the aperture in the surround panel—called the projected area (measured in $m^2$). This latter dimension is equivalent to the opening in the building envelope. One consequence of this is that the U value of the product will increase as it gets deeper, despite the thermal properties of the individual components staying the same.

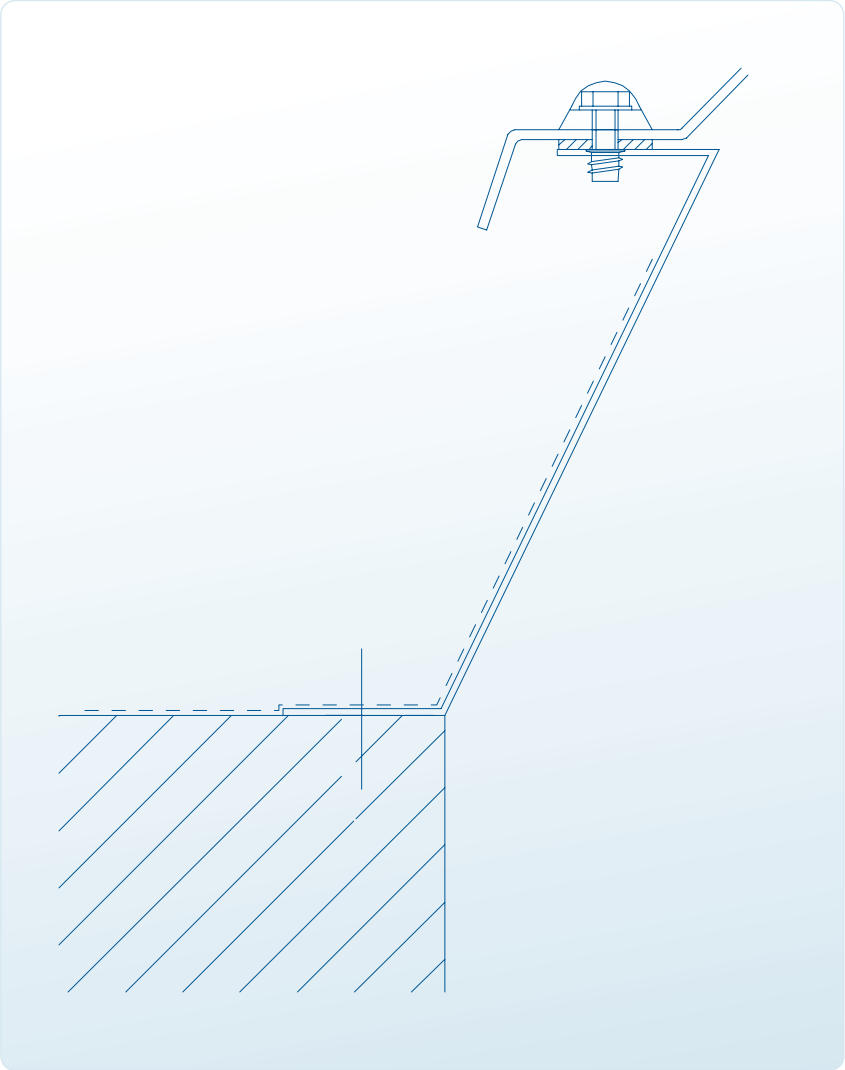
The building energy software SBEM uses the actual area (often called the developed area) of the product, to calculate the heat transfer through the product.

To show what this value is, a 'supplemental' U value has been calculated using developed area and it is this relevant value that we quote in this document.

# X-Five



This metal system offers considerable flexibility for unheated areas where thermal insulation is not an important criterion. Frames and kerbs are finished in white as standard but coloured kerbs are also available. X-Five rooflights can be square, rectangular or circular in shape and single glazed as standard with enhanced UV protected polycarbonate or glass. The security frame is also available as an option. Multiple skin options are available on request.

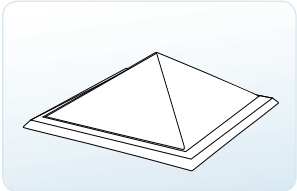


## Size and Shape

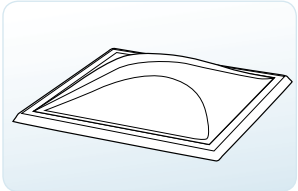
Xtralite rooflights are bespoke products and a range of shapes is available including those shown here. Similarly, virtually any sizes can be accommodated—up to a maximum of 1500 mm x 2400 mm—although designers may wish to consider the guide sizes shown (which also relate to other characteristics—such as ventilation—discussed elsewhere in this Guide).

**Guide Sizes (mm)**

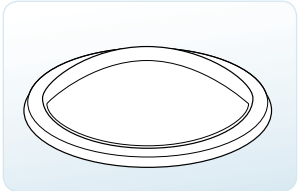
| Square | | Rectangular | | Circular (Diameter) | |
|---|---|---|---|---|---|
| 600 x 600 | 1200 x 1200 | 600 x 900 | 900 x 1800 | 600 | 900 |
| 750 x 750 | 1350 x 1350 | 600 x 1200 | 900 x 2400 | 1200 | 1500 |
| 900 x 900 | 1500 x 1500 | 600 x 1500 | 1000 x 1500 | 1800 | |
| 1000 x 1000 | 1800 x 1800 | 600 x 1800 | 1000 x 2000 | | |
| 1050 x 1050 | | 600 x 2400 | 1200 x 1500 | | |
| | | 900 x 1200 | 1200 x 1800 | | |
| | | 900 x 1350 | 1200 x 2400 | | |
| | | 900 x 1500 | 1500 x 2400 | | |



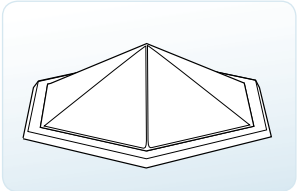
Pyramid (PY)



Dome (DM)



Circular (CIR)



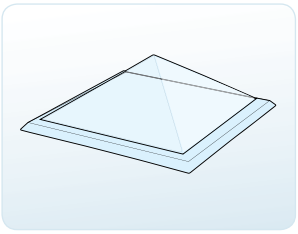
Hexagonal (HEX)

# **Product Portfolio** Rooflights—X-Five
# Glazing Size, Shape, Colour and Materials

4.0 Uvalue

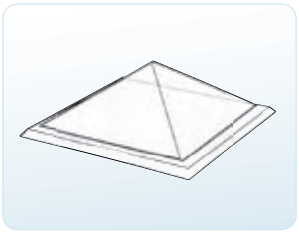
## Glazing Colour

The various glazing layers in Xtralite rooflights can be supplied in four types or colours: clear, opal, bronze or diffused—with the characteristics described below. For information on the light transmission of different types of polycarbonate rooflight glazing in various configurations, refer to the earlier section: **Designing with Daylight**—Properties of Glazing Materials and Configurations. In addition, all ranges are 'Non-fragile, Class B' rating classified to ACR[M]001:2005 *'Test For Non-Fragility of Profiled Sheeted Roofing Assemblies'*, Edition 3 – the "Red Book".



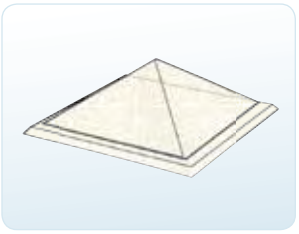
### Clear

- High light transmission.
- Placement where glare may occur is a consideration.
- Allows full vision of views and objects.



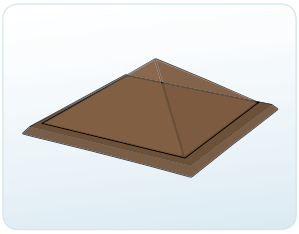
### Diffused

- Maximises privacy.
- High levels of light transmission into a building.
- Diffuses light transmission and so avoids glare and shadows.
- Prevents vision of views and objects.



### Opal

- Maximises privacy.
- Diffuses light transmission and so avoids glare and shadows.
- Prevents vision of views and objects.

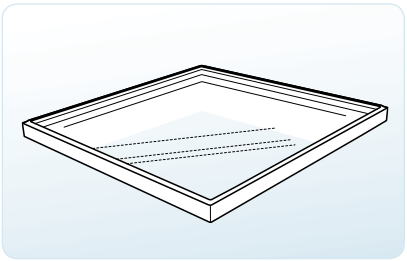


### Bronze

- Reduces solar heat gain.
- Reduces light transmission into a building.

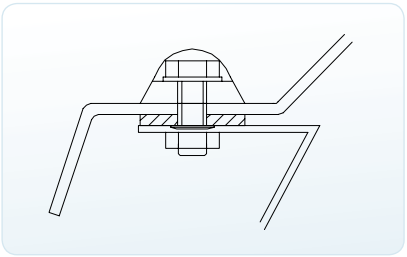
## Alternative Glazing Materials—Glass (IGL)

Offered in lieu of polycarbonate. Double glazed insulated glass units will provide a low 'U' value alternative. Selection of high specification glass can also be used to reduce such things as solar gain and rain noise whilst retaining non-fragile status. Contact Xtralite to discuss your requirements.



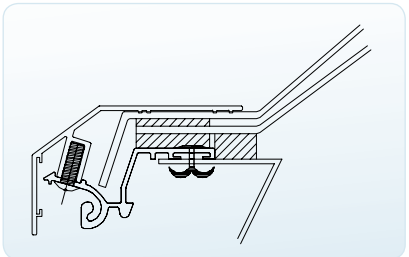
## Security

Xtralite offers a range of security options to prevent unauthorised access, depending on the level of security required and product range selected.



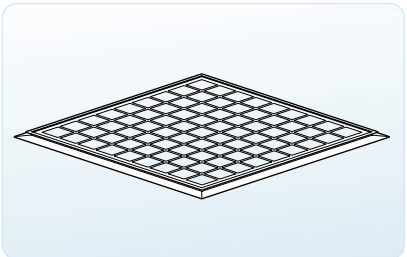
### Security Screws (SS)

Intrusion is hampered as the thread assemblies into which the security screws locate are not easily accessed once the glazing is fixed.



### Security Frame (SF)

A purpose-designed, robust, extruded aluminium framing system that encloses and secures the outer vulnerable edge of the glazing and clips onto the lower assembly.



### Intruder Grid (IG)

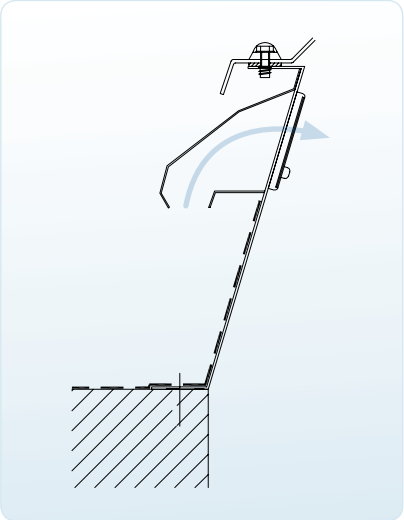
Intruder grid systems may be added to all rooflights in the Xtralite range. They are positioned between the upstand and the roof structure and consist of a 3 mm diameter, solid steel fully-welded mesh in a 75 mm grid. This system will resist entry even when the rooflight has been compromised or removed.

# Ventilation and Security



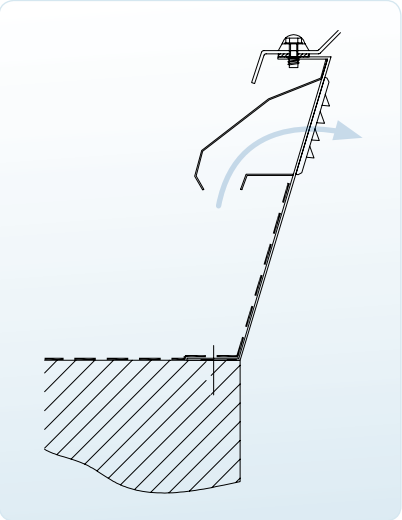
## Ventilation

Xtralite rooflights can incorporate a range of ventilation and access systems. For more background information and tables showing the performance levels of the various systems shown below, refer to the earlier section: **Performance Characteristics and Legislation—Ventilation**. Where ventilation is a primary consideration for energy efficient environmental management or smoke control during fires, refer to the **Natural Smoke and Ventilation Systems** section later in this Guide.



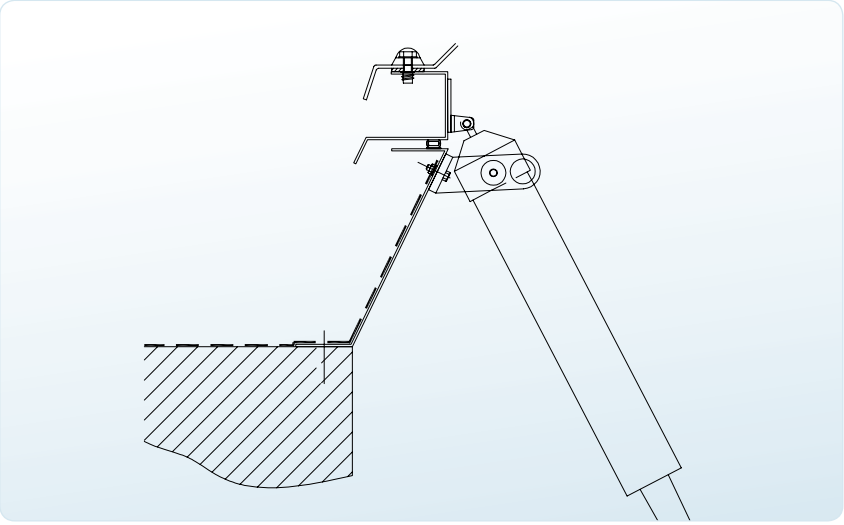
### Hit and Miss Vent (01)

Provides minimal background ventilation



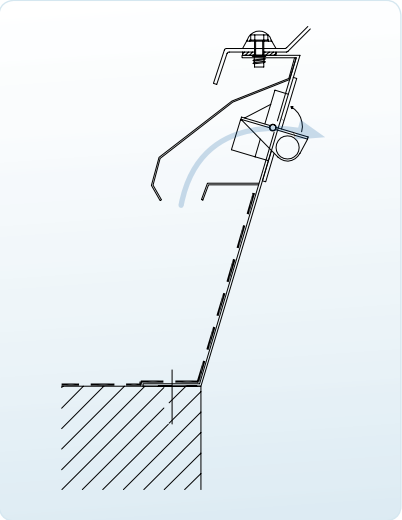
### Permanent Vent (08)

Provides continual ventilation



### Linear Motor Vent (06)

The whole rooflight top hinges to allow ventilation through the open vent area.



### Controlled Louvre Vent (09)

Louvre inset into side wall of unit, this can be manually operated to provide anything from 'trickle' to 'full on'.

### U Value Calculation

The U value of a rooflight is calculated by dividing the heat transfer across the system (measured in Watts) by the environmental temperature difference across the test element (measured in degrees K) multiplied by the area of the aperture in the surround panel—called the projected area (measured in $m^2$). This latter dimension is equivalent to the opening in the building envelope. One consequence of this is that the U value of the product will increase as it gets deeper, despite the thermal properties of the individual components staying the same.

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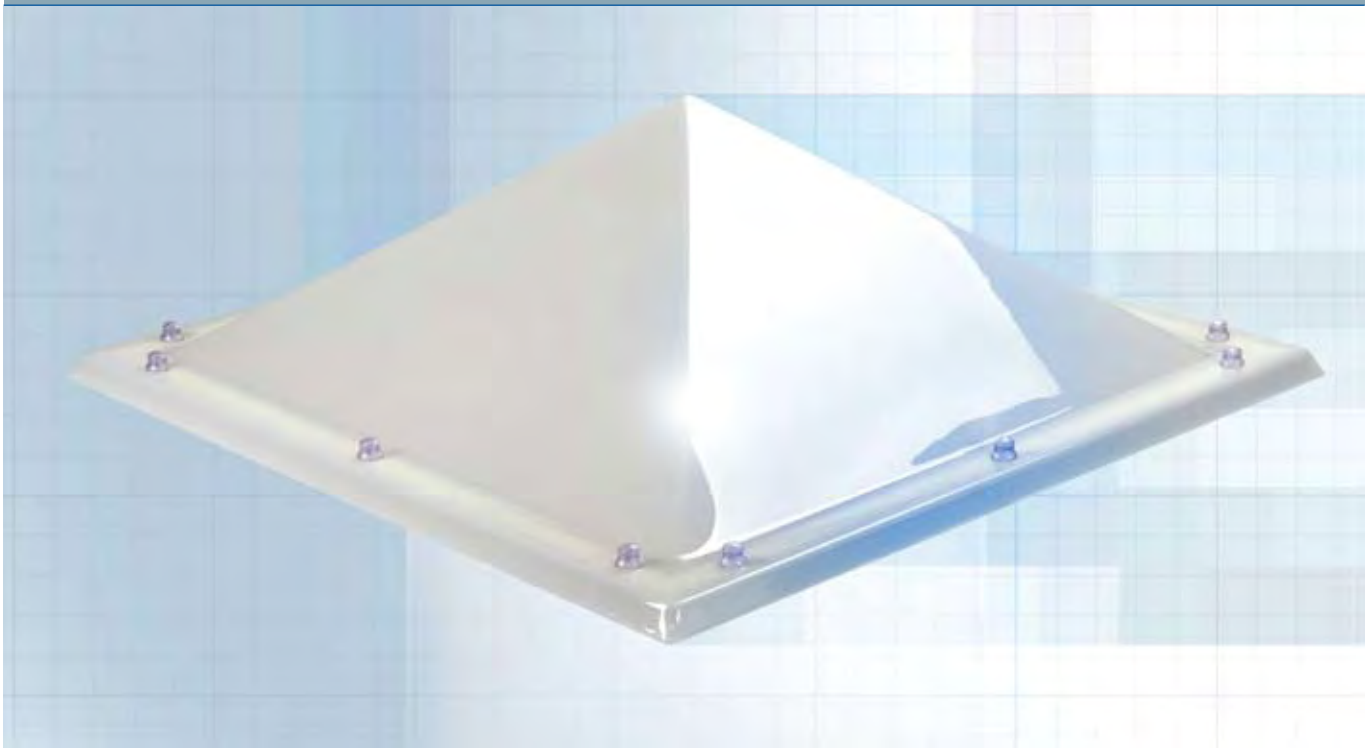
# **Product Portfolio** Rooflights
# X-Glaze



The X-Glaze range provides single, double or triple skin polycarbonate glazing units for direct fixing to a builder's kerb or upstand. As there are no integral frames or kerbs, the usual range of Xtralite ventilation, access and other options are not available. Also, the U value provided applies to glazing only, as—for Building Regulations purposes—the builder's kerb or upstand forms an integral part of the roof not the rooflight.

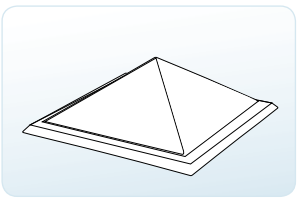
| | Triple Skin | Double Skin | Single Skin |
|---|---|---|---|
| **U value** (2.2 required for Part L) | 1.8 Uvalue | 2.9 Uvalue | 4.0 Uvalue |

## Size and Shape

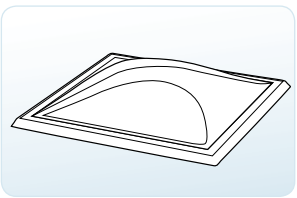
Xtralite rooflights are bespoke products and a range of shapes is available including those shown here. Similarly, virtually any sizes can be accommodated—up to a maximum of 1500 mm x 2400 mm—although designers may wish to consider the guide sizes shown (which also relate to other characteristics—such as ventilation—discussed elsewhere in this Guide).

**Guide Sizes (mm)**

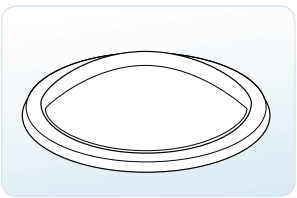
| Square | | Rectangular | | Circular (Diameter) | |
|---|---|---|---|---|---|
| 600 x 600 | 1200 x 1200 | 600 x 900 | 900 x 1800 | 600 | 900 |
| 750 x 750 | 1350 x 1350 | 600 x 1200 | 900 x 2400 | 1200 | 1500 |
| 900 x 900 | 1500 x 1500 | 600 x 1500 | 1000 x 1500 | 1800 | |
| 1000 x 1000 | 1800 x 1800 | 600 x 1800 | 1000 x 2000 | | |
| 1050 x 1050 | | 600 x 2400 | 1200 x 1500 | | |
| | | 900 x 1200 | 1200 x 1800 | | |
| | | 900 x 1350 | 1200 x 2400 | | |
| | | 900 x 1500 | 1500 x 2400 | | |



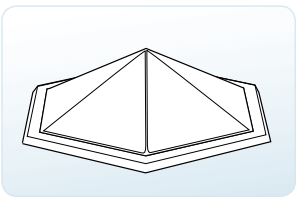
Pyramid (PY)



Dome (DM)



Circular (CIR)



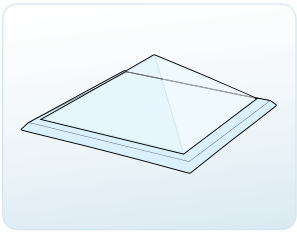
Hexagonal (HEX)

# Glazing and Security



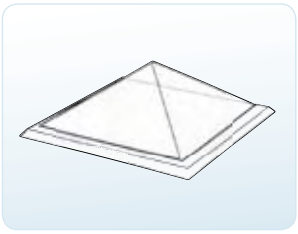
## Glazing Colour

The various glazing layers in Xtralite rooflights can be supplied in four types or colours: clear, opal, bronze or diffused—with the characteristics described below. For information on the light transmission of different types of polycarbonate rooflight glazing in various configurations, refer to the earlier section: **Designing with Daylight**—Properties of Glazing Materials and Configurations. In addition, all ranges are 'Non-fragile, Class B' rating classified to ACR[M]001:2005 *'Test For Non-Fragility of Profiled Sheeted Roofing Assemblies'*, Edition 3 – the "Red Book".



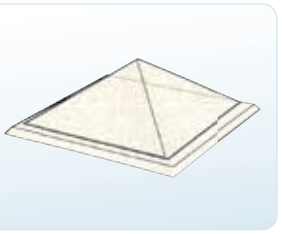
### Clear

- High light transmission.
- Placement where glare may occur is a consideration.
- Allows full vision of views and objects.



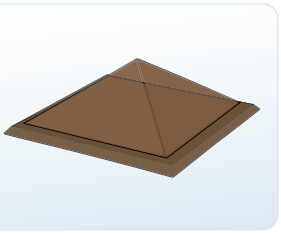
### Diffused

- Maximises privacy.
- High levels of light transmission into a building.
- Diffuses light transmission and so avoids glare and shadows.
- Prevents vision of views and objects.



### Opal

- Maximises privacy.
- Diffuses light transmission and so avoids glare and shadows.
- Prevents vision of views and objects.



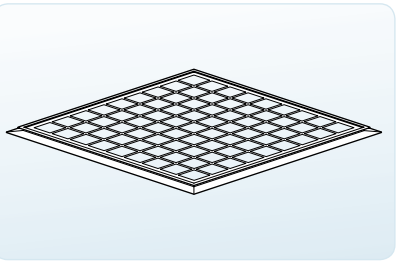
### Bronze

- Reduces solar heat gain.
- Reduces light transmission into a building.

## Security

Xtralite offers a range of security options to prevent unauthorised access, depending on the level of security required and product range selected.

### Security Screws (SS)



### Intruder Grid (IG)

Intruder grid systems may be added to all rooflights in the Xtralite range. They are positioned between the glazing and roof opening and consist of a 3 mm diameter, solid steel fully-welded mesh in a 75 mm grid. This system will resist entry even when the rooflight has been compromised or removed.

# Rooflight Specification Guide



Each of Xtralite's rooflight ranges has a wide array of options. To aid specifiers in the selection process Xtralite has created a simple-to-follow guide, designed to help formulate the rooflight configuration required.

By following the advice in this manual and referring to the CAD database on the Xtralite website **www.xtralite.co.uk** in the downloads section, specifiers can see the options available and configure individual roof light specifications.

When specifying, it is not essential to use the product codes which denote the different glazing, ventilation and roof attachment options available, specifying using text descriptions is acceptable. However, providing the correct codes may assist in accurately specifying the desired rooflight configuration.

If further assistance is required in determining the rooflight configuration, please call Xtralite on **01670 354157**.

**Understanding the Xtralite Ventilation and Attachment Codes**

XT-X1-A-00

- XT — Denotes an Xtralite product. This part of the code will not change.
- X1 — Denotes the range of rooflights, (X1 – X5). (See step 1)
- A — Denotes the Roof Attachment method. (See step 3)
- 00 — Denotes the ventilation type. (See step 4)

**Understanding the Xtralite Glazing Code**

XT-DM-3-SF-BRONZE

- XT — Denotes an Xtralite product. This part of the code will not change.
- DM — Denotes the glazing shape. (See steps 6&7)
- 3 — Denotes the glazing configuration. (See steps 6&7)
- SF — Denotes the security options. (See steps 6&7)
- BRONZE — Denotes the glazing colour. (See steps 6&7)

## Step 1—Before the detailing begins

Consider the following two key elements:

- Most rooflight specification is driven by Part L and consequently U value performance. So select the rooflight that meets your particular project requirements from the X-One to X-Five range.
- If **glazing only (X-Glaze)** is required go to step 7. For units that require an attachment or ventilation zone go to step 2.

**U value Options**

| | X-One | X-Two | X-Three | X-Four | X-Five |
|---|---|---|---|---|---|
| **U value** (2.2 required for Part L) | 1.3 Uvalue | 1.8 Uvalue | 2.2 Uvalue | 2.2 Uvalue | 4.0 Uvalue |

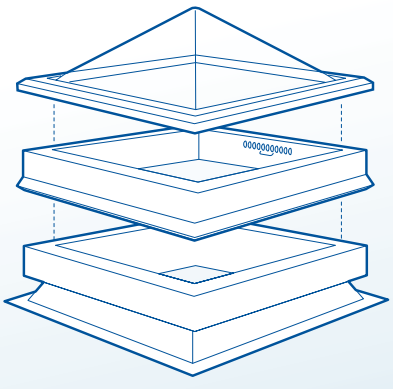
Xtralite are capable of producing bespoke-sized rooflights, however when size is not an issue typical standard sizes are shown in step 5 and a guide to measuring the roof opening is shown in step 8 .

## Step 2—Understanding the rooflight construction

Rooflight construction is broken down into three key areas:

- Attachment zone
- Ventilation zone
- Glazing zone

You will need to work from the bottom up so firstly—the attachment zone.



## Step 3—The Attachment Zone

The attachment zone covers three elements;

1. The shape of the opening—rectangular, square or circular
2. The various attachment options
3. Security—the inclusion of an intruder grid

Further information regarding these details is available in the individual product sections within the product portfolio and also at **www.xtralite.co.uk**

**Attachment Zone Options**

| | Code | X-One | X-Two | X-Three | X-Four | X-Five |
|---|---|---|---|---|---|---|
| **Roof Opening Shape** | | | | | | |
| Rectangular/Square | | • | • | • | | • |
| Circular | | | | • | • | • |
| **Attachment** | | | | | | |
| Kerb with Variable Metal Foot | A | • | • | | | |
| Kerb with Variable Metal Foot to Suit Kerb-to-Falls Insulation | B | • | • | | | |
| Kerb Direct to Roof | C | • | • | • | • | • |
| Adaptor Kerb | D | • | • | • | | • |
| Sleeve Over | F | • | • | • | | • |
| **Security** | | | | | | |
| Intruder Grid | IG | • | • | • | • | • |

## Step 4—The Ventilation Zone

Xtralite's range of options gives the specifier considerable scope to satisfy the ventilation requirement.

**Ventilation Zone Options**

| | Code | X-One | X-Two | X-Three | X-Four | X-Five |
|---|---|---|---|---|---|---|
| Unventilated | 00 | • | • | • | • | • |
| Hit and Miss | 01 | | • | • | | • |
| Rotary Vent | 02 | • | • | • | | |
| Wormgear | 03 | • | • | • | | • |
| Access Hatch with Gas Spring | 04G | | • | • | | • |
| Access Hatch with Restriction Stay | 04F | • | • | • | | • |
| Access Hatch with Electric Motor | 04E | | | • | | • |
| Smoke Vent/AOV with 90° Opening | 0590 | | | • | | • |
| Smoke Vent/AOV with 140° Opening | 05140 | | | • | | • |
| Smoke Vent/AOV with Dual-Pitch Opening | 05DP | | | | | • |
| Linear Motor | 06 | • | • | • | | • |
| Emergency Opening Gas Spring | 07 | | • | • | | • |
| Permanent Vent | 08 | | | | | • |
| Control Louvre | 09 | | | | | • |
| 50% Louvre | 10 | | | | | • |
| Electromagnet | 11 | | | • | | • |
| Electric Sliding Opener | 12E | | | | | • |
| Manual Sliding Opener | 12M | | | | | • |
| Extract Vent | 13 | | | | | • |
| Trickle Vent | 14 | | | | • | • |

## Step 5—Sizing the Rooflight

Xtralite has the ability to manufacture bespoke-sized modular rooflights up to; rectangular 1500 mm x 2400 mm, circular 1800 mm (diameter). The following is a selection of common standard sizes. For larger rooflights see the continuous rooflights, panelised glazing and specialist glazing sections.

**Size Options (mm)**

| | | | | X-One | X-Two | X-Three | X-Four | X-Five |
|---|---|---|---|---|---|---|---|---|
| **Square** | 600 x 600 | 750 x 750 | 900 x 900 | | | | | |
| | 1000 x 1000 | 1050 x 1050 | 1200 x 1200 | • | • | • | | • |
| | 1350 x 1350 | 1500 x 1500 | 1800 x 1800 | | | | | |
| **Rectangular** | 600 x 900 | 900 x 1800 | 600 x 1200 | | | | | |
| | 900 x 2400 | 600 x 1500 | 1000 x 1500 | | | | | |
| | 600 x 1800 | 1000 x 2000 | 600 x 2400 | • | • | • | | • |
| | 1200 x 1500 | 900 x 1200 | 1200 x 1800 | | | | | |
| | 900 x 1350 | 1200 x 2400 | 900 x 1500 | | | | | |
| | 1500 x 2400 | | | | | | | |
| **Circular** (Diameter) | 600 | 900 | 1200 | | | • | • | • |
| | 1500 | 1800 | | | | | | |

## Step 6—The Glazing Zone

Within the glazing zone there are four options to consider, material, shape, colour and security. Unless otherwise specified the glazing will be 3 mm polycarbonate for each skin.

**Glazing Zone Options**

| **Material*** | | Code | X-One | X-Two | X-Three | X-Four | X-Five |
|---|---|---|---|---|---|---|---|
| Polycarbonate | Single | 1 | | | | | • |
| | Double | 2 | | | | | • |
| | Triple | 3 | • | • | • | • | |
| Glass** | Single | GL | | | | | • |
| | Double | IGL | • | • | • | • | |
| **Shape** | | | | | | | |
| Polycarbonate | Pyramid | PY | • | • | • | | • |
| | Dome | DM | • | • | • | | • |
| Glass | Flat | Glass | • | • | • | • | • |
| Solid | Flat | Solid | • | • | • | • | • |
| **Glazing Colours** | | | | | | | |
| Polycarbonate | Clear | Clear | • | • | • | • | • |
| | Diffused | Diffused | • | • | • | • | • |
| | Opal | Opal | • | • | • | • | • |
| | Bronze | Bronze | • | • | • | • | • |
| **Glazing Security** | | | | | | | |
| Security Screws | | SS | • | • | • | • | • |
| Security Frame | | SF | • | • | • | | • |

*Glazing options are only those that we recommend to achieve the U value figures shown in step 1. Other options are available on request.
** For your glass specification, please contact Xtralite to review the options available.

## Step 7—Specifying Glazing Only (X-Glaze)

For those situations where a pre-constructed builder's kerb already exists, Xtralite provide a polycarbonate glazing only option. A security screw attachment is available and if further security is required an intruder grid can be fitted. U values vary depending on whether single, double or triple glazing configurations are used. For sizing guidance please refer to step 5.

**Glazing Only Options**

| | Code | Configuration | | |
|---|---|---|---|---|
| | | **Triple Skin** (Code 3) | **Double Skin** (Code 2) | **Single Skin** (Code 1) |
| **U value** (2.2 required for Part L) | |  |  |  |
| **Polycarbonate Options** | | | | |
| Dome | DM | • | • | • |
| Pyramid | PY | • | • | • |
| Trapezoid | TR | • | • | • |
| **Colour Options** | | | | |
| Clear | Clear | • | • | • |
| Diffused | Diffused | • | • | • |
| Opal | Opal | • | • | • |
| Bronze | Bronze | • | • | • |
| **Security Options** | | | | |
| Security Screws | SS | • | • | • |
| Intruder Grid | IG | • | • | • |

## Step 8—Required Information for Bespoke Rooflight Sizes

To ensure that each bespoke rooflight is correctly manufactured, the measurements required are clarified in the descriptions and accompanying diagrams below and overleaf.

## Glazing only (X-Glaze) and Adaptor Kerbs

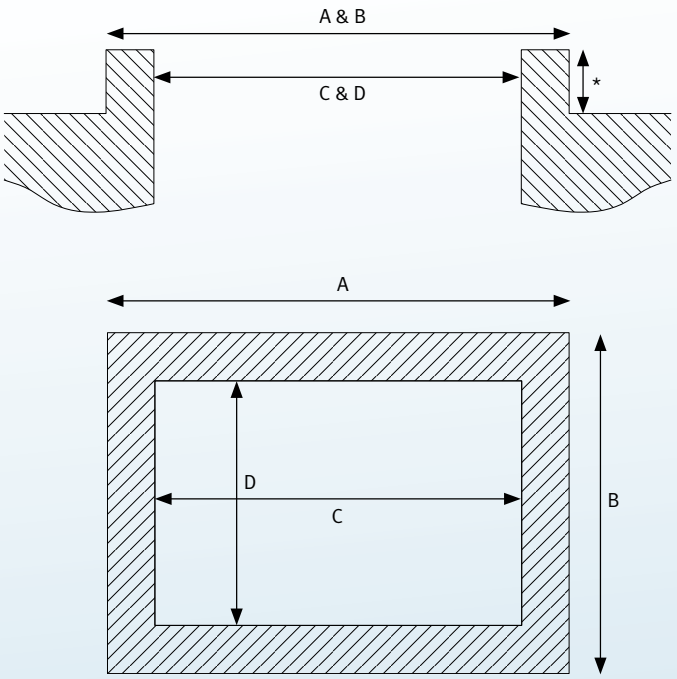
To fix X-Glaze (domes and pyramids) and rooflights with adaptor kerbs to a kerb that has been pre-built the measurements required are shown in the diagram and itemised below.

A & B — overall finished kerb sizes including all added insulation and weatherproofing finishes.

C & D — internal finished sizes including all well liners.

* Min 150 mm from finished roof surface.

### X-Glaze and Adaptor Kerbs



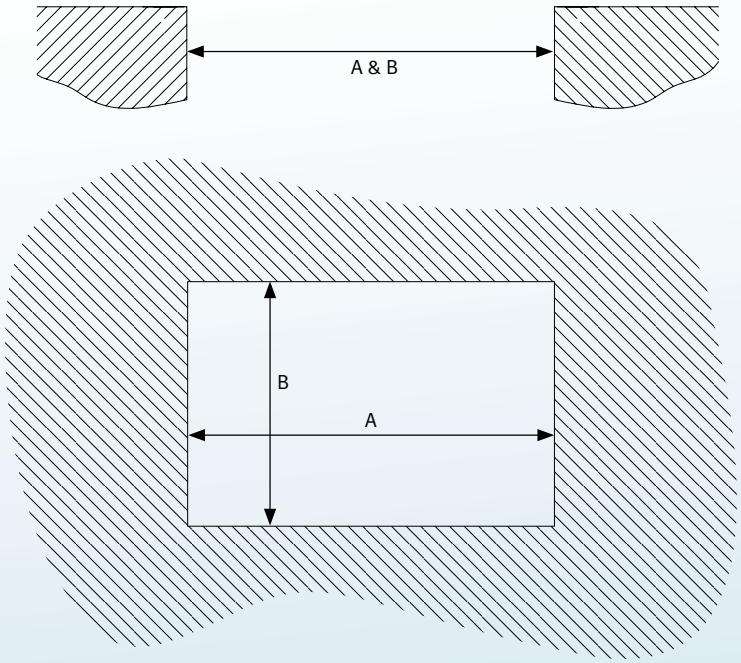

## Rooflights that Include a Kerb Supplied by Xtralite

Care must be taken to ensure the fixing point of the rooflight kerb locates onto solid ground to ensure a secure fixing.

The measurements shown in the diagram and itemised below are the required details.

A & B — the roof opening size.

### Rooflights that Include a Kerb Supplied by Xtralite



# Product Portfolio
# Continuous Rooflights



Xtralite ROOFLIGHTS

# Overview

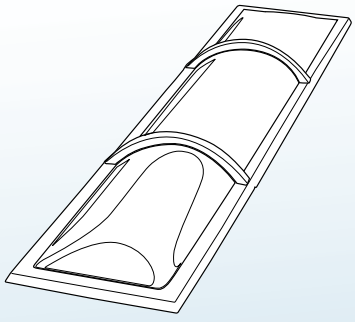


Xtralite has introduced this range for fast-track procurement of linear rooflights up to 2.4 m wide. For larger continuous rooflights—or those with corners or other complexities—refer to the Specialist Roof Glazing section. Three design formats are available:

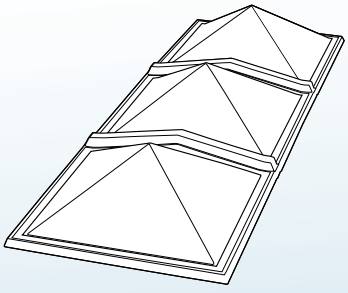
- Thermoformed Barrel Vaults
- Linked Pyramids
- Linked Domes

| Guide Sizes (mm) |
|---|
| **Barrel Vaults (Width)** |
| 600 |
| 900 |
| 1200 |
| 1500 |
| 1800 |
| 2100 |
| 2400 |

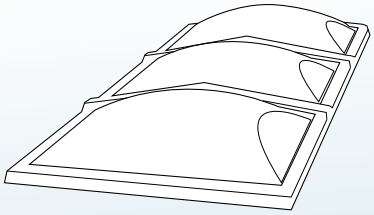
Continuous Rooflights are triple glazed as standard and formed from enhanced UV-protected polycarbonate with vented airspaces to satisfy Part L requirements. Single- and double-skin options (which fall outside Part L) are also available. The integral Cascade water management system ensures that moisture drains to the outside of the building and air leakage meets Part L criteria.



**Thermoformed Barrel Vault (BR)**



**Linked Pyramid (CP)**



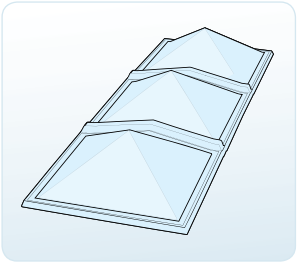
**Linked Dome (CD)**

Xtralite ROOFLIGHTS

# **Product Portfolio** Continuous Rooflights
# Glazing and Security Options

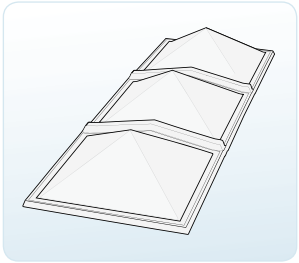
## Glazing Colour

The various glazing layers in Xtralite rooflights can be supplied in four types or colours: clear, opal, bronze or diffused—with the characteristics described below. For information on the light transmission of different types of polycarbonate rooflight glazing in various configurations, refer to the earlier section: **Designing with Daylight**—Properties of Glazing Materials and Configurations. In addition, all ranges are 'Non-fragile, Class B' rating classified to ACR[M]001:2005 *'Test For Non-Fragility of Profiled Sheeted Roofing Assemblies'*, Edition 3 – the "Red Book".



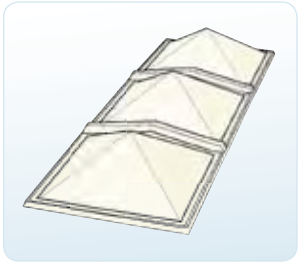
### Clear

- High light transmission.
- Placement where glare may occur is a consideration.
- Allows full vision of views and objects.



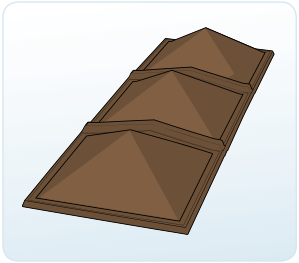
### Diffused

- Maximises privacy.
- High levels of light transmission into a building.
- Diffuses light transmission and so avoids glare and shadows.
- Prevents vision of views and objects.



### Opal

- Maximises privacy.
- Diffuses light transmission and so avoids glare and shadows.
- Prevents vision of views and objects.



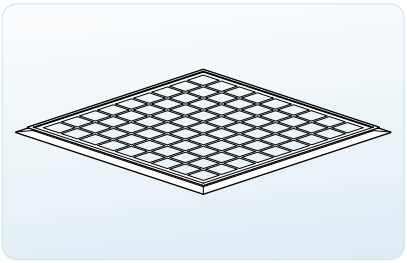
### Bronze

- Reduces solar heat gain.
- Reduces light transmission into a building.

## Security

Xtralite offers a range of security options to prevent unauthorised access, depending on the level of security required and product range selected.

### Security Screws (SS)



### Intruder Grid (IG)

Intruder grid systems may be added to all rooflights in the Xtralite range. They are positioned between the upstand and the roof structure and consist of a 3 mm diameter, solid steel fully-welded mesh in a 75 mm grid. This system will resist entry even when the rooflight has been compromised or removed.

# Product Portfolio
# Panelised Glazing



Xtralite ROOFLIGHTS

# **Product Portfolio** Panelised Glazing
# Overview



A unique aluminium-framed glazing system that can reduce site installation time by as much as 70%, due to its ease of fixing. Only two screws are required for each panel (except the first which requires just four). Panels are sized and constructed specifically for each project so there is no cutting or fabrication on site. The system is available on either a supply only or supply and fix basis.

Xtralite Panelised Glazing is:

- Lightweight
- Impact resistant
- Fully factory-assembled
- Thermally efficient
- Non-fragile
- Easy to handle
- 20-year insurance protected
- Available with a comprehensive product guarantee

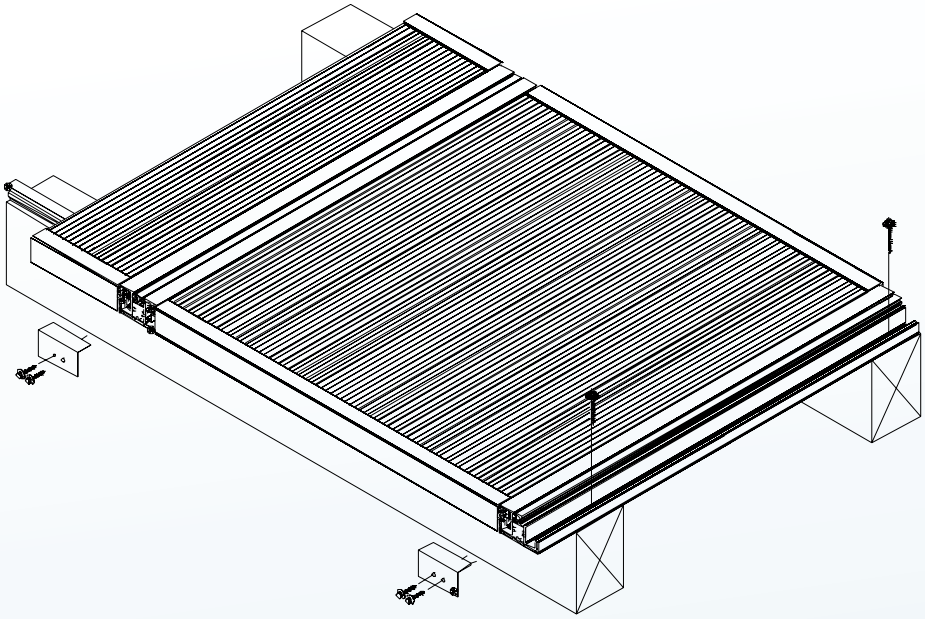
Xtralite Panelised Glazing is suitable for roofing and walling installations, ranging from 10° pitch to vertical. The system is perfect for northlights, patent glazing replacement, monopitch rooflights and vertical glazing. The versatility of the system means it can be used on ridges or abutting wall panels and gutters. This allows the designer the flexibility to introduce natural light into the building across most areas of the roof or other structures. Xtralite Panelised Glazing is ideal for both new build and refurbishment in numerous applications including factories, schools, leisure centres, logistics facilities and other open-plan buildings. The system is now also available with the latest advanced glazing technology Nanogel® sheet—offering impressive energy saving and lighting characteristics (see the earlier section **Designing with Daylight—Properties of Glazing Materials and Configurations**).

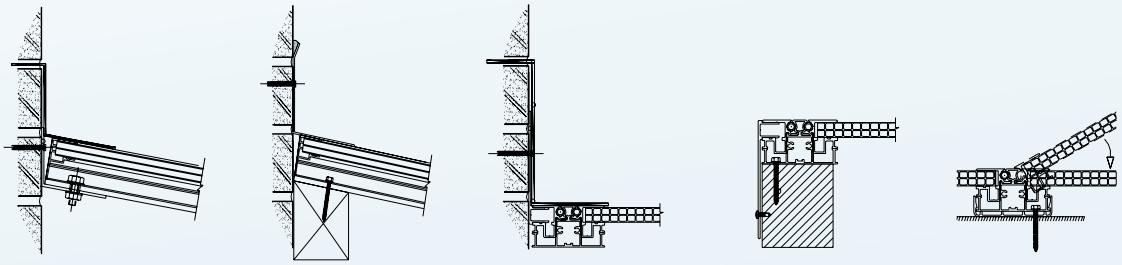
Xtralite ROOFLIGHTS

# Linked Modular System



## Specification





| | |
|---|---|
| Description | Interlocking, aluminium-framed polycarbonate. |
| Size | Width—1.0 m as standard. Length—up to 5.0 m (longer by arrangement). |
| Glazing | Multi-wall, UV-protected, structured polycarbonate sheet (clear as standard—opal, bronze and grey as an option). |
| Structure | Integral aluminium side profiles, main bar and secondary link bars. Both main and secondary profiles are complete with water management systems and are designed to work in a 'seal-less' format. |
| Thermal cloak | High quality extruded PVC-U undercladding profile clips to main profile enhancing the thermal properties of the assembly to reduce the possibility of condensation problems. |
| Finish | Polyester powder coated to BS 6496. |
| Colour | Standard white RAL 9910 Matt (other colours available). |
| Performance | Light transmission: clear 82%. U value: 2.3 W/m²K (16 mm triplewall). Fire: BS 476 Part 7—class 1. Building Regulations (1991). Class O – Tp (a). Aluminium: BS 1474. |
| Fixings | High quality stainless steel. |

# Vertical Panels with Nanogel® Technology



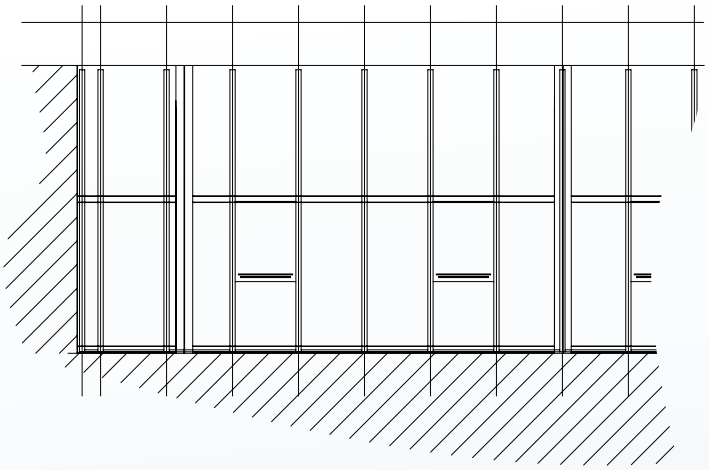
The unique, aluminium framed Panelised Glazing system described previously is also a particularly effective light transmitting wall solution when used in conjunction with Nanogel® technology. The clear polycarbonate structured multi-wall panels—available in a choice of thicknesses—are filled with Nanogel® translucent aerogel granules. They give excellent light transmission and diffusion for a 'shadow-less' light quality, ideal for sports facilities for example, as well as improved sound reduction.

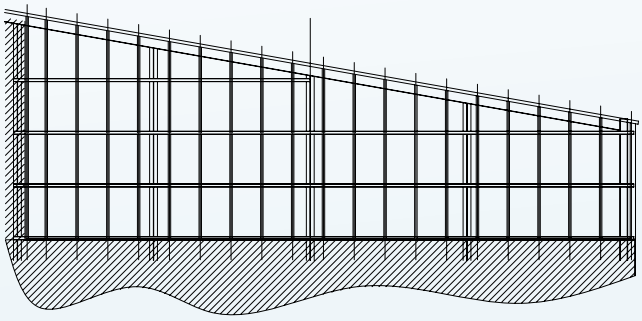
However, it is the substantial improvement in insulation performance that is most impressive with Nanogel®, due to the limited heat conduction of the granules. With U values as low as 0.91 W/m²K, substantial proportions of Nanogel® Panelised Glazing can be used for light transmitting walls within the constraints of Part L, unattainable with many other glazing systems. It is also worth remembering that the Panelised Glazing system is fabricated in the factory to suit each individual project, in line with the Modern Methods of Construction (MMC) ethos, with minimal site work. In addition to ensuring accuracy and consistent performance, this feature saves time—particularly as Xtralite products are not imported.

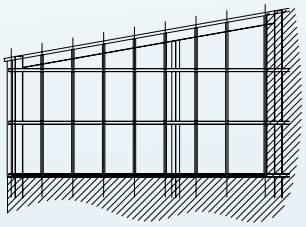
Xtralite ROOFLIGHTS

# **Product Portfolio** Panelised Glazing
# Vertical Panels with Nanogel® Technology

## Specification







| | |
|---|---|
| Maximum spans | Up to 2.5 m (self supporting). |
| Length | Up to 5.0 m. |
| Loading | Designed in accordance with CP3 Chapter V Part 2:1972<br>BS 6399:Part 1 and Part 3 1984 max. 1.5 kPa wind and 0.75 kPa imposed. |
| Safety | ACR[M]001:2005 Class B option available. |
| Glazing options | 16 mm and 25 mm structured multi-wall polycarbonate. |
| Thermal performance | Part L: below 2.0 W/m²K options available. |
| Fire regs | BS 476 Part 7: class 1(1991) Class '0' Tp(a). |
| Surface finish | Mill finish and polyester powder. |

Panelised Glazing systems are designed and manufactured by Xtralite in the UK specifically for each project. A choice of panel thickness is offered with maximum panel widths of 1.0 m (16 mm thick) and 1.2 m (25 mm thick), and length of 5 m. The factory assembled aluminium frames are available in mill finish or polyester powder coated in the specifier's choice of colour and require minimal on-site fixing.

# Product Portfolio
## Specialist Roof Glazing



Xtralite ROOFLIGHTS

# Overview



Over the years, Xtralite has developed a universal, structural glazing package for bespoke installations, offering architects complete design freedom while meeting the widest set of technical requirements. It utilises a comprehensive suite of interchangeable profiles from which the Xtralite system designers can select, in order to create an unlimited variety of differing shaped and sized rooflighting structures. In addition to impressive bespoke rooflights within buildings, other structures can also be supplied such as canopies, walkways and smoking shelters.

All designs incorporate such features as:

- 'Cascade' internal water management system
- Custom engineered connections
- Bespoke closures
- Custom-designed flashings
- 20 year warranty

An impressive choice of high quality glazing materials is available including glass and polycarbonate, and the latest advanced glazing technology Nanogel® sheet—offering impressive energy saving and lighting characteristics (see the earlier section **Designing with Daylight—Properties of Glazing Materials and Configurations**).

Of course, there is more to successfully realizing architectural concepts than a well-developed, comprehensive system of components. Of equal importance is a skilled and experienced design team with particular expertise in glazing technology. There are few, if any, similar organisations with such a rich breadth of knowledge and range of skills as Xtralite.

The Xtralite team comprises:

- Project Managers
- Estimators
- Design Engineers
- CAD Operators
- Quantity Surveyor
- Structural Engineer
- Installation Manager
- Commercial Manager
- Technical Manager

All of whom can be contacted on: **01670 354157**. Xtralite has recently substantially enlarged its manufacturing facilities to allow for further expansion of its Specialist Roof Glazing Division.

Xtralite ROOFLIGHTS

**Product Portfolio** Specialist Roof Glazing

# Semi-Circular Barrel Vault with Nanogel® Technology

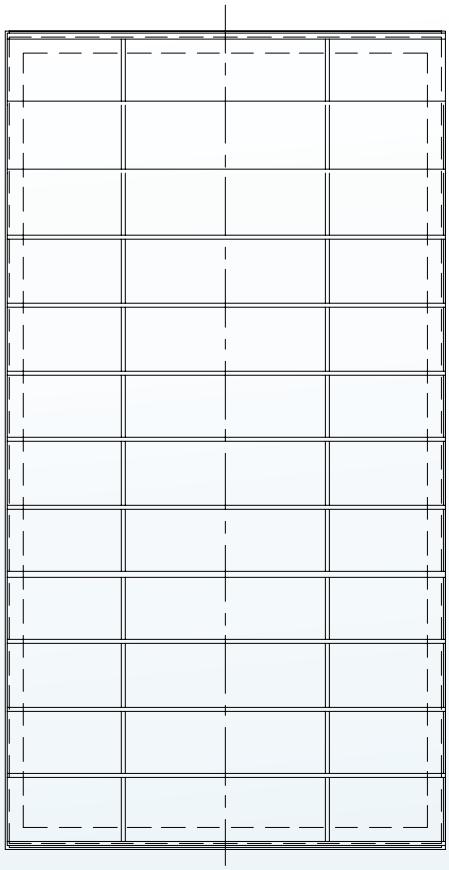
The classic vault is a simple semi-circle that tops the supporting structure. Aalternatively, it can be extended on vertical legs incorporating such features as windows, vents or louvres. Ends can be terminated with vertical glazed screens or simply abut an adjoining structure.

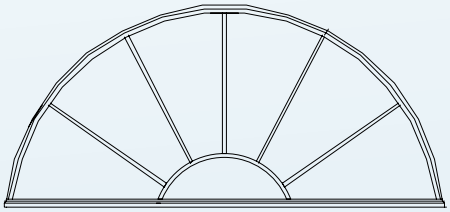
The spanning performance quoted below assumes classic semi-circular geometry and is self-supporting—much larger spans can be achieved but these would require a substructure for additional support.

May be glazed with a range of polycarbonate options—from solid single-skin for canopies and unheated spaces, to multiwall structured with exceptional thermal performance for part L compliance.

All metal parts can be mill finish for economy or, alternatively, coloured with polyester powder, PVF2 or anodised.

## Specification





| | |
|---|---|
| Maximum spans | Up to 7.0 m (self supporting). |
| Length | Infinite length. |
| Loading | Designed in accordance with CP3 Chapter V Part 2:1972 BS 6399:Part 1 and Part 3 1984 max. 1.5 kPa wind and 0.75 kPa imposed. |
| Safety | ACR[M]001:2005 Class B option available. |
| Glazing options | Structured and solid polycarbonate: clear, opal or bronze. |
| Thermal performance | Part L: below 2.0 W/m$^2$K options available. |
| Fire regs | BS 476 Part7:class1(1991) Class '0' Tp(a). |
| Surface finish | Mill finish, polyester powder, PVF2 and anodised. |

Illustrated here are details from an installation, designed and constructed with semi-circular geometry.

Such details are indicative only—project-specific designs and details are produced for each project engineered by Xtralite.

For more information on the semi-circular barrel vault contact our structural department on **01670 354157** or email **sales@xtralite.co.uk**

Xtralite ROOFLIGHTS

**Product Portfolio** Specialist Roof Glazing

# Low Profile Barrel Vault

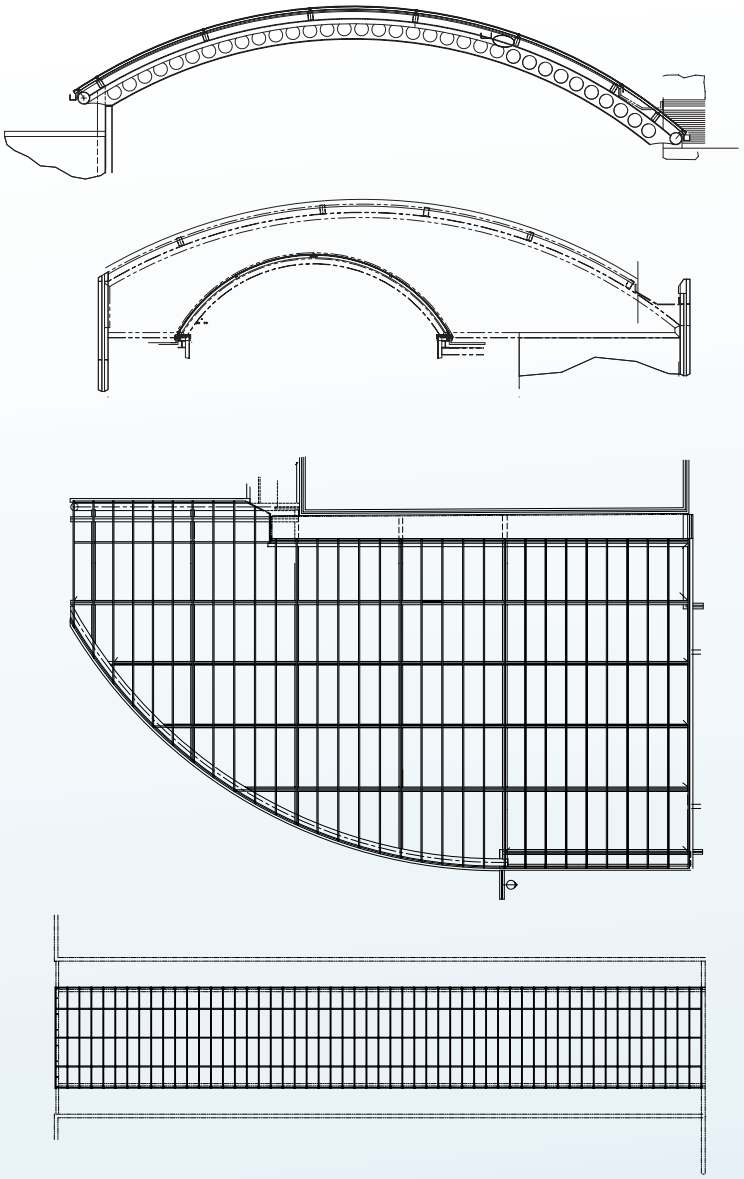
The typical low-profile barrel vault is an elegant low rise arc spanning between supporting structures. The normal geometry for low rise is usually stated as the radius of the arch is equal to the span of the arch, other geometries are entirely possible. Ends can be terminated with vertical glazed screens or simply abut an adjoining structure.

The spanning performance quoted overleaf assumes standard low-profile geometry and is self-supporting—much larger spans can be achieved but these would require a substructure for additional support.

They may be glazed with a range of polycarbonate options—from solid single-skin for canopies and unheated spaces, to multiwall structured with exceptional thermal performance for part L compliance.

All metal parts can be mill finish for economy or, alternatively, coloured with polyester powder, PVF2 or anodised.

## Specification



| | |
|---|---|
| Maximum spans | Up to 10.0 m (self supporting). |
| Length | Infinite length. |
| Loading | Designed in accordance with CP3 Chapter V Part 2:1972 BS 6399:Part 1 and Part 3 1984 max. 1.5 kPa wind and 0.75 kPa imposed. |
| Safety | ACR[M]001:2005 Class B option available. |
| Glazing options | Glazing in glass or structured and solid polycarbonate. |
| Thermal performance | Part L: below 2.0 W/m²K options available. |
| Fire regs | BS 476 Part7:class1(1991) Class '0' Tp(a). |
| Surface finish | Mill finish, polyester powder, PVF2 and anodised. |

Illustrated here are details from an installation, designed and constructed with low-rise geometry.

Such details are indicative only—project-specific designs and details are produced for each project engineered by Xtralite.

For more information on the low-profile barrel vault contact our structural department on **01670 354157** or email **sales@xtralite.co.uk**

Xtralite ROOFLIGHTS

# Hipped-End Ridgelight



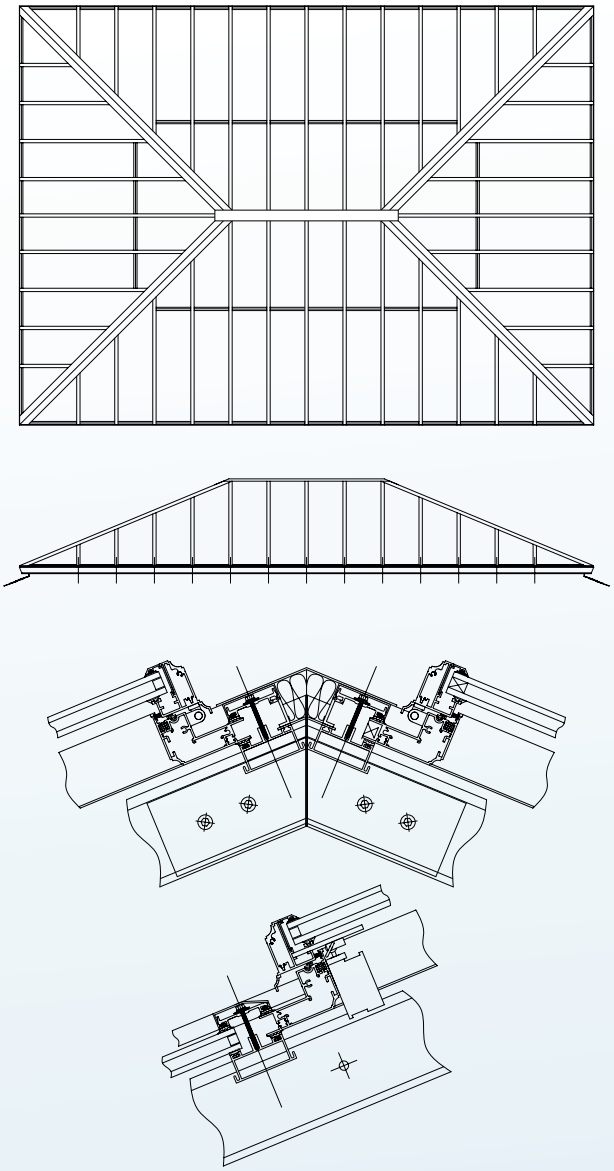
Create instant impact in a scheme with an Xtralite hipped-end ridgelight. These constructions seem to have an innate ability to introduce more daylight than any other type of rooflight construction. With hipped-end construction the sweep created at the sides is continued around at the ends producing an attractive, meaningful feature.

The most usual geometry for these rooflights would be 30°, although 45° is not uncommon. The limits for slope ranges from 10° up to near vertical.

They may be glazed with a range of advanced glasses and high specification polycarbonate options—from solid single glazed for canopies and unheated spaces, to multiwall structured or triple glazed with exceptional thermal performance for part L compliance.

All metal parts can be mill finish for economy or, alternatively, coloured with polyester powder, PVF2 or anodised.

## Specification



| | |
|---|---|
| Maximum spans | Up to 7.0 m (self supporting). |
| Length | Infinite length. |
| Loading | Designed in accordance with CP3 Chapter V Part 2:1972 BS 6399:Part 1 and Part 3 1984 max. 1.5 kPa wind and 0.75 kPa imposed. |
| Safety | ACR[M]001:2005 Class B option available. |
| Glazing options | Glazing in glass or structured and solid polycarbonate. |
| Thermal performance | Part L: below 2.0 W/m²K options available. |
| Fire regs | BS 476 Part7:class1(1991) Class '0' Tp(a). |
| Surface finish | Mill finish, polyester powder, PVF2 and anodised. |

Illustrated here are details from a hipped-end ridgelight installation, designed and constructed with 30° geometry.

Such details are indicative only—project specific designs and details are produced for each project engineered by Xtralite.

For additional information on the hipped end ridgelight contact our structural department on **01670 354157** or email **sales@xtralite.co.uk**

Xtralite ROOFLIGHTS

# Ridgelight



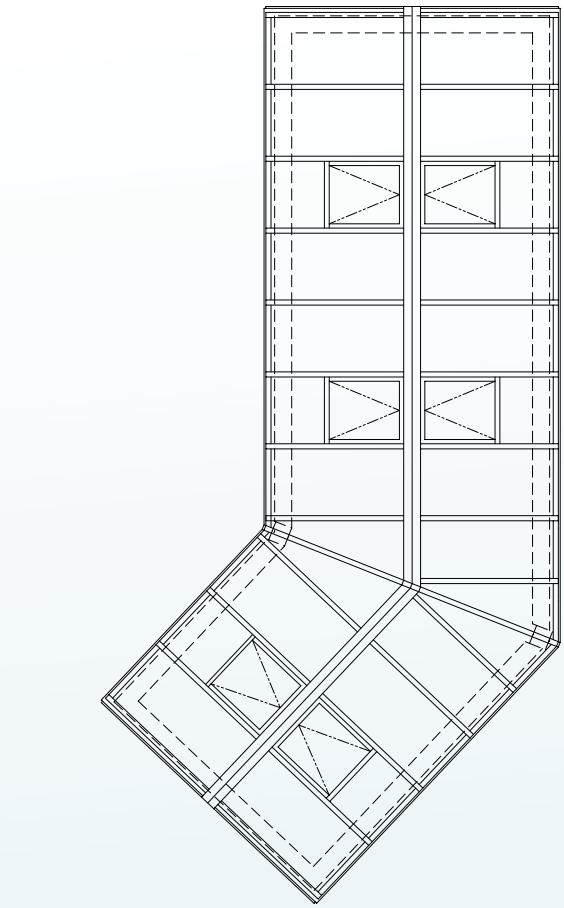
This is the workman of rooflights—used to cover and light corridors, walkways and monospaces. The detailing is both dedicated and repetitive, thus introducing enhanced levels of economy.

The most usual geometry for these rooflights would be 30°, although 45° is not uncommon. The limits for slope range from 10° up to near vertical.

They may be glazed with a range of advanced glasses and high specification polycarbonate options—from solid single glazed for canopies and unheated spaces, to multiwall structured or triple glazed with exceptional thermal performance for part L compliance.

All metal parts can be mill finish for economy or, alternatively, coloured with polyester powder, PVF2 or anodised.

## Specification



| | |
|---|---|
| Maximum spans | Up to 7.0m (self supporting). |
| Length | Infinite length. |
| Loading | Designed in accordance with CP3 Chapter V Part 2:1972 BS 6399:Part 1 and Part 3 1984 max. 1.5 kPa wind and 0.75 kPa imposed. |
| Safety | ACR[M]001:2005 Class B option available. |
| Glazing options | Glazing in glass or structured and solid polycarbonate. |
| Thermal performance | Part L: below 2.0 W/m$^2$K options available. |
| Fire regs | BS 476 Part7:class1(1991) Class '0' Tp(a). |
| Surface finish | Mill finish, polyester powder, PVF2 and anodised. |

Illustrated here are details from a ridgelight installation, designed and constructed with 30° geometry and surmounting a pitched roof.

It is capable of turning corners, as illustrated, and just as capable of being extended to infinity should the need ever arise.

Such details are indicative only—project specific designs and details are produced for each project engineered by Xtralite.

For additional information on the ridgelight contact our structural department on **01670 354157** or email **sales@xtralite.co.uk**

Xtralite ROOFLIGHTS

**Product Portfolio** Specialist Roof Glazing

# Self-Supporting Pyramid

As the name suggests these pyramids do not require any additional support except, of course, an upstand or kerb to which it can be attached.

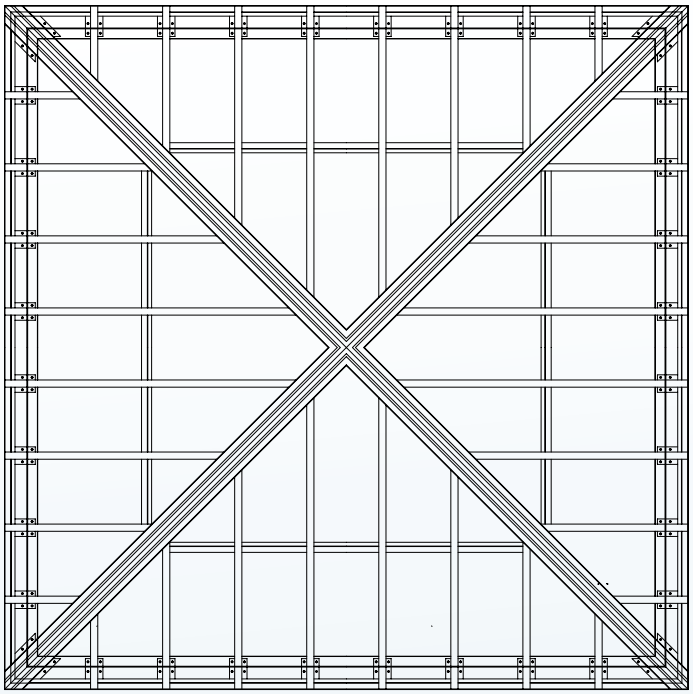
More than anything else, the pyramid is ‘a statement’ as presumably the Pharaohs would agree!! Strong lines and ‘focus’ make it useful in more ways than simply introducing light into a space.

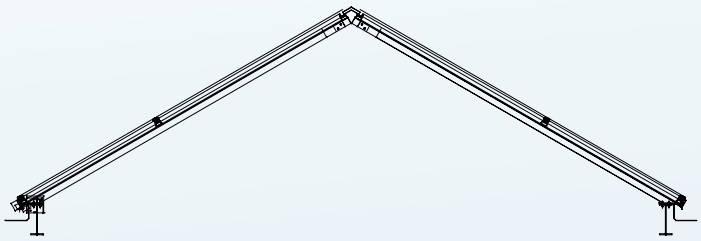
The most usual geometry for these rooflights would be 30°, although 45° is not uncommon. The limits for slope ranges from 10° up to near vertical.

They may be glazed with a range of advanced glasses and high-specification polycarbonate options—from solid single glazed for canopies and unheated spaces, to multiwall structured or triple glazed with exceptional thermal performance for part L compliance.

All metal parts can be mill finish for economy or, alternatively, coloured with polyester powder, PVF2 or anodised.

## Specification





| | |
|---|---|
| Maximum base square | Up to 8.0 m (self supporting). |
| Loading | Designed in accordance with CP3 Chapter V Part 2:1972 BS 6399:Part 1 and Part 3 1984 max. 1.5 kPa wind and 0.75 kPa imposed. |
| Safety | ACR[M]001:2005 Class B option available. |
| Glazing options | Glazing in glass or structured and solid polycarbonate. |
| Thermal performance | Part L: below 2.0 W/m²K options available. |
| Fire regs | BS 476 Part7:class1(1991) Class '0' Tp(a). |
| Surface finish | Mill finish, polyester powder, PVF2 and anodised. |

Illustrated here are details from a self-supporting pyramid installation, designed and constructed with 30° geometry and set into a flat roof.

Such details are indicative only—project-specific designs and details are produced for each project engineered by Xtralite.

For additional information on the self-supporting pyramid contact our structural department on 01670 354157 or email sales@xtralite.co.uk

Xtralite ROOFLIGHTS

# Pitched Polygon



A round, faceted pyramid of indescribable beauty when well engineered. Xtralite has delivered and installed many of these to the Middle and Far East.

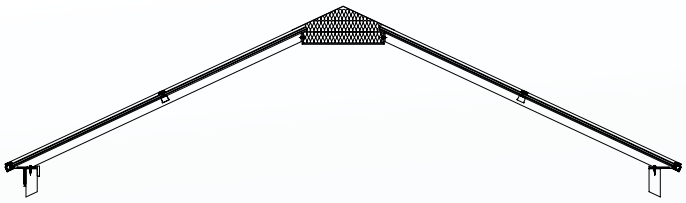
But, by inspection of the picture it can be seen that there is an overwhelming level of engineering. Couple that with the proportion of metal to glazing and it becomes obvious that this isn't a low budget item. These rooflights are nothing less than jewels mounted in roofscape settings.

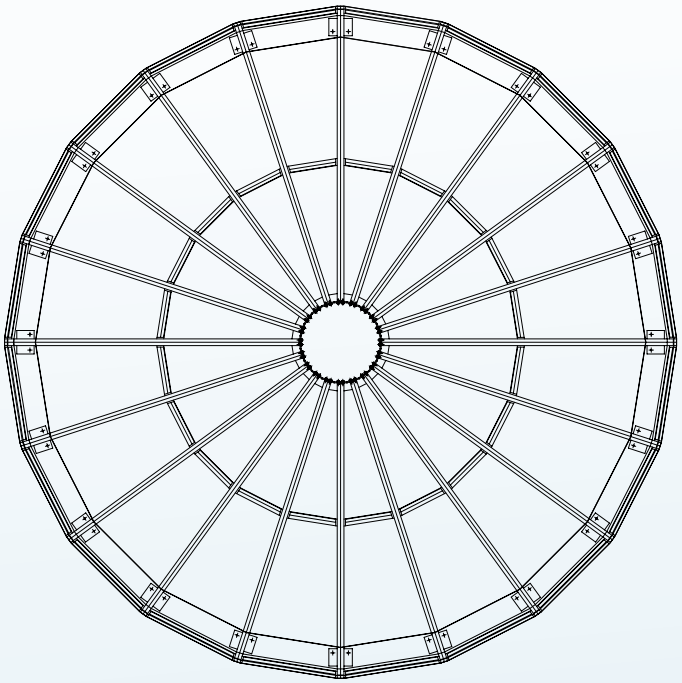
The most usual geometry for these rooflights would be 30°, although 45° is not uncommon. The limits for slope ranges from 10° up to near vertical.

They may be glazed with a range of advanced glasses and high-specification polycarbonate options—from solid single glazed for canopies and unheated spaces, to multiwall structured or triple glazed with exceptional thermal performance for part L compliance.

All metal parts can be mill finish for economy or, alternatively, coloured with polyester powder, PVF2 or anodised.

## Specification





| | |
|---|---|
| Maximum base square | Up to 10.0 m (self supporting). |
| Loading | Designed in accordance with CP3 Chapter V Part2:1972 BS 6399:Part 1 and Part 3 1984 max. 1.5 kPa wind and 0.75 kPa imposed. |
| Safety | ACR[M]001:2005 Class B option available. |
| Glazing options | Glazing in glass or structured and solid polycarbonate. |
| Thermal performance | Part L: below 2.0 W/m²K options available. |
| Fire regs | BS 476 Part7:class1(1991) Class '0' Tp(a). |
| Surface finish | Mill finish, polyester powder, PVF2 and anodised. |

Illustrated here are details from a self-supporting pitched polygon installation, designed and constructed with 30° geometry and set into a sloping metal profiled roof.

Such details are indicative only—project-specific designs and details are produced for each project engineered by Xtralite.

For additional information on the hipped end ridgelight contact our structural department on **01670 354157** or email **sales@xtralite.co.uk**

Xtralite ROOFLIGHTS

# Mono-Pitched Rooflight



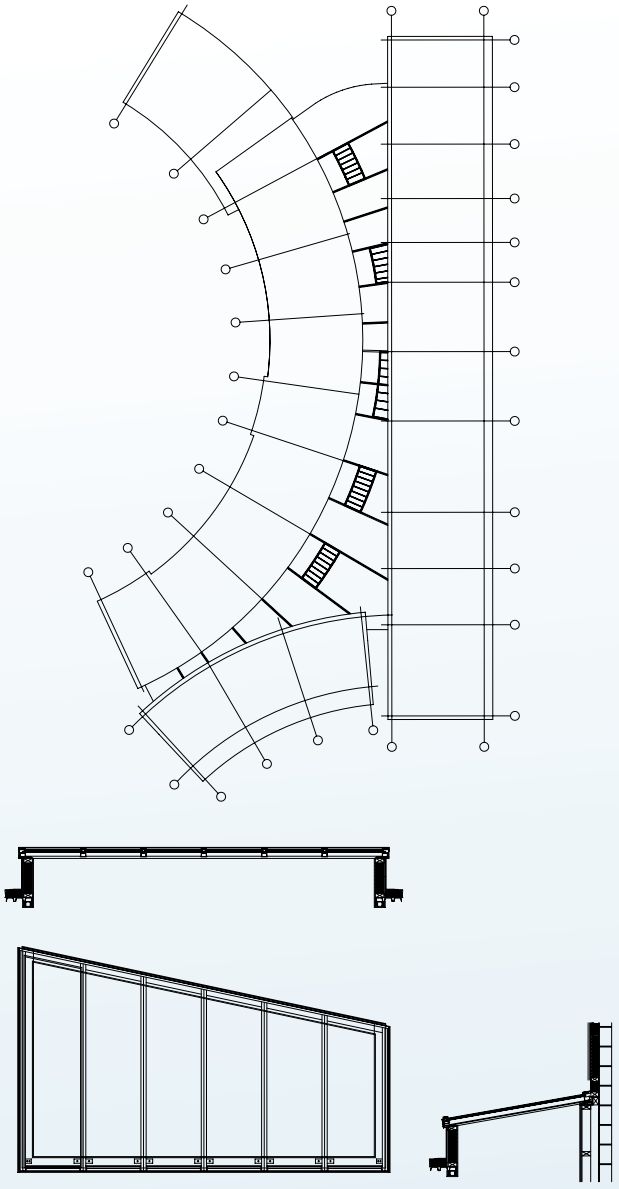
Arguably the most universally used system for closing and providing a glazed cover. Mono-pitches have been effectively used for covered walkways, large-scale conservatory areas through to major atria on prestigious buildings. One of the benefits of mono-pitch design is that it is rigidly constrained by the need for a level, orthogonal structure onto which it mounts. Capable of receiving accessories like smoke or natural ventilation modules access hatches and doors. The mono-pitch is equally at home when used to create an area of vertical glazing.

The most usual geometry for these rooflights would be 30°, although 45° is not uncommon. The limits for slope ranges from 10° up to vertical.

They may be glazed with a range of advanced glasses and high-specification polycarbonate options—from solid single glazed, for canopies and unheated spaces, to multiwall structured or triple glazed with exceptional thermal performance for part L compliance.

All metal parts can be mill finish for economy or, alternatively, coloured with polyester powder, PVF2 or anodised.

## Specification



| | |
|---|---|
| Maximum base square | Up to 4.0 m to 6.0 m (self supporting) dependant on glazing material. |
| Loading | Designed in accordance withCP3 Chapter V Part 2:1972 BS 6399:Part 1 and Part 3 1984 max. 1.5 kPa wind and 0.75 kPa imposed. |
| Safety | ACR[M]001:2005 Class B option available. |
| Glazing options | Glazing in glass or structured and solid polycarbonate. |
| Thermal performance | Part L: below 2.0 W/m²K options available. |
| Fire regs | BS 476 Part7:class1(1991) Class '0' Tp(a). |
| Surface finish | Mill finish, polyester powder, PVF2 and anodised. |

Illustrated here are details from a mono-pitched installation, designed and constructed with 15° geometry. Several such rooflights are arranged around a newly constructed building, introducing daylight to areas that would otherwise lack the benefit of natural light.

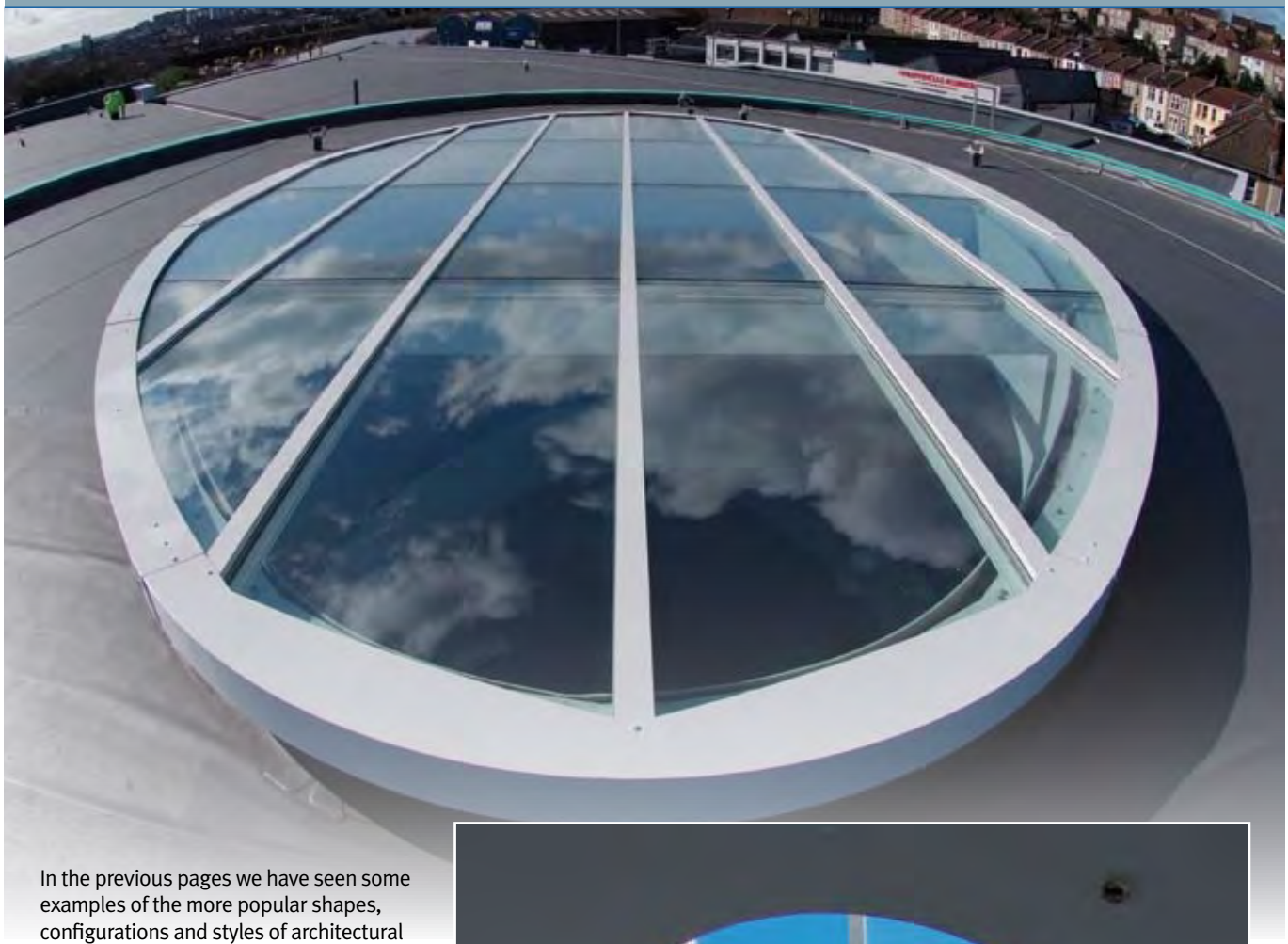
Such details are indicative only—project-specific designs and details are produced for each project engineered by Xtralite.

For additional information on the hipped end ridgelight contact our structural department on **01670 354157** or email **sales@xtralite.co.uk**

Xtralite ROOFLIGHTS

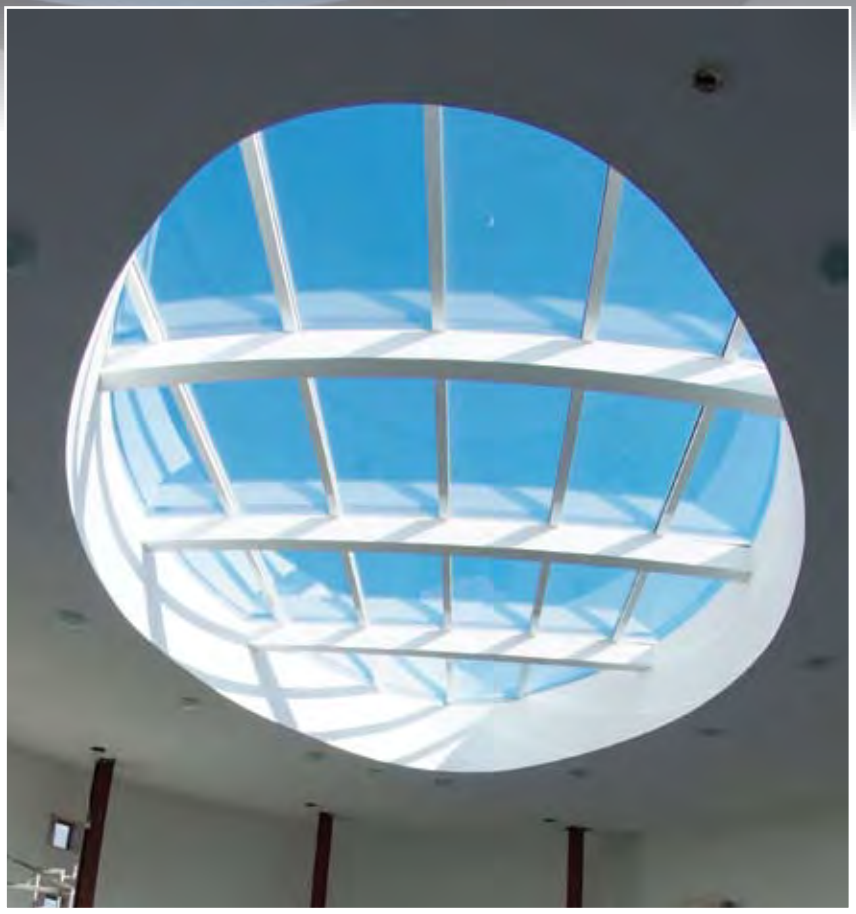
# Design Freedom





In the previous pages we have seen some examples of the more popular shapes, configurations and styles of architectural specialist roof glazing. However, Xtralite works closely with architects to realise individual design concepts while meeting the various technical challenges presented by roof glazing.

Illustrated here is an impressive 9 metre-long elliptical rooflight which forms the central focus of Bristol's Eastgate Oriental Centre. Here, a large copper-clad drum contains a sweeping main staircase leading to a first-floor gallery. This area is lit by the dramatic, elliptical oculus rooflight set within the shallow mono-pitched roof of the copper drum. Xtralite worked with the architects to develop an optimum structural and glazing solution to minimise rafter size, with perimeter cover flashings concealing both the construction and drainage route.



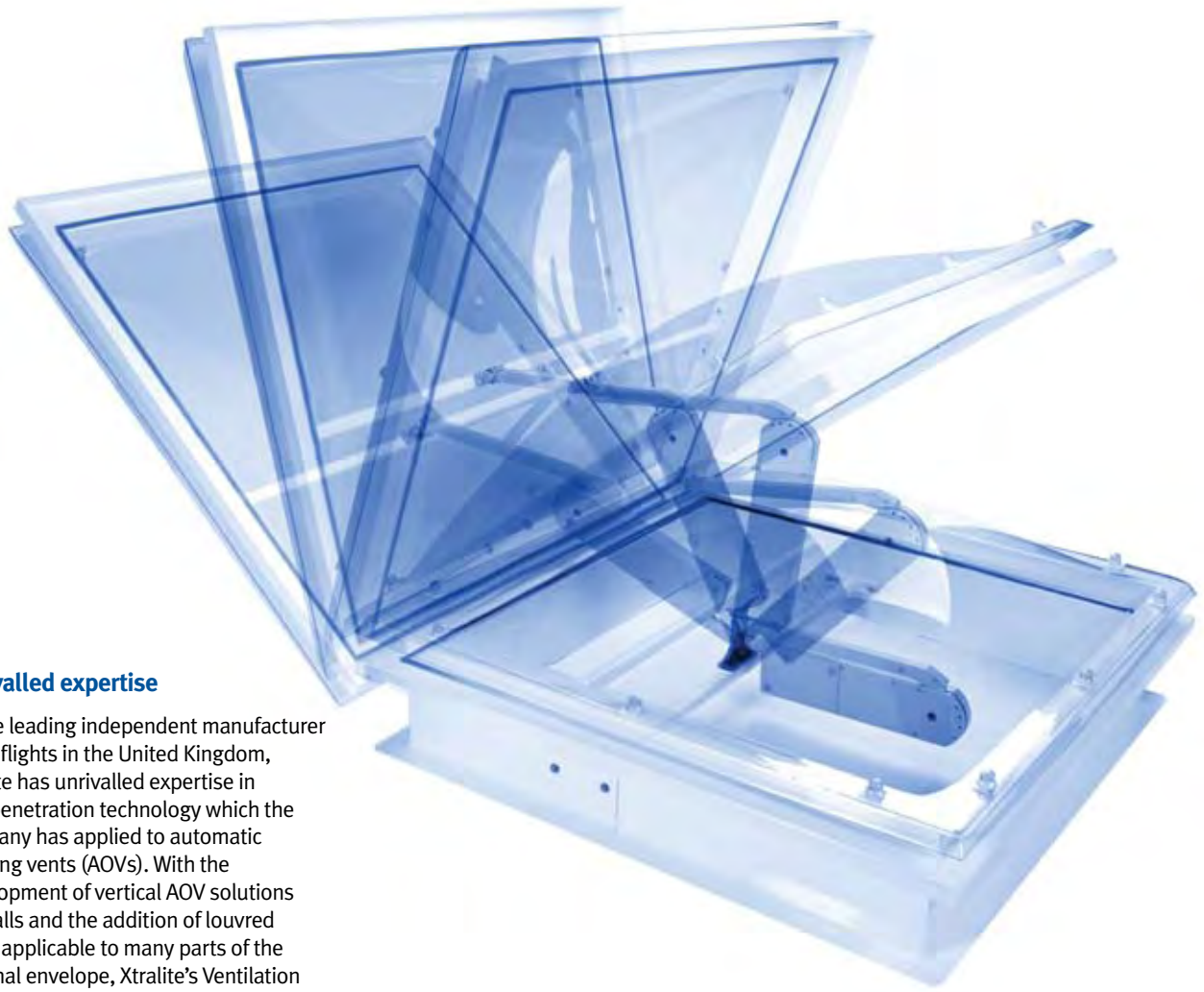
# Product Portfolio
# Natural Smoke and Ventilation Systems



Xtralite ROOFLIGHTS

# Xtralite Expertise





## Unrivalled expertise

As the leading independent manufacturer of rooflights in the United Kingdom, Xtralite has unrivalled expertise in roof penetration technology which the company has applied to automatic opening vents (AOVs). With the development of vertical AOV solutions for walls and the addition of louvred vents applicable to many parts of the external envelope, Xtralite's Ventilation Division can now satisfy all natural ventilation requirements.

In addition to effective air flow when operational, AOVs when closed must resist weather penetration and provide appropriate thermal insulation—areas where Xtralite specialises. The Xtralite range includes louvred units (particularly suitable for high-level use), double units and 140° single units, as well as 90° single units for access purposes.

## Providing the complete package

Natural ventilation units may be required for a variety of reasons, notably energy-efficient environmental management or smoke control during fires. Certified control panels are required to operate vents to meet specific needs—either automatically or manually by building managers or the fire and rescue services. Xtralite works in partnership with leading specialists in control systems to provide a complete package of natural ventilation.

## Ordering Advisory Note

The rooflight installation includes opening vents believed to be for the purpose of natural fresh air and/or smoke ventilation.

Consideration should be given at the earliest opportunity as to the required performance of the opening vents within the rooflight in conjunction with other automated aspects of the building.

Regardless of the voltage of the electric actuator attached to the opening vent (24 V DC or 230 V AC) the principle of its operation remains the same, an electric window actuator supplied by Xtralite will be of a reverse polarity or 'power open' and 'power close' nature.

Permanent power should never be left on a mains voltage electric actuator.

Our experience tells us that often there is a lack of co-ordination between trades, and these crucial aspects are neglected.

The basic considerations are as follows:-

- How many zones do the opening lights need to open in – are they all opening together or in separate areas?
- Is there a requirement for them to respond to locally-placed thermostats, or external rain sensors?
- Is there a requirement for the opening vents to be controlled by a Building Management System?

The practical considerations are as follows:-

- Where the local junction box near to the electric actuator opening the vent is to be located?
- What is the required cable specification?

Through Xtralite's controls partner, assistance on these important points is available.

Xtralite ROOFLIGHTS

# **Product Portfolio** Natural Smoke and Ventilation Systems
# The Case for Natural Smoke Ventilation in Fires

## Effective and safe

Smoke control using natural ventilation is a particularly effective means of protecting escaping occupants, those awaiting rescue and fire-fighters from the immediate dangers of fire and smoke. In principle, high-level outlet vents and low-level inlet vents open automatically in the event of a fire to allow cool air into the building and allow smoke and hot air to flow out. This improves the conditions for occupants to escape and fire-fighters to enter. In the absence of ventilation, smoke fills the room, being drawn back down from the ceiling by convection as temperatures rise, leading to potential—and particularly dangerous—'flashover'.

The specific design of an effective and safe smoke ventilation system requires specialist involvement, perhaps by the mechanical and electrical consultant, and may well form part of a fire engineering solution.

## Helping you comply with building regulations

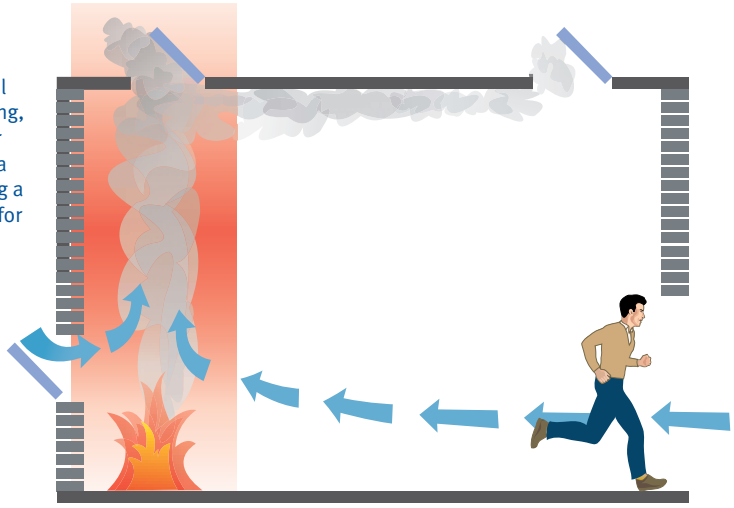
Guidance to building regulations includes specific use of smoke ventilation systems, as outlined overleaf. In England and Wales, **Part B of the Building Regulations** covers fire and the **Approved Document (AD B) Volume 2** provides guidance applicable to flats and non-dwellings. The following national, regulatory guidelines have similar requirements: Section 2 of the Scottish Building Standards Agency Technical Handbooks 2007; Technical Booklet E of the Building Regulations (Northern Ireland); Technical Guidance Document B of the Government of Ireland Building Regulations 2006. **AD B** identifies a number of situations where AOVs to provide natural ventilation are appropriate, including:

- Small single-stair blocks of flats
- Common escape routes in larger blocks of flats
- Basement areas
- Enclosed car parks
- Vertical smoke shafts, as part of a smoke control design

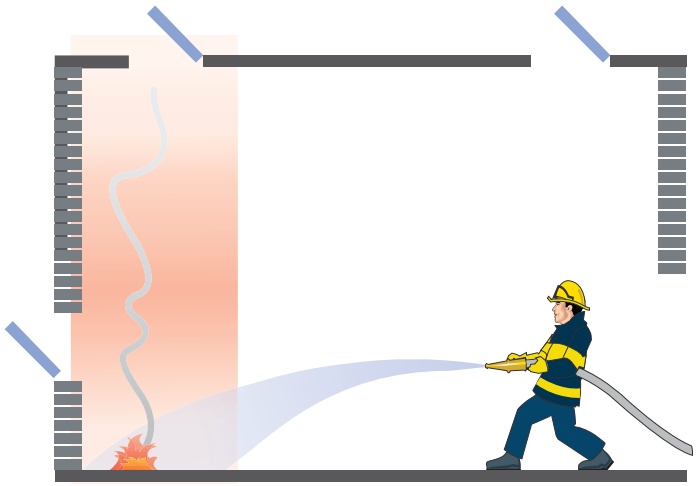
In several cases, **AD B** specifies the minimum of ventilation—generally either 1 $m^2$ or 1.5 $m^2$.

1. In the event of a fire, actuators open high-level smoke vents and low-level fresh air inlet vents.

2. This allows cool air into the building, forcing the hot air and smoke out via the roof, providing a smoke-free layer for safe escape.



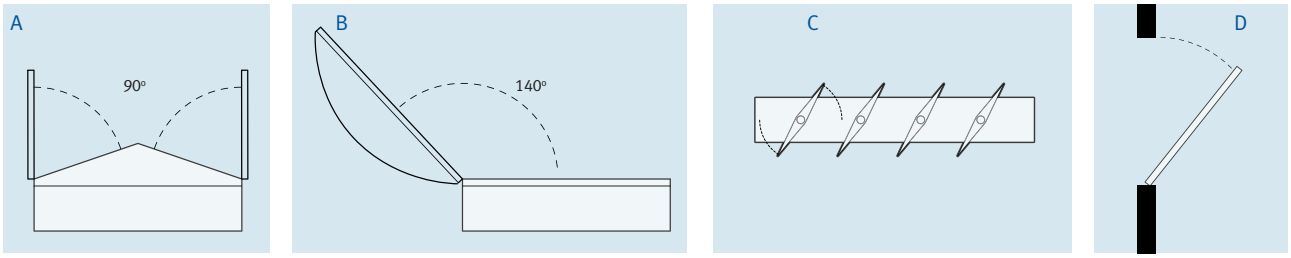
3. The smoke-free layer allows safe access for the fire to be fought and extinguished.



### Benefits of Smoke Ventilation

- Safety of life
- Improved means of escape
- Building protection
- Required by law

## AOV components




AOV 90° Double-Pitch Unit | AOV 140° Single Unit | Louvre AOV | Vertical AOV

## Example installation and system diagrams

### Simple system

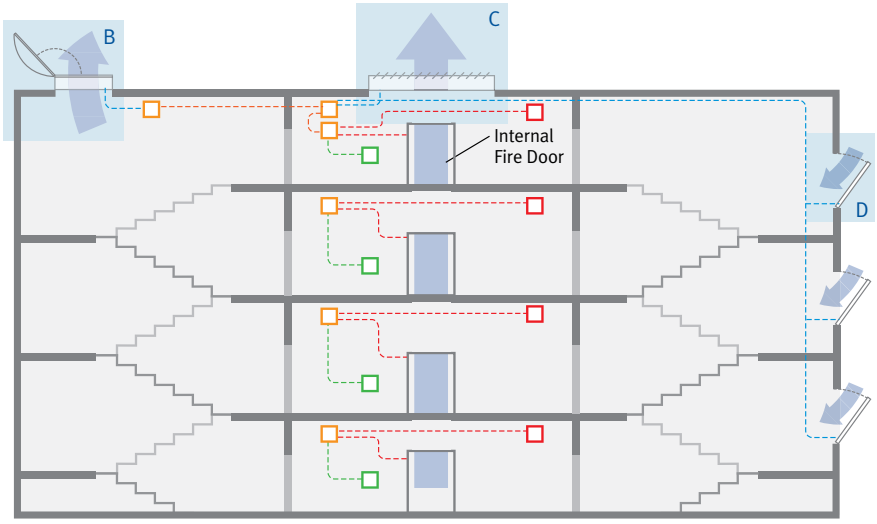
Typically used in small stair building.

### Networked control

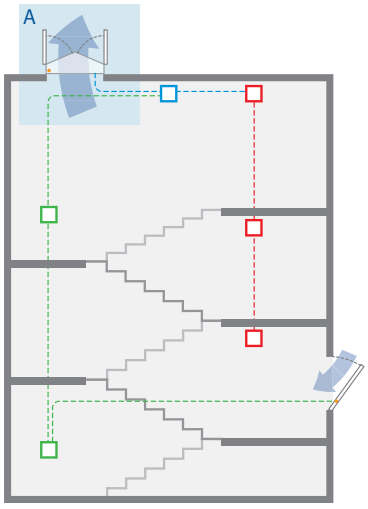
Ideal configuration where wiring distances are considerable or there is little free space for a central zoned control panel. Each controller would be capable of sending and receiving signals including 'heartbeat' status monitoring and contain primary and secondary power supplies.

### Centralised control

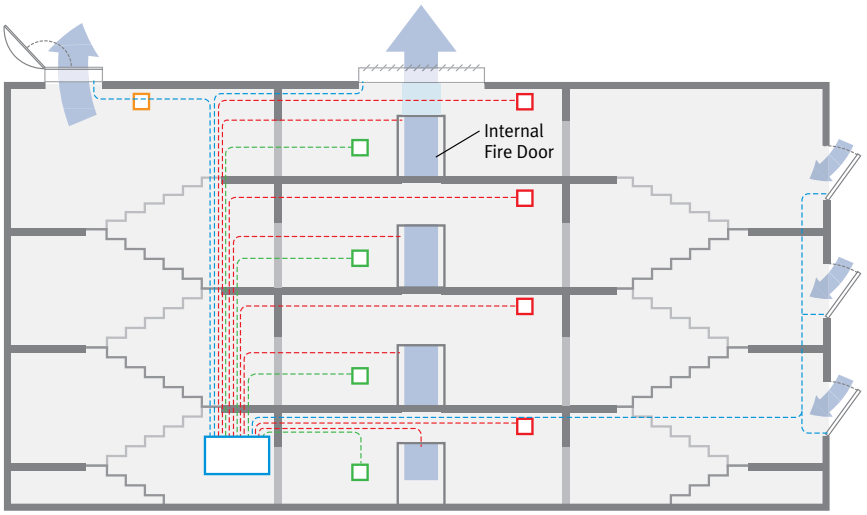
Systems can be installed with centralised zoned control to allow primary and secondary power for the system to be located in one control panel.




Networked control




Simple system




Centralised control

Central control panel | Ionisation smoke detector | Networked controller | Manual control point

Xtralite ROOFLIGHTS

# **Product Portfolio** Natural Smoke and Ventilation Systems
# AOV Roof Units

Similar in design to Xtralite rooflights, AOV Roof Units are available with either glazed or solid tops and a choice of opening configurations.

- Single units opening to 140° or 90°
- Double units opening to 90°
- All units made to measure and easy to install
- Supplied with or without control panel and/or battery backup

Xtralite Rooflight AOV's can be supplied with their own kerb for fixing directly to the roof deck and then weathered in the traditional manner with the roofing membrane being dressed up the outside of an insulated kerb. Alternatively if a kerb is being constructed as part of the roofing system (metal roofing or a builder's kerb) then we are able to supply a kerb adapter. Both kerb and kerb adapter units are manufactured from folded galvanised steel or aluminium, both materials being polyester powder coated white—and can be thermally broken to suit the requirements of Part L of the Building Regulations.

## Lids

The lid or top of the unit can be supplied in three forms:

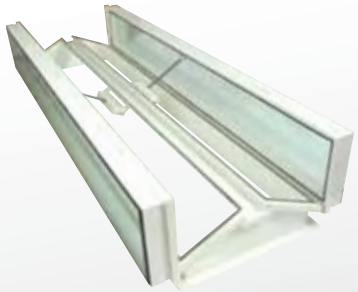
- Solid metal panel, insulated and polyester powder coated—generally at the head of a smoke shaft when only ventilation is required in case of a fire, so no need for light.
- Glazed top in single- or triple-skin polycarbonate, which can be made in the full range of sizes.
- Glazed top in a double glazed glass unit with toughened outer and laminated inner.

## Operation

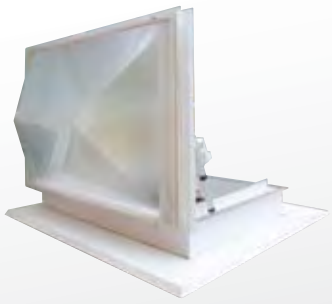
All Xtralite AOV units operate via a 24 V DC 'power open'/'power close' actuator, which must be operated by a CE-certified battery-backed control panel.

90° double-pitch unit with solid top

140° single unit with domed polycarbonate glazing



90° double-pitch unit with double glazing in glass



90° single unit for access with pyramid polycarbonate glazing

90° double-pitch unit with domed polycarbonate glazing

# AOV Vertical Systems



Xtralite AOV Vertical Systems have been developed specifically for use in external walls as part of the fenestration design to provide the required level of smoke ventilation.

The design of AOV Vertical Systems allows the glazed frame to be installed within any external wall. The profiles used in the system construction are carefully selected to provide an appearance which can, if required, closely match the building's standard fenestration.

AOV Vertical Systems are designed with a water management detail that ensures seepage and leakage is discharged out of the building. The frame is thermally broken to limit both heat losses and condensation, and is powder coated in white as standard or in any RAL colours as an option. Xtralite AOV Vertical Systems are available to provide a free area of ventilation of 1 $m^2$ or 1.5 $m^2$ to comply with **Building Regulations AD B**, or other specified ventilation levels. The physical dimensions of the frame can be adjusted to suite specific design requirements.

## Frames and glazing systems

Integral transoms and mullions are mechanically-fixed and sealed into the outer frames. This is a drained, dry-glazed system utilising captive and wedge gaskets allowing single skin up to 6.4 mm and double skin up to 28 mm to be installed. All glazing should be in accordance with **BS 6262**. Xtralite AOV Vertical Systems have been tested and classified in accordance with **BS 6375: Part 1: 1989**.

## Glazing and panels

Typical glazing could comprise of

- 6 mm toughened clear outer
- 12 mm air gap
- 6 mm laminated clear inner.

A typical metal infill panel could comprise of:

- 2 mm aluminium sheet outer
- insulation core spacer
- 2 mm aluminium sheet inner.

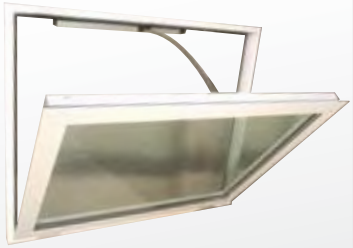
A full range of other infill panels can be supplied with the systems to suit the individual project requirements.

## Fixings

All fixings used in the construction of the window are stainless steel which must also be used to fasten upstands to the substructure.

## Operation

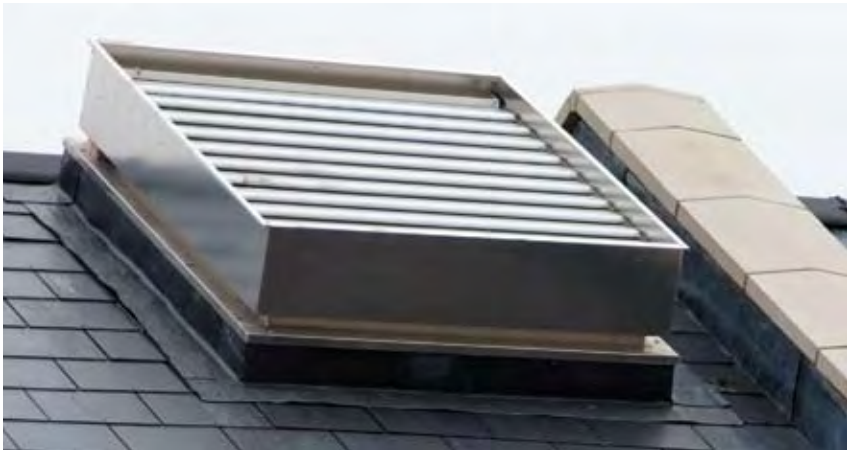
All Xtralite AOV units operate via a 24 V DC 'power open'/'power close' actuator, which must be operated by a CE-certified battery-backed control panel.



Typical vertical system opening vent

Xtralite ROOFLIGHTS

# **Product Portfolio** Natural Smoke and Ventilation Systems
# AOV Louvred Units



Xtralite AOV Louvred Units are lightweight, compact and maintenance-free, and suitable for installation on roofs, walls and other parts of the building's external envelope. The multi-channel drainage system and overlapping louvres guarantee a rain-proof system. All components are corrosion resistant and the ventilator side panels are reinforced by inner and outer longitudinal profiles.

## Louvre options

A choice of louvre blade materials is available, including those to allow daylight into the building:

- Single-skinned aluminium
- Double-skinned aluminium
- Multi-wall polycarbonate
- Single-skinned laminated safety glass

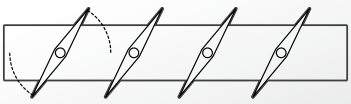
## Fixing flanges

Flanges can be provided to suit any specific requirements including installation within glazing, on or under profiled roofs, directly within roofing felt or with a kerb.

## Operation

All Xtralite AOV units operate via a 24 V DC 'power open'/'power close' actuator, which must be operated by a CE-certified battery-backed control panel.

Typical double-skinned aluminium louvred unit



Cross section of louvre operation

### Nationwide New Home Developer

On this housing project, three different types of Xtralite natural ventilation units were used as part of a comprehensive smoke control system. In addition to this AOV roof unit, louvred units were fitted to pitched roofs and a special triangular unit produced.

### Retirement Homes

To meet particular requirements on many of this retirement builder's projects, Xtralite worked closely with the client to develop a bespoke AOV unit. Some 2.5 metres long and 600 mm wide, this special unit provides automatic smoke ventilation over corridors.

# Glossary and Further Information



Xtralite
ROOFLIGHTS

# Important Notes



1. Xtralite has a policy of continually upgrading its products and reserves the right to alter specifications accordingly.
2. All Xtralite products meet stringent quality procedures.
3. Responsibility for ensuring that any building component(s) complies with the Building Regulations or other legislation rests solely with the client and/or specifier.
4. Information contained within this specification guide is to the best of our knowledge entirely accurate at the time of going to press.
5. 

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# Glossary



**U Value**

Units W/m²K—a measure of the thermal efficiency of a material or product. The lower the number, the higher the insulation value.

**A.O.V**

Automatic opening vent—a specialist type of rooflight designed for the discharge of smoke and heat. Often connected to the fire alarm system (BMS)—usually opens when alarm is activated.

**Access Hatch**

A rooflight unit specifically-designed to facilitate acces to the roof area – usually for maintenance.

**Adaptor Kerb**

A type of kerb that adapts a rooflight upstand to a builder's kerb.

**Aerogel**

The lightest, most-effective translucent insulation available (see Nanogel®).

**Air Infiltration**

Natural air seepage through unsealed voids and joints in parts of the building structure.

**Asphalt**

Roof covering material based upon a mix of asphalt and mineral fillers.

**Barrel Vault**

Semi-cylindrical rooflight that may be semi-circular or low rise (30° angles at kerb).

**Builders Work**

Anything below the rooflight that involves construction.

**Cassette**

Factory-assembled polycarbonate glazing panel with either double- or triple-skins.

**Chain Motor**

Electrical actuator for hinged opening rooflights.

**Cill/Sill**

Top face of kerb or upstand.

**Clerestory**

Vertical glazing at the base of a rooflight. Such a unit is often called a 'Lantern Light'.

**Cold Bridge**

A thermal track allowing heat energy to escape by conduction.

**D.G.U.**

Double glazed unit—refers to glass construction only.

**Daylight**

The light produced by an overcast sky—averages 5,000 lux for 85% of daylight hours.

**Daylight Factor**

The ratio between internal and external light levels.

**Diffused/Diffusing**

Property of glazing material whereby transmitted light is scattered, creating better internal light distribution and preventing direct image formation.

**Dome**

Rooflight shape. May refer to small moulded 'modular' units or large self-supporting glazed constructions. Can be either 'low rise' (usual) or 'high rise' (semi-circular).

**Dual Pitch**

May refer to 'mono-pitch' glazing constructed with two different angles. Sometimes used to describe a 'ridge light' (see Ridge Light).

**E.P.D.M.**

Synthetic rubber used for manufacturing seals and gaskets.

**Felt**

Bituminous-based roof covering.

**Glazing Bar**

A structural member designed to support, restrain and seal glazing panels.

**High-performance Felt**

Bituminous based roof covering upgrade for enhanced performance and longer life

**High Rise**

Usually refers to shape or geometry of a dome or barrel vault. Actually describes semi-circular or hemi-spherical.

**Hit & Miss**

A type of ventilation system. Can be either open or closed.

**In-Plane**

Rooflight set into a pitched roof so that there is no protrusion above the roof surface or plane.

**Insulation**

Material used to increase the thermal performance of a material or system.

**Kerb/Curb**

The roof mounting for a rooflight. May be constructed by the builder (builder's kerb) or can be supplied as part of the rooflight. On a roof up to 17°, must protrude at least 150 mm above roof-top surface.

**Lantern**

A rooflight set above vertical glazed sides. Invented by Victorians.

**Lifting Frame**

The upper, supporting frame of an opening rooflight unit.

**Linear Motor**

High-spec controllable actuator for opening rooflights.

**Low Rise**

Usually refers to shape or geometry of a dome or barrel vault. Traditionally describes an arc of a circle or sphere with a 60° subtended angle.

**Metal Deck**

Roof construction based upon the use of layers of corrugated metal sheets.

**Mono Pitch**

Single plane of sloping glazing.

**Mullion**

Another name for a rafter—traditionally applies to windows or vertical glazing (see Rafter).

**Multi-wall Polycarbonate**

Another term for structural polycarbonate.

**Nanogel®**

Trade name for Aerogel. Supplied in the UK by Xtralite Rooflights Limited.

**Non-Fragile**

Refers to the ability of a glazing system or rooflight to resist the impact of a stumbling, falling human body. Measured and rated to ACR[M]001: 2005.

**Northlight**

A sloping rooflight which faces generally in a northern direction. This limits the amount of sunlight entering the building.

**Opaque**

A reference to a materials inability to transmit light.

**Part L**

Refers to Building Regulations Approved Document Part L—Subdivided into two parts each being further subdivided into two parts.

Eire Building Regulations Part L—this is a reference to the section of the Eire Building Regulations intended to govern the use of fuel & energy. It is a single document with two distinct parts, Non-domestic & domestic.

Part 6—this is a reference to the section of the Scottish Building Regulations intended to cover conservation and use of energy. Part 6 is split into two parts Non-domestic & domestic.

**Permanent Vent**

Ventilation system that is not often used. Uncontrolled and permanently open.

**Powder Coating**

A protective coating of coloured polyester or occasionally epoxy.

**Pyramid**

Usually refers to shape or geometry of a dome or glazed structure. The optimum construction angle is 30°.

**Rafter**

A structural member designed to support, restrain and seal glazing panels. These members always run 'top to bottom'.

**Ridge Light**

Rooflight constructed with two slopes of glazing. Ends can be vertical or hipped. Can be constructed to be self-supporting.

**Roof Window**

Window specifically designed to be set and flashed into, and be flush with, a sloping tiled or, slated roof. Velux being the generic.

**Rooflight**

A roofing accessory designed to admit light into the building whilst weatherproofing the open roof aperture. Can also be used to introduce ventilation and/or gain access to the roof.

**Security Fixing**

A screw or bolt with an anti-tamper head.

**Self-Supporting**

A rooflight structure that requires no support other than that upon which it sits.

**Silicone**

Durable synthetic resin used as a wet sealing compound.

**Silicone Joint**

Designed joint making use of the properties of silicone.

**Single-Ply Membrane**

Polymeric sheet roof covering.

**Skin**

Refers to a single leaf of glazing (usually polycarbonate) may be prefixed by single, double or triple.

**Skylight**

Another name for a rooflight (American in origin).

**Smoke Vent**

Another term for an A.O.V.

**Solar Gain**

Resultant internal heat gain due to transmission of solar energy.

**Solar Shading**

Device for reducing the level of transmitted solar energy. May be by blinds or louvres or by selective filtration by the glazing medium.

**Solid Polycarbonate**

Polycarbonate produced as monolithic sheet material similar in appearance to glass.

**Standing Seam**

A type of metal decking system that joins with a rolled metal 'zip' system.

**Structural**

Self supporting system—often prefixes rooflight.

**Structural Polycarbonate**

Lightweight polycarbonate sheet extruded in a multi-wall format which enhances strength and thermal performance.

**Thermal Break**

A high thermal resistance barrier to heat flow. Used to insulate metal items that may run from the inside to the outside.

**Thermo-formed**

Plastic material shaped, when softened by heating.

**TPR**

Synthetic rubber used for manufacturing seals and gaskets.

**Translucent**

A term describing the ability of a glazing medium to transmit light without being able to form an image through.

**Transom**

The horizontal glazing bar—runs between rafters (see transverse).

**Transparent**

A term describing the property of a glazing medium to transmit light whilst being able to form a clear image through.

**Transverse**

Runs across. Refers to a transom glazing bar (see Transom).

**Trickle**

Low-level ventilation system. Usually not controlled.

**Upstand**

The mounting for a rooflight. May be part of the roof construction or part of the rooflight itself. Must be at least 150 mm high (see Kerb).

**uPVC**

Un-plasticised polyvinyl chloride.

**Ventilation**

Introduction of fresh air and exhaustion of stale air.

**Weathering Cowl**

A hood shaped to shelter a detail and prevent weather ingress.

**Wormgear**

Name given to hinged opening rooflights controlled and opened manually.