



GLAZINGVISION guide to

rooflights &
roof windows



We all have a predilection to well lit, airy and inviting spaces, so increasing the use of glazing products in the built environment can be an efficient way of improving an internal space.

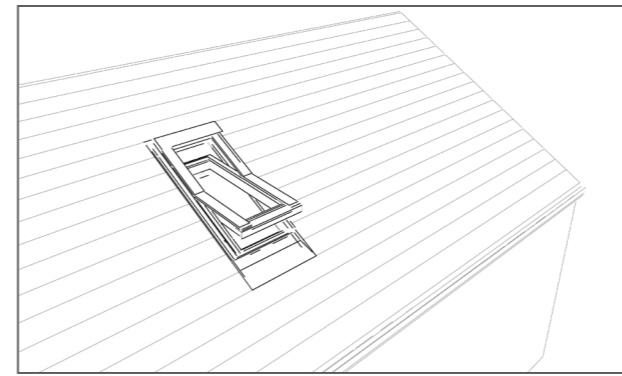
There are a number of products available that offer varying degrees of natural daylight and ventilation in the form of rooflights and roof windows. While most people will be familiar with these products, what are the key differences between them and which one should be specified in a given application?

Rooflight or roof window?

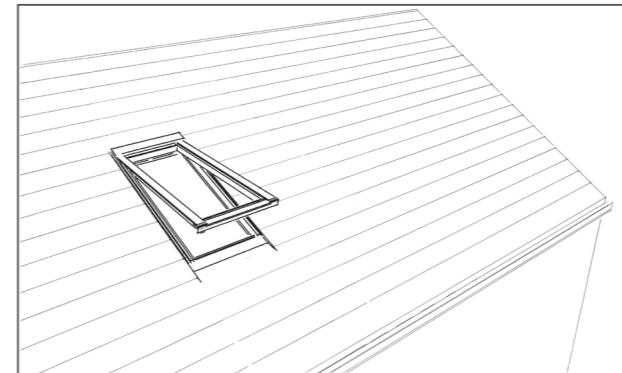
The simplest way to answer this question is to first consider the roof type that your product is going to be installed, is it a flat roof or a pitched roof? In most cases a rooflight will be installed on a flat roof or terrace and fixed to an upstand or kerb with in minimal pitch of around 3-5°

Roof windows are usually installed on a pitched roof of 15° or more, normally these are designed to allow installation up to a maximum 60°, with some products being able to be fixed up to 90°.

Roof windows are usually installed on a pitched roof of 15° or more.



Centre pivot roof window

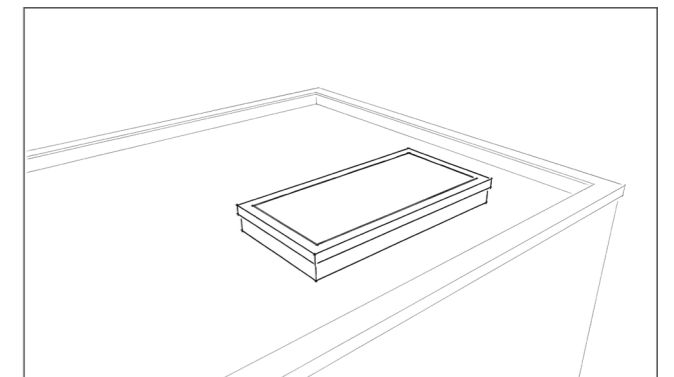


Top hung roof window

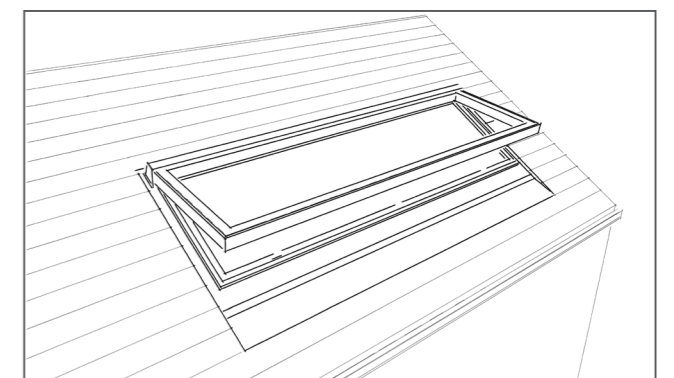
Rooflights

Rooflights designed for flat roof applications tend to have a broader range of products compared to roof windows. This can range from simple fixed units as illustrated here, to more complex systems of architectural glazing or sliding products such as box rooflights, which allow access to a roof terrace.

Although there are a multitude of off the shelf products available, rooflight manufacturers can often specialise in one of bespoke designs, allowing more flexibility in scale, glass specification and application.



Fixed rooflight for flat roof



Contemporary top hung opening roof window

Contemporary roof windows

Taking advantage of rooflight design technologies, some manufacturers are now offering larger, contemporary style roof windows.

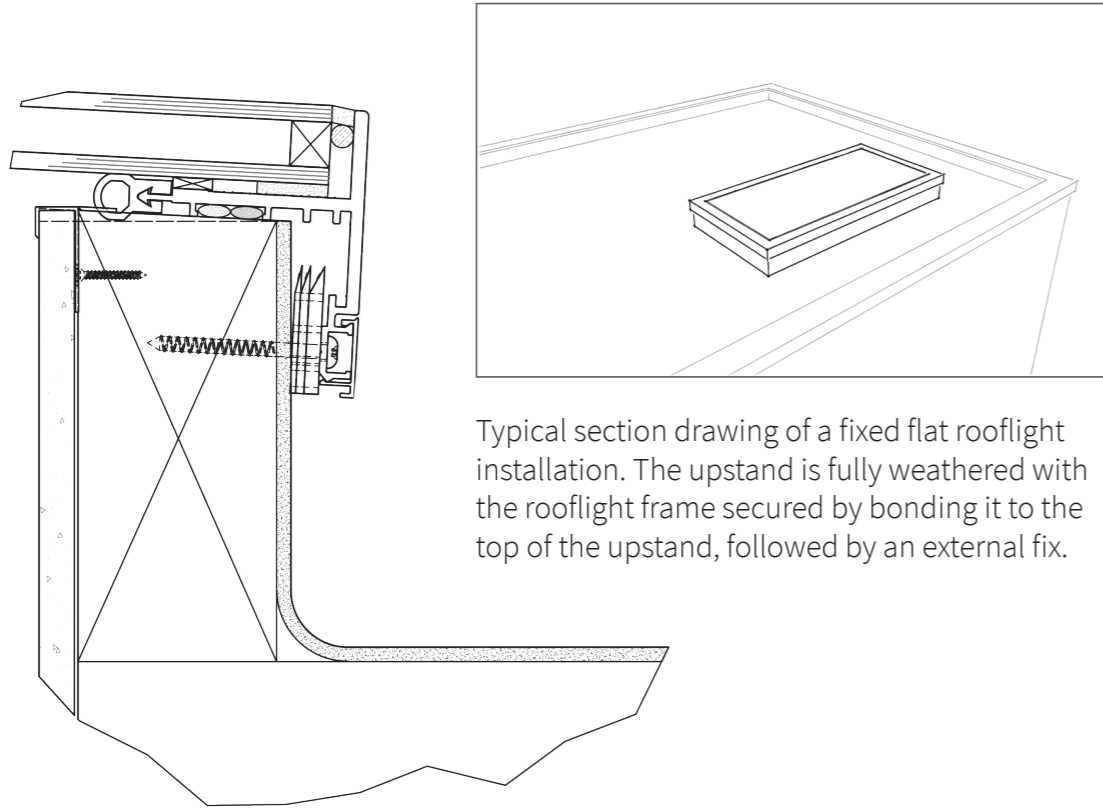
Larger openings mean noticeable increases in daylight and natural ventilation, as well as more dramatic views. These new products can be manufactured roughly twice the size of the existing centre pivot roof windows and are available in either fixed glazing or top hung units supported by chain actuators or screw jack mechanisms.

Roof window types

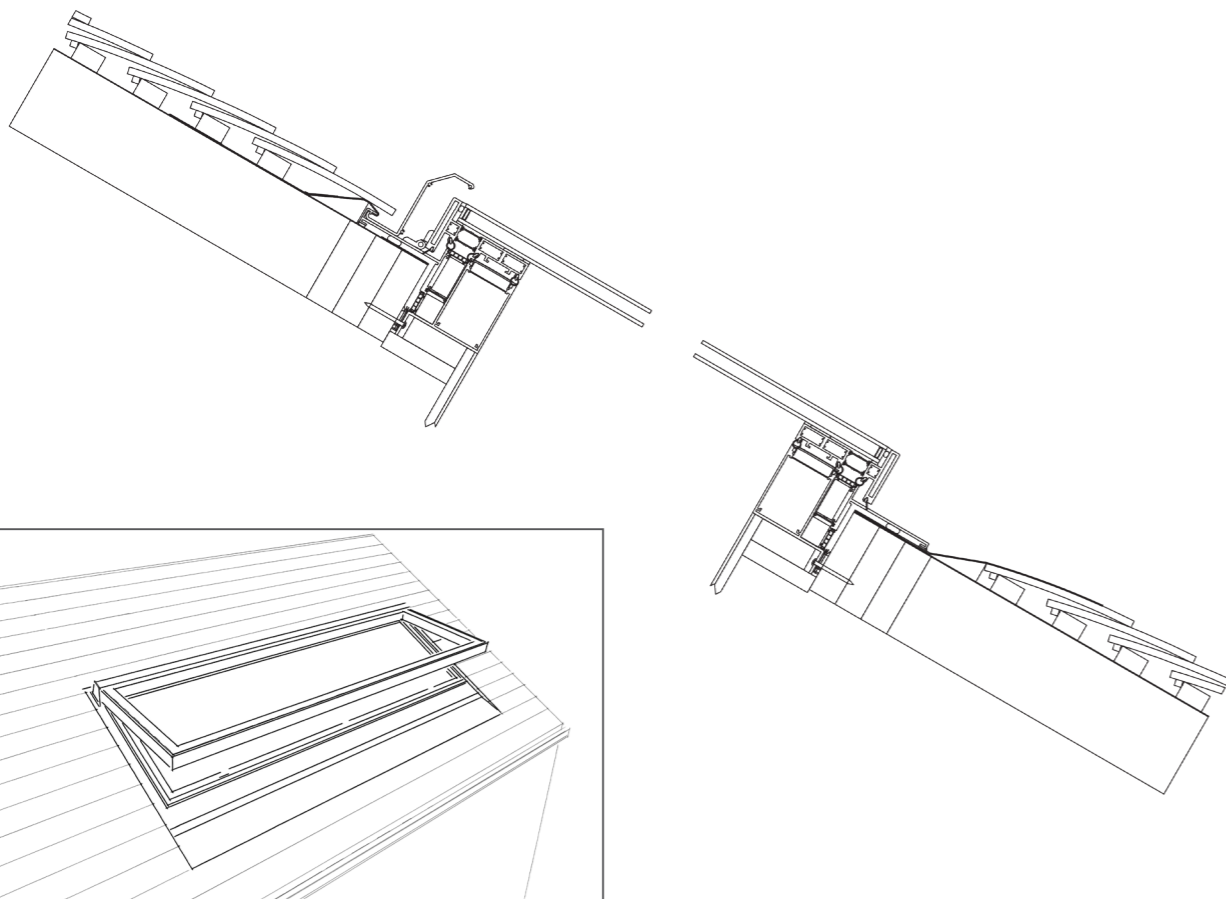
The most widely used roof windows are centre pivot and top hung units, these products provide reasonable levels of daylight and ventilation and are popular on new builds having been adopted by most large housing developers.

Centre pivot and top hung roof windows are usually only available in a set list of sizes and as such, cannot be individually manufactured to suit a specific opening. However, as they are widely used and have been in development for many years, roofing trades are very familiar with the options available and the roof design will be specified to suit a particular size.

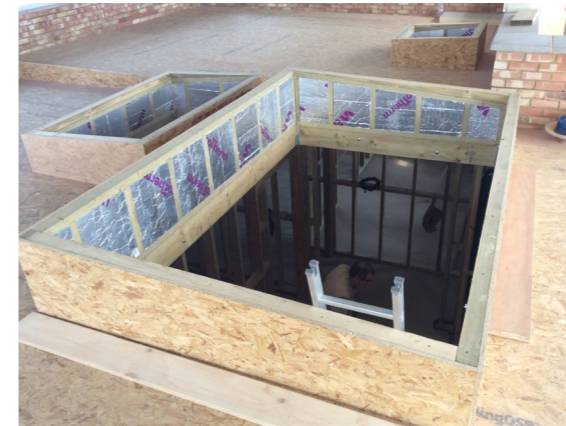
These units can be opened manually using a control bar or handle, in addition there are options available for motorised units, as well as other bolt on options such as blinds and insect screens.



Typical section drawing of a fixed flat rooflight installation. The upstand is fully weathered with the rooflight frame secured by bonding it to the top of the upstand, followed by an external fix.



Contemporary roof window installation secured to the rafters and weathered using a combination of flashings and skirts for header, cill and jambs.



Structural rooflight upstand for flat roof



Upstand complete with weathering



Roof window install prior to flashing and tiling

Rooflight installation

Rooflights for flat roof applications are designed to be installed using an upstand or kerb system which structurally supports the unit and provides a surface for any weathering to be fixed to.

The upstand should provide enough height to ensure that the rooflight remains watertight, this is usually a minimum of 150mm to maintain any guarantees provided by suppliers of weatherproofing systems. They can be weathered using a variety of materials, such as lead, felt or single ply membrane.

The upstand will usually have a pitch built into it of 3-5° to encourage rainwater to run off the glass and be wide enough to structurally support the rooflight. However, they can vary in width and pitch, so its important to check manufacturer recommendations prior to commencing any works on site.

Due to the use of a raised upstand, rooflights are deemed to be installed 'out of plane' meaning they sit at a different level to the surrounding roof.

Roof window installation

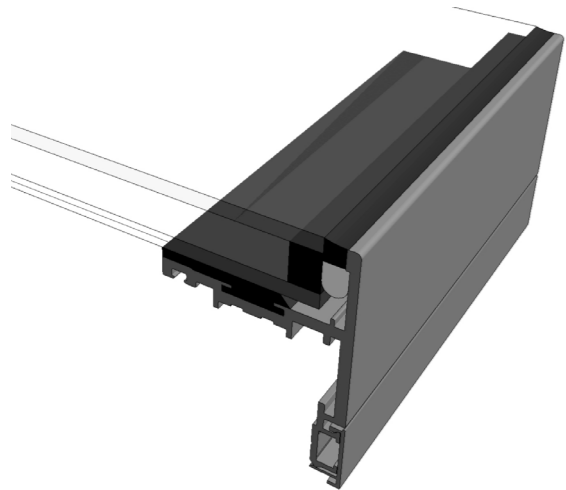
Roof windows are covered under BS EN 14351-1:2010 which stipulates that they must be installed in the same orientation and 'in plane' with the surrounding roof, typically at a minimum 15° pitch.

They are fixed structurally to the rafters and trimmers which create the opening, and are weathered into the roof using a combination of skirts, flashings and soakers.

Most roof window manufacturers will provide a flashing kit specific to the roof covering being used to correctly install and fully weather proof the unit.



Typical roof window section, timber core with polyurethane outer skin.



Rooflight section using polyester powder coated aluminium extrusion.

Frame specification

Roof window frame construction is usually Pinewood which is treated to withstand moisture or a combination of a timber core with polyurethane outer. Visually the frames tend to be grey or white, but recently some manufacturers have begun to introduce other colours.

Rooflights for flat roof applications tend to be constructed of either aluminium or steel, this provides sufficient structural rigidity to allow a much larger variation of sizes and shapes.

Frames can be minimal simple designs for smaller fixed units, becoming more complex if the unit opens, where motors and drive systems can be hidden within the frame. It is common for these designs to include the use of a thermal break to reduce the chances of cold bridging. This is where warm internal air can begin to form condensation on a cold metal frame, a thermally broken frame is split with an insulating material such as polyamide to separate the outer section from the inner.

Some sort of external finish will be required to prevent rust or corrosion, usually this will involve painting or powder coating the frame to the desired colour. Higher specifications are available for coastal installations, which involve a more in-depth pre-treatment process and thicker final finishes to protect the frame from the harsher environment.

Glass specification

Due to the limited range of sizes available, glass specification in roof windows will generally comprise of a 6mm laminated low e inner pane and 4-6mm toughened outer. There are various coatings available for easy clean and solar control, plus triple glazed variants and options on Argon or Krypton filled cavities for increased thermal performance.

Rooflights on flat roofs will need more consideration when it comes to glass spec as they are installed at a minimal pitch. This, combined with larger sizes means that loading and allowable glass deflection must be scrutinized more closely.

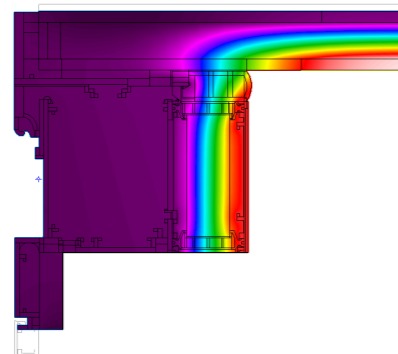
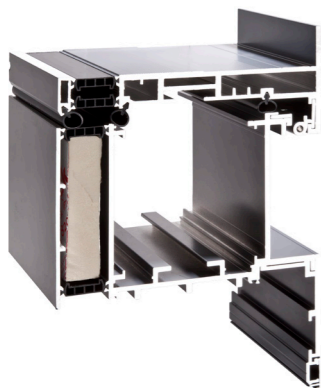
6mm toughened outer panes are the starting point and these are likely to be either heat strengthened or heat soak tested, from there it will depend on the size of the glazing. Its purpose and geographic location might determine snow loads or solar gain for example.

A good example of this is walk on rooflights, where the external pane of glass can be anything from 25.5mm thick using a toughened heat soak tested laminated section, this example would be fine for UK domestic foot traffic, but the thickness would increase for use in public buildings where crowd loads would need to be accommodated.

Aside from this, many other options are available with rooflights – triple glazed, Argon and Krypton filled cavities, soft coat and hard coat low e coatings, acoustic glass, security glass, even privacy glass which can be switched between opaque and clear.



Walk on specification roof light installed on a terrace.



Example of a thermally broken rooflight frame, manufactured using extruded aluminium with a combination of polyamide thermal breaks and closed cell PIR insulation. This efficiently isolates warm internal air clashing with the cooler external frame causing condensation.

Certification and standards

In plane Roof windows need to comply with BS EN 14351-1:2010. This standard applies to roof windows which are installed in the same orientation and in plane with the surrounding roof, typically at a minimum 15° pitch and weathered into the roof using skirt or flashing.

This means they must be CE marked before they can be sold. Manufacturers are expected to provide a declaration of performance (DOP) to advise specifiers how the unit performs under test conditions. This will cover things such as tests to simulate prolonged and heavy rainfall, how the roof window withstands increased air pressure, glass deflection and monitoring any air leakage to ensure the product does not create drafts or allow in damp.

Rooflights currently have no specific standard to comply with so they cannot be CE marked (although they must still comply with The Building Regulations). There are several standards in place, but none of these accurately describe glass rooflights for flat roof applications. Currently the only standard available applies to smoke vent type rooflights or Automatic Opening Vents (AOV) as they are often known. As fire safety products, these units should be CE marked and comply with BS EN 12101-2:2003.

Below: Pitchglaze roof window being tested for air tightness.



Proving performance

As there are no specific British standards and no harmonised European standard (hEN) for out of plane flat glass rooflights, the only way to prove suitability and performance is through independent testing organisations such as British Board of Agrément (BBA).

The BBA is the UK's major authority offering approval and certification services to manufacturers and installers in the construction industry. BBA Approval is recognised by building control, government departments, architects, local authorities, specifiers, and industry insurers like the NHBC.

Rooflights that have been accredited by the BBA will have been tested to the following criteria:

1. Strength and stability
2. Durability
3. Condensation risk
4. Light and solar transmittance
5. Behaviour during a fire
6. Water resistance
7. Thermal performance

Advantages and disadvantages

Roof windows are very popular and widely used having been adopted by all major national house builders. They are robust, reliable and offer value for money. The advantage of standardised sizes and specifications means that they are usually available to buy off the shelf. However, the disadvantage of this is their flexibility – particularly when it comes to scale.

If you're looking for larger sections of glazing on your roof then roof windows presently only offer a limited amount of scope. Internally too, roof windows will usually have some visible framework which adds visual clutter to the view through the glass.



Example of 'Certificate of Agrément' by the BBA.

Externally though, on pitched roofs they are designed to sit flush with the plane of the roof and offer aesthetically pleasing clean lines, which rooflights can struggle to match.

Rooflights tend to be offered in a much wider range of shapes, sizes, specification and function. You may want to open up your entire roof with glass that retracts, or be able to safely walk on the glass if installed in a terrace. Need access to that terrace? Hinged access or box rooflights can provide a suitable means of egress. The scope with rooflights is much broader but this will tend to mean that your unit is built to order with a lead time of several weeks.



The Pitchglaze is a CE marked roof window designed to be installed in pitched tiled roof applications flush with the tiling line.

Left: Pitchglaze roof window by Glazing Vision dwarfs traditional centre pivot roof window, yet maintains a frameless internal view.

Best of both worlds contemporary roof windows

If you want the flexibility, scale and minimal internal framework of a rooflight, but with a low external profile that can be installed flush with roof tiling lines on a pitched roof, then the latest contemporary roof windows may be the answer.

These are a modern evolution of the roof window. Using the same technologies and design concepts from rooflight manufacturing, it is now possible to specify roof windows in sizes of up to 3m² in either fixed or top hinged variations.

Glazing Vision Pitchglaze and Pitchvent

The Pitchglaze is a CE marked roof window designed to be installed in pitched tiled roof applications flush with the tiling line.

We have adopted our pioneering 'frameless' design ethos with this product so that when installed the building occupants can enjoy sky only views through the aperture, something not usually found with traditional roof window products.

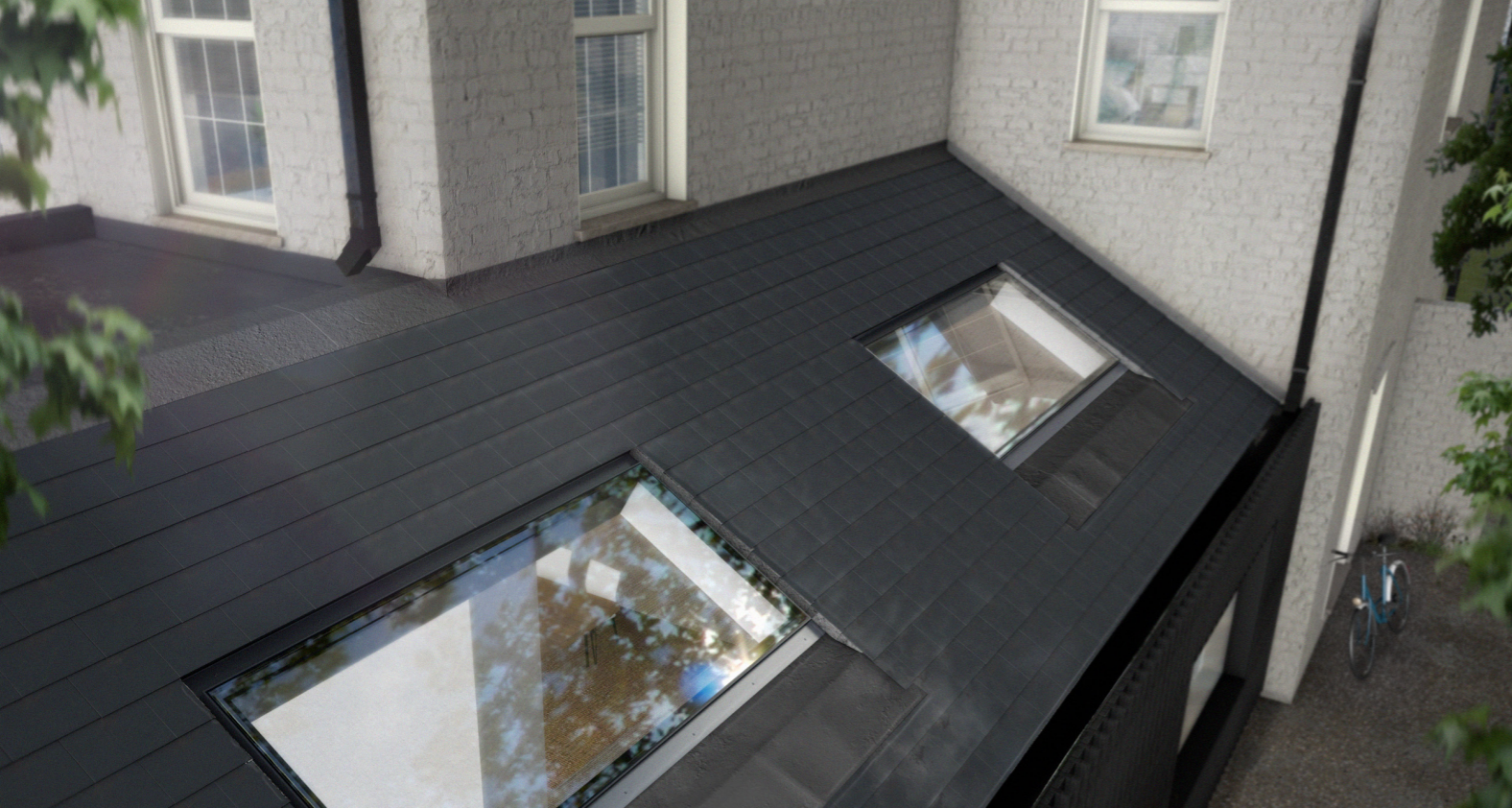
The Pitchglaze is designed to be used at roof pitches between 15° and 60° and comprises of Qualicoat approved polyester powder coated aluminium framework combined with either double or triple glazing options.

The Pitchvent is a CE marked top hinged roof window designed to improve natural ventilation.

This unit is available as either a manually operated unit, using a screw jack and pole mechanism or as a chain actuated variant, supplied with one or two actuators, depending on specification.

When compared to more traditional roof windows the Pitchglaze and Pitchvent are available in much larger sizes, allowing increased amounts of natural daylight and natural ventilation to penetrate the building, whilst maintaining a low profile external aesthetic.

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Pitchvent hinged roof window

Thermally broken aluminium extrusions with polyamide breaks

Qualicoat approved dual coloured powder coated framework (RAL7015 Slate Grey / RAL9010 Pure White)

Available in manually or chain driven variants

Intelligent wall switch supplied as standard (chain variant)

Internally mounted power supply input 230v, output 24v DC 300W

Maximum 3m2 internal aperture - landscape or portrait

Double glazed and triple glazed specification available with either heat soak tested toughened or heat strengthened laminated inner pane

Optional remote control / rain sensor (chain variant)

Pitchglaze performance specifications

CE marked to EN 14351-1:2006+A2:2016

Declared Performance

Air permeability	BS EN 12207	Class 4 / ±750 pascals
Watertightness	BS EN 12208	Class E750 / 750 pascals
Wind resistance	BS EN 12210	Class E2400
		± 2400 pascals serviceability
		± 3600 pascals safety

U-values (triple glazed 3000mm x 1000mm nominal aperture)

U _g	= 0.6 W/(m2K)
U _w	= 0.9 W/(m2K)
U _d	= 0.8 W/(m2K)

Qualicoat approved RAL7015 framework

Minimum pitch 15° Maximum pitch 60°

Pitchvent performance specifications

CE marked to EN 14351-1:2006+A2:2016

Declared Performance

Air permeability	BS EN 12207	Class 4 / 600 pascals
Watertightness	BS EN 12208	9A / 600 pascals
Wind resistance	BS EN 12210	Class 4C / 1600 pascals

U-values (triple glazed 3000mm x 1000mm nominal aperture)

U _g	= 0.6 W/(m2K)
U _w	= 1.6 W/(m2K)
U _d	= 1.1 W/(m2K)

Qualicoat approved RAL7015 / RAL9010 framework

Minimum pitch 15° Maximum pitch 60°

Pitchglaze fixed roof window (Mk II)

No visible fixings or internal framework

Qualicoat approved powder coated framework (RAL7015 Slate Grey)

Available in portrait or landscape orientations

Dedicated EPDM bubble gasket separating frame from interior space

Standard, sunken or raised installation options

Maximum 3m2 internal aperture

Double glazed and triple glazed specification available with either heat soak tested toughened or heat strengthened laminated inner pane

Full installation manual and CAD drawings available at www.glazingvision.co.uk/resources

