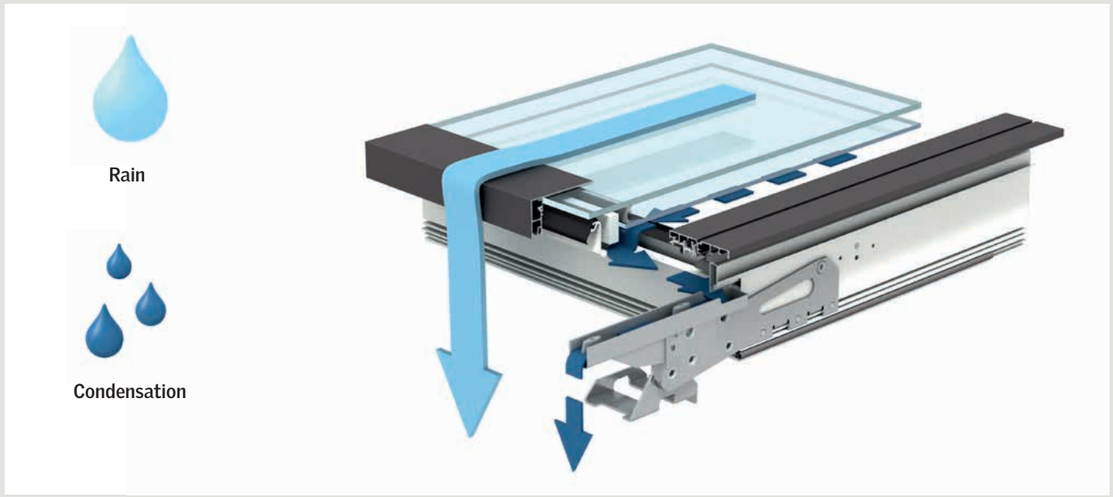
Performance

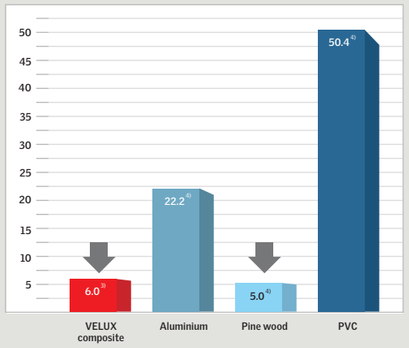
Watertightness

The module is fitted with a step pane to ensure water is lead safely off the unit and onto the roof surface. Likewise, interior condensation is drained from the construction via a channel system that distribute surplus water to the roof.



Linear expansion coefficient – (10^{-6} m/m K)

Low score means high thermal stability



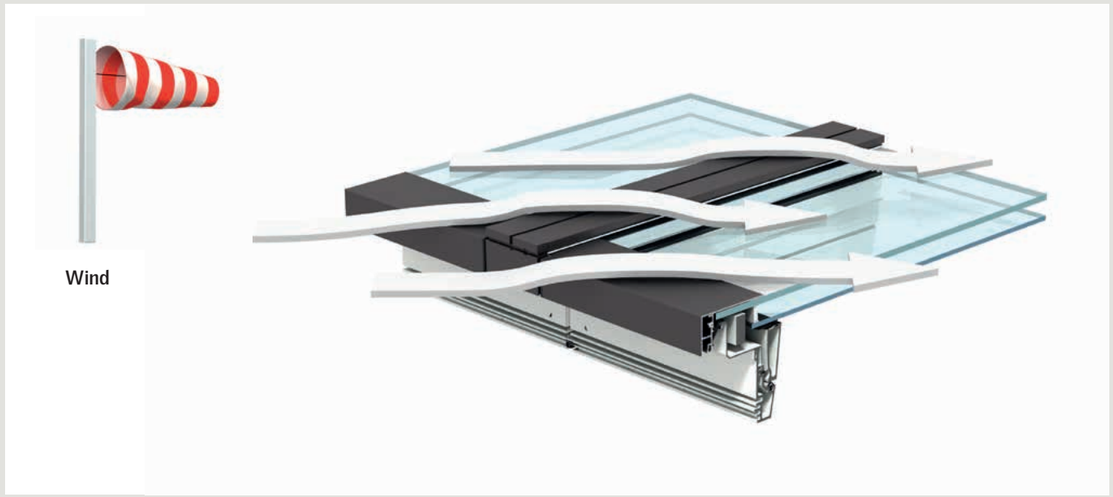
Traditional skylight materials fluctuate in form due to thermal changes, causing damage to gaskets and an increased risk of water ingress. Since the modular skylights composite contain 80% fibreglass, the profile properties are quite equal to those of the glazing unit. The similarity minimizes the risk of opposing movements in the construction, ensuring tightness of joints and a longer life expectancy of the application.

Full installation test

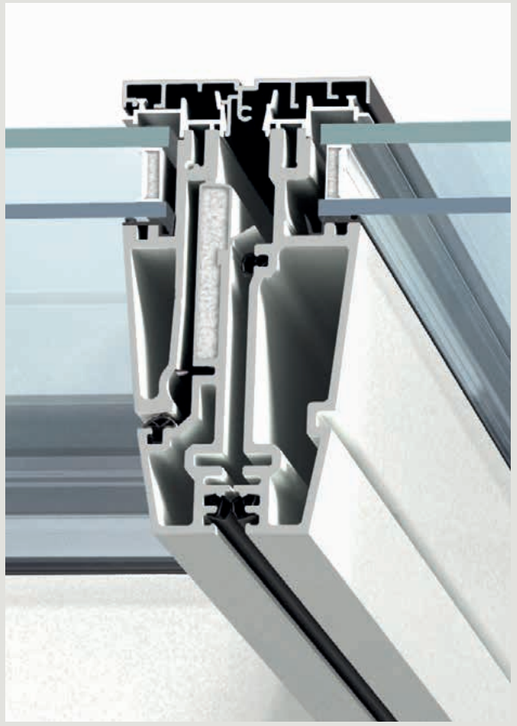
Installation and module watertightness is tested in a wind tunnel with wind speeds up to 37 m/s (hurricane force). The test uses a full installation with modules and flashing.

Airtightness

Modules are connected with a two-level gasket system that protects against air ingress due to excessive wind loads. The cladding, which is attached on top of the connected modules, contains several pressure compensation channels that reduce the load on gaskets and joints. The modules have obtained the highest classification for air permeability.



Air permability



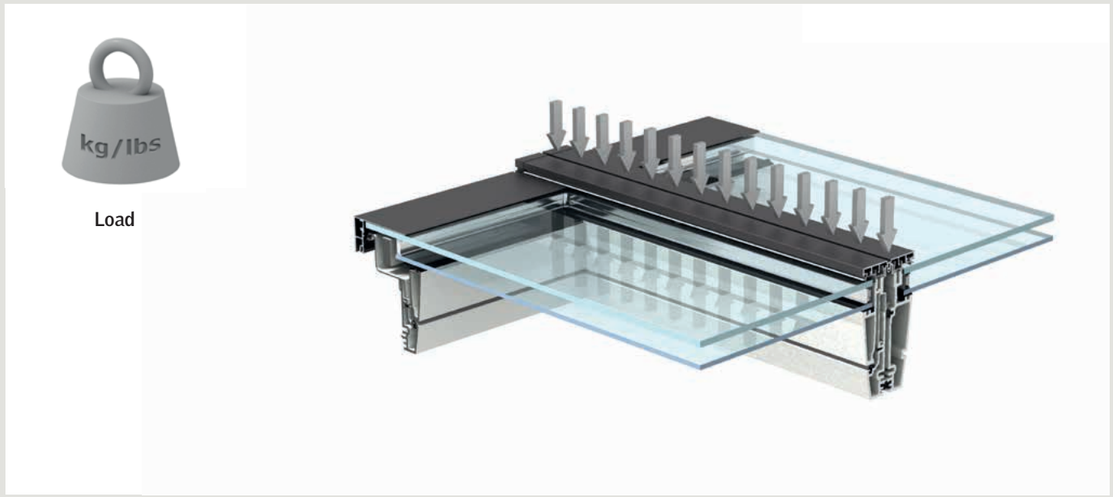
A two-level system with gaskets in the top and bottom ensure a very tight and durable connection between the two module profiles.

Source: [1] Approved external test institute [2] According to EN ISO 10077-2 [3] Value identical to fibreglass [4] www.engineeringtoolbox.com [5] Internal VELUX test

Performance

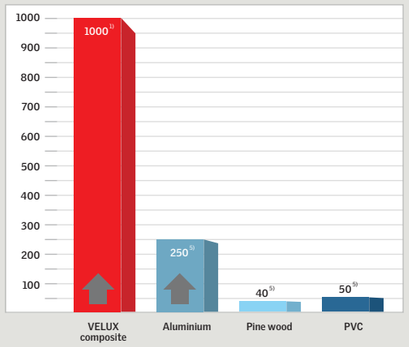
Strength

The modular profiles are made of an extremely tough composite material. The strength stems from a highly specialized pultrusion process, which creates a rare combination of high flexural strength and unparalleled resistance to breakage. The unique mix makes the composite a safe and durable element as well as a strong measure against aesthetically unappealing deformation.



Flexural strength – (N/mm²)

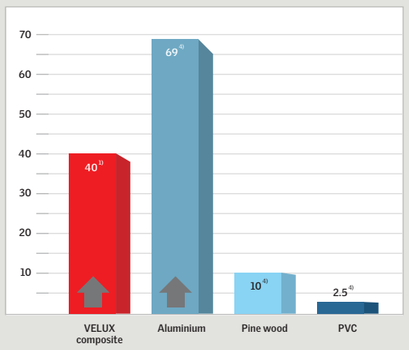
High score means high strength (resistance to breakage)



Compared to traditional skylight materials, the exceptional strength of the pultruded composite material allows longer and slimmer frame and sash profiles to be produced. As a result, large skylights with slim profiles become an option, which can lead to better aesthetic solutions.

Flexural Modulus (E-Modulus) – (GPa)

High score means little deflection



The high rigidity of the pultruded composite material makes the frame and sash extremely stiff. The rigid properties ensure reliable performance with very little deflection of the profiles and more durable aesthetics.

Modular skylights composite

A

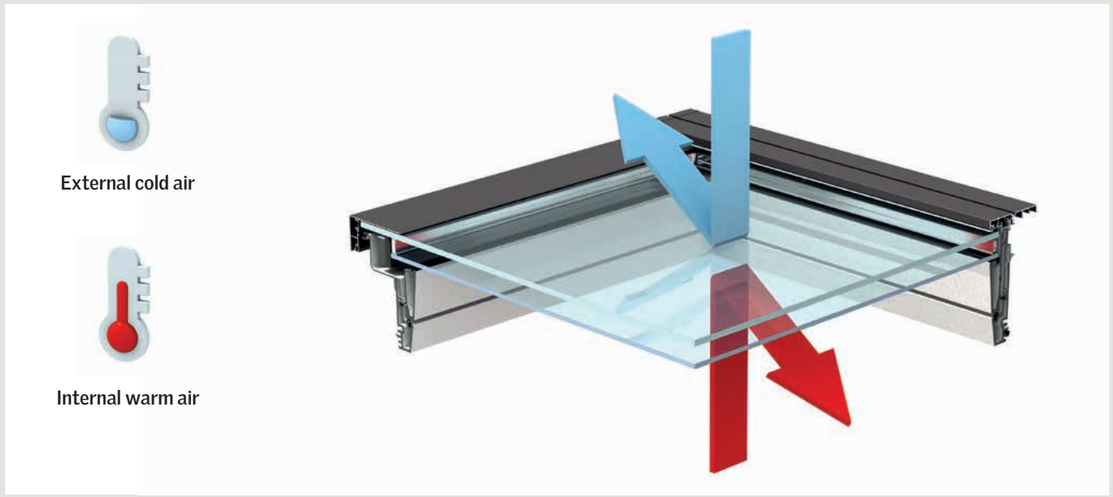
B

A To start the pultrusion process, strands of fibreglass are pulled from a fibre creel. The strands are pulled through a matrix that bundle the fibreglass to match the final geometric design.

B Following the matrix, strands enter a heated mould where fibreglass is mixed with polyurethane under high pressure. The resulting profile consists of 80% fibreglass and 20% polyurethane. Throughout the process profiles are regularly tested for dimensional inaccuracies.

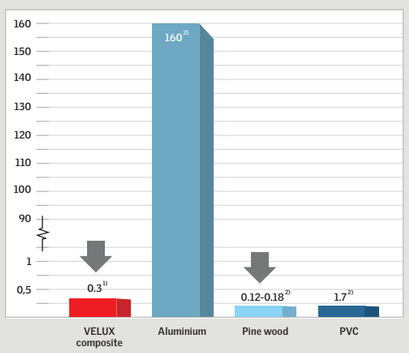
Energy

Very low thermal conductivity and an array of low-energy glazing options make the total modular solution exceptionally energy efficient. The system offers 2 or 3-layer glazing in combination with three different coatings. The different combinations allow you to specify the product precisely according to your demands, whether you prefer heat control or protection against cold weather.



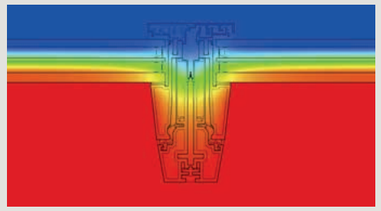
Thermal conductivity – (W/mk)

Low score means high insulation performance



The special composite possesses extremely low-conductive properties that surpass' traditional profile materials – a measure for high insulation performance.

Thermal insulation



Thermal tests reveal the profiles ability to prevent cold bridging.

Low-energy glazing in combination with low-conductive profiles creates a convincing shield against all kinds of cold weather.

Source: 1) Approved external test institute 2) According to EN ISO 10077-2 3) Value identical to fibreglass 4) www.engineeringtoolbox.com 5) Internal VELUX test

Performance

Glazing and U-values

Modular skylights are fitted with a 2-layer standard low-energy glazing unit. Alternatively a 3-layer glazing unit is available for projects that require extra low U-value. Both glazing units are available with different coatings for different levels of energy and solar protection, and with foil laminated inner glazing for added safety.

Double-glazing unit
U_w= 1.4 W/(m²K)
Veriant. 10, 11, 12

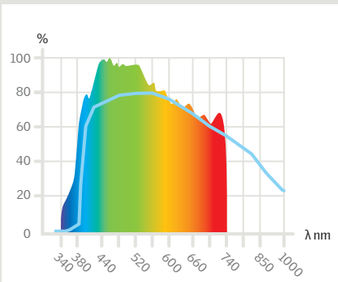
Triple-glazing unit
U_w= 1.0 W/(m²K)
Variant: 16, 17, 18

Colour rendering of glazing units

Glazing with low emissivity coating (LowE)

T-value = 77%
g-value = 58%
R_a = 94.47

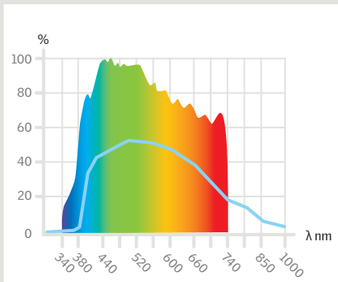
Variant: 10



Glazing with light sun protection coating (Sun1)

T-value = 49%
g-value = 27%
R_a = 90.39

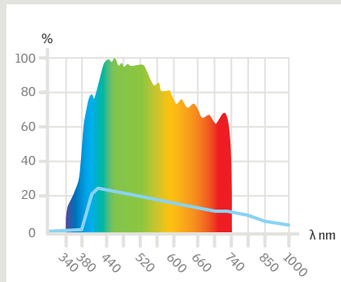
Variant: 11



Glazing with advanced sun protection coating (Sun2)

T-value = 19%
g-value = 16%
R_a = 86.30

Variant: 12



Spectral values (wave length in nm)
Visible daylight
tau

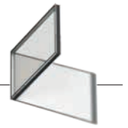
Colour simulation

Depending on the choice of coating, the penetrating light will be affected together with the natural colouring of the interior. Photos below compare the effect of the three available coatings in terms of colour rendering and luminosity to unfiltered daylight (no glazing).

Neutral daylight

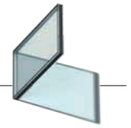
No glazing

Low emissivity coating



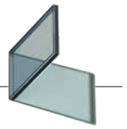
Variant: 10

Light sun protection coating

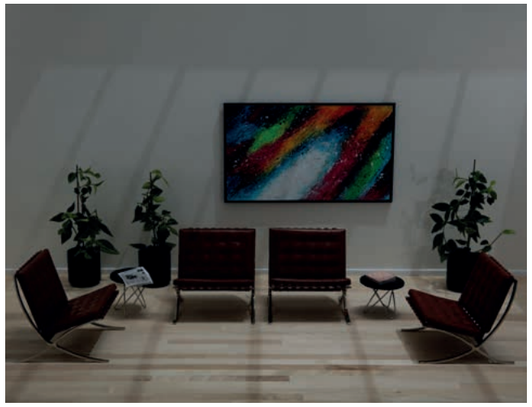


Variant: 11

Advanced sun protection coating



Variant: 12



Chairs in photos: Miniature Vitra Design Museum.

Read more about glazing units in our Technical Handbook
Can be downloaded at: velux.co.uk/modularskylights

Performance

Tested and classified

Due to the concept of prefabrication, we are able to test our products extensively against all thinkable hazards and stressful events. Tests are performed in controlled environments and even if only one component is investigated, results refer to all within our skylight concept. All products are manufactured, assembled and delivered from the same heavily controlled production line, leading to components with completely identical properties.

Watertightness

Classification: EN 12208:2000

VELUX modular skylights: E900

No water penetration up to 900 Pa.
900 Pa equals 134 Km/h (37.2 m/s).
(Hurricane = 32 m/s).

Resistance to Wind Load

Classification: EN 12210:2001

VELUX modular skylights: Class C5

Frontal deflection measured at 2000 Pa is less than L/300.
(L = span length).

Air Permeability

Classification: EN 12207:2000

VELUX moduler skylights: Class 4

Highest air permeability classification
Draught measured to less than 2.6 m^3/hm through joints at peak pressure.

Electromagnetic compatibility (EMC)

All electrical components are rigorously tested and comply with relevant EMC standards.

External Fire Performance

Classification: EN 13501-5 + A1:2009

VELUX modular skylights

B_{ROOF} **(t1):** No penetration or burning droplets.
B_{ROOF} **(t4):** No penetration of roof system within one hour.

Reaction to Fire

Classification: EN 13501-1:2007 + A1:2009

VELUX modular skylights: Clas B

Slow development of fire and moderate heat release.

Resistance to Fire

Classification: EN 13501-2:2007+A1:2009

Fixed fire resistant module (HFS): REI30
Venting fire resistant module (HVS): EI30

Strength

Ultimate strength under control

Flexual strength of the VELUX composite: 1000 N/mm^2

Safety at work

Fall-through protection

- DGUV Certificate (DE)
- NARM ACR fragile roofing assembly Class A
- CWCT TN 66/67 Class 2

Walking on VELUX Modular skylights is not allowed however, by holding above certificates VELUX Modular Skylights offer enhanced protection against fall through during installation and maintenance.