VELUX®

Commercial Skylights

VELUX Modular Skylights

Designed in cooperation with Foster + Partners

modularskylights.veluxusa.com

Advanced, innovative and proven

When you develop something that could potentially change the way skylights are designed, specified, installed and operated for a very long time, your are bound to use expensive words like the three keywords above. However, as we begin to describe how special our skylights are, it seems obvious that these three are well covered and signed for.

When VELUX Modular Skylights were introduced in 2011, it was the first prefabricated skylight concept to incorporate high energy performance, thermal stability and great strength in a slim and fully integrated design. To our delight, our modular skylights have since then established themselves as the most innovative skylight system on the market. Now, they're the proven choice in commercial buildings throughout the world.

"This is our contribution in terms of pushing the prefabrication of sophisticated building elements forward."

Paul Kalkhoven
Senior partner at Fosters + Partners


SIEMENS

Index

Ridgelights in Siemens Head Office,
Ballerup, Denmark

Design

The skylight module

Given the aesthetics and advanced performance of the products, our skylights are commonly used in heated buildings and primarily in projects that support light commercial interests, e.g. hospitals, schools, shopping centers, offices, museums etc. However, all buildings that have a suitable structure, and which are large enough to host an installation, will support modular skylights.

Functions

Modular skylights are available as fixed and venting modules. Due to a hidden chain actuator, fixed and venting skylight modules appear visually identical in closed position.

Venting modules are top-hung and can be used for ventilation comfort.

Fixed skylight module

HFC

Motorized comfort venting skylight module

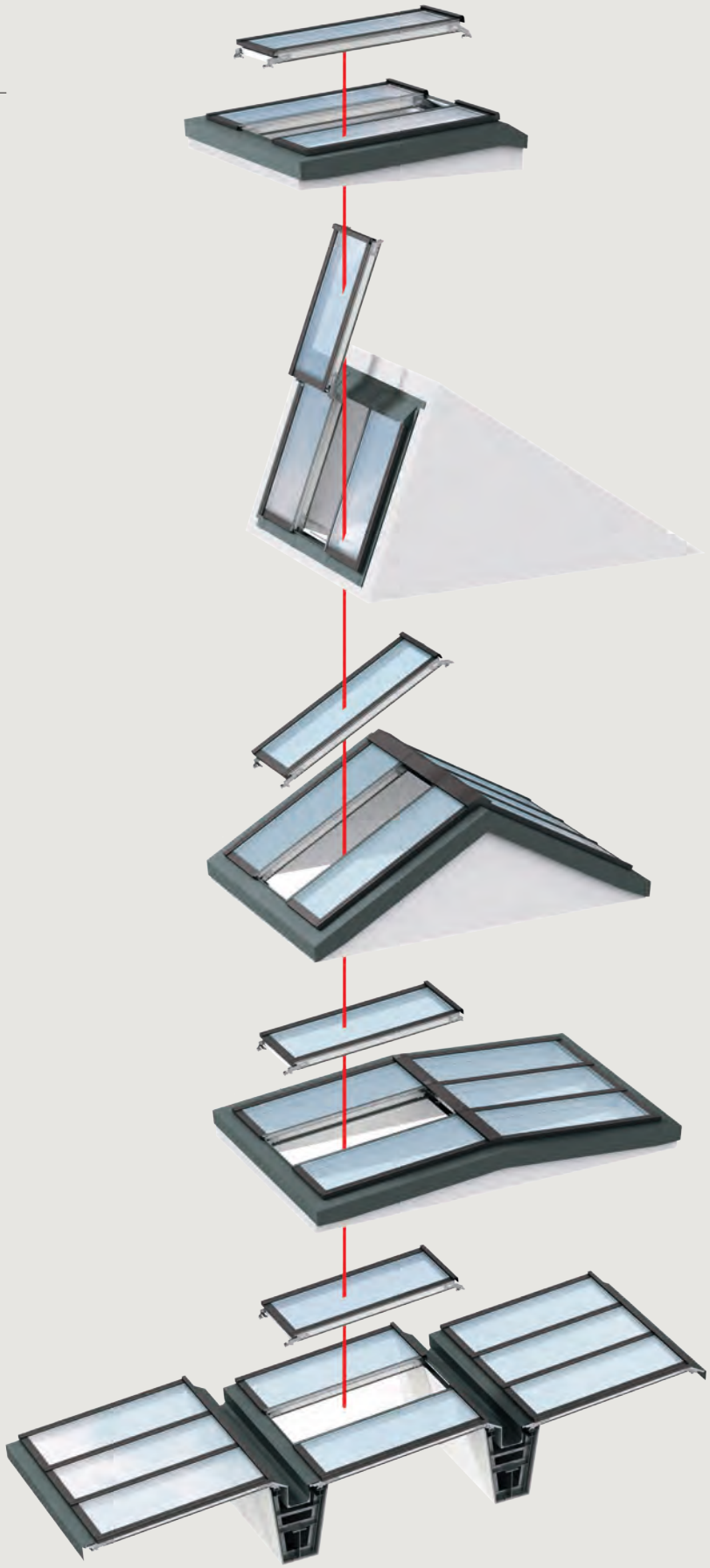
HVC
Opens up to 16.14 inches

One module for all solutions

All modular skylight solutions are based on the same skylight module and the same basic installation process. In other words, we offer a variety of solutions that utilize a singular module.

The modular concept is in every sense a "one module fits all". This means that you can apply the same module specifications, regardless of whether your project requires a longlight, ridgelight, northlight or other.

This unique modular feature makes the design process much more straightforward, leaving more time to develop aesthetics, ventilation properties, heat and daylight control etc.

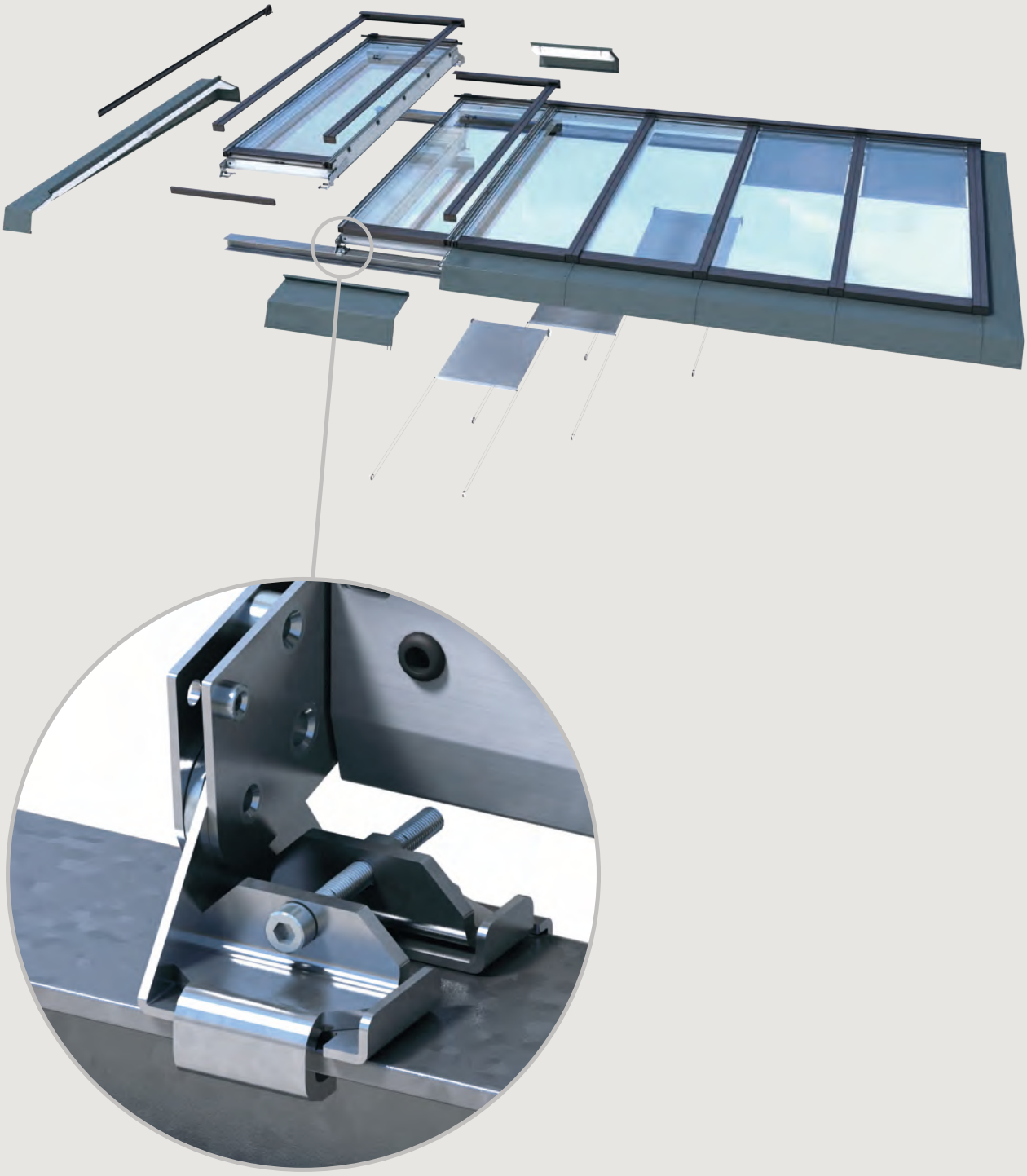


Design

Designed for trouble-free installation

All components are designed in exact accordance to the overall system. In our controlled production facilities, we monitor all aspects to ensure a perfect fit and assembly.

Our unique bracket system with a simple clamp design guarantees a predictable installation process, which makes it possible to fit an entire module within minutes.

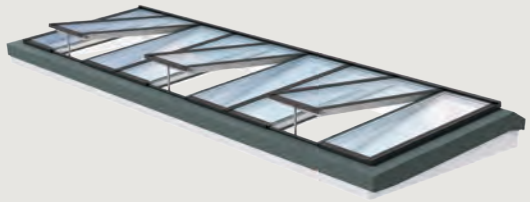


Skylight solutions

The modular skylight system allows you to create six different configurations for a variety of room and building types, ranging from narrow corridors and small courts to large studios and areas intended for circulation. Each solution is delivered with a prefabricated flashing system that ensures a perfect fit and a 100% watertight solution without the use of additional caulking and sealants.

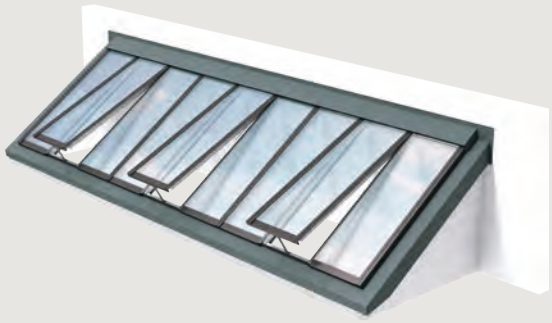
Longlight 5° - 25°

Page 18



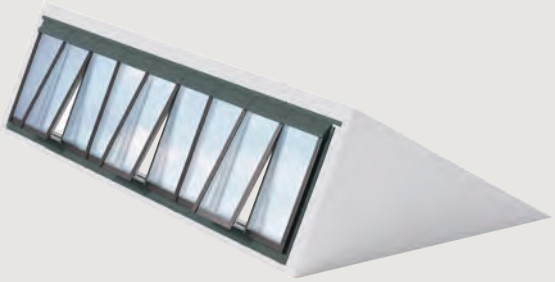
Wall-Mounted Longlight 5° - 40°

Page 20



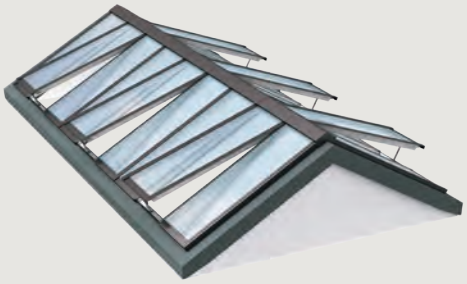
Northlight 25° - 90°

Page 19



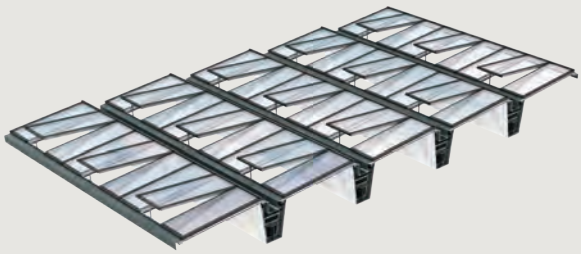
Ridgelight 25° - 40°

Page 22



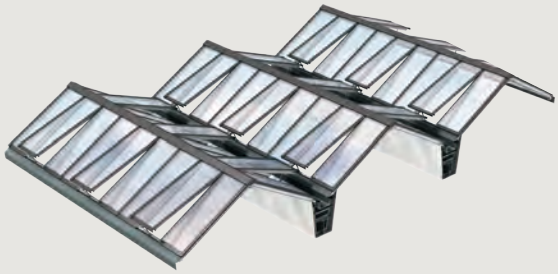
Atrium Longlight 5° - 25°

Page 26



Atrium Ridgelight 25° - 40°

Page 26



Design

A one step approach to daylight, ventilation and indoor comfort

Longlight in ASSA ABLOY office, Apeldoorn, the Netherlands

What you draw is what you get

The simplicity of our modular skylight design and the fully integrated actuator make it impossible to distinguish between fixed and venting modules. The visual uniformity means that even a simple sketch is likely to create a life like image of the final product.

Ridgelight with beams in ATP, Vordingborg, Denmark

Integrated actuator offers seamless ventilation

Venting modules are fitted with a fully integrated chain actuator that allows the room to be ventilated automatically. The actuator is connected to an intelligent control system that closes the module automatically in case of rain or strong winds. There are no visual differences between fixed and vented modules when closed.

Design

A one step approach to daylight, ventilation and indoor comfort

Roller shades on south facing modules in Siemens Head Office, Ballerup, Denmark

Advanced daylight and heat control with integrated roller shades

Specially designed roller shades (optional) protect against solar glare and heating. The fully integrated shades employ thin wires that hover beneath the pane, creating the sensation of a free-floating window shade.

Shades are automatic and can be programmed to respond to luminosity and temperature when integrated into the building's HVAC system.

VELUX open system

Climate control for automated building management

Venting Modular Skylights and shades controlled with the open system solution are connected to ± 24 V DC and can be connected to, and integrated with common building automation fieldbus systems.

A wall switch is for basic control of shades and ventilation.

A combined rain and wind sensor is available as an accessory.

OS
Open system

Read more about choice of control system in our Technical Handbook or see how the systems are connected in our Electrical Handbook. Both can be downloaded at: modularskylights.veluxusa.com

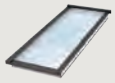
Design

Size grid

Standard size

Special sizes, functional limitations may apply.

Fixed modules



mm	675	750	800	900	1000
800					
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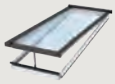
Comfort ventilation



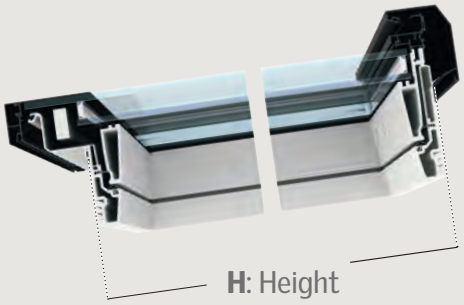
mm	675	750	800	900	1000
800					
1000					
1200					
1400					
1600					
1800					
2000					
2200					
2400					

* Modules for longlight and northlight, with extra strong glazing unit.

** No roller shades available.

How to measure the modules

Width and height of the modules are determined by the exterior W and H dimensions of the frame – not the measurements of the cladding, flashing or brackets.



Roller shades

The integrated roller shades fit perfectly into the window opening, creating a seamless connection between sash and cloth. Roller shades can be included in the module order they are built to fit.

Sunscreening

Gray	White	Black

Design

Exterior components

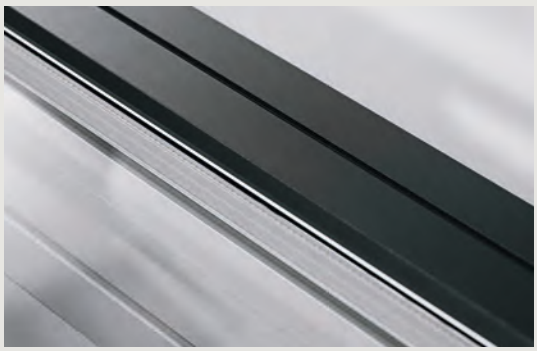
Cladding
Material: Aluminum (1 mm)
Surface: Scratch resistant powder lacquer
Color: "Noir 2100 Sable YW" Akzo Nobel

Flashing
Material: Aluminum (0.8-1.2 mm)
Surface: PVdt lacquer
Color: NCS standard color: S 7500-N (RAL 7043)

Assembly of middle and top section cladding. Longlight 5-25°.

Assembly of side and top section cladding. Flashing to the right. Longlight 5-25°.

Cladding and flashing assembly at the front of the rooflight.

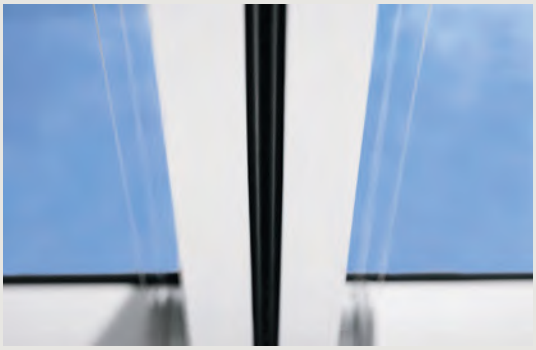


Middle section cladding connects two modules.

Side view of top covering. Longlight 5-25°.

Side view of top covering. Ridgelight 25-40°.

Interior components and features



A black gasket ensures seamless and tight connection between two modules.

Connection between sash, glazing and outside cladding.

Roller shades are kept taut and smooth by a strong, thin cable suspension.

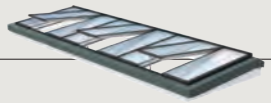
Roller shade bottom wheel ensures position of the cable.

The chain in the hidden actuator raises the venting module to provide ventilation for comfort.

The motor for roller shade operation is hidden inside the rod .

Applications

Longlight 5° - 25°



ASSA ABLOY office, Apeldoorn, the Netherlands. Interior.



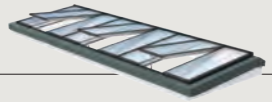
Multi Sports Centre, Copenhagen, Denmark. Interior.

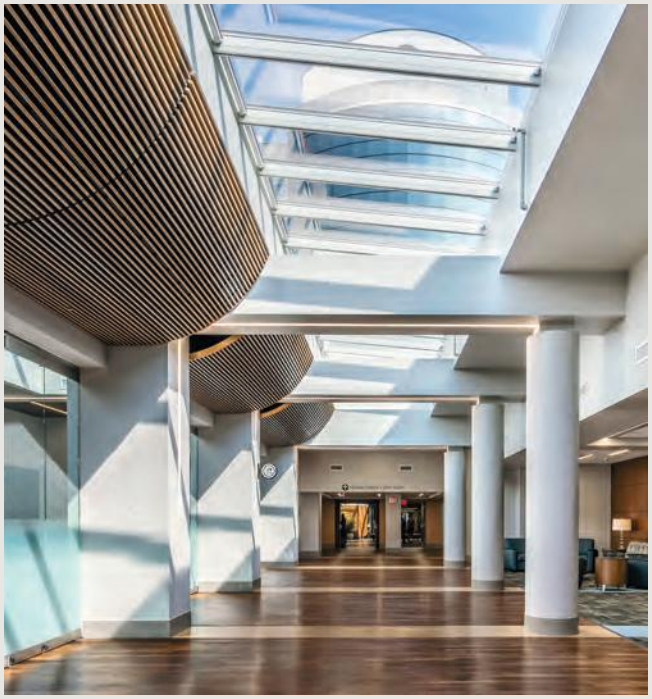
SALUS Haus, Bruckmühl, Germany. Interior.

Cornell University Sibley Hall, Ithaca, NY. Exterior.

Applications

Longlight 5° - 25°

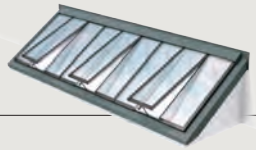


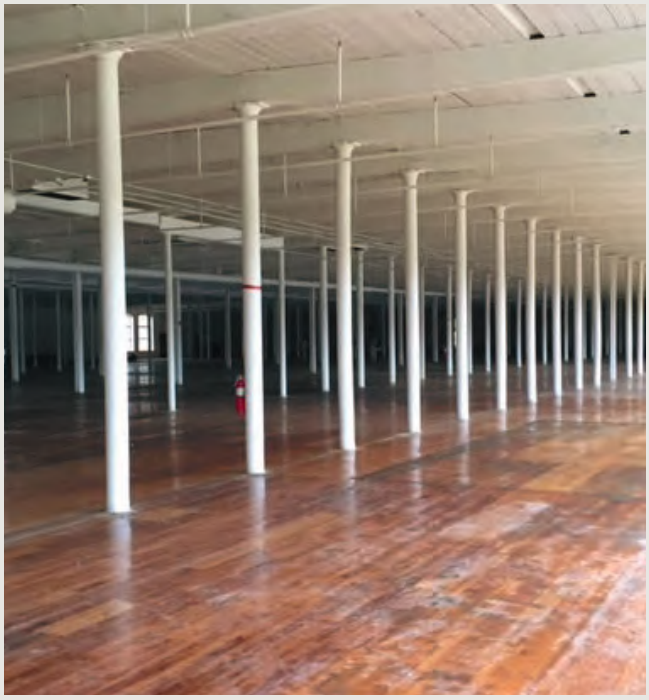


Self Regional Healthcare, Greenwood, SC. Interior.

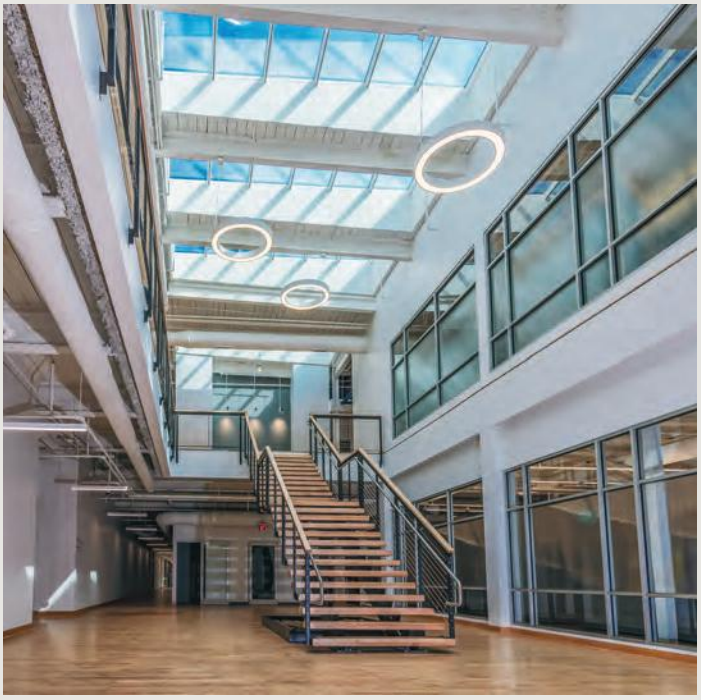
Cornell University Sibley Hall, Ithaca, NY. Interior.

Longlight 5° - 25°





BEFORE - Beaumont Mill, Spartanburg, SC. Interior.



AFTER - Beaumont Mill, Spartanburg, SC. Interior.

Northlight 25° - 90°

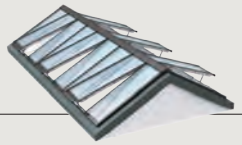
Ice rink, Lantriac, France. Exterior.

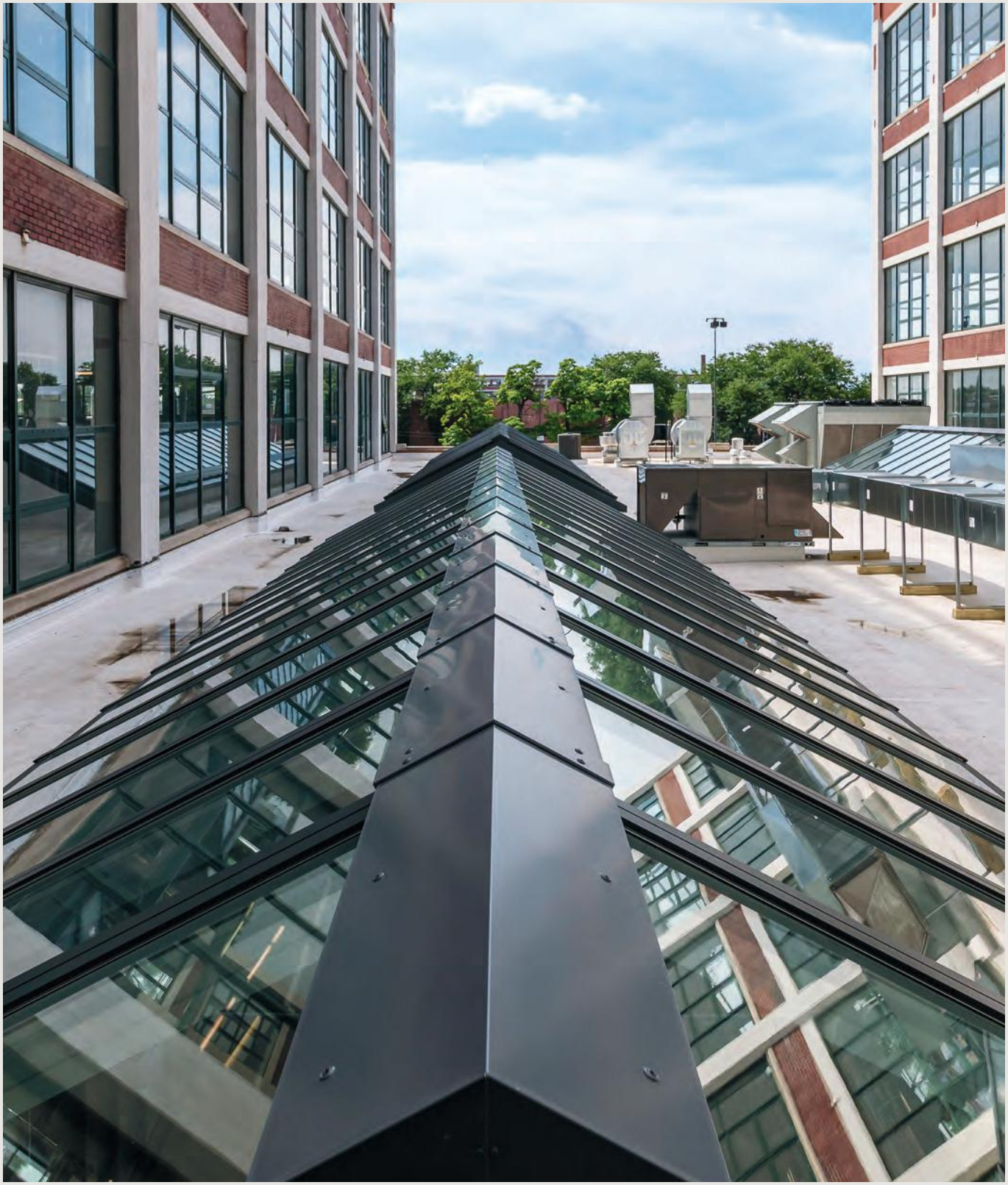
Ice rink, Lantriac, France. Interior.

Sågbäck Gymnasiet, Stockholm, Sweden. Interior..

Applications

Ridgelight 25° - 40°



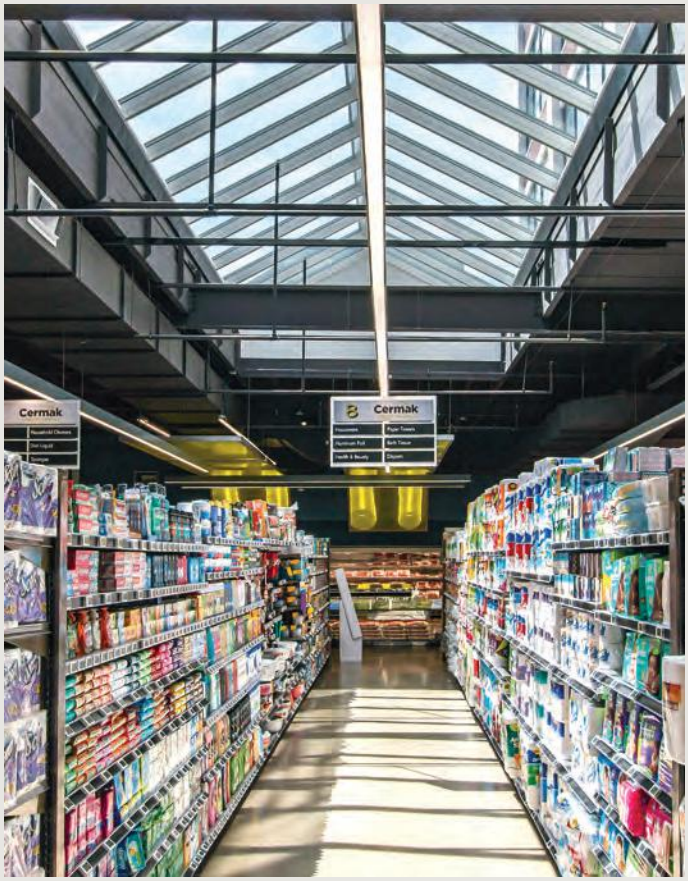


Cermak Grocery Chicago, IL. Exterior.

BEFORE - Iron Workers District Council, Dayton, OH. - Interior.

AFTER - Iron Workers District Council, Dayton, OH. Interior.

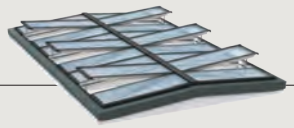
BEFORE - Cermak Grocery Chicago, IL. Interior.



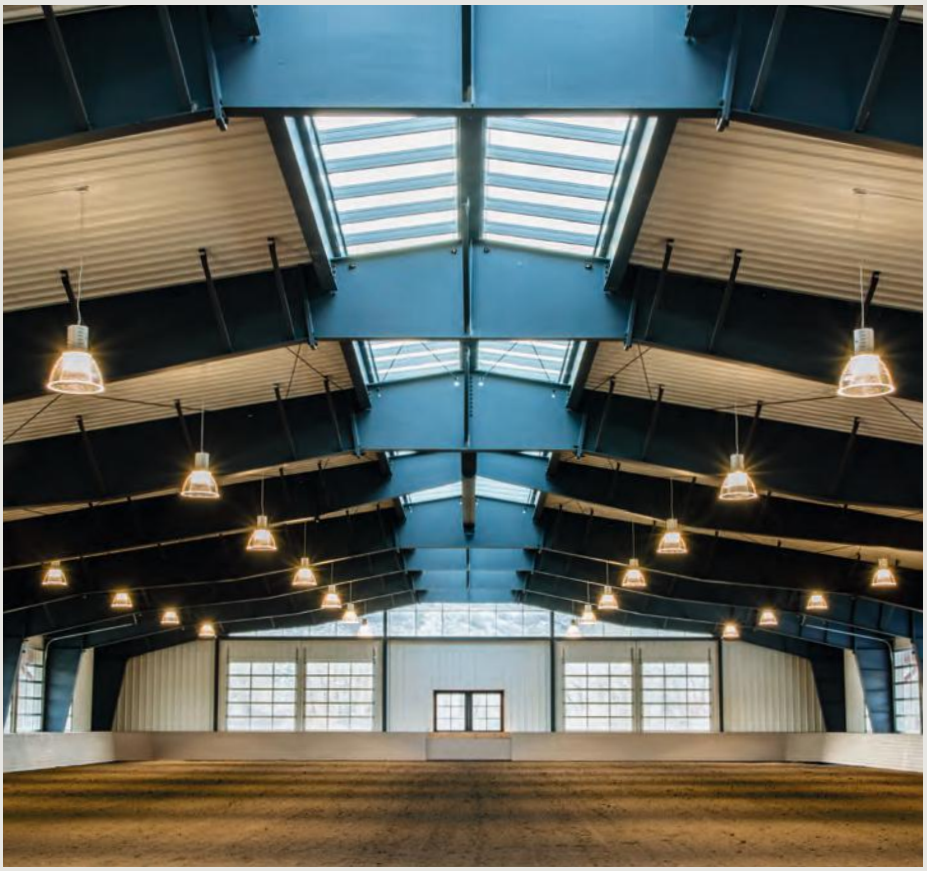
AFTER - Cermak Grocery Chicago, IL. Interior.

Applications

Ridgelight 25° - 40°



Winter Farms Equestrian Ranch, UT. Interior.



Winter Farms Equestrian Ranch, UT. Interior.

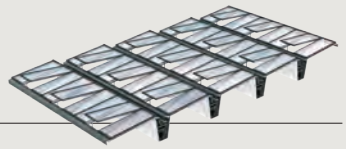
Winter Farms Equestrian Ranch, UT. Exterior.

BEFORE - The Leamington Hotel, Oakland, CA. Interior.

AFTER - The Leamington Hotel, Oakland, CA. Interior.

Applications

Atrium Longlight and Atrium Ridgelight



DSV Headquarter, Hedehusene, Denmark. Interior.

Green Solution House, Bornholm, Denmark. Interior.

BEFORE - 500 Seneca St, Buffalo, USA. Interior.

AFTER - 500 Seneca St, Buffalo, USA. Interior.

Applications

Photovoltaic panels

Green Solution House, Bornholm, Denmark.

Modular skylights are available with two different types of integrated monocrystalline photovoltaics:

1) The first type consists of a semi-transparent pane with one half covered in evenly distributed black squared photovoltaics, size approx. 6 x 6 inches. The semi-transparent module converts solar radiation to electricity with up to 8% efficiency.

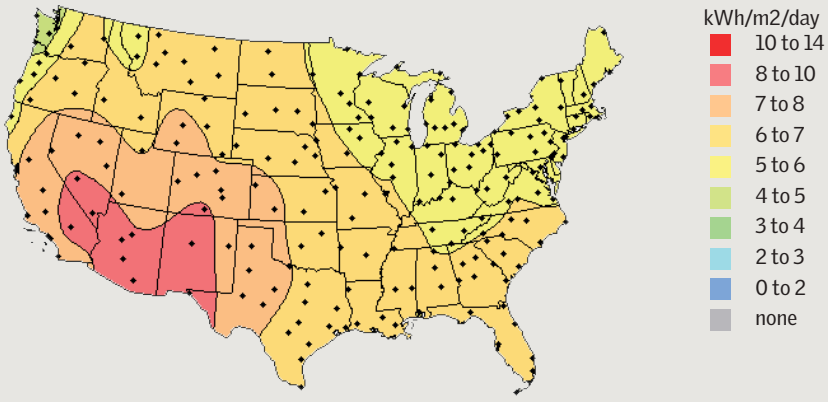
2) The second type is opaque and fully covered with photovoltaics without any transparency. The opaque module converts solar radiation to electricity with up to 13% efficiency.

Integrated photovoltaics are available in standard module widths from 800-1000 mm (31.5 x 39 in) and heights from 1200-2400 mm (47 x 94.5 in, fixed and venting).

In order to achieve maximum output from photovoltaic modules, we recommend a solution, which is tilted towards the equator and located in a shadow-free environment. As a rule of thumb the installation should be pitched at an angle that equals the latitude minus 10%.

Average Daily Solar Radiation Per Month

North-South Axis tracking flat plate tilted at latitude - 15°

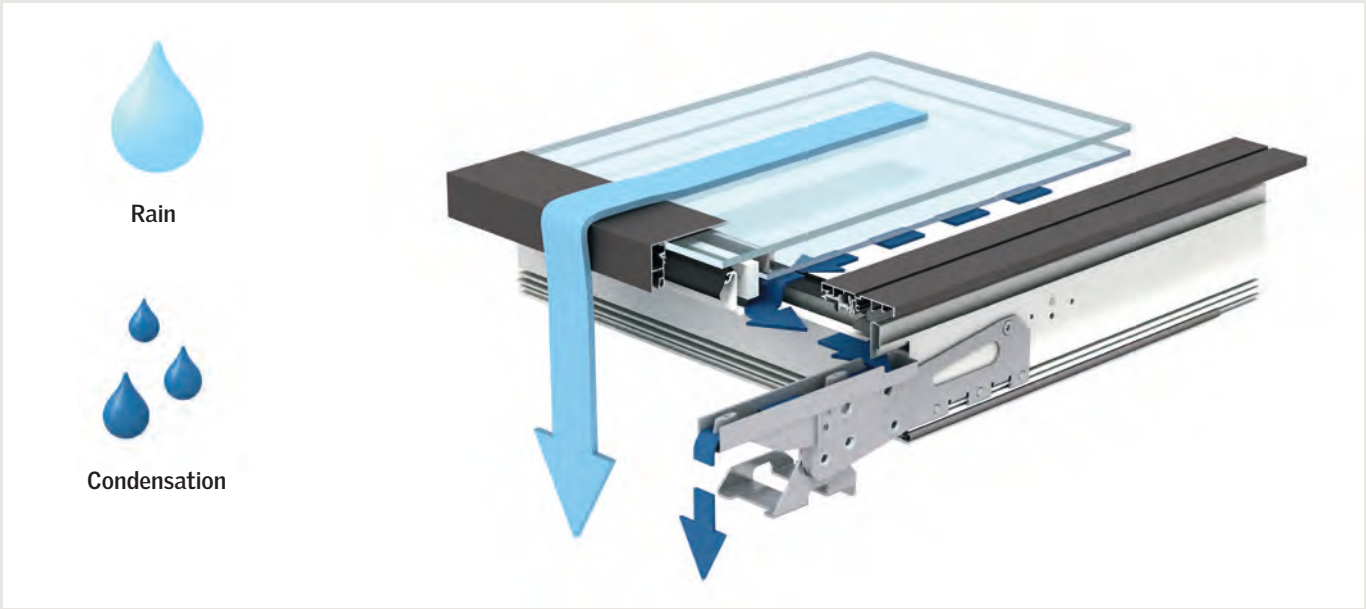


This data was collected from a US government website. http://rredc.nrel.gov/solar/old_data/nsrdb/1961-1990/redbook/atlas/serve.cgi

Performance

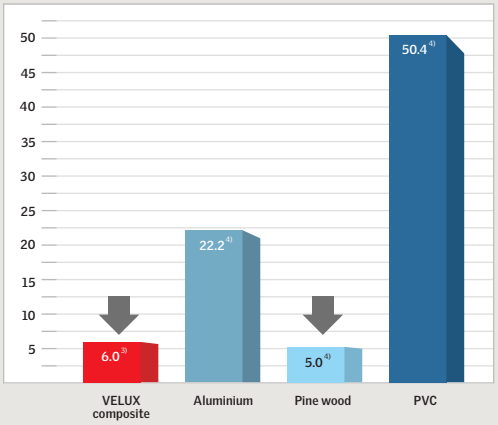
Water tightness

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



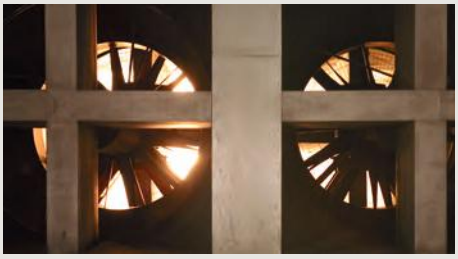
Linear expansion coefficient – (10^{-6} m/m K)

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

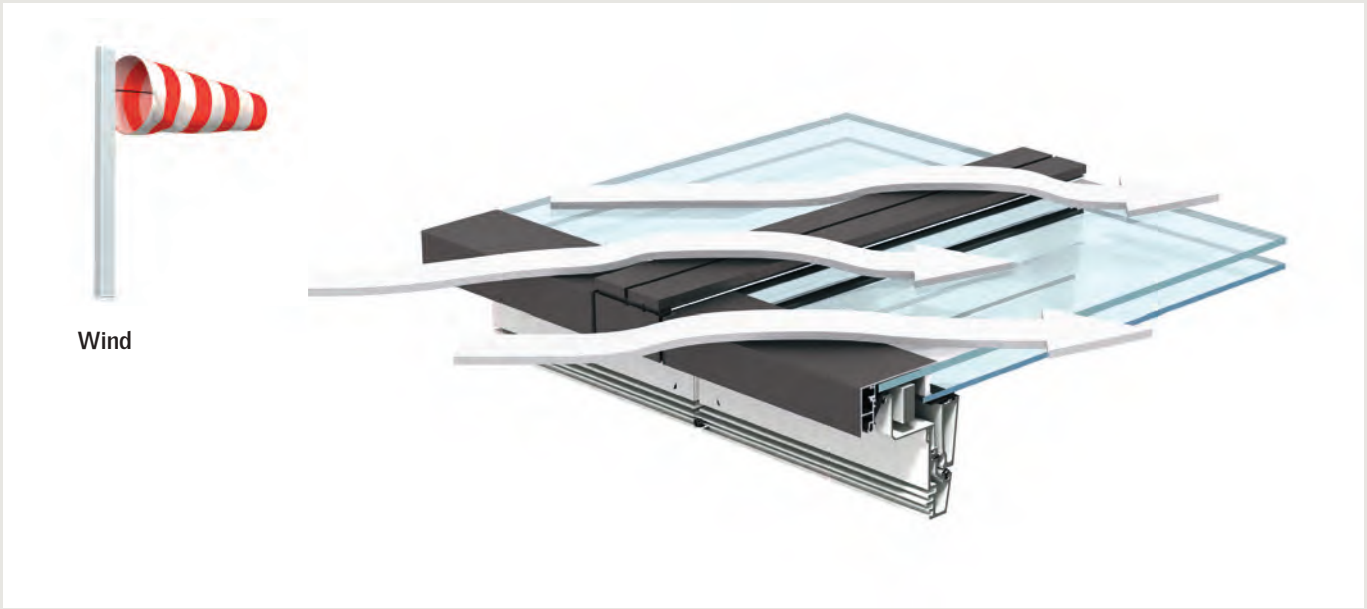


Installation and module water tightness is tested in a wind tunnel with wind speeds up to 82 MPH (hurricane force). The test uses a full installation with modules and flashing.

Performance

Air tightness

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 possible classification for air permeability.



Wind

Air permeability

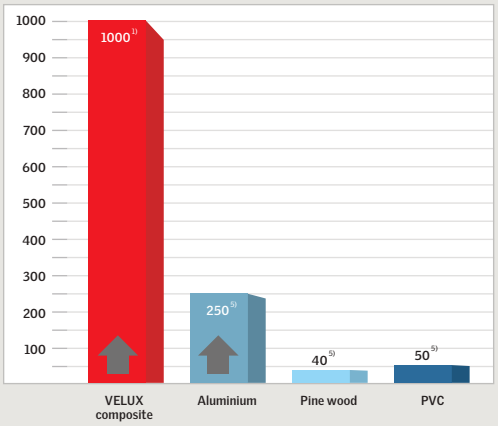
A two-level system with gaskets in the top and bottom ensure a very tight and durable connection between the two module profiles.

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)

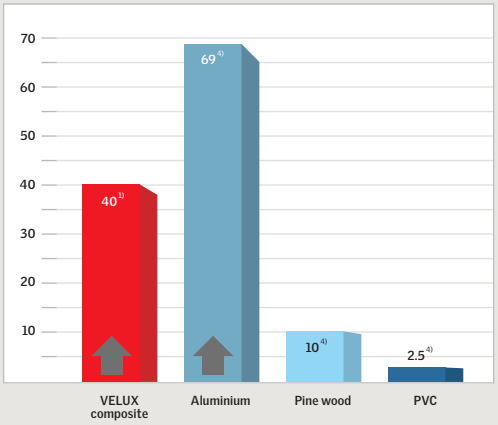
High score means high strength (resistance to breakage)



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 fiberglass are pulled from a fiber creel. The strands are pulled through a matrix that bundle the fiberglass to match the final geometric design.

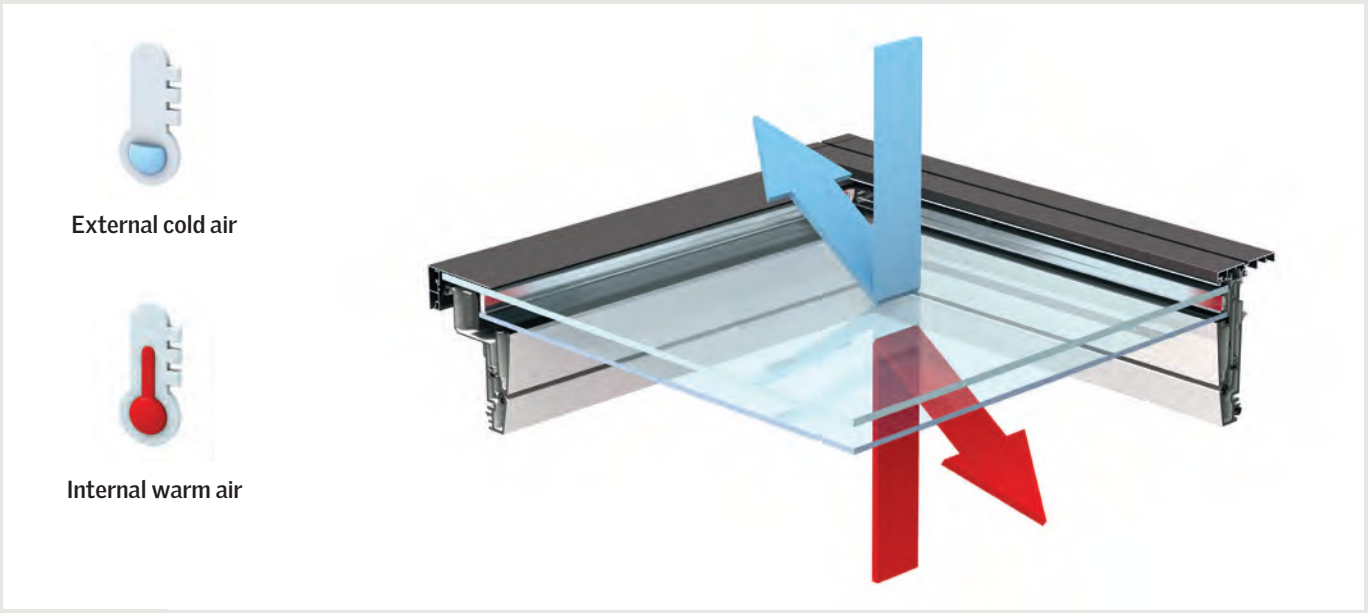
B Following the matrix, strands enter a heated mould where fiberglass is mixed with polyurethane under high pressure. The resulting profile consists of 80% fiberglass and 20% polyurethane. Throughout the process profiles are regularly tested for dimensional inaccuracies.

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

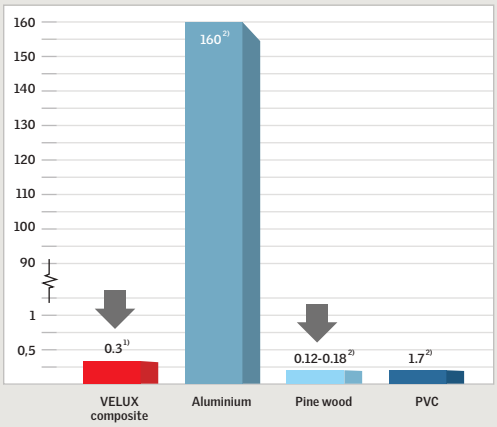
Energy

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.



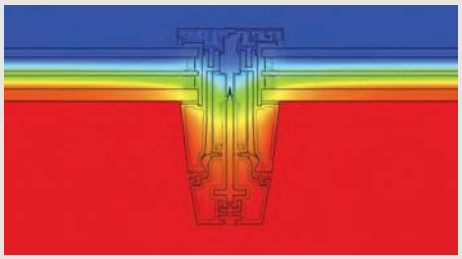
Thermal conductivity – (W/mk)

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.

Glazing and Module Ratings

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
Variant: 10, 11, 12

Type 16
Triple-glazing unit
Variant: 16, 17, 18

US Testing for VMS Modules (according to NFRC procedures)

Glazing with low emissivity coating (LowE)

Tested 20 degrees above horizontal

Vt	=	64%
SHGC	=	0.46
U-factor	=	0.34

Tested vertical

Vt	=	64%
SHGC	=	0.46
U-factor	=	0.28

Glazing with light sun protection coating (Sun1)

Tested 20 degrees above horizontal

Vt	=	46%
SHGC	=	0.25
U-factor	=	0.33

Tested vertical

Vt	=	46%
SHGC	=	0.24
U-factor	=	0.27

Triple glazing with light sun protection coating (Sun1)

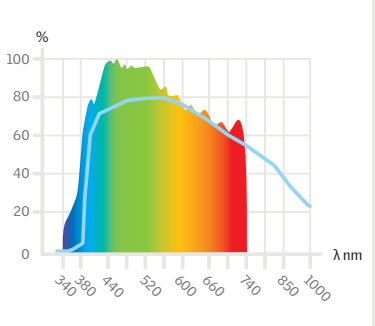
Tested 20 degrees above horizontal

Vt	=	55%
SHGC	=	0.36
U-factor	=	0.21

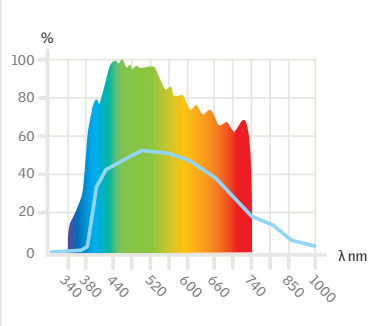
Tested vertical

Vt	=	56%
SHGC	=	0.36
U-factor	=	0.16

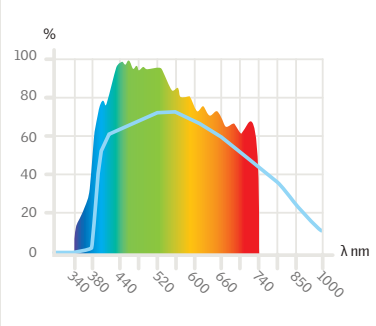
Variant: 10



Variant: 11



Variant: 16



Spectral values (wave length in nm)

Visible daylight tau

Performance

Color simulation

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

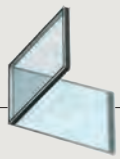
Neutral daylight

No glazing

Low emissivity coating

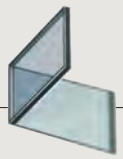
Variant: 10

Light sun protection coating

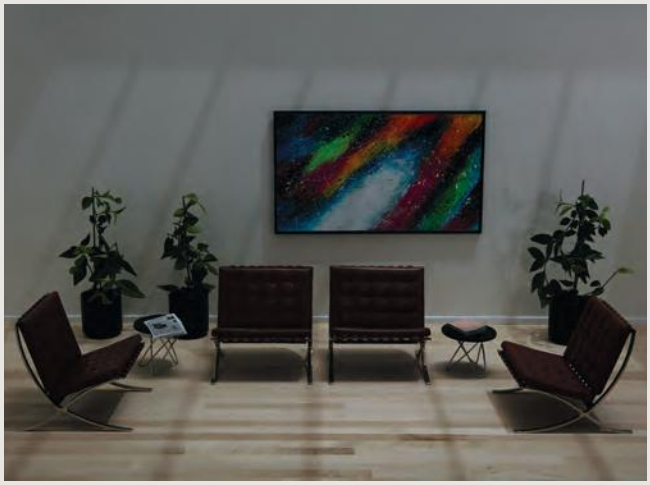


Variant: 11

Advanced sun protection coating



Variant: 12



Read more about glazing units in our Technical Handbook which can be downloaded at: modularskylights.veluxusa.com

Chairs in photos: Miniature Vitra Design Museum.

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 in accordance with harmonized standards for windows and doors together with smoke and heat control systems. All products are manufactured, assembled and delivered from the same heavily controlled production line, leading to components with completely identical properties.

Watertightness

Per ASTM E331 – No water penetration at the following differential air pressure (positive)

Venting modules1: 15 psf
Fixed modules2: 25 psf

Resistance to Wind Load

Per ASTM E330 – NAFS-11 Ratings

Venting modules1: +95/-50 psf
Fixed modules2: +60/-100 psf

Air Permeability

Per ASTM E283 – highest leakage direction

Venting modules1: 0.25 cfm/sq ft
Fixed modules2: 0.20 cfm/ sq ft

Electromagnetic compatibility (EMC)

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

Performance

External Fire Performance

Per ASTM E108

Reaction/Resistance to Fire

Self-Ignition Temperature (ASTM D 1929) - 500°C

Flash Ignition Temperature (ASTM D 1929) - 410°C

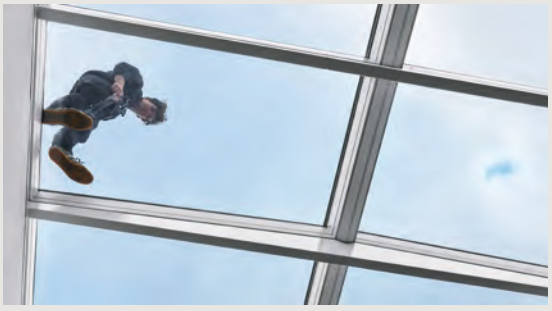
Average Smoke Density Rating (ASTM D 2843) – 7.0

Linear Rate of Burn (ASTM D 635) – Class CC1

Strength

Per ASTM E330 – NAFS-11 Ratings

Venting modules1: 15 psf
Fixed modules2: 25 psf



Safety at work

A 200-lb. weight was dropped from 1 ft. and then 2 ft.
Then a 400-lb. weight was rested on the glass, then dropped from 1 ft. and 2 ft. all with no damage resulting.

Walking on VELUX Modular skylights should not be allowed. However, by holding the above certificates, VELUX Modular Skylights offer enhanced protection against fall-through during installation and maintenance.

1. 39" x 94.5" venting module with type 10 glazing tested.
2. 39" x 118" fixed module with type 10T glazing tested.

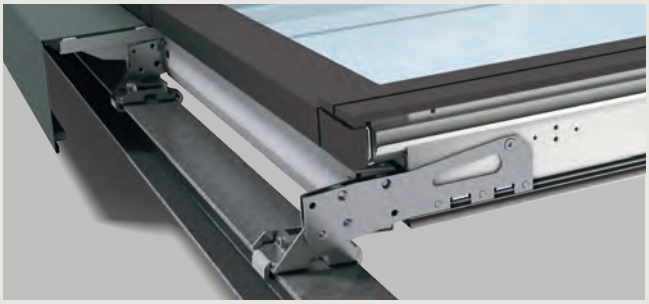
One module for all solutions - no wet glazing required

Shielding a building means protecting it against the dangers of weather as well as allowing work to commence inside the building. This makes speed a pivotal demand. Modular skylights are conceived to support the fastest imaginable installation process, starting from delivery on the construction site to fastening the final screw.

On arrival all items are marked with numbers and letters that clearly show the order in which the various components should be installed. Modules are hoisted directly from the pallets onto the prepared sub-construction and fastened within minutes. Final flashing and cladding is applied with prefabricated components, built to fit.

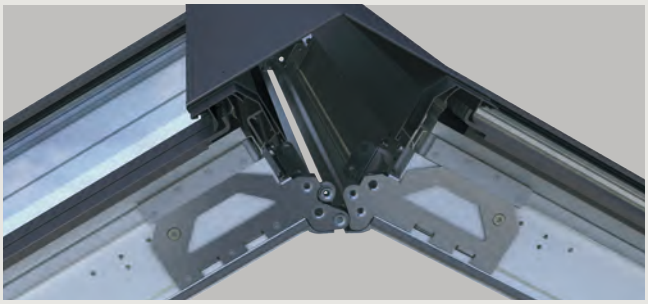
"It probably takes about 2-3 times longer with a traditional installation."

John Wolff
Wolff Tømmerfirmaet A/S
(Installer on Siemens Headquater Denmark and DSV Headquater Denmark)



Brackets and clamps

The galvanized steel bracket system for fastening the module consists of two identical brackets and clamps in top and bottom.

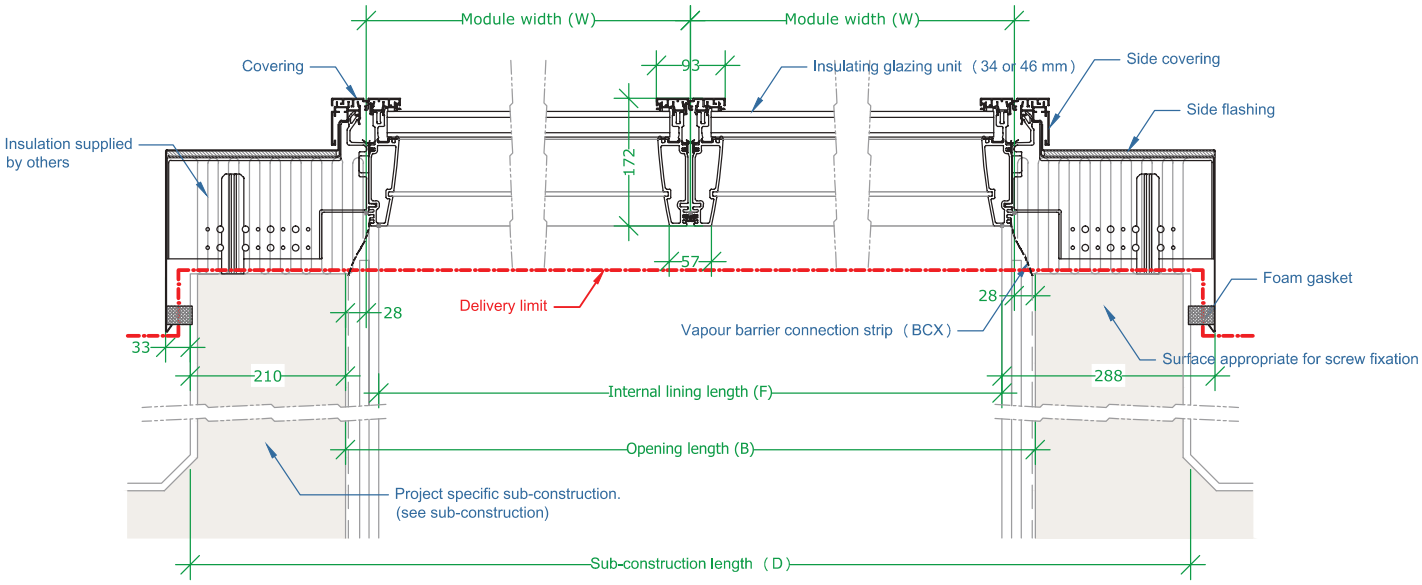


Top bracket for ridgelight

The top bracket for ridgelight 25-40° secures the opposing modules in the ridge to create a self-supporting construction.

Support

Technical drawings, 2D



Download detailed 2D illustrations and technical drawings

Precise and detailed AutoCAD material can be downloaded for immediate use directly from our website. The drawings contain all relevant descriptions and measurements.

AUTODESK AUTOCAD 2D

Download a complete folder with all material on modular skylights. Drawings can also be found in our Technical Handbook. Folder and handbook are available for download on our product website listed below.

See more technical drawings in our Technical Handbook. Download it at: modularskylights.veluxusa.com

Go to download section at **modularskylights.veluxusa.com** >

CAD/BIM objects, 3D

Use drag and drop objects

VELUX CAD/BIM objects are available to be used with the most popular modelling programs. Furthermore, all 3D objects are compatible with Autodesk AutoCAD, Trimble SketchUp and 3D Studio/3DS. The object families are built in accordance with buildingSMART, including: COBIE, CCS and Omni class.

BIM AUTODESK® REVIT®

AUTODESK® 3DS MAX®

BIM GRAPHISOFT ARCHICAD

SketchUp

BIM VECTORWORKS

AUTODESK AUTOCAD 3D

Objects can be downloaded from international BIM libraries and from the VELUX website.

AUTODESK.

http://seek.autodesk.com/

bimobject

www.bimobjects.com

polantis

www.polantis.com

Go to download section at **modularskylights.veluxusa.com** ›

Support

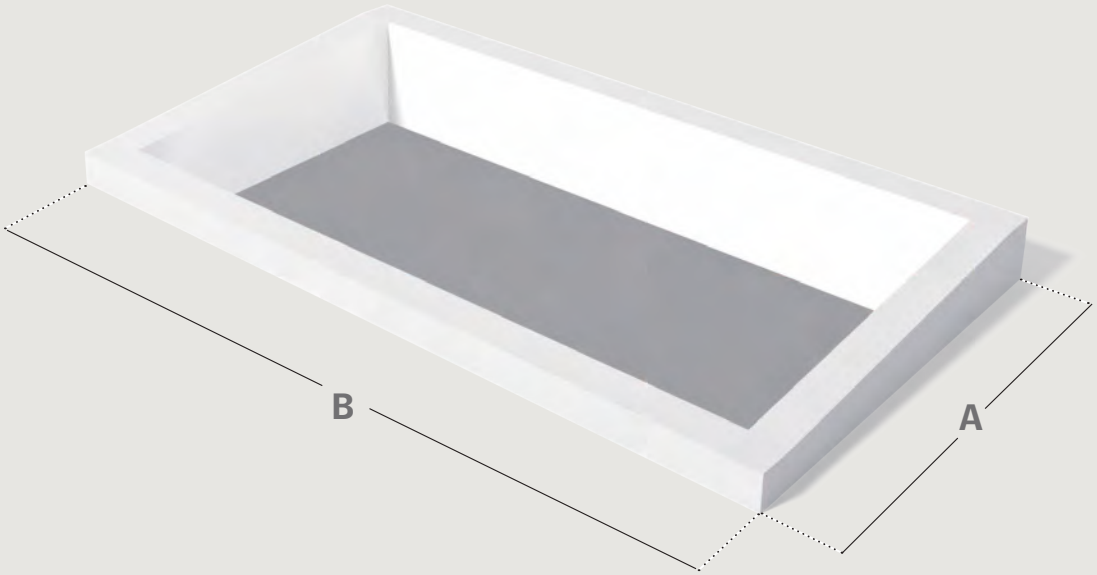
Sub-construction

To support a trouble-free installation process, the sub-construction needs to accommodate the very specific installation system. Modular skylights require an accurate, fixed dimensioned substructure. Likewise, the strength of the sub-construction needs to be calculated from project to project, based on the building design and application size.

Thus the sub-construction is not part of the prefabricated modular system.

Download our guide for sub-construction at:

modularskylights.veluxusa.com



Read all about sub-constructions in the guides at: modularskylights.veluxusa.com

Design phase

Consultancy

To help you get started, we offer expert guidance from even before your project gets approved.

Technical documentation

All technical documentations are available for download on our websites.

Specification

Our experienced building consultants stand ready to help you specify your projects.

Installation phase

On-site support

Once your project is underway we will help you track your progress and offer on-site consultancy on any critical issues.

Instruction

To insure high safety and efficiency on the construction site, we offer various forms of training for all installers that are involved. The training can take place directly on the construction site where your project is performed.

Support

Daily operation

After sale

A number of tools and accessories are available to help optimize the solution, if or when the requirements evolve.

User guidance

To maximize the performance output it is sometimes necessary to educate the users about the properties of the solution and train elected employees on how to operate the skylights.

Product service

Should the system for some reason require professional service, our team of VELUX service technicians will do all they can to solve the problem to everyone's satisfaction.

Guarantee

Our modular skylights and flashings are supported by a 10-year guarantee. Shades, actuators and other electrical components that are a part of the modular system comes with a 5-year guarantee. All warranty is subject to correct installation and usage.

Warranty conditions can be found on:
www.modularskylights.velux.com

Contact

Our aim is to provide all the tools and answers that will make your project as simple and trouble-free as possible. Thus we offer a wide range of expert support and consultancy even from before the project starts to well after its completion. To get in touch, please contact us here:

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