VELUX modular skylights are sash-frame constructed single skylights with a high-insulating glazing unit. The modules are available as fixed and venting skylights. All individual skylights are delivered as prefabricated modules with dedicated factory finished flashings to ensure watertightness in every available solution.

VELUX modular skylights are CE-marked in accordance with the harmonized standard EN 14351-1 – Windows and doors.

In addition the skylight modules have been tested and approved in accordance with EN 12101-2 – Smoke and heat control systems Part 2: Specification for natural smoke and heat exhaust ventilators.

This technical handbook for VELUX modular skylights describes the product characteristics and performance of the skylight module together with sunscreensing and control system. For real life case studies and inspiration, please refer to velux.co.uk/modularskylights
Modular System
Skylight Module

CE marked VELUX modular skylights can be used in any building where the national, local and individual building requirements allow the use of skylight modules. Given the aesthetics and advanced performance of the products, VELUX modular skylights are commonly used in heated buildings and primarily in projects that support light commercial interests, e.g. hospitals, schools, shopping centres, offices, museums etc. However all buildings that have a suitable structure, and which are large enough to host an installation, will support VELUX modular skylights.

Functions & Sizes

VELUX modular skylights are available as fixed and venting modules. Due to a hidden chain actuator, the fixed and venting skylight modules appear to be visually identical in closed position. Venting modules are top-hung and can be used for comfort ventilation, and in addition, certain types are approved for smoke ventilation in accordance with EN 12101-2.

Size grid

<table>
<thead>
<tr>
<th>Fixed modules</th>
<th>Comfort ventilation</th>
<th>Smoke ventilation</th>
</tr>
</thead>
<tbody>
<tr>
<td>HFC</td>
<td>Motorized comfort ventilation</td>
<td>Motorized smoke ventilation</td>
</tr>
<tr>
<td>HVC</td>
<td>Opening up to 410 mm</td>
<td>Opening up to 700 mm in less than 60 seconds</td>
</tr>
<tr>
<td>HVC</td>
<td>Motorized smoke ventilation</td>
<td>Opening up to 700 mm in less than 60 seconds</td>
</tr>
</tbody>
</table>

* Modules height above 2400 are delivered with extra strong glazing unit only.
△ No roller blinds available.
○ Only open system actuator available.

If roller blinds are requested for smoke venting modules, please refer to local fire authorities for permission.

Modules height above 2400 are delivered with extra strong glazing unit only.

No roller blinds available.

Only open system actuator 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.
VELUX modular skylights can be combined in a number of configurations creating perfect solutions for a wide variety of building types, from narrow corridors and internal courts to studios and large circulation spaces. Each solution is delivered with a special designed, prefabricated flashing ensuring perfect system.

**Solutions (monopitch)**

- **Longlight 5 - 25°**  
  Page: 40

- **Wall-mounted Longlight 5 - 40°**  
  Page: 42

- **Northlight 25 - 90°**  
  Page: 44

- **Atrium Longlight 5 - 25°**  
  Page: 48

**Ridgelight (dual pitch)**

- **Ridgelight 25 - 40°**  
  Page: 46

- **Ridgelight at 5° with Beam**  
  Page: 48

- **Atrium Ridgelight 25 - 40°**  
  Page: 50

- **Atrium Ridgelight at 5° with Beam**  
  Page: 52
Module – Main Components

- Mounting bracket
- Cladding
- Flashing
- Glazing unit
- Frame and sash

Module – Electrical Components

- Power supply and control unit
- Chain actuator
- Roller blind
- Remote control

Options:

<table>
<thead>
<tr>
<th>Remote control</th>
<th>Power supply and control unit</th>
<th>Rain and wind sensor unit</th>
<th>Wall switch</th>
<th>Interface for external wall switch</th>
<th>Interface for external control devices</th>
</tr>
</thead>
<tbody>
<tr>
<td>KLR 200</td>
<td>KLC 400</td>
<td>KLA S105</td>
<td>KLI 110</td>
<td>KLF 050</td>
<td>KLF 200</td>
</tr>
</tbody>
</table>

Read more about electrical products in Electrical Handbook at velux.co.uk/modularskylights
The main structural profiles of VELUX modular skylights consist of pultruded composite, containing approximately 80% continuous fibreglass treads and 20% two-component polyurethane resin. The composite guarantees high heat insulating performance (graph 1) and thermal stability (graph 2) as well as excellent profile stiffness (graph 3) and strength (graph 4). In combination, the characteristics of the VELUX composite gives the slim profiles self-supporting strength and an ability to support installations of considerable size.

In addition the material is maintenance-free, non-corrosive and electrical non-conductive.

In combination with low-energy glazing units the VELUX modular skylights are able to achieve one of the lowest overall U-values for frame and glazing assembly within the skylight market. The inner surface is treated with white paint as standard. Other colours are available to special order.
Frame & Sash

1. **Thermal conductivity (W/mK)**
   - A low score means high insulation performance
   Profiles used for VELUX modular skylights consist of pultruded fiberglass and polyurethane composite resulting in high insulation.

2. **Linear expansion coefficient (10^-6 m/mK)**
   - A low score means high thermal stability
   Whereas traditional skylight materials are bound to fluctuations in form due to thermal changes, the composite of VELUX modular skylights will maintain its dimensional properties, ensuring tightness of joints and prolonging the expected lifetime of the application.

3. **Flexural Modulus (E-Modulus) (GPa)**
   - A high score means low deflection
   The high rigidity of the pultruded composite material results in very stiff frame and sash, ensuring reliable performance with very little deflection of the profiles and better aesthetics of the skylight.

4. **Flexural Strength (N/mm²)**
   - A high score means high strength
   The very high strength of the pultruded composite material allows for design and production of longer and slimmer frame and sash profiles than traditional skylight materials. This enables design of large skylights with slim profiles resulting in better aesthetic performance.

**Source:**
1. Accredited external tests
2. According to EN ISO 10077-2
3. Value identical to fiberglass
4. www.engineeringtoolbox.com
5. Internal VELUX test
Cladding

Each single module has an assigned set of claddings. Cladding components are attached on four sides of the skylight, ensuring a watertight connection. The cladding is made of extruded aluminium, which is covered with a scratch resistant, granite grey powder coating for added weather protection and aesthetics. Other colours are available at premium price.

Flashing

VELUX modular skylights come with factory-finished flashings. The pre-fabrication of flashings ensures a high quality solution and safe and fast installation process. The flashing has a top, side and bottom section made from aluminium with a grey paint finish. Other colours are available at premium price.
VELUX modular skylights come with a low-energy double-glazing unit. Alternatively, the skylight modules can be supplied with improved solar protection or a krypton filled triple-glazing unit for extra-low U-value. All glazing units include a toughened outer glass layer and a 3+3 or 5+5 mm safety inner glass layer with 2 x 0.38 mm interlayer PVB foil. For technical values on glazing units, please refer to the chapter about Product Data.

The triple-glazing units have a heat-strengthened middle glass layer. Heat strengthened glass is also utilised for the inner pane of triple-glazed units with a 5+5mm inner pane.

The cavity between the panes of the glazing units is filled with argon gas or krypton as a default. All glazing units consist of a warm edge spacer and they are produced with warm edge technology to minimise the risk of condensation at the pane edges to provide the glazing units with the most durable insulation capabilities.

Glazing Unit

Example of double-glazing unit (LowE)

Variant 10

- Laminated inner glass with PVB foil
- Low-E coating
- Spacer
- Outer glass layer with step

Variant 16

- Laminated inner glass with PVB foil
- Low-E coating
- Middle glass
- Low-E coating
- Spacers
- Outer glass layer with step

Example of triple-glazing unit (LowE)

Variant 10

- Low-E coating
- Laminated inner glass with PVB foil
- Spacer
- Outer glass layer with step

Example of triple-glazing unit (LowE)

Variant 16

- Low-E coating
- Laminated inner glass with PVB foil
- Middle glass
- Low-E coating
- Spacers
- Outer glass layer with step

Note: Visual quality of glazing units. Interference effects and/or effects specific to multiple glazing and/or anisotropy may occur in the visible glass surface due to the physics of the material and its production technologies.

Glazing with low emissivity coating (LowE)

Variant 10

- T-value = 79%
- g-value = 59%
- Rₜ = 96.4

Glazing with light added sun protection coating (Sun1)

Variant 11

- T-value = 49%
- g-value = 27%
- Rₜ = 91.2

Glazing with high sun protection coating (Sun2)

Variant 12

- T-value = 18%
- g-value = 16%
- Rₜ = 90.7

Visible daylight τ

Proofread text with PDF output:
Brackets & Hinges

Material and surface treatment
Metal components in VELUX modular skylights are made of galvanized steel. The majority of the steel components are electroplated according to European norm EN ISO 2081 Table A1 – C: iridescent. Components fulfill corrosion resistance grade 4 in accordance with EN ISO 1670. Based on these properties, VELUX modular skylights can be used where external weather conditions and indoor climate conditions remain within the normal spectre of corrosiveness.

Note: VELUX modular skylights must NOT be used in indoor environments, where the risk of condensation on metal components can lead to extreme corrosive attack. Environments include buildings with swimming pools and other similar facilities that use highly corrosive substances, e.g. salt and/or chloride. Evaporation can lead to corrosive attack on components, weaken the functionality and in the end compromise the structural integrity of the installation.

Brackets
VELUX modular skylights are supplied with mounting brackets and clamps and are ready to be installed on any preferred sub-constructed made of steel, concrete or wood finished with a steel profile at the top. Mounting brackets are fixed during installation with a clamping system holding the skylight in place.

Using a steel profile on top of the sub-constructed provides benefits, since the clamps at any time during installation can be released to allow minor positional adjustment of the modules.

If the skylight modules are mounted on the batten using screws through the top- and bottom brackets. These screws are not included in the VELUX delivery, and the correct dimensions must be ensured by the customer.

Hinges
The pre-fitted hinges of the venting modules are tested under the most severe conditions, using the largest and heaviest modules to open and close continuously.

Examples of Brackets & Hinges

- Clamp for fixing mounting bracket on steel profile
- Bottom bracket for longlight and ridgelight
- Top bracket for northlight
- Top bracket for wall-mounted longlight
- Top bracket for ridgelight 5° with beam
- Top bracket for ridgelight 25 - 40°
Module - Assembled
**Vapour Barrier Connection Strip**

To ensure a high quality installation of VELUX modular skylights and to prevent condensation occurring within the kerb construction, it is highly recommended to install the BCX vapour barrier connection strip.

The factory-finished BCX creates the perfect connection between the VELUX modular skylights and the vapour barrier of the building.

![The factory-finished BCX](image)

![Position of BCX](image)

The vapour barrier connection strip BCX is made of a diffusion-tight polyethylene membrane completed with a pre-fitted rubber gasket along one edge. With a perfect fit into the skylight frame rebate, installation is an easy job that guarantees a vapour-tight solution.

**Chain Actuator**

Venting VELUX modular skylights are top-hung and use a hidden chain actuator integrated at the bottom profile. There are two variants of the chain actuator. You can either choose the VELUX INTEGRA® system based on the io-homecontrol® technology and use the VELUX INTEGRA® control pad, KLR 200, for user-friendly control.

Alternatively you can choose the open system variant and connect the installation to your preferred building management system. The open system chain actuator can be programmed even after installation to suit specific needs, e.g. speed, tensile, compressive force, noise level and power consumption.

These parameters and functions can be changed via the green communication wire if connecting to WindowMaster MotorLink™ control.

The chain actuator for VELUX modular skylights has a build in reversing function that prolongs the lifetime of the gaskets.

The chain actuator is accessible from the roof. Therefore maintenance requires no access from the inside of the building.

VELUX modular skylights have a recommended minimum installation height of 2.5 m above floor level (inside) and ground level (outside). In case of installation below that level, safety measures must be applied by the installer/user to prevent serious injury. No instruction or measure can eliminate the inherent hazards resulting from installation height below 2.5 m.

VELUX will not accept responsibility for damages, injury or death resulting from such installation. The installer/user is ultimately responsible for own omissions and actions. Measures could be for instance a motion sensor able to disconnect power from the control unit in case of any movement in the immediate vicinity of the VELUX modular skylights.
**Control System**

**VELUX INTEGRA®**

Venting modular skylights and blinds controlled with the VELUX INTEGRA® system will be powered and controlled from the control unit KLC-400. Each KLC-400 can operate one venting skylight module and up to four roller blinds individually, in groups or simultaneously.

Skylight systems installed with the VELUX INTEGRA® system are controlled with the VELUX INTEGRA® control pad, KLR 200, which allows the skylight modules and blinds to be set in any position and offers a range of programming features.

Open system
Venting modular skylights and blinds controlled with the open system solution are connected to ± 24 V DC. In addition to ± 24 V DC the open system skylights and blinds can be connected to, and integrated in, common building automation fieldbus systems, i.e. KNX, BACnet, LON and Modbus. The connection is made through the integrated WindowMaster MotorLink™ technology that among other things enables exact position control, feedback and speed control.

Wind deflector for smoke ventilation modules

The wind deflector KCD W00H00 0040 is intended to be used with smoke ventilation modular skylights. The wind deflector is designed to change the wind profile over the skylights in open position, in order to minimize the risk of air intake and allow outtake of smoke even in unfavorable wind conditions, same time causing the possible less visual effect on the exterior of the skylight. The wind deflector KCD exists in one variant, fitting all skylight module sizes.

The deflector is tested together with VELUX modular Skylights in accordance with EN 12101-2. For more explanation on the performance of smoke ventilation modular skylights and the influence of the deflector on the aerodynamic free area see page 59-63.

The deflector can be purchased and installed at the same time as the smoke ventilator, or can be installed subsequently. In any case the aerodynamic free area of the smoke ventilators is declared both with and without deflector, from which the applicable performance and influence of the deflector on the performance must be respected.
The internal roller blind, RMM, is designed for installation with VELUX modular skylights, and is available in all standard module sizes. The blind protects against heat and glare and helps to control the amount of light in the room.

The blind consists of four wheels located in each corner of the skylight module and two steel wires, running along the module side frame. The two wires pull a lightweight polyester fabric available in three commonly used colours:

- Grey: RMM 4083
- White: RMM 4084
- Black: RMM 4085
- White: RMM 4094

Since all standard sized VELUX modular skylights have cables for internal blinds pre-installed, securely connecting the blinds to the terminal block at the top of the module and to the power supply is quick and easy.

To support fast and safe installation of VELUX modular skylights it is possible to order roller blinds pre-mounted from the factory.

Order the right size
To order the right sizes see the type sign on the VELUX modular skylight. How to read the type sign see page 35.
Beam for Ridgelight at 5°

When installing VELUX modular skylights in a 5° ridgelight solution, the modules are supported by a steel beam. The beam is included in the VELUX delivery and is ready for fast and easy installation with no further preparation.

VELUX Beams are treated with a white primer as standard and available for modules from 1200 to 3000 mm in height.

VELUX beams do not come with a fire rating as a standard. If such a demand occurs, please be advised:
- For up to 30 minutes of fire resistance, clients will need to purchase a) modules with fire resistant glazing units and intumescent strip (HVS/HFS) and b) ask the local fire authorities to assess the fire properties of the beam.

If the beam is required to meet these increased demands for fire resistance, it must be treated with fire paint. Clients are advised to inform the local VELUX sales company of such demands prior to order, as standard beams have not been primed for fire paint. Please note that fire paint will change the visual appearance of the beams slightly.

If there are no specific fire rating demands for the modules, but specific demands for the beams, only point b) is relevant.

Always take into consideration that it is only possible to make beams fire rated for up to 30 minutes. If fire rating demands exceed 30 minutes, 5° ridgelight configurations are not suited for this installation.

Type Sign

All VELUX modular skylights, electrical components and accessory products have a type sign sticker. The type sign helps to identify the product and must NOT be removed.

If a product is damaged or malfunctioning, the VELUX sales company must be informed about information given within the type sign.

Example of type sign and position

<table>
<thead>
<tr>
<th>Module type</th>
<th>Module size</th>
<th>Module variant</th>
<th>Variant code</th>
<th>Production code</th>
<th>Sales order number</th>
<th>Reference to the relevant product standard(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HFC 100200</td>
<td>0010</td>
<td>37BC09V</td>
<td>5002692643</td>
<td>453071-2011-10</td>
<td></td>
<td>An example of a VELUX type sign and its components.</td>
</tr>
</tbody>
</table>
Solutions
Quick Overview of Skylight Solutions vs. Roof Constructions

* Please note that all solutions, independently of roof construction, require installation on a sub-structure designed according to instructions given by VELUX.

** Measurements are guidelines only. Exact numbers will be supplied by your VELUX Sales company.
Longlight 5 - 25°

Longlights are bands of VELUX modular skylights, supplied with installation brackets and clamps that guarantee a fast and secure installation. The pre-fabricated flashing allows for configurations with a pitch of 5 to 25°.

Longlights are mounted on a standard steel profile of 100 mm width (not a VELUX component). The brackets are fixed with a clamping system holding the skylights in place. It is also possible to install the mounting brackets of a longlight directly onto a wooden batten without using the clamps.

Use the table to define module height (H) and/or installation pitch (α).

Example:

A = 2500 mm

Result:

α1: H = 2400 mm at installation pitch of 5°

α2: H = 2600 mm at installation pitch of 23.9°

Download CAD & BIM Objects

Sectional Drawings

Not available as venting modules as default. Measurements in the above example are guidelines only. Exact numbers will be supplied by your VELUX sales company.
Wall-mounted Longlight 5 - 40°

Wall-mounted longlights are bands of VELUX modular skylights mounted against a vertical wall. As the skylight modules are supplied with installation brackets and clamps a fast and secure installation is guaranteed. The flashing allows for configurations with a pitch of 5° to 40°.

Wall-mounted longlights are mounted on a standard steel profile of 100 mm width at the wall. At the bottom you can choose to mount the skylights on either a steel profile using the clamping system or directly onto a wooden batten without using the clamps. The steel profiles and wooden battens are not VELUX components.

Use the table to define module height (H) and/or installation pitch (α).

Example:

A = 1800 mm

Result:

α1: H = 1800 mm at installation pitch of 24°
α2: H = 2000 mm at installation pitch of 34°

Not available as venting modules as default.

Measurements in the above example are guidelines only. Exact numbers will be supplied by your VELUX sales company.
**Northlight 25 - 90°**

Similar to longlights, northlights are bands of VELUX modular skylights. The characteristic upright design is primarily for installations that are directed towards the northern hemisphere for soft and reflected lighting. Northlight installations are applicable for pitch of 25 to 90°.

At the bottom, northlights are mounted on a standard steel profile of 100 mm (not a VELUX component) and fixed with clamps holding the skylight in place. All the top the brackets are fixed to the sub construction with screws meant for wood.

The prefabricated modular flashing ensures easy integration in the roof surface. All flashings are easily installed externally, eliminating the need for any interior work. The roof surface underneath the flashing must be appropriate for screw fixation.

---

**Solutions**

**Defining module size to your project**

Example:

\[ \alpha_1: H = 1600 \text{ mm at installation pitch of } 50° \]

\[ A_{\text{max}} = 1680 \text{ mm} \]

\[ A_{\text{min}} = 1566 \text{ mm} \]

---

**Sectional Drawings**

<table>
<thead>
<tr>
<th>Installation pitch</th>
<th>Opening with</th>
<th>Module height</th>
<th>Opening width</th>
<th>Opening length</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \alpha )</td>
<td>(mm)</td>
<td>(mm)</td>
<td>(mm)</td>
<td>(mm)</td>
</tr>
<tr>
<td>90°</td>
<td>1640</td>
<td>1600</td>
<td>1800</td>
<td>2000</td>
</tr>
<tr>
<td>85°</td>
<td>1615</td>
<td>1575</td>
<td>1775</td>
<td>1975</td>
</tr>
<tr>
<td>80°</td>
<td>1590</td>
<td>1550</td>
<td>1650</td>
<td>1850</td>
</tr>
<tr>
<td>75°</td>
<td>1565</td>
<td>1525</td>
<td>1625</td>
<td>1825</td>
</tr>
</tbody>
</table>

---

Not available as venting modules as default.
**Ridgelight 25 - 40°**

Ridgelight is a classic looking solution, consisting of two rows of skylights linked together at the ridge, creating a self-supporting structure. The flashing allows for installations with a pitch of 25 to 40°.

Due to horizontal forces, it is recommended to use a sub-construction of steel or concrete when mounting a ridgelight.

**Use the table to define module height (H) and/or installation pitch (α).**

**Example:**

\[ A = 3775 \text{ mm} \]

**Result:**

\[ \alpha_1: H = 2000 \text{ mm at installation pitch of 26°} \]

\[ \alpha_2: H = 2200 \text{ mm at installation pitch of 35.5°} \]

**Solutions**

**Sectional Drawings**

Measurements in the above example are guidelines only. Exact numbers will be supplied by your VELUX sales company.
Ridgelight at 5° with Beam

Ridgelights at 5° pitch guarantee the illusion of a small glass roof with discreet transverse horizontal supporting beams. The prefabricated VELUX beam supports the skylights and creates the 5° pitch. The beams are mounted on the sub-construction.

![Sub-construction for ridgelight at 5° with beam](velux.co.uk/modularskylights)

Use the table to define module height (H) and/or installation pitch (α).

Example:

**A** = 4975 mm

Result:

α: H = 2400 mm at installation pitch of 5°

![Module height (H) and installation pitch (α)](velux.co.uk/modularskylights)

Sectional Drawings

Cross section - top

- Roof tiles
- Ridge top piece
- Chain anchor (in-house or open system)
- Overflow flashing (SRC)
- Drainage profiles (Multi-braced)
- Glazing profile
- Insulating glazing unit (34 or 44 mm)
- Insulation supplied by others
- Insulation supplied by others
- Bottom flashing (SRC)
- Insulation supplied by others
- Roof tiles

Cross section - bottom

- Delivery limit
- Insulating glazing unit (34 or 44 mm)
- Insulation supplied by others
- Insulation supplied by others
- Bottom flashing (SRC)
- Insulation supplied by others
- Roof tiles

Longitudinal section

- Delivery limit
- Insulating glazing unit (34 or 44 mm)
- Insulation supplied by others
- Insulation supplied by others
- Bottom flashing (SRC)
- Insulation supplied by others
- Roof tiles

Sub-construction width (C)

- Delivery limit
- Insulating glazing unit (34 or 44 mm)
- Insulation supplied by others
- Insulation supplied by others
- Bottom flashing (SRC)
- Insulation supplied by others
- Roof tiles

Measurement in the above example are guidelines only. Exact numbers will be supplied by your VELUX sales company.
Atrium Longlight

An atrium solution consists of several longlights attached to each other in the sub-construction. A drainage gutter separates each assembly.

The supporting beams are not included in the VELUX delivery. The support structure is part of the primary structure of the building and will have to be designed by a structural engineer.

The distance between the skylights depends on thickness of insulation, width of drainage gutter and pitch of skylights. The shown example of an atrium is designed with 100 mm insulation and a 400 mm wide drainage gutter in a 5° pitch, resulting in a distance between skylights of 820 mm.

Sub-construction

Sub-construction for atrium Longlight at velux.co.uk/modularskylights

Use the table to define module height (H) and/or installation pitch (α).

Example:

A = 2870 mm

Result:

α1: H = 2800 mm at installation pitch of 10°

α2: H = 3000 mm at installation pitch of 23°

Module height (H) vs. installation pitch (α)

Module width (W) vs. opening width (A)

Module width (W) vs. opening length (B)

Not available as venting modules ad default.

Measurements in the above example are guidelines only. Exact numbers will be supplied by your VELUX sales company.
An atrium ridgelight solution consists of several ridgelights attached to each other in the sub-construction. A drainage gutter separates each strip.

The supporting steel beams are not included in the VELUX delivery. The support structure is part of the primary structure of a building and will have to be designed by a structural engineer.

The distance between the skylights depends on thickness of insulation, width of drainage gutter and pitch of skylights. The shown example of an atrium is designed with 100 mm insulation and a 400 mm wide drainage gutter in a 5° pitch, resulting in a distance between skylights of 820 mm.

Use the table to define module height (H) and/or installation pitch (α).

Example:

\[ A = 3775 \text{ mm} \]

Result:

\[ \alpha_1: H = 1800 \text{ mm at installation pitch of } 5° \]
\[ \alpha_2: H = 2000 \text{ mm at installation pitch of } 26° \]
\[ \alpha_3: H = 2200 \text{ mm at installation pitch of } 35.5° \]

Use the table to define module height (H) and/or installation pitch (α). Measurements in the above example are guidelines only. Exact numbers will be supplied by your VELUX sales company.
**Skylight Module**

**Essential characteristic performances for CE-marked skylight modules (EN 13501-1)**

| H-S | \hline
<table>
<thead>
<tr>
<th>Essential characteristics</th>
<th>Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resistant to wind load</td>
<td>class C1</td>
</tr>
<tr>
<td>Resistant to snow load</td>
<td>See glazing variant construction</td>
</tr>
<tr>
<td>Reaction to Fire*</td>
<td>class 8</td>
</tr>
<tr>
<td>External fire performance**</td>
<td>Bg1(b1); Bg2(b50)</td>
</tr>
<tr>
<td>Water tightness***</td>
<td>EN900</td>
</tr>
<tr>
<td>Impact resistance</td>
<td>NDP</td>
</tr>
<tr>
<td>Load-bearing capacity of safety devices</td>
<td>NDP</td>
</tr>
<tr>
<td>Acoustic performance</td>
<td>36 (L, -5) - 38 (L, -4) dB5</td>
</tr>
<tr>
<td>Thermal transmittance</td>
<td>Double glazing: 1.3-1.5 W/m²K8</td>
</tr>
<tr>
<td>Solar factor</td>
<td>0.60 - 0.133</td>
</tr>
<tr>
<td>Light transmittance</td>
<td>0.79 - 0.166</td>
</tr>
<tr>
<td>Air permeability****</td>
<td>class 4</td>
</tr>
</tbody>
</table>

Notes:
1) For skylight height > 2400 mm: NPD
2) No safety device on VELUX modular skylights
3) For specific types and sizes see the table with glazing variants on page 66
4) For explanation of test method and results, please refer to section of Air Permeability
5) For explanation of test method and results, please refer to section of Watertightness
6) For explanation of test method and results, please refer to section of External fire performance
7) For explanation of test method and results, please refer to section of Reaction to Fire

**Performance of fire resistant skylight modules (EN 13501-2)**

| H-S | \hline
<table>
<thead>
<tr>
<th>Essential characteristics</th>
<th>Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resistant to Fire HVS (openable)</td>
<td>E150</td>
</tr>
<tr>
<td>Resistant to Fire HVS (openable)</td>
<td>RE130</td>
</tr>
</tbody>
</table>

Notes:
- The fire resistant modules are tested in accordance with EN 1366-2 and EN 1366-3. The classifications are expressed in accordance with EN 1365-3. The tests are carried out without roller blinds by default.
- If a customer wishes to install roller blinds on the fire resistant modules subsequently, VELUX urges the customers to obtain written approval from the local fire authorities.

**Skylight Module**

**Essential characteristic performances for CE-marked smoke ventilation skylight modules (EN 12101-2)**

| H-C | \hline
<table>
<thead>
<tr>
<th>Essential characteristics</th>
<th>Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal activation system/sensitivity</td>
<td>passed</td>
</tr>
<tr>
<td>Response delay (response time)</td>
<td>&lt; 60 s</td>
</tr>
<tr>
<td>Operational reliability</td>
<td>Rs 1000 + 10 000</td>
</tr>
<tr>
<td>Aerodynamic free area (Aa) [m²]</td>
<td>See ventilation tables on pages 61 and 62</td>
</tr>
<tr>
<td>Resistance to heat</td>
<td>B300</td>
</tr>
<tr>
<td>Mechanical stability</td>
<td>passed</td>
</tr>
<tr>
<td>Opening under load</td>
<td>See Tables below (Opening under load)</td>
</tr>
<tr>
<td>Low ambient temperature</td>
<td>T(-15)</td>
</tr>
<tr>
<td>Stability under wind load</td>
<td>W(300)</td>
</tr>
<tr>
<td>Resistance to wind-induced vibration (where included)</td>
<td>passed</td>
</tr>
<tr>
<td>Reaction to fire*</td>
<td>class B**</td>
</tr>
</tbody>
</table>

Notes:
1) For explanation of test method and results, please refer to section of Reaction to Fire
2) Variants with inner pane of 55.2 and 44.2 laminate have a sub-class s1-d2
3) For explanation of test method and results, please refer to section of Air Permeability

**Performance of fire resistant smoke ventilation skylight modules (EN 12101-2)**

| H-C | \hline
<table>
<thead>
<tr>
<th>Essential characteristics</th>
<th>Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Snow load with double-glazing unit (10, 11 and 12)</td>
<td>snow load with triple-glazing unit (10K, 11K, 12K, 13, 14, 15 and 16)</td>
</tr>
<tr>
<td>With motor force 1300 N</td>
<td>Total glass thickness 18 mm</td>
</tr>
<tr>
<td>Snow load with double-glazing unit (10, 11 and 12)</td>
<td>With motor force 1300 N</td>
</tr>
<tr>
<td>Snow load with triple-glazing unit (10T, 11T and 12T)</td>
<td>Snow load with triple-glazing unit (13T, 14T, 15K, 16, 16K, 16T, 17, 17K, 17T, 18 and 18T)</td>
</tr>
<tr>
<td>With motor force 1300 N</td>
<td>Total glass thickness 14 mm</td>
</tr>
</tbody>
</table>

The tables illustrate the performance for modules opening under load in accordance with EN 12101-2. The provided performance is NOT equal to structural load bearing capacity of an actual application. The design of a roof light must therefore be dimensioned to fit the specific building project, local architectural style and practice.

**Opening under load**

- Snow load with double-glazing unit (10, 11 and 12)
- Snow load with triple-glazing unit (10, 11, 12, 13, 14, 15, 16 and 17)

**Snow load with double-glazing unit (10, 11 and 12)**

<table>
<thead>
<tr>
<th>Snow load</th>
<th>With motor force 1300 N</th>
<th>Total glass thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>HVC ---080</td>
<td>SL 3557</td>
<td>SL 3076</td>
</tr>
<tr>
<td>HVC ---100</td>
<td>SL 3270</td>
<td>SL 2809</td>
</tr>
<tr>
<td>HVC ---120</td>
<td>SL 2987</td>
<td>SL 2522</td>
</tr>
<tr>
<td>HVC ---140</td>
<td>SL 2705</td>
<td>SL 2256</td>
</tr>
<tr>
<td>HVC ---160</td>
<td>SL 2423</td>
<td>SL 1991</td>
</tr>
<tr>
<td>HVC ---180</td>
<td>SL 2140</td>
<td>SL 1726</td>
</tr>
<tr>
<td>HVC ---200</td>
<td>SL 1857</td>
<td>SL 1471</td>
</tr>
<tr>
<td>HVC ---220</td>
<td>SL 1574</td>
<td>SL 1216</td>
</tr>
<tr>
<td>HVC ---240</td>
<td>SL 1291</td>
<td>SL 0951</td>
</tr>
<tr>
<td>HVC ---260</td>
<td>SL 1008</td>
<td>SL 0686</td>
</tr>
<tr>
<td>HVC ---280</td>
<td>SL 725</td>
<td>SL 0421</td>
</tr>
</tbody>
</table>

**Snow load with triple-glazing unit (10, 11, 12, 13, 14, 15, 16 and 17)**

<table>
<thead>
<tr>
<th>Snow load</th>
<th>With motor force 1300 N</th>
<th>Total glass thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>HVC ---067</td>
<td>SL 3109</td>
<td>SL 2628</td>
</tr>
<tr>
<td>HVC ---075</td>
<td>SL 2931</td>
<td>SL 2459</td>
</tr>
<tr>
<td>HVC ---080</td>
<td>SL 2753</td>
<td>SL 2386</td>
</tr>
<tr>
<td>HVC ---090</td>
<td>SL 2575</td>
<td>SL 2313</td>
</tr>
<tr>
<td>HVC ---100</td>
<td>SL 2397</td>
<td>SL 2239</td>
</tr>
<tr>
<td>HVC ---120</td>
<td>SL 2019</td>
<td>SL 1966</td>
</tr>
<tr>
<td>HVC ---140</td>
<td>SL 1741</td>
<td>SL 1793</td>
</tr>
<tr>
<td>HVC ---160</td>
<td>SL 1463</td>
<td>SL 1620</td>
</tr>
<tr>
<td>HVC ---180</td>
<td>SL 1185</td>
<td>SL 1477</td>
</tr>
<tr>
<td>HVC ---200</td>
<td>SL 0907</td>
<td>SL 1245</td>
</tr>
</tbody>
</table>

**Snow load with double-glazing unit (10K, 11K, 12K, 13, 14, 15, 16 and 17)**

<table>
<thead>
<tr>
<th>Snow load</th>
<th>With motor force 1300 N</th>
<th>Total glass thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>HVC ---067</td>
<td>SL 3057</td>
<td>SL 2588</td>
</tr>
<tr>
<td>HVC ---075</td>
<td>SL 2882</td>
<td>SL 2410</td>
</tr>
<tr>
<td>HVC ---080</td>
<td>SL 2698</td>
<td>SL 2237</td>
</tr>
<tr>
<td>HVC ---090</td>
<td>SL 2510</td>
<td>SL 2170</td>
</tr>
<tr>
<td>HVC ---100</td>
<td>SL 2321</td>
<td>SL 2105</td>
</tr>
<tr>
<td>HVC ---120</td>
<td>SL 2037</td>
<td>SL 1942</td>
</tr>
<tr>
<td>HVC ---140</td>
<td>SL 1753</td>
<td>SL 1779</td>
</tr>
<tr>
<td>HVC ---160</td>
<td>SL 1471</td>
<td>SL 1506</td>
</tr>
<tr>
<td>HVC ---180</td>
<td>SL 1187</td>
<td>SL 1433</td>
</tr>
<tr>
<td>HVC ---200</td>
<td>SL 0907</td>
<td>SL 1245</td>
</tr>
</tbody>
</table>

**Snow load with triple-glazing unit (10K, 11K, 12K, 13, 14, 15, 16 and 17)**

<table>
<thead>
<tr>
<th>Snow load</th>
<th>With motor force 1300 N</th>
<th>Total glass thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>HVC ---067</td>
<td>SL 2931</td>
<td>SL 2459</td>
</tr>
<tr>
<td>HVC ---075</td>
<td>SL 2753</td>
<td>SL 2386</td>
</tr>
<tr>
<td>HVC ---080</td>
<td>SL 2575</td>
<td>SL 2313</td>
</tr>
<tr>
<td>HVC ---090</td>
<td>SL 2397</td>
<td>SL 2239</td>
</tr>
<tr>
<td>HVC ---100</td>
<td>SL 2019</td>
<td>SL 1966</td>
</tr>
<tr>
<td>HVC ---120</td>
<td>SL 1741</td>
<td>SL 1793</td>
</tr>
<tr>
<td>HVC ---140</td>
<td>SL 1463</td>
<td>SL 1620</td>
</tr>
<tr>
<td>HVC ---160</td>
<td>SL 1185</td>
<td>SL 1477</td>
</tr>
<tr>
<td>HVC ---180</td>
<td>SL 0907</td>
<td>SL 1245</td>
</tr>
</tbody>
</table>

Note:
- Standard size
- Special sizes, functional limitations may apply
Smoke Ventilation Systems

A smoke ventilation system is always a building specific design, incorporating smoke ventilators, controls, air inlets and mechanical ventilation.

Designing a smoke ventilation system is therefore a rather complex matter, which shall be addressed by skilled and authorized fire engineers, in order to obtain adequate performance and level of safety.

The design cover all relevant parameters such as the location of the building, height and shape of the roof, position of ventilators on the roof, relative position to each other, facades and doors providing air intake, mechanical ventilation, evacuation plan and escape routes, and the natural and artificial wind obstacles in the surrounding of the building.

The VELUX Group provide the essential performance characteristics of each individual CE marked VELUX Modular Skylights in accordance with EN 12101-2, but cannot validate the functionality and safety of the full system.

VELUX wind deflector for smoke ventilation modules

Whenever it is required to obtain an Aerodynamic free area (Aa) which is accountable in any wind condition, i.e. considering the possible side wind effect, a possible solution is to install smoke ventilators with prefabricated VELUX KCD wind deflector. The KCD wind deflector is specifically designed to change the wind profile in any wind direction and to ensure that negative pressure i.e. wind suction occurs in the direct surrounding of the opening of the Modular Skylight. This enables smoke exhaust even in case of wind, provided that the entire building and smoke ventilation system is designed appropriately by authorized fire engineers.

The aerodynamic performance of the modular skylights with and without deflector in accordance with EN 12101-2 is expressed on the following page 63.

The KCD wind deflector is not applicable above 60° installation inclination, on so called wall-mounted smoke ventilators. Smoke ventilators installed in this range are to be considered wind sensitive by default in accordance with EN 12101-2. When a smoke ventilator is wind sensitive the Aerodynamic area must be tested and expressed without influence of side wind, therefore the use of a smoke deflector is meaningless. KCD wind deflector furthermore is not compatible with Northlight flashings, therefore not applicable on Northlight applications.

VELUX smoke ventilation modular skylights can be used without wind deflector, when local regulations and design conditions are allowing to do so. When VELUX smoke ventilator modular skylights are installed without deflectors they are wind sensitive, which means that negative discharge i.e. air intake may occur in unfavorable wind conditions. This must be regarded and addressed by the building owner when designing the building and planning with wind sensitive smoke ventilators. To prevent negative discharge the building owner must take steps to incorporate the product as a part of the total solution that can be approved by the local authorities. The sound could be, for instance a wind direction sensor in connection with multi-direction placement of smoke ventilators or a KCD wind deflector, or another device/roof integrated solution that ensures a sufficient aerodynamic free area.

Product Data

<table>
<thead>
<tr>
<th>Source of images: DE 611XBS549 Rapport, Page 2 Figure 1 and page 11</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
</table>

### Geometric area

| EN 12101-2:2003 Av [m²] | 0.48 - 1.89 depending on size |

### Aerodynamic area

| EN 12101-2:2003 Annex B Aa Roof [m²] | 0.05 - 0.89 depending on size |

### Aerodynamic value

| EN 12101-2:2003 Annex B Cv0 | 0.08 - 0.52 depending on size |

### Snow load (SL)

| EN 12101-2:2003 Annex E SL [N/m²] | 750 N/m² |

### Wind load (WL)

| EN 12101-2:2003 Annex F WL [N/m²] | 3000 N/m² |

### Low ambient temperature (T)


### Reliability (RE) (Dual purpose)


### Resistance to heat (B)


### Reaction to fire for NSHEV

| EN 13501-1 Class B-s1,d2 for IGU 55.2 | B-s1,d0 for IGU 33.2 |

### Wind deflector KCD W000H00 0040

| Material | Aluminium |
| Material thickness | 3 mm / 6 mm |
| Surface treatment | Powder coated (60 - 120µ) |
| Colour | NCS S7500-N, gloss 30 |
Examples
Skylight: HVC 090100 0010AB
Aerodynamic Free Area (Aa) without deflector*: 0.36 m²
Aerodynamic Free Area (Aa) with wind deflector KCD W00H00
0040: 0.19 m²
Required Total Aerodynamic area: 4 m²

Example 1.
Wind influence can be disregarded based on local conditions and regulations.
Skylight: HVC 090100 0010AB - Aerodynamic Free Area (Aa) without deflector*: 0.36 m²
Number of required skylights: 4 m² / 0.36 m² = 11.111

Example 2.
Wind influence must be regarded based on local conditions and regulations.
Skylight: HVC 090100 0010AB
Aerodynamic Free Area (Aa) without deflector*: 0.36 m²
Aerodynamic Free Area (Aa) with wind deflector KCD W00H00
0040: 0.19 m²

Solution 1
Skylights placed in 4 different directions and wind direction dependent opening control used to avoid opening of skylights facing unfavorable wind
Number of required skylights: 4 m² x 4 = 16 m² / 0.36 m² = 44.444 → 45 units

Solution 2
Use KCD wind deflector
Number of required skylights: 4 m² / 0.19 m² = 21.05 → 22 units

Alternative solution
Example 1 might also be possible with the condition that a wind barrier as a part of the roof construction is designed and built by the project in the vicinity of the skylights. The design of course has to be approved by the local authorities as sufficient solution to protect the smoke ventilation skylights from the impact of unfavorable wind.

Definitions
In accordance with EN 12101-2:

\[ C_v \] Coefficient of discharge that states the ratio between \( A_a \) and \( A_v \) \( (C_v = \frac{A_a}{A_v}) \). For roof-mounted smoke and heat exhaust ventilators the value of \( C_v \) is the lower of \( C_v0 \) and \( C_{vw} \).

\[ C_v0 \] Coefficient of discharge calculated based on pressure testing without side wind influence.

\[ C_{vw} \] Coefficient of discharge calculated based on pressure testing with side wind influence.

\[ A_a \] \( [\text{m}^2] \) Aerodynamic free area \( (A_a = A_v \times C_v) \).

May be described as the effective area of the ventilator taking into account reductions in air flow along edges and around the openable panel as well as motors etc.

\[ A_v \] \( [\text{m}^2] \) Geometric area, corresponds to frame aperture area.

Roof-mounted:
Smoke ventilators installed from 0° up to 60°. VELUX Modular Skylights installed from 5° to 60° are proven wind sensitive. This must be considered in planning the smoke ventilation of the building.

Wall-mounted:
Smoke ventilators installed above 60° up to 90°. Wall-mounted smoke ventilators are, as per definition, wind sensitive regardless form the design.

Other relevant parameters
In accordance with DIN 18232
\[ A_v \] \( [\text{m}^2] \) Geometric free area, corresponds to the minimum unobstructed opening area of the smoke ventilators.

The area is calculated by the use of the total opening area of the ventilator, in case of Modular Skylight top-hung ventilators from the front opening and the side triangles. Not identical to \( A_a \) \( [\text{m}^2] \), which is calculated in comfort opening position.

The use of the parameter is to define the ventilation area of smoke ventilators when they are used as so called smoke exhaust shaft, assuming that outtake pressure is generated by mechanical extract fans or generated by chimney stack effect. A typical use of this area is when smoke ventilators are used over staircases. National and local regulations may differ and wherever they exist must be followed.

In accordance with EN 13141-1
\[ A_v \] \( [\text{m}^2] \) Geometric free area, corresponds to the minimum unobstructed opening of the openable modular skylights in natural comfort ventilation position.

The area is calculated by the use of the total opening area of the ventilator, in case of Modular Skylight top-hung ventilators from the front opening and the side triangles. Not identical to \( A_a \) \( [\text{m}^2] \), which is calculated in smoke ventilation opening position.

Used to define natural ventilation performance of comfort ventilation modular skylights and dual purpose smoke ventilation modular skylights in comfort ventilation use.
In accordance with EN 12101-2

<table>
<thead>
<tr>
<th>Size of Skylight</th>
<th>Geometric free area: $A_g$ [m²]</th>
<th>Geometric area: $A_v$ [m²]</th>
</tr>
</thead>
<tbody>
<tr>
<td>475 x 600</td>
<td>353</td>
<td>0.54</td>
</tr>
<tr>
<td>475 x 900</td>
<td>410</td>
<td>0.68</td>
</tr>
<tr>
<td>475 x 1200</td>
<td>460</td>
<td>0.82</td>
</tr>
<tr>
<td>475 x 1500</td>
<td>490</td>
<td>0.99</td>
</tr>
</tbody>
</table>

**Comfort Ventilation**

In accordance with DIN 18232

**Smoke Ventilation**

- In accordance with EN 13141-1
- In accordance with DIN 18232

### Ventilation Characteristics HVC

<table>
<thead>
<tr>
<th>Size of Skylight</th>
<th>Geometric free area: $A_g$ [m²]</th>
<th>Geometric area: $A_v$ [m²]</th>
</tr>
</thead>
<tbody>
<tr>
<td>475 x 600</td>
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</tr>
<tr>
<td>475 x 1500</td>
<td>490</td>
<td>0.99</td>
</tr>
</tbody>
</table>

**Comfort Ventilation**

In accordance with DIN 18232

**Smoke Ventilation**

- In accordance with EN 13141-1
- In accordance with DIN 18232

### Product Data

- **Resistance to heat (B)**

- **Reaction to fire for NSHEV**
  - EN 13501-1 Class B-s1,d2 for IGU 55.2
  - EN 13501-1 Class B-s1,d0 for IGU 33.2

- **Reliability (RE) (Dual purpose)**

- **Low ambient temperature (T)**

- **Wind load (WL)**
  - EN 12101-2:2003 Annex F WL [N/m²] 3000 N/m²

- **Snow load (SL)**
  - EN 12101-2:2003 Annex E SL [N/m²] 750 N/m²

- **Aerodynamic value**
  - EN 12101-2:2003 Annex B $A_a$ Roof [m²] 0.05-0.89 depending on size

- **Aerodynamic area**
  - EN 12101-2:2003 Av [m²] 0.48 - 1.89 depending on size

- **Actuator chain stroke [mm]**
  - EN 12101-2:2003 Annex E chain stroke [mm]

- **Actuator**
  - EN 12101-2:2003 Annex H CV0 0.08 - 0.52 depending on size

- **Smoke ventilation characteristics**
  - HVC------ ----AB

- **Discharge coefficient ($C_v$)**
  - EN 12101-2:2003 Annex B $C_v$ 0.08 - 0.52 depending on size

- **Aerodynamic free area ($A_a$)**
  - EN 12101-2:2003 Annex B $A_a$ Roof [m²] 0.05-0.89 depending on size

- **DIN 18232**
  - Geometric free area: $A_g$ [m²]
  - Geometric area: $A_v$ [m²]
### Ventilation Characteristics HVC

<table>
<thead>
<tr>
<th>Size of Skylights</th>
<th>Discharge coefficient ( C_v )</th>
<th>Geometric free area ( A_g )</th>
<th>Geometric free area ( A_g ) with side wind</th>
<th>Geometric free area ( A_g ) with side wind and ( \phi ) &gt; 60°</th>
<th>Geometric free area ( A_g ) without side wind</th>
<th>Geometric free area ( A_g ) without side wind and ( \phi ) &gt; 60°</th>
<th>Smoke ventilation characteristics HVC -- -- -- -- Aa</th>
<th>DIN 12101-2</th>
<th>DIN 3103-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skylight Module</td>
<td>20°</td>
<td>0.50</td>
<td>0.40</td>
<td>0.37</td>
<td>0.25</td>
<td>0.25</td>
<td>0.25</td>
<td>0.16</td>
<td>0.12</td>
</tr>
<tr>
<td></td>
<td>25°</td>
<td>0.55</td>
<td>0.45</td>
<td>0.41</td>
<td>0.24</td>
<td>0.24</td>
<td>0.24</td>
<td>0.16</td>
<td>0.12</td>
</tr>
<tr>
<td></td>
<td>30°</td>
<td>0.60</td>
<td>0.50</td>
<td>0.46</td>
<td>0.28</td>
<td>0.28</td>
<td>0.28</td>
<td>0.16</td>
<td>0.12</td>
</tr>
<tr>
<td></td>
<td>35°</td>
<td>0.65</td>
<td>0.55</td>
<td>0.51</td>
<td>0.32</td>
<td>0.32</td>
<td>0.32</td>
<td>0.16</td>
<td>0.12</td>
</tr>
<tr>
<td></td>
<td>40°</td>
<td>0.70</td>
<td>0.60</td>
<td>0.56</td>
<td>0.36</td>
<td>0.36</td>
<td>0.36</td>
<td>0.16</td>
<td>0.12</td>
</tr>
<tr>
<td></td>
<td>45°</td>
<td>0.75</td>
<td>0.65</td>
<td>0.61</td>
<td>0.40</td>
<td>0.40</td>
<td>0.40</td>
<td>0.16</td>
<td>0.12</td>
</tr>
<tr>
<td></td>
<td>50°</td>
<td>0.80</td>
<td>0.70</td>
<td>0.66</td>
<td>0.44</td>
<td>0.44</td>
<td>0.44</td>
<td>0.16</td>
<td>0.12</td>
</tr>
<tr>
<td></td>
<td>55°</td>
<td>0.85</td>
<td>0.75</td>
<td>0.71</td>
<td>0.48</td>
<td>0.48</td>
<td>0.48</td>
<td>0.16</td>
<td>0.12</td>
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<tr>
<td></td>
<td>60°</td>
<td>0.90</td>
<td>0.80</td>
<td>0.76</td>
<td>0.52</td>
<td>0.52</td>
<td>0.52</td>
<td>0.16</td>
<td>0.12</td>
</tr>
</tbody>
</table>

### Glazing Area

#### Calculation of glazing area

Nominal module size: \( W \times (H + 62 \text{ mm}) \) m²

Visible glazing area: \( W \times (2 \times 44 \text{ mm}) \times (H - (2 \times 44 \text{ mm}) \) m²

#### Frame & Sash

- **Material**: Polycarbonate, composite (approx. 80% fiberglass and 20% polystyrene)
- **Material thickness**: 3-4 mm
- **Surface coating**: Waterbased white coating
- **Colour**: RAL 9010, gloss 30

#### Cladding & Flashing

- **Material**: Aluminium
- **Material thickness**: 1.5 mm
- **Surface**: Scratch resistant powder lacquer (60-120 mp)
- **Colour**: RAL 2001, Satin White "Alko Robol"

#### Flashing

- **Material**: Aluminium
- **Material thickness**: 1 mm
- **Surface**: Front: PVDF lacquer Back: polyamide polyester lacquer
- **Colour**: Front: NCS standard colour 5 7500-N (RAL 7043)

#### Insulation material

- **EPS**
Double Glazing = DG  Trible Glazing = TG

2) The Rw-value indicates the number of decibels by which a window will reduce apparent noise.
1) For product sizes $A \leq 2.7 \text{ m}^2$. For product sizes of $2.7 \text{ m}^2 < A < 3.6 \text{ m}^2$ the sound insulation values shall be deducted by 1 dB.

Rw+C is an adjustment factor to account for high frequency noise sources e.g. living activities (talking, music, radio, TV), railway traffic at medium to high speed, road traffic exceeding 80 km/h, or a jet aircraft.

Rw+Ctr is an adjustment factor to account for low frequency noise sources e.g. urban road traffic or railway traffic at low speeds.

Fire resistant glazing units

Double Coating ISU ISU $U_\psi$ $\phi$ $g$ $\tau_v$ $\psi$ $Ra$

Construction (outside – inside) code W/m²K W/mK % % %

Double glazing

LowE 6H LowE-9Krypton - SH - Int.6 - 44.2F 10U 1.0 0.083 76 60 96
Sun1 6H Sun1-9Krypton - SH - Int.6 - 44.2F 11U 1.0 0.083 64 40 92
Sun2 6H Sun2-9Krypton - SH - Int.6 - 44.2F 12U 1.0 0.083 57 32 90

Trible glazing

LowE

Sun1

Sun2

Panee coatings

LowE Low emissivity coating
Sun1 Light sun protection coating
Sun2 Advanced sun protection coating

Example of glazing unit construction

From outside - inside

ISU 36

8H LowE-12 Argon-8HS-12 Argon-33.2F LowE

8 mm pane with toughened glass.

LowE Low energy coating

12 Argon 12 mm argon filled cavity

8HS 8 mm pane with heat strengthened glass.

12 Argon 12 mm argon filled cavity

33.2F Laminated float glass pane, 3 + 3 mm, 2 x 0,38 mm PVB

LowE Low energy coating

Notes:
- For product sizes $A < 2.7 \text{ m}^2$. For product sizes of $2.7 \text{ m}^2 < A \leq 3.6 \text{ m}^2$ the sound insulation values shall be deducted by 1 dB.
- The $R_w$ value indicates the number of decibels by which a window will reduce apparent noise.
- $R_{w+C}$ is an adjustment factor to account for high frequency noise sources e.g. living activities (talking, music, radio, TV), railway traffic at medium to high speed, road traffic exceeding 80 km/h, or a jet aircraft.
- $R_{w+C}$ is an adjustment factor to account for low frequency noise sources e.g. urban road traffic or railway traffic at low speeds.
- It is up to the customer to verify the chosen glazing unit against the project specific conditions following the national requirement.
### Chain Actuator

<table>
<thead>
<tr>
<th>Material</th>
<th>Anodised aluminium housing with zinc cromate passivated steel chain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>Max 5.5 kg</td>
</tr>
<tr>
<td>Control system</td>
<td>MotorLink™ or ±24 V DC*</td>
</tr>
<tr>
<td>Supply cable**</td>
<td>5 m grey silicone cable, 3 cord, 0.75 mm² (white, brown, green)**</td>
</tr>
<tr>
<td>Chain stroke</td>
<td>Up to 700 mm (depending on module size)</td>
</tr>
<tr>
<td>Opening speed</td>
<td>HVC ----CB (comfort) 7 mm/s</td>
</tr>
<tr>
<td></td>
<td>HVC ----AB (smoke and comfort) 13 mm/s)</td>
</tr>
<tr>
<td>Sound level</td>
<td>32 dB (min speed)***</td>
</tr>
<tr>
<td>Holding force (tractive)</td>
<td>5000 N (burglary strength) min</td>
</tr>
<tr>
<td>Pressure force</td>
<td>1000 Newton* (smoke ventilation: 1300 Newton)</td>
</tr>
<tr>
<td>Tractive force</td>
<td>300-1000 Newton*</td>
</tr>
<tr>
<td>IP rating</td>
<td>IPX4</td>
</tr>
<tr>
<td>Operation conditions</td>
<td>-15°C - +76°C, max. 90% relative humidity (not condensing)</td>
</tr>
<tr>
<td>Nominal voltage</td>
<td>24 V DC (max 10% ripple)</td>
</tr>
<tr>
<td>Voltage</td>
<td>19-32 V DC</td>
</tr>
<tr>
<td>Max Voltage</td>
<td>32 V DC</td>
</tr>
<tr>
<td>Switch-on-duration</td>
<td>ED max 20% (2 minutes per 10 minutes)</td>
</tr>
<tr>
<td>Current consumption</td>
<td>HVC ----CB (comfort) max 2 A</td>
</tr>
<tr>
<td></td>
<td>HVC ----AB (smoke and comfort) max 5.5 A</td>
</tr>
<tr>
<td>Service</td>
<td>It is recommended to carry out a function test of the actuator at least once a year and to make sure that the skylight opens correctly</td>
</tr>
<tr>
<td>CE marking</td>
<td>The product is tested with the original WindowMaster control units and complies with the EMC directive's requirements for use in residential, commercial and light commercial buildings</td>
</tr>
<tr>
<td>Reservation</td>
<td>The VELUX Group reserve the right to technical changes</td>
</tr>
</tbody>
</table>

### Maximum drive time for comfort ventilation (HVC ----AB)

<table>
<thead>
<tr>
<th>Module length</th>
<th>Chain length [mm]</th>
<th>Drive time [sec]</th>
</tr>
</thead>
<tbody>
<tr>
<td>800</td>
<td>353</td>
<td>27</td>
</tr>
<tr>
<td>1000</td>
<td>410</td>
<td>32</td>
</tr>
<tr>
<td>1200</td>
<td>410</td>
<td>32</td>
</tr>
<tr>
<td>1400</td>
<td>410</td>
<td>32</td>
</tr>
<tr>
<td>1600</td>
<td>410</td>
<td>32</td>
</tr>
<tr>
<td>1800</td>
<td>410</td>
<td>32</td>
</tr>
<tr>
<td>2000</td>
<td>410</td>
<td>32</td>
</tr>
<tr>
<td>2200</td>
<td>410</td>
<td>32</td>
</tr>
<tr>
<td>2400</td>
<td>410</td>
<td>32</td>
</tr>
<tr>
<td>2600</td>
<td>410</td>
<td>32</td>
</tr>
<tr>
<td>2800</td>
<td>410</td>
<td>32</td>
</tr>
</tbody>
</table>

When using a smoke ventilation skylight module (HVC AB) for comfort ventilation also, the chain stroke must be limited by the drive time in order to prolong the lifetime expectancy of the module. The drive time must be limited according to this table.
### Control System

**KLC 400**

**Material and colour**
- Black fire resistant polycarbonate

**Size and weight**
- Product including packaging: 587 mm x 80 mm x 166 mm (W x H x D) 2.0 kg
- Control unit: 380 mm x 26 mm x 87 mm (W x H x D) 1.5 kg

**Installation**
- 24 V DC SELV class II construction output
- The control unit is for use in small/midsize installations with VELUX modular skylights.
- The control unit is installed under the front flashing of VELUX modular skylights and functions at temperatures between -35°C and +50°C. Ta = 40°C
- It is equipped with a 10 m 2-core cable (2 x 1.5mm2 H05VV-F) and plug for connection to the mains supply.
- Radio frequency range: 300 m range open field. Depending on the building construction, the indoor range is approximately 30 m.

**IP rating**
- IPX4

**Power consumption**
- Primary side: 230/240 V AC - 50 Hz / 200W
- Secondary side: 24 V DC - 5 A class II construction output.

**Connection**
- The control unit is only to be used with VELUX modular skylights and VELUX roller blinds RMM.
- The control unit can supply power to one venting skylight module and/or up to four roller blinds RMM.
- The connection wires are prefitted with wire-to-wire connectors.
- The connection wire to the chain actuator may not be extended.

**Compatibility**
- KLC 400 is based on radio frequency (RF) technology and signals are transmitted in the 868 MHz range.
- It is compatible with products with the io-homecontrol® logo and can be used with VELUX modular skylights chain actuator and roller blinds RMM.
- VELUX electrical products connected to KLC 400 can be operated by io-homecontrol® compatible activation control.

**CE marking**
- CE marked to indicate that it is in accordance with the following EU directives:
  - CPR, LVD, MD, RoHS, WEEE, R&TTE, Packaging waste directive and EMC for household, trade and light industry.
  - CE marked to indicate that it is in accordance with the following EU directives:
  - For household, trade and light industry.

**Note**
- VELUX reserve the right to make technical changes.

### Roller Blind

**VELUX INTEGRA®**

**Materials (visible parts)**
- Fabric: Polyester
- Wire: Stainless steel
- Control bar: Anodized aluminium
- Top pulley wheels: Stainless steel

**Colours (cloth)**
- Grey, black and white

**Weight**
- Max 3.4 kg

**Installation**
- Please see installation instructions

**Compatibility**
- All VELUX modular skylights with VELUX INTEGRA® control system

**Control system**
- VELUX INTEGRA®

**Supply cable**
- 0.2 m silicone cable, 2 cord, 0.75 mm² (white, brown)

**Running speed**
- 70 mm/sec

**Sound level**
- TBD

**Operating conditions**
- -15°C - +75°C, max. 90% relative humidity (not condensing)

**Nominal voltage**
- 24 V DC. Can only be supplied by KLC 400.

**Power consumption**
- 0.4 A

**Service**
- It is recommended to carry out a function test of the roller blind at least once a year and to make sure that the roller blind runs correctly.

**CE marking**
- The product is tested with the VELUX KLC 400 control units and complies with the EMV directive's requirements for use in residential, commercial and light commercial buildings.

**Reservation**
- The VELUX Group reserve the right to technical changes.

### Product Data

**KLR 200**

**Material and colour**
- ABS, white (NCS S 1000-N), black (RAL 9005) and metallic grey

**Size and weight**
- Product including packaging: 235 x 153 x 48 mm (W x H x D), 250 g
- Control panel: 95 x 95 x 23 mm (W x H x D), 180 g

**Use**
- For indoor use, minimum ambient temperature 50 °C
- Radio frequency range: 200 m range open field. Depending on the building construction, the indoor range is approximately 20 m
- Maximum number of products in 200*

**Power consumption**
- 3 x Alkaline AA (1.5 V) batteries
- Expected battery lifetime: Approximately 1 year

**Compatibility**
- Based on radio frequency (RF) technology, transmitted in 868 MHz range.
- Compatible with products with the io-homecontrol® logo.
- Can be used with all VELUX INTEGRA® and VELUX INTEGRA® Solar products.

**CE marking**
- This product has been CE-marked to indicate that it is in accordance with the relevant EU directives.
- This product has been tested with other genuine VELUX INTEGRA® products and together with these it meets the requirements of the LVD and EMC directive for household, trade and light industry.

**Note**
- This product has been designed for use with genuine VELUX products. The connection to other products may cause damage or malfunction. VELUX Group reserve the right to make technical changes.

**CE marking**
- CE marked to indicate that it is in accordance with the following EU directives:
  - CPR, LVD, MD, RoHS, WEEE, R&TTE, Packaging waste directive and EMC for household, trade and light industry.
  - Combinations of VELUX electrical products meet the requirements of above-mentioned directives.

**Note**
- VELUX reserve the right to make technical changes.

---

* Maximum recommended number of products is 100 and for daily use it is 50.
Roller Blind

Open system

<table>
<thead>
<tr>
<th>Materials (visible parts)</th>
<th>Fabric</th>
<th>Polyestere</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wire</td>
<td>Stainless steel</td>
<td></td>
</tr>
<tr>
<td>Control bar</td>
<td>Anodized aluminium</td>
<td></td>
</tr>
<tr>
<td>Top pulley wheels</td>
<td>Stainless steel</td>
<td></td>
</tr>
</tbody>
</table>

Colours (cloth) Grey, black and white

Weight Max 3.4 kg

Installation See installation instruction

Compatibility All VELUX modular skylights with open system control

Control system MotorLink™ or ±24 V DC

Supply cable* 0.5 m grey silicone cable, 3 cord, 0.75 mm² (white, brown, green**)

Running speed 30-70 mm/sec

Sound level TBD

IP rating IPX0

Operating conditions -45°C - +75°C, max 90 % relative humidity (not condensing)

Nominal voltage 24 V DC (max 10 % ripple)

Voltage 19-32 V DC

Max. voltage ±24 V DC

Switch-on-duration ED max 20 % (2 minutes per 10 minutes)

Current consumption Max 1A

Service It is recommended to carry out a function test of the roller blind at least once a year and to make sure that the roller blind runs correctly

CE marking The product is tested with the original WindowMaster control units and complies with the EMC directive's requirements for use in residential, commercial and light commercial buildings

Reservation The VELUX Group reserve the right to technical changes

* At standard ± 24 V DC connection maximum distances from roller blind to power supply in accordance to calculation

Max cable length = permissible voltage drop (U) / (copper conductivity of copper (S)/a cable cross section (a))

Total max actuator current (I) x amps x 2

At MotorLink™ (3 cord) connection maximum distances from roller blind to motor controller (power supply) is 50 m.

**Green = communication wire for MotorLink™

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Product Data

NSHEV (Natural Heat and Smoke Exhaust Ventilators) - EN 12101-2:2003

<table>
<thead>
<tr>
<th>Geometric area</th>
<th>Av [m²]</th>
<th>0.48 - 1.89 depending on size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aerodynamic area</td>
<td>Aa Roof [m²]</td>
<td>0.05 - 0.89 depending on size</td>
</tr>
<tr>
<td>Aerodynamic value</td>
<td>Cv0</td>
<td>0.08 - 0.52 depending on size</td>
</tr>
<tr>
<td>Snow load (SL)</td>
<td>SL [N/m²]</td>
<td>750 N/m²</td>
</tr>
<tr>
<td>Wind load (WL)</td>
<td>WL [N/m²]</td>
<td>3000 N/m²</td>
</tr>
<tr>
<td>Low ambient temperature (T)</td>
<td>T [°C]</td>
<td>T (-15)</td>
</tr>
<tr>
<td>Reliability (RE) (Dual purpose)</td>
<td>RE [Nr of opening]</td>
<td>1000 + 10000</td>
</tr>
<tr>
<td>Resistance to heat (B)</td>
<td>B [°C]</td>
<td>B300</td>
</tr>
<tr>
<td>Reaction to fire for NSHEV</td>
<td>EN 13501-1 - B, s1-d2 for IGU 55.2</td>
<td></td>
</tr>
<tr>
<td>B-s1,d0 for IGU 33.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Roller Blind effects on double-glazing unit</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pane variant</th>
<th>10</th>
<th>11</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>g-value</td>
<td>T-value</td>
<td>Fc-value</td>
<td>g-value</td>
</tr>
<tr>
<td>Without RMM</td>
<td>Grey (4083)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>With RMM</td>
<td>Grey (4083)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>White, fire resistant (4094)</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

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Roller Blind effects on double-glazing unit

<table>
<thead>
<tr>
<th>Pane variant</th>
<th>10T</th>
<th>11T</th>
<th>12T</th>
</tr>
</thead>
<tbody>
<tr>
<td>g-value</td>
<td>T-value</td>
<td>Fc-value</td>
<td>g-value</td>
</tr>
<tr>
<td>Without RMM</td>
<td>Grey (4083)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>With RMM</td>
<td>Grey (4083)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>White, fire resistant (4094)</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>
Roller Blind

Roller blind effects on triple-glazing unit

<table>
<thead>
<tr>
<th>Pane variant</th>
<th>16</th>
<th>17</th>
<th>18</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>g-value</td>
<td>T-value</td>
<td>Fc-value</td>
</tr>
<tr>
<td>Without RMM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>With RMM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grey (4083)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White (4084)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black (4085)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White, fire-resistant (4094)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Roller blind effects on triple-glazing unit

<table>
<thead>
<tr>
<th>Pane variant</th>
<th>16T</th>
<th>17T</th>
<th>18T</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>g-value</td>
<td>T-value</td>
<td>Fc-value</td>
</tr>
<tr>
<td>Without RMM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>With RMM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grey (4083)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White (4084)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black (4085)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White, fire-resistant (4094)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

g-value:
“The total transmitted fraction of the incident solar radiation consisting of direct transmitted solar radiation and the part of the absorbed solar radiation transferred by convection and thermal radiation to the internal environment.” (EN 13363-2)
“The fraction of the incident solar radiation that is totally transmitted by the glass.” (EN 410)
The g-value (total solar energy transmittance) is a measure of how much solar energy that is transmitted through the construction in the cooling period.
The g-value is defined as the ratio between the solar energy transmitted through the glazing and the incident solar factor on the glazing.

T-value:
“The transmitted fraction of the incident solar radiation in the visible part of the solar spectrum, see EN 410” (EN 13363-2)
“The fraction of incident light that is transmitted by the glass.” (EN 410)

Fc-value:
“The shading factor, Fc-value, is the ratio of the solar factor of the combined glazing and solar protection device, gtot, to that of the glazing alone, g, Fc=gtot/g
Note: in some countries, Fc is known as z.” (EN 14501)

Beam for Ridgelight at 5°

Material: Steel
Material thickness: 3 mm
Construction: Hollow beam
Surface: Primed RAL 9003
Foam gasket on beam: 15 mm

Product Data

NSHEV (Natural Heat and Smoke Exhaust Ventilators) - EN 12101-2:2003

Geometric area
EN 12101-2:2003 Av [m²] 0,48 - 1,89 depending on size

Aerodynamic area
EN 12101-2:2003 Annex B Aa Roof [m²] 0,05 - 0,89 depending on size

Aerodynamic value
EN 12101-2:2003 Annex B Cv0 0,08 - 0,52 depending on size

Snow load (SL)
EN 12101-2:2003 Annex E SL [N/m²] 750 N/m²

Wind load (WL)
EN 12101-2:2003 Annex F WL [N/m²] 3000 N/m²

Low ambient temperature (T)

Reliability (RE) (Dual purpose)

Resistance to heat (B)

Reaction to fire for NSHEV
EN 13501-1 Class B-s1,d2 for IGU 55.2
B-s1,d0 for IGU 33.2

Beam for Ridgelight at 5°

Material Steel
Material thickness 3 mm
Construction Hollow beam
Surface Primed RAL 9003
Foam gasket on beam 15 mm
Resistance to Wind Load

Test method: EN 12211

Classification of wind load

<table>
<thead>
<tr>
<th>Class</th>
<th>P1</th>
<th>P2(1)</th>
<th>P3</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>400</td>
<td>200</td>
<td>600</td>
</tr>
<tr>
<td>1</td>
<td>800</td>
<td>400</td>
<td>1200</td>
</tr>
<tr>
<td>2</td>
<td>1200</td>
<td>600</td>
<td>1800</td>
</tr>
<tr>
<td>3</td>
<td>1600</td>
<td>800</td>
<td>2400</td>
</tr>
<tr>
<td>4</td>
<td>2000</td>
<td>1000</td>
<td>3000</td>
</tr>
<tr>
<td>Exxxx</td>
<td>xxx</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1) This pressure having been repeated 50 times.
2) Specimen tested with wind loading above class 5, classified Exxxx – where xxxx is the actual test pressure P1 (e.g. 2350 etc.)

Classification of relative frontal deflection

<table>
<thead>
<tr>
<th>Class</th>
<th>Relative frontal deflection</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>&lt; L/150</td>
</tr>
<tr>
<td>B</td>
<td>&lt; L/200</td>
</tr>
<tr>
<td>C</td>
<td>&lt; L/300</td>
</tr>
</tbody>
</table>

1) This pressure having been repeated 50 times.
2) Specimen tested with wind loading above class 5, classified Exxxx – where xxxx is the actual test pressure P1 (e.g. 2350 etc.)

Classification of resistance to wind load

<table>
<thead>
<tr>
<th>Wind load class</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A1</td>
<td>B1</td>
<td>C1</td>
</tr>
<tr>
<td>2</td>
<td>A2</td>
<td>B2</td>
<td>C2</td>
</tr>
<tr>
<td>3</td>
<td>A3</td>
<td>B3</td>
<td>C3</td>
</tr>
<tr>
<td>4</td>
<td>A4</td>
<td>B4</td>
<td>C4</td>
</tr>
<tr>
<td>5</td>
<td>A5</td>
<td>B5</td>
<td>C5</td>
</tr>
<tr>
<td>Exxxx</td>
<td>Aexxxx</td>
<td>Bexxxx</td>
<td>Cexxxx</td>
</tr>
</tbody>
</table>

Note: In resistance to wind load classification the number refers to the wind load class, see table 1 and the letter to the relative frontal deflection, see table 2

VELUX modular skylights: Class C5

- Frontal deflection measured at P1: 2000 Pa is less than L/300.
- 50 cycle pressure test P2: 1000 Pa
- After that repeated Air permeability test passed
- Safety test done at P3: 3000 Pa passed with no released part
Reaction to Fire
Test method: EN ISO 11925-2, EN 13823

Reaction to fire classes for building products (excl. floorings)

<table>
<thead>
<tr>
<th>Main class</th>
<th>Smoke class</th>
<th>Burning droplets class</th>
<th>Requirements according to FIGRA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Non comb</td>
</tr>
<tr>
<td>A1</td>
<td>-</td>
<td>-</td>
<td>x</td>
</tr>
<tr>
<td>A2</td>
<td>-</td>
<td>-</td>
<td>x</td>
</tr>
<tr>
<td>B</td>
<td>-</td>
<td>-</td>
<td>x</td>
</tr>
<tr>
<td>C</td>
<td>-</td>
<td>-</td>
<td>x</td>
</tr>
<tr>
<td>D</td>
<td>-</td>
<td>-</td>
<td>x</td>
</tr>
<tr>
<td>E</td>
<td>-</td>
<td>- or d2</td>
<td>-</td>
</tr>
<tr>
<td>F</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

* The test is a corner basket test, which shows how much the product contributes to the development of fire.

Internal fire spread and smoke contribution.

---

**Reaction to Fire**

**Classification: EN 13501-1**

<table>
<thead>
<tr>
<th>Classification</th>
<th>THR600 (MJ)</th>
<th>FIGRA (W/s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>Non-combustible</td>
<td>Non-combustible</td>
</tr>
<tr>
<td>A2</td>
<td>≤ 120</td>
<td>≤ 120</td>
</tr>
<tr>
<td>B</td>
<td>≤ 120</td>
<td>≤ 250</td>
</tr>
<tr>
<td>C</td>
<td>≤ 250</td>
<td>≤ 750</td>
</tr>
<tr>
<td>D</td>
<td>≤ 750</td>
<td>≤ 1100</td>
</tr>
<tr>
<td>E</td>
<td>≤ 1100</td>
<td></td>
</tr>
</tbody>
</table>

**Smoke subclass**

<table>
<thead>
<tr>
<th>TSP600 (m²)</th>
<th>s1</th>
<th>s2</th>
<th>s3</th>
</tr>
</thead>
<tbody>
<tr>
<td>50/50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100/100</td>
<td>s1</td>
<td>s2</td>
<td></td>
</tr>
<tr>
<td>150/150</td>
<td></td>
<td>s2</td>
<td></td>
</tr>
<tr>
<td>200/200</td>
<td></td>
<td>s2</td>
<td>s3</td>
</tr>
</tbody>
</table>

**Claess B, s1-d0 or d2**

- B: Very low combustibility
- s1: Lowest smoke volume
- d0: No droplets in T pane variants
- d2: Droplets in standard pane variant

**Internal fire spread and smoke contribution.**
**Resistance to Fire**

**Test method:** EN 1365-2 and EN 1634-1

**Fixed modules:** EN 1365-2 Fire resistance tests for loadbearing elements - Part 2: Floors and roofs*

**Venting modules:** EN 1634-1 Fire resistance and smoke control tests for door and shutter assemblies, operable windows and elements of building hardware – Part 1: Fire resistance test for door and shutter assemblies and operable windows*

* In accordance with EN 1365-2, 1., roofs can be roof constructions incorporating a glazed elements, which is the relevant standard for fixed modular skylights. For venting modules, the relevant standard is EN 1634-1.

---

**Classification: EN 13501-2**

**Presentation of classification**

Performance Characteristics – Designatory letters and pass criteria

The classification shall be presented according to the following template

```
<table>
<thead>
<tr>
<th>R</th>
<th>E</th>
<th>I</th>
</tr>
</thead>
<tbody>
<tr>
<td>Load bearing capacity</td>
<td>Integrity</td>
<td>Insulation</td>
</tr>
</tbody>
</table>
```

**R - Load bearing capacity** (not applicable on venting modules, only on fixed)

Withstanding fire exposure without loss of mechanical stability

**E - Integrity**

No cracks or openings in excess of given dimension

No ignition of a cotton pad on the unexposed side

No flames sustained on the unexposed side

**I - Insulation**

Maximum temperature rise on unexposed side not exceeding 180°C

Mean temperature rise on unexposed side not exceeding 140°C

Note there are further characteristics that are defined in the standard but these are not relevant for VELUX modular skylights.

**Classification periods**

All classification periods against any of the characteristics shall be declared in minutes, using one of the periods: 10, 15, 20, 30, 45, 60, 90, 120, 180, 240 or 360. Note that not all the period applies to all elements

**Declaration of performance**

Combination of the designatory letters as appropriate shall be used as a part of the classification of performance. They shall be supplemented by time in the elapsed completed minutes of the nearest lowest class during which the functional requirements are satisfied.

**VELUX modular skylights:**

Fixed module (HFS): **REI30**

Venting module (HVS): **EI30**

---

*In accordance with EN 1365-2, 1., roofs can be roof constructions incorporating a glazed elements, which is the relevant standard for fixed modular skylights. For venting modules, the relevant standard is EN 1634-1.*
**External Fire Performance**

Test method: TS 1187 - External fire exposure to roofs*

* In accordance with EN 14351-1, TS1187 test methods T1 and T4 shall be used to determine the external fire performance of roof windows.

---

**External Fire Performance**

**Classification: EN 13501-5 + A1**

**Test 1**

<table>
<thead>
<tr>
<th>Class</th>
<th>Classification criteria</th>
</tr>
</thead>
</table>
| BRooF (t1) | All of the following conditions shall be satisfied for any one test:  
- external and internal fire spread upwards < 0,700 m  
- external and internal fire spread downwards < 0.600 m  
- maximum burned length external and internal < 0,800 m  
- no burning material (droplets or debris) falling from exposed side  
- no burning/glowing particles penetrate the roof construction  
- no single through opening > 25 mm²  
- sum of all spread opening < 4500 mm²  
- lateral fire spread does not reach the edges of the measuring zone  
- no internal glowing combustion  
- maximum radius of fire spread on “horizontal” roofs, external and internal < 0,200 m |
| FRowF (t1) | No performance determined. |

**Test 4**

<table>
<thead>
<tr>
<th>Class</th>
<th>Classification criteria</th>
</tr>
</thead>
</table>
| GRooF (t4) | No penetration of roof system within 30 min.  
- Roof system is penetrated within 30 min but is not penetrated in the preliminary test.  
- Flame spread is not controlled. |
| DRowF (t4) | Roof system is penetrated within 30 min but is not penetrated in the preliminary test.  
- Flame spread is not controlled. |
| ERowF (t4) | No performance determined. |

---

**Test 1 – with burning brands**

**Test 4 – two stages incorporating burning brands, wind and supplementary radiant heat**

---

**Product Data**

**NSHEV (Natural Heat and Smoke Exhaust Ventilators) - EN 12101-2:2003**

- Geometric area
  - EN 12101-2:2003 Annex B \[m²\] 0,48 - 1,89 depending on size

- Aerodynamic area
  - EN 12101-2:2003 Annex B \[m²\] 0,05 - 0,89 depending on size

- Aerodynamic value
  - EN 12101-2:2003 Annex B \[\text{Cv0} \ [\text{m}²/\text{s}]\] 0,08 - 0,52 depending on size

- Snow load (SL)
  - EN 12101-2:2003 Annex E \[\text{SL} \ [\text{N/m²}]\] 750 N/m²

- Wind load (WL)
  - EN 12101-2:2003 Annex F \[\text{WL} \ [\text{N/m²}]\] 3000 N/m²

- Low ambient temperature (T)
  - EN 12101-2:2003 Annex E \[\text{T} \ [\degree\text{C}]\] T (-15)

- Reliability (RE) (Dual purpose)
  - EN 12101-2:2003 Annex C \[\text{RE} \ [\text{Nr of opening}]\] 1000 + 10000

- Resistance to heat (B)
  - EN 12101-2:2003 Annex G \[\text{B} \ [\degree\text{C}]\] B300

**Reaction to fire for NSHEV**

- EN 13501-1 Class B-s1,d2 for IGU 55.2
- B-s1,d0 for IGU 33.2

---

* In accordance with EN 14351-1, TS1187 test methods T1 and T4 shall be used to determine the external fire performance of roof windows.

---

**VELUX modular skylights**

B_{RowF} (t1)  
B_{DRowF} (t4)
**Watertightness**

Test method: EN 1027

<table>
<thead>
<tr>
<th>Pressure (Pa)</th>
<th>Time (min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>50</td>
<td>10</td>
</tr>
<tr>
<td>100</td>
<td>15</td>
</tr>
<tr>
<td>150</td>
<td>20</td>
</tr>
<tr>
<td>200</td>
<td>25</td>
</tr>
<tr>
<td>250</td>
<td>30</td>
</tr>
<tr>
<td>300</td>
<td>35</td>
</tr>
<tr>
<td>350</td>
<td>40</td>
</tr>
<tr>
<td>400</td>
<td>45</td>
</tr>
<tr>
<td>450</td>
<td>50</td>
</tr>
<tr>
<td>500</td>
<td>55</td>
</tr>
<tr>
<td>550</td>
<td>60</td>
</tr>
<tr>
<td>600</td>
<td>65</td>
</tr>
<tr>
<td>650</td>
<td>70</td>
</tr>
</tbody>
</table>

**Classification: EN 12208**

<table>
<thead>
<tr>
<th>Classification</th>
<th>Pressure (Pa)</th>
<th>Wind (Km/h)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 A</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2 A</td>
<td>50</td>
<td>32</td>
</tr>
<tr>
<td>3 A</td>
<td>100</td>
<td>45</td>
</tr>
<tr>
<td>4 A</td>
<td>150</td>
<td>55*</td>
</tr>
<tr>
<td>5 A</td>
<td>200</td>
<td>63</td>
</tr>
<tr>
<td>6 A</td>
<td>250</td>
<td>71</td>
</tr>
<tr>
<td>7 A</td>
<td>300</td>
<td>78</td>
</tr>
<tr>
<td>8 A</td>
<td>450</td>
<td>95</td>
</tr>
<tr>
<td>9 A</td>
<td>600</td>
<td>110</td>
</tr>
<tr>
<td>E 750</td>
<td>750</td>
<td>123**</td>
</tr>
<tr>
<td>E 900</td>
<td>900</td>
<td>134</td>
</tr>
</tbody>
</table>

* Equal to depression
** Equal to tropical storm

VELUX modular skylights: E900
No water penetration up to 900 Pa.
900 Pa equals 134 Km/h.
Air Permeability

Test method: EN 1026

Test Pressure

150 Pa - Class 1
300 Pa - Class 2
600 Pa - Class 3, 4

Class 1
- Poor air permeability
- Draught
- Major heat loss

Class 2
- Modest air permeability
- Draught in wind
- Large heat loss

Class 3
- Good air permeability
- Low heat loss
- Minimum requirement in most EU member states for heated inhabited buildings

Class 4
- Highest air permeability
- Draught ≤ 2.6 m³/hm² through joint
- Tight in most conditions
- Small draught at peak pressure

Velux modular skylights: Class 4

Product Data

NSHEV (Natural Heat and Smoke Exhaust Ventilators) - EN 12101-2:2003

Geometric area
EN 12101-2:2003 Av [m²] 0.48 - 1.89 depending on size

Aerodynamic area
EN 12101-2:2003 Annex B Aa Roof [m²] 0.05 - 0.89 depending on size

Aerodynamic value
EN 12101-2:2003 Annex B Cv0 0.08 - 0.52 depending on size

Snow load (SL)
EN 12101-2:2003 Annex E SL [N/m²] 750 N/m²

Wind load (WL)
EN 12101-2:2003 Annex F WL [N/m²] 3000 N/m²

Low ambient temperature (T)

Reliability (RE) (Dual purpose)
EN 12101-2:2003 Annex C RE [Number of openings] 1000 + 10000

Resistance to heat (B)

Reaction to fire for NSHEV
EN 13501-1 Class B-s1,d2 for IGU 55.2
Class B-s1,d0 for IGU 33.2
Additional solutions
Shaped Solution with Adaption of Lining

- **Atrium Longlight**
  - Internal Lining
  - Roof

**Feature**: By adapting the internal lining it is possible to build a shaped skylight with standard skylight modules.

**Advantage**: By using standard skylight modules on non-square roof designs, the architects will not have to compromise the wishes for the interior design.

**Benefit**: The solution can be combined with venting skylights and internal roller blinds. Using standard products with standard installation principles gives high security in the design and building process. Installing venting skylights and roller blinds gives a better indoor climate.

---

Asymmetric Ridgelight

**Feature**: By constructing an asymmetric ridgelight it is possible to combine modules of different length in the installation.

**Advantage**: The solution allows for installation between two roofs of different heights, or of modules in different slopes. By combining panes with different characteristics on each side of the ridgelight, it is possible to maximize daylight and minimize heat gain.

**Benefit**: The asymmetric ridgelight offers more flexibility in installation between buildings or sections of buildings.

---

Shaped Solution with Oval Lining

- **Atrium Ridgelight**
  - Internal Lining
  - Roof

**Feature**: By adapting the internal lining it is possible to build a shaped skylight with standard skylight modules.

**Advantage**: By using standard skylight modules on non-square roof designs, the architects will not have to compromise the wishes for the interior design.

**Benefit**: The solution can be combined with venting skylights and internal roller blinds.

---

Atrium of Combined Solutions

**Feature**: An atrium build of a combination of different solutions.

**Advantage**: Combining different solutions in an installation exploits the advantages of each solution in one atrium and offers the possibility to optimize comfort and smoke ventilation areas.

**Benefit**: Flexibility in designing an atrium.
### Infill Panel

**Ventilation penetration**

- Use an infill panel when penetrating the skylight with e.g. ventilation.

**Wall**

- Use infill panels when covering a wall in the building.

#### Feature | Advantage | Benefit
---|---|---
Ventilation shaft: | Continuous skylight installations instead of disrupted installations. | Cheaper product solution and better design.
Wall | Use infill panels when covering a wall in the building. | 

**Note:**

Products with a fixed, opaque insulating infill panel are out of the scope of the harmonised product standard EN 14351-1 used for CE marking of windows.

No harmonised product standard is available/applicable for these products; they are not and cannot be CE marked.

The VELUX Group can deliver the above-mentioned products and provide product specifications on the relevant general performance characteristics for thermal transmittance, air permeability, watertightness, resistance to wind load and reaction to fire, on request. The VELUX Group is not responsible for the specific application of the product with fixed, opaque insulating infill panel. It is the responsibility of the customer to verify the fitness of the product for specific use with the relevant authorities.

### Skylight Modules with Photovoltaic Glazing Units

VELUX modular skylights can be delivered with photovoltaic glazing units in both a fully covered or partly covered variant. Illustration shows partly covered variant.

#### Feature

- The solution offers a build-in solution where photovoltaic panels are combined with skylights installations.

#### Advantage

- The solution will optimize the utilization of space on the roof. Further the photovoltaic panels creates a shadow effect in the building that reduces heat gain and glare.

### Light Fittings on Modules

The inner ridge covering of a ridgelight or the connection between two modules allows for mounting different kinds of functional or visual objects.

#### Feature

- Use the inner ridge covering or the connection between modules to mount light fittings, smoke detectors, sprinklers etc.

#### Advantage

- Flexibility in mounting other functional products and features.
### Code Structure – Modular Skylights

**Example**

<table>
<thead>
<tr>
<th>HVC</th>
<th>067</th>
<th>160</th>
<th>0</th>
<th>0</th>
<th>10</th>
<th>T</th>
<th>C</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Module width</td>
<td>Module height</td>
<td>Interior colour</td>
<td>Exterior colour</td>
<td>Pane type</td>
<td>Pane variant</td>
<td>Electric variant</td>
<td>Generation</td>
</tr>
<tr>
<td>H = VMS</td>
<td>067 = 675 mm</td>
<td>120 = 1200 mm</td>
<td>0 = std.</td>
<td>0 = std.</td>
<td>10 = DGU/lowE</td>
<td>No keeter</td>
<td>DGU/lowE</td>
<td>Integra®</td>
</tr>
<tr>
<td>F = Fixed</td>
<td>075 = 750 mm</td>
<td>140 = 1400 mm</td>
<td>11 = DGU/Sun1</td>
<td>DGU/Sun2</td>
<td>12 = DGI/Sun2</td>
<td>No keeter</td>
<td>DGU/Sun2</td>
<td>Integra®</td>
</tr>
<tr>
<td>V = Vesting</td>
<td>080 = 800 mm</td>
<td>160 = 1600 mm</td>
<td>13 = DGI/Sun1</td>
<td>DGI/Sun2</td>
<td>14 = DGI/Sun2</td>
<td>No keeter</td>
<td>DGI/Sun2</td>
<td>Integra®</td>
</tr>
<tr>
<td>S = Fire-resistant variant: With fire resistant glazing unit and intumescent strip</td>
<td>090 = 900 mm</td>
<td>180 = 1800 mm</td>
<td>15 = TGU/lowE</td>
<td>TGU/Sun1</td>
<td>16 = TGU/lowE</td>
<td>No keeter</td>
<td>TGU/lowE</td>
<td>Integra®</td>
</tr>
<tr>
<td>C = Commercial market</td>
<td>100 = 1000 mm</td>
<td>200 = 2000 mm</td>
<td>17 = TGU/Sun1</td>
<td>TGU/Sun2</td>
<td>18 = TGU/Sun2</td>
<td>No keeter</td>
<td>TGU/Sun2</td>
<td>Integra®</td>
</tr>
<tr>
<td>B = special</td>
<td>220 = 2200 mm</td>
<td>240 = 2400 mm</td>
<td>19 = TGU/Sun1</td>
<td>TGU/Sun2</td>
<td>20 = TGU/Sun2</td>
<td>No keeter</td>
<td>TGU/Sun2</td>
<td>Integra®</td>
</tr>
<tr>
<td></td>
<td>260 = 2600 mm</td>
<td>280 = 2800 mm</td>
<td>21 = TGU/Sun1</td>
<td>TGU/Sun2</td>
<td>22 = TGU/Sun2</td>
<td>No keeter</td>
<td>TGU/Sun2</td>
<td>Integra®</td>
</tr>
<tr>
<td></td>
<td>300 = 3000 mm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Code Structure – Opening flashing package

**Example**

<table>
<thead>
<tr>
<th>ERC</th>
<th>XXX</th>
<th>160</th>
<th>0</th>
<th>0</th>
<th>0</th>
<th>25</th>
<th>D</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Module width</td>
<td>Module height</td>
<td>Interior Flashing</td>
<td>Exterior Flashing</td>
<td>Exterior Cladding</td>
<td>Installation pitch</td>
<td>VMS Cover</td>
<td>Generation</td>
</tr>
<tr>
<td>E = Flashing</td>
<td>XXX = Not relevant on height package</td>
<td>120 = 1200 mm</td>
<td>0 = std.</td>
<td>0 = std.</td>
<td>0 = std.</td>
<td>05 = 5°, 10° etc.</td>
<td>D = Extra cover</td>
<td>No Extra cover when HVC &gt; 2100</td>
</tr>
<tr>
<td>L = Longlight</td>
<td>080 = 800 mm</td>
<td>140 = 1400 mm</td>
<td>Only relevant on ERC</td>
<td>Only relevant on ERC</td>
<td>Only relevant on ERC</td>
<td>Only relevant on ERC</td>
<td>ELC/ERC/ENC</td>
<td></td>
</tr>
<tr>
<td>R = Ridgelight</td>
<td>090 = 900 mm</td>
<td>160 = 1600 mm</td>
<td>NCS standard colour: 5.750-N (RAL 7043)</td>
<td>NCS standard colour: 5.750-N (RAL 7043)</td>
<td>NCS standard colour: 5.750-N (RAL 7043)</td>
<td>NCS standard colour: 5.750-N (RAL 7043)</td>
<td>ENC/ENC/ENC</td>
<td></td>
</tr>
<tr>
<td>N = Northlight</td>
<td>100 = 1000 mm</td>
<td>180 = 1800 mm</td>
<td>200 = 2000 mm</td>
<td>220 = 2200 mm</td>
<td>240 = 2400 mm</td>
<td>260 = 2600 mm</td>
<td>ENC/ENC/ENC</td>
<td></td>
</tr>
<tr>
<td>W = Wall-mounted Longlight</td>
<td>280 = 2800 mm</td>
<td>300 = 3000 mm</td>
<td>350 = 3500 mm</td>
<td>370 = 3700 mm</td>
<td>390 = 3900 mm</td>
<td>400 = 4000 mm</td>
<td>ENC/ENC/ENC</td>
<td></td>
</tr>
<tr>
<td>C = Commercial Market</td>
<td>310 = 3100 mm</td>
<td>330 = 3300 mm</td>
<td>350 = 3500 mm</td>
<td>370 = 3700 mm</td>
<td>390 = 3900 mm</td>
<td>400 = 4000 mm</td>
<td>ENC/ENC/ENC</td>
<td></td>
</tr>
<tr>
<td></td>
<td>310 = 3100 mm</td>
<td>330 = 3300 mm</td>
<td>350 = 3500 mm</td>
<td>370 = 3700 mm</td>
<td>390 = 3900 mm</td>
<td>400 = 4000 mm</td>
<td>ENC/ENC/ENC</td>
<td></td>
</tr>
</tbody>
</table>

### Code Structure – Module flashing package

**Example**

<table>
<thead>
<tr>
<th>ERC</th>
<th>080</th>
<th>XXX</th>
<th>0</th>
<th>0</th>
<th>0</th>
<th>25</th>
<th>D</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Module width</td>
<td>Module height</td>
<td>Interior Flashing</td>
<td>Exterior Flashing</td>
<td>Exterior Cladding</td>
<td>Installation pitch</td>
<td>VMS Cover</td>
<td>Generation</td>
</tr>
<tr>
<td>E = Flashing</td>
<td>067 = 675 mm</td>
<td>075 = 750 mm</td>
<td>Only relevant on ERC</td>
<td>Only relevant on ERC</td>
<td>Only relevant on ERC</td>
<td>Only relevant on ERC</td>
<td>D = Extra cover</td>
<td>No Extra cover when HVC &gt; 2100</td>
</tr>
<tr>
<td>L = Longlight</td>
<td>080 = 800 mm</td>
<td>Only relevant on ERC</td>
<td>Only relevant on ERC</td>
<td>Only relevant on ERC</td>
<td>Only relevant on ERC</td>
<td>Only relevant on ERC</td>
<td>ENC/ENC/ENC</td>
<td></td>
</tr>
<tr>
<td>R = Ridgelight</td>
<td>090 = 900 mm</td>
<td>DGU/Sun1, 9110, 9115</td>
<td>DGU/Sun2, 9110, 9115</td>
<td>DGU/Sun2, 9110, 9115</td>
<td>DGU/Sun2, 9110, 9115</td>
<td>DGU/Sun2, 9110, 9115</td>
<td>ENC/ENC/ENC</td>
<td></td>
</tr>
<tr>
<td>N = Northlight</td>
<td>100 = 1000 mm</td>
<td>120 = 1200 mm</td>
<td>140 = 1400 mm</td>
<td>160 = 1600 mm</td>
<td>180 = 1800 mm</td>
<td>200 = 2000 mm</td>
<td>ENC/ENC/ENC</td>
<td></td>
</tr>
<tr>
<td>W = Wall-mounted Longlight</td>
<td>150 = 1500 mm</td>
<td>170 = 1700 mm</td>
<td>190 = 1900 mm</td>
<td>210 = 2100 mm</td>
<td>230 = 2300 mm</td>
<td>250 = 2500 mm</td>
<td>ENC/ENC/ENC</td>
<td></td>
</tr>
<tr>
<td>C = Commercial Market</td>
<td>180 = 1800 mm</td>
<td>200 = 2000 mm</td>
<td>220 = 2200 mm</td>
<td>240 = 2400 mm</td>
<td>260 = 2600 mm</td>
<td>280 = 2800 mm</td>
<td>ENC/ENC/ENC</td>
<td></td>
</tr>
<tr>
<td></td>
<td>290 = 2900 mm</td>
<td>300 = 3000 mm</td>
<td>310 = 3100 mm</td>
<td>320 = 3200 mm</td>
<td>330 = 3300 mm</td>
<td>340 = 3400 mm</td>
<td>ENC/ENC/ENC</td>
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</tbody>
</table>
## Code Structure – Roller Blinds

### Example

<table>
<thead>
<tr>
<th>Code Structure – Roller Blinds</th>
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</thead>
<tbody>
<tr>
<td>RMM 067 160 4083 A</td>
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<table>
<thead>
<tr>
<th>Type</th>
<th>Module width</th>
<th>Module height</th>
<th>Fabric variant</th>
<th>Electric variant</th>
</tr>
</thead>
<tbody>
<tr>
<td>R = Roller blind</td>
<td>067 = 675 mm</td>
<td>120 = 1200 mm</td>
<td>4083 = Grey</td>
<td>A = Open system</td>
</tr>
<tr>
<td>M = Electrical</td>
<td>075 = 750 mm</td>
<td>140 = 1400 mm</td>
<td>4084 = White</td>
<td></td>
</tr>
<tr>
<td>M = For VELUX Modular Skylights</td>
<td>080 = 800 mm</td>
<td>160 = 1600 mm</td>
<td>4085 = Black</td>
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</tr>
<tr>
<td></td>
<td>090 = 900 mm</td>
<td>180 = 1800 mm</td>
<td>4094 = Fire-resistant, white</td>
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</tr>
<tr>
<td></td>
<td>100 = 1000 mm</td>
<td>200 = 2000 mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>220 = 2200 mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>240 = 2400 mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>260 = 2600 mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>280 = 2800 mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
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<td>300 = 3000 mm</td>
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## Code Structure – Product Label

<table>
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<td>HVC 090180 0010 TCB</td>
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<table>
<thead>
<tr>
<th>Module type</th>
<th>Module size</th>
<th>Colour variant</th>
<th>Pane type</th>
<th>Pane variant</th>
<th>Electric variant</th>
<th>Generation</th>
<th>Order number</th>
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</thead>
<tbody>
<tr>
<td>Vented Module</td>
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