



LAMILUX

PASSIVHAUS SKYLIGHTS

SKYLIGHTS AS ACTIVE ENERGY MANAGERS

"Nowadays, anyone who builds or renovates needs to pay close attention to the energy efficiency of the building – due to increasingly stringent regulations alone. The Passivhaus standard is one way of achieving these goals in a sustainable and environmentally conscious manner. For precisely this purpose, we have developed special skylights that also serve as active energy managers in a building. The Passivhaus Institut Darmstadt confirms that our special glass roofs and flat roof windows offer the greatest energy efficiency on the market. We are proud that we are making an important contribution to people's health and to the health of the planet. "

Andreas Rudolph
Head of Application Technology LAMILUX Skylights



The LAMILUX CI Philosophy

Customer value alone is the reason we exist – and the focus of our activities. This requires harmony, identity and a conformity of customer value and company strategy.

The principles that guide our company's actions and customer relations are set out in LAMILUX's company philosophy:

Customised Intelligence – serving customers is our first priority:
This requires outstanding performance and leadership in all areas relevant to customers, particularly in the role of:

- A leader in quality – optimum benefit for customers
- A leader in innovation – at the cutting edge of technology
- A leader in service – fast, uncomplicated and friendly
- A leader in expertise – optimum sales and technical advisory services
- A leader in problem solving – individual, customised solutions

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MAXIMUM EFFICIENCY FOR THE PASSIVHAUS

The trend continues: Passivhaus is gaining ground internationally as the highest energy efficiency standard. This high energy standard has long since established itself in successful and pioneering projects outside of private residential construction: swimming pools, schools and nurseries, sports and event halls, congress and administration buildings are becoming passive houses.

We are the world's first manufacturer to develop three Passivhaus skylight systems – a large area of inclined glazing and two flat roof windows – which, as phA advanced components, are each in the highest efficiency range. In addition, two skylight systems – a ventilation flap and a continuous rooflight – have received Passivhaus class phB certification.

Our skylights of Passivhaus standard have the following features:

- Outstanding thermal insulation with extremely low U-values
- Very good, certified air-tightness of class 4 as per standard EN12207
- Effective energy gains thanks to large daylight incidence and solar heat input
- No thermal bridges thanks to continuous thermally decoupled systems

More and more architects and planners across the globe are focusing on the Passivhaus construction concept. This concept has a proven track record of energy efficiency, comfort, cost-effectiveness and environmental friendliness.

And as the Passivhaus Institut Darmstadt emphasises, the Passivhaus is much more than just an energy-saving house: It requires 75 per cent less thermal heat than conventional new buildings. The thermal energy consumption is many times lower than that of a low-energy house. The Passivhaus also has special windows and highly effective thermal insulation overall. In addition, it uses the energy sources available in its interior and, in particular, the incident solar heat.

Dr Benjamin Krick from the Passivhaus Institut Darmstadt, which has certified our skylights, emphasises: "The high-quality nature of our building concept thrives on high-quality components that fit seamlessly into the challenging overall energy context."

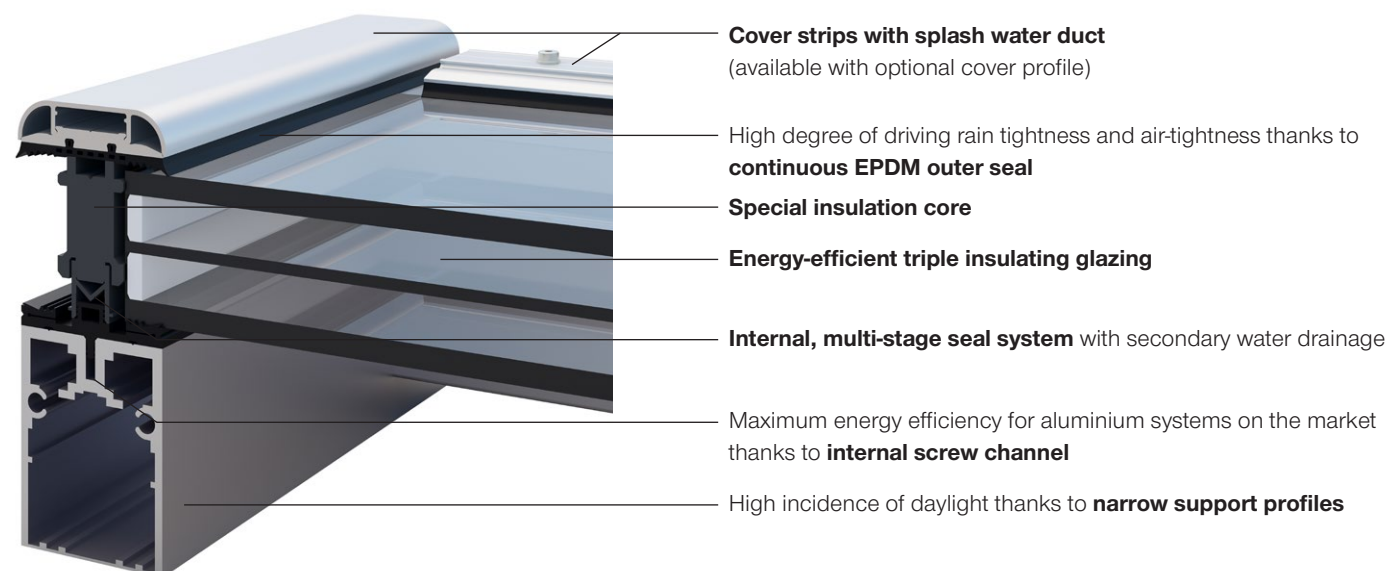


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GLASS ROOF PR60 PASSIVHAUS

The LAMILUX Glass Roof PR60 Passivhaus is the optimum, energy-efficient solution. The product variant has an optimised insulation core and thereby offers better thermal separation. This is combined with a special edge seal which, in turn, thermally enhances the glazing. As a result, our Glass Roof PR60 Passivhaus is the first inclined glazing in the world to have been certified for the highest Passivhaus efficiency class – “phA advanced component”.

In addition to the special heat insulation, the considerable air-tightness is a further advantage of this variant. The ingenious combination of highly efficient materials and innovative production technology make this glass roof unique. This can also be seen in the free shaping and freedom of design that are of course also fully present in the Passivhaus variant.



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VENTILATION FLAP PR60

Bring not only daylight but also fresh air into the building by integrating flap systems into glass roof and façade constructions. The LAMILUX Ventilation Flaps PR60 with Passivhaus class pHB certification are easy to activate and make a significant contribution to climate optimisation in buildings. This also considerably reduces the energy required for air conditioning units used for cooling. Around 30 percent of energy used to heat and cool buildings can be saved as a result of efficiency optimisation functions in room automation systems alone.

Our ventilation flap PR60 can be integrated in all commercially available mullion-and-transom systems. Its opening angle is continuously adjustable; opening itself is possible by means of different motor variants. The materials used for the ventilation flap are designed for durability.

The flap has a special design: It has the lowest roof upstand on the market and, thanks to the optional structural glazing composite technology, level water drainage.

The CE marking – Tested according to DIN EN 14351-1

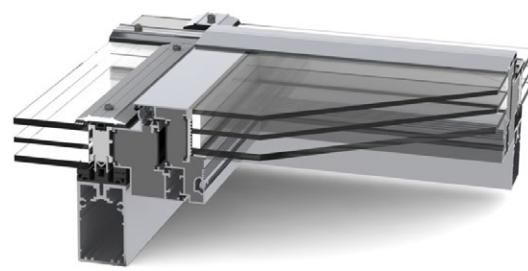
On the European market, testing of window sashes in line with the product standard DIN EN 14351-1 and CE marking is mandatory. Our flap systems have completed all tests successfully and hold the required certifications:

- Resistance to wind load (Class C5 DIN EN 12210)
- Impermeability to driving rain (Class E 1200 DIN EN 12208)
- Air permeability (Class 4 DIN EN 12207)
- Thermal insulation (U_f -values up to 1.15 W/(m²K) as per ISO 10077-2)



LAMILUX Ventilation Flap PR60 Variant 1

With circumferential cover strip for roof inclinations between 8° and 75°



LAMILUX Ventilation Flap PR60 Variant 2

With level water drainage for roof inclinations between 2° and 75°

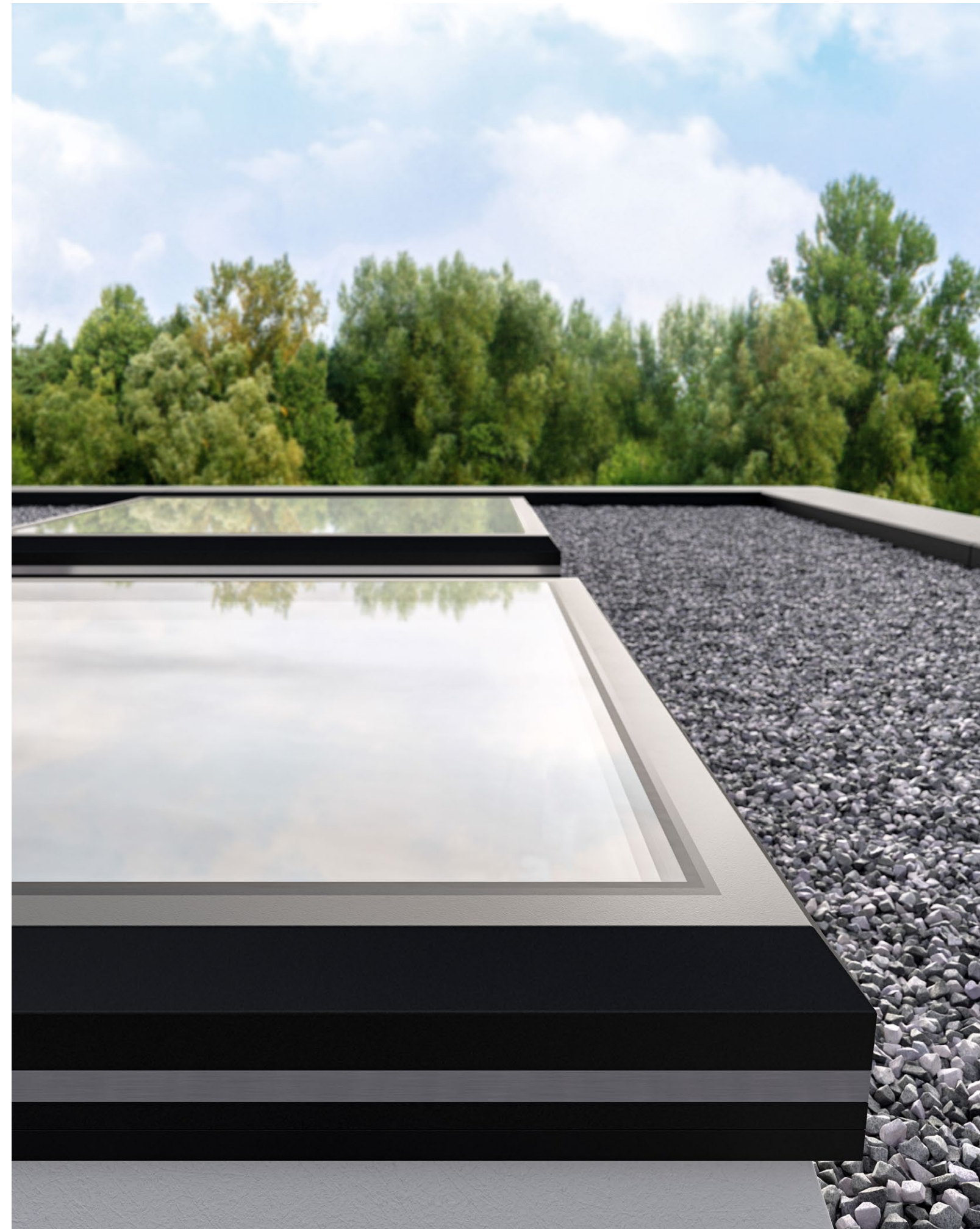


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GLASS SKYLIGHT FE PASSIVHAUS

The energy properties of building products measure all things in modern construction to demonstrate their performance. The passive house demands the highest of standards and the LAMILUX Glass Skylight FE has been certified by the Passive House Institute in Darmstadt as the world's first skylight to achieve this class of energy efficiency. With the latest research and development, architects and passive house planners also now have a Passive House certified Smoke Vent Skylight option which also meets this quality standard. A key feature of the LAMILUX Glass Skylight FE and LAMILUX Smoke Vent version is the level transitions from glazing to frame which, in conjunction with 5° inclined upstand, ensures optimum water drainage and preserving clean panes.

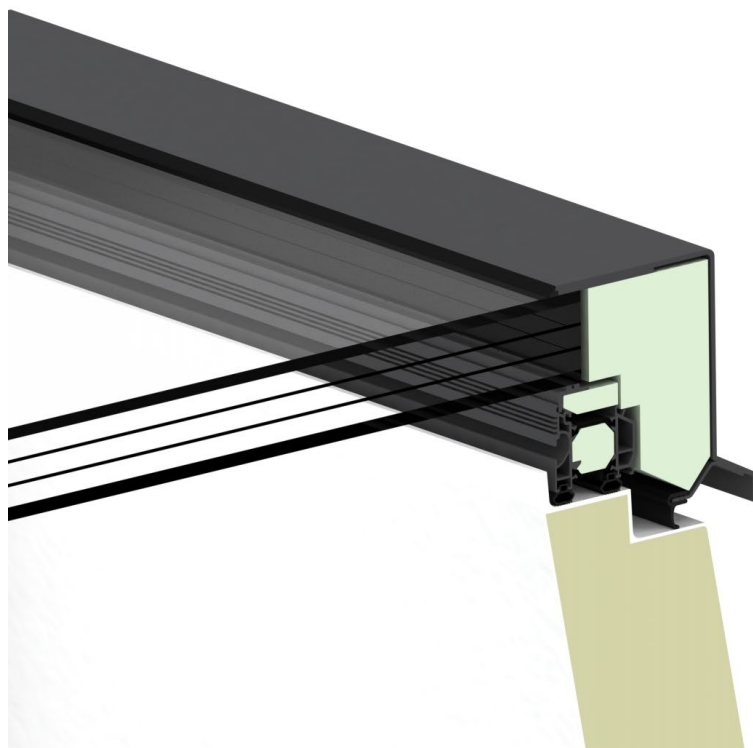
Notably because of its optimised insulating core and the warm edge in the standard quadruple glazing, it meets the passive house efficiency class pH_C and the criteria for the cool-temperate climate zone with a low heat transfer coefficient U_{SK} of 0.85 W/m²K and U_g of 0.56 W/m²K. Other advantages include high solar heat gains whilst minimizing the risk of condensation.



LAMILUX GLASS SKYLIGHT FE PASSIVHAUS+

For the “cold” climate region, the LAMILUX Glass Skylight FE Passivhaus+ is the first skylight in the world to receive Passivhaus certification in the highest efficiency class. As example, it is suitable for passive houses in cities such as Reykjavik, Oslo, Stockholm, Warsaw, Kiev, Moscow, Yekaterinburg, Winnipeg, Quebec, Halifax and Calgary, but it is also used in many regions of Austria and Switzerland.

The outstanding U-value of the LAMILUX Glass Skylight FE Passivhaus+ is the result of insulation made of special foam in the upper part and in the upstand in addition to warm edge with Super Spacer in standard quadruple glazing. It also has a minimised risk of condensation thanks to a stable f_{RSI} value of 0.76, low heat loss and high solar heat gains as well as a very low heat transmission coefficient of $U_{SL} = 0.69 \text{ W/(m}^2\text{K)}$.





HARHEIM NURSERY, FRANKFURT

Project:

Construction of a municipal nursery of Passivhaus standard with a modern, bright and friendly design

Systems:

- One shed roof LAMILUX Glass Roof PR60 Passivhaus with a surface inclination of 5° and dimensions 7.5 x 7.5 m
- LSG glazing as triple heat insulation glazing (U_g value 0.6 W/(m²K)) divided into 36 glass panels
- Edge bond thermally optimised with Super Spacers as “warm edge”
- Twelve LAMILUX Smoke Lifts PR60
- Fly screen for SHEV flaps



WILLIBALD-GLUCK-GYMNASIUM, NEUMARKT

Project:

New construction of a low-energy building as a high school with two atria, for which the energy-efficient glass roofs provide both illumination and ventilation

Systems:

- Two LAMILUX Glass Roofs PR60 Passivhaus, 13 x 20 m and 13 x 21 m, consisting of 54 and 60 glass panels
- Six LAMILUX Smoke Lifts PR60 per glass roof for ventilation and aeration as well as smoke and heat exhaust devices in case of fire
- Integration of the glass roofs in the building ventilation concept for flushing with fresh air at night



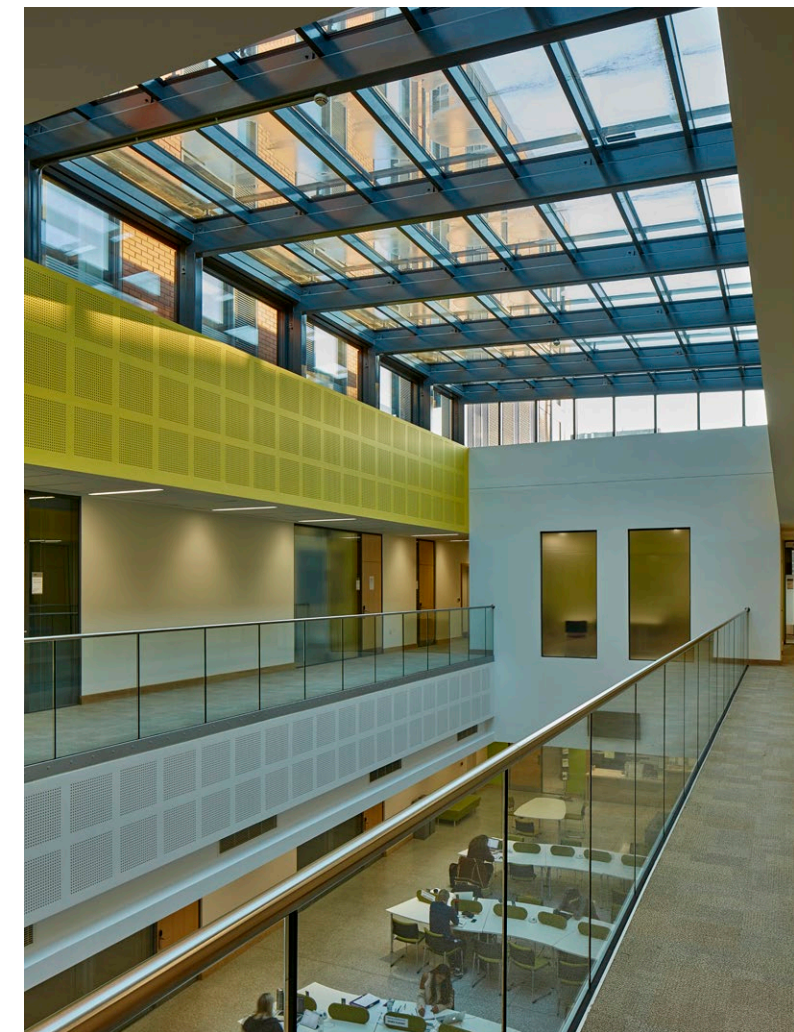
POST MERCIER, LUXEMBOURG

Project:

New construction of the administration and service building for POST Luxembourg for up to 900 employees with a glass roof over the atrium

Systems:

- One LAMILUX Glass Roof PR60 Passivhaus of 625 m² in size, a 5° inclination and a U value of 0.91 W/(m²K) as well as smoke and heat extraction flaps
- Elevation on a 2.5 m high vertical glass façade at a height of 27 m
- Steel supporting structure made by the subsidiary Mirotec Glas- und Stahlbau



UNIVERSITY OF LEICESTER, ENGLAND

Project:

Largest non-residential building of Passivhaus standard in the UK for more than 2,350 employees and students

Systems:

- Two LAMILUX Glass Roofs PR60 Passivhaus, each measuring 6.5 x 15.6 m and with a surface inclination of 3°
- U-value of the overall construction of 0.82 W/(m²K)
- External shading

LAMILUX SKYLIGHTS

ROOFLIGHT F100 W



GLASS SKYLIGHT F100



GLASS SKYLIGHT FE



GLASS ARCHITECTURE



MODULAR GLASS SKYLIGHT MS78



FLAT ROOF HATCHES



CONTINUOUS ROOFLIGHT



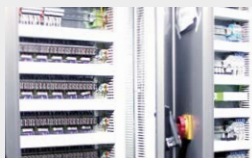
RENOVATION



SMOKE AND HEAT EXHAUST



BUILDING SMOKE EXTRACTION



RODA LIGHT AND AIR TECHNOLOGY



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about
LAMILUX
skylights!

The technical data listed in this brochure correspond to the current status at the time of printing and are subject to change. Our technical specifications are based on calculations and supplier specifications, or have been determined by independent testing authorities within the scope of applicable standards.

Thermal transmission coefficients for our plastic glazing were calculated using the finite element method with reference values in accordance with DIN EN 673 for insulated glass. Taking into account practical experience and the specific characteristics of plastic, the temperature difference between the outer surfaces of the material was defined as 15 K. Functional values refer to test specimens and the dimensions used in testing only. We cannot provide any further guarantees of technical values. This particularly applies to changed installation conditions or if dimensions are re-measured on site.



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