



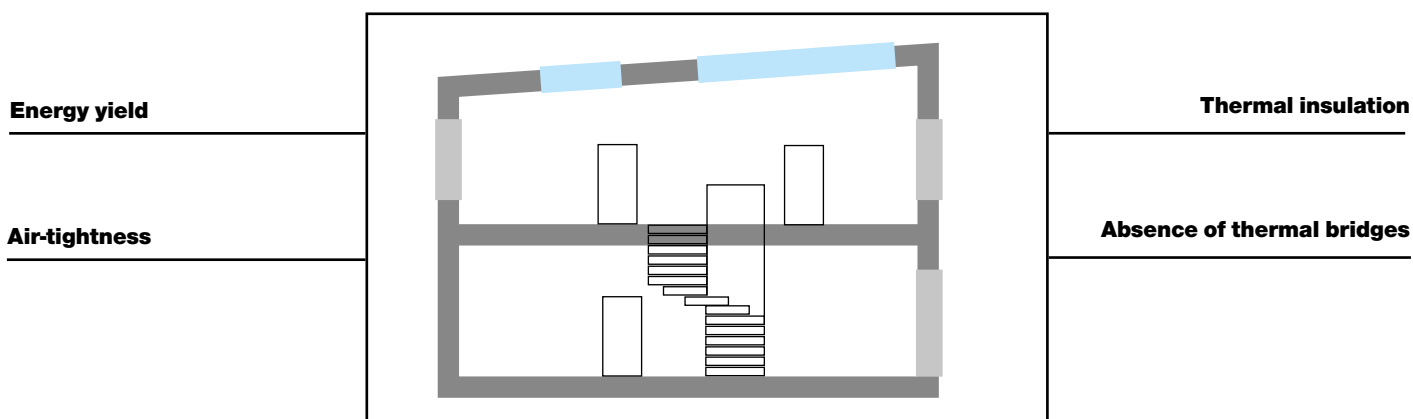
LAMILUX Passive House Daylight Systems

Maximum efficiency for active energy management 

MAXIMUM EFFICIENCY FOR PASSIVE HOUSES

LAMILUX is the first manufacturer worldwide to develop three skylight systems for Passive Houses – one large-scale sloped glazing system and two flat roof windows. They are **phA advanced components**, meaning that they all achieve the highest efficiency ratings.

LAMILUX daylight systems have all the key features of Passive Houses:



- **excellent thermal insulation** with extremely low U-values
- **very good, verified air-tightness** achieving Class 4 of the EN12207 standard
- **effective energy yield** thanks to extensive daylight incidence and solar heat input
- **no thermal bridges** thanks to **thermally isolated systems throughout**



The LAMILUX CI Philosophy

Customer value is the reason for our existence and is the focus of our activities. This requires harmony, identity and a balance between customer value and company strategy.

These guiding ideas for our company's actions and our day-to-day relationship with our customers are described in LAMILUX's company philosophy:

'Customised intelligence – serving the customer is our mission.'

This requires outstanding performance and leadership in all areas relevant to customers, particularly in the role of:

- **Quality leader** – optimum benefits for customers
- **Innovation leader** – at the cutting edge of technology
- **Leader in service** – fast, uncomplicated, reliable and friendly
- **Leader in expertise** – best-in-class technical and commercial advisory services
- **Leader in solutions** – individual, tailor-made solutions

DAYLIGHT SYSTEMS AS ACTIVE ENERGY MANAGERS

The trend is continuing: 'Passive Houses' are on the rise around the world as the highest standard in energy efficiency. This standard of energy excellence has long been established far beyond the private housing sector, and is manifesting itself in a number of successful and ground-breaking projects: swimming pools, schools, nurseries, sports and events facilities, conference and office buildings are all becoming 'Passive Houses'.



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CI-System glazed architecture PR 60energysave



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CI-System glazed element FEnergysave



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CI-System glazed element FEnergysave

PASSIVE HOUSES – REQUIREMENTS AND PRODUCTS

Ever more architects and planners around the world are getting on board with the Passive House concept. It has proven itself thousands of times in practice and represents energy efficiency, comfort, economy and environmental friendliness. As the Passivhaus-Institut Darmstadt points out, a Passive House is far more than 'just' an energy-saving house:

- **it needs 75 per cent less heat than conventional new builds.**
- **Its heating energy consumption is way below that of a 'low energy house'.**
- **A Passive House is fitted with special windows and has highly effectively thermal insulation overall.**
- **It uses its inherent energy sources, especially incident solar heat.**

Dr Benjamin Krick from the Passivhaus-Institut Darmstadt, which certified the LAMILUX daylight systems, says: 'The high quality of our construction concept is built around high-grade components that fit seamlessly into the sophisticated over-arching energy context.'



LAMILUX CI System

Glazed Architecture PR60_{energysave}

LAMILUX CI-System Glazed Architecture PR60energysave for large glass roofs

CERTIFIED GLASS ROOF SYSTEM SOLUTION IN THE BEST EFFICIENCY CLASS

The **LAMILUX CI-System Glazed Architecture PR60energysave** glass roof is the world's first sloped glazing in the highest Passive House efficiency class of pHA advanced component, and can be designed to suit almost any configuration. Its high solar yield is excellent thanks to the generous incident daylight and the optimised isotherm profiles (no thermal bridges) in the robust support structure.



- 1** special core insulation block
- 2** energy efficient triple glazing with 'warm edge' in SuperSpacer design
- 3** high air and rain impermeability thanks to continuous outer EPDM seals
- 4** solar yield thanks to narrow support profiles

LAMILUX CI-System glazed architecture PR60energysave is becoming an integral part of challenging architectural concepts for energy efficient Passive House building skins.

Freely designable, the sloped glazing achieves the ideal balance between **high daylight incidence** and **excellent thermal insulation** and **air-tightness**.

The **optimised isotherm profiles** prevent water condensation and mould formation.



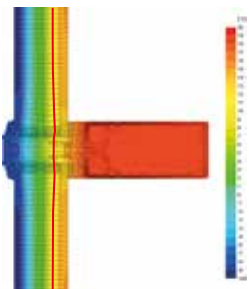
www.LAMILUX.de/passivhaus



THE HIGHEST PASSIVE HOUSE STANDARD WITH FREEDOM OF DESIGN

LAMILUX CI System Glazed Architecture PR 60energysave sets energy standards for glass roofs and embodies LAMILUX's high energy efficiency promise.

- first sloped glazing certified in line with the Passive House standard
- highest Passive House energy efficiency class – phA advanced component
- **heat transfer coefficient (U_{CWi}) is up to $0.81 \text{ W}/(\text{m}^2\text{K})$ / temperature factor $f_{Rsi} = 0.79$**
- high solar yield thanks to narrow profiles and large glass surfaces



PASSIVE HOUSE CERTIFICATION

in the highest class, phA

'For the first time, this gives energy- and cost-conscious architects and designers a sloped glazing system solution that is not only suitable for Passive Houses, but also meets the highest Passive House efficiency class, phA.'

(Dr.-Ing. Benjamim Krick, Passivhaus-Institut Darmstadt)



Premises: SHOPPING MALL

ENERGY EFFICIENCY

Thermally isolated and thermally insulated profile system – optionally with the highest Passive House efficiency class

Building-specific, energetically optimised glazing with a "warm edge"

Integration of highly airtight lift systems for natural aeration and ventilation

Integration of pane-integrated PV systems

COMFORT

Integration of controllable and permanent sun protection systems

Integration of programmed controllers and sensor-dependent automation for the ventilation lifts and sunshade control

High level of sound insulation

DESIGN

Individual freedom of design

Adaptable system for large-scale structures

premium and filigree appearance

SAFETY

Actuation of the lift systems as a SHEVS system

Permanent fall-through proofing

Impervious to driving rain (Class E, 1200 EN 12208) and high air-tightness



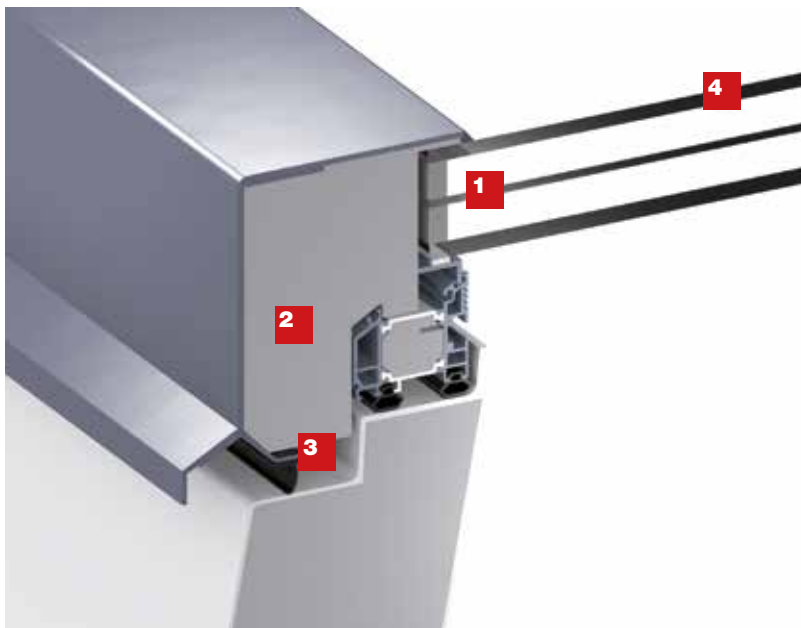
LAMILUX CI System

Glass Elements FE_{energysave}

LAMILUX CI-System glazed element FEnergysave – flat roof windows for Passive Houses

EXCELLENT THERMAL INSULATION AND AIR-TIGHTNESS

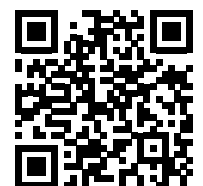
The ideal skylight for new builds and energy-related renovations are now available to architects and Passive House planners – **the LAMILUX CI-System Glazed Element FEnergysave**. Based on the standards DIN EN ISO 10077-1 and 10077-2, the Passivhaus-Institut Darmstadt determined a thermal insulation value (U_{SL}) of 0.84 W/(m²K).



- 1** 'Warm Edge' with the SuperSpacer using triple glazing as standard
- 2** further improved thermal insulation
- 3** high level of air-tightness thanks to triple stage sealing system
- 4** high solar yield thanks to mullion-free glazing

The **LAMILUX CI-System Glazed Element FEnergysave** combines **outstanding thermal insulation and air-tightness** with a generous amount of natural incident light. It achieved the **highest classification** as a phA advanced component in the certification.

Triple glazing with argon filling is used in the compact system, in accordance with Passive House requirements. The spacer forms the 'warm edge' with SuperSpacers.



www.LAMILUX.de/passivhaus



Premises: HOUSE



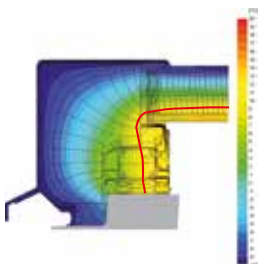
THE BEST ENERGY PERFORMANCE FOR SUSTAINABLE AND MODERN BUILDING

- highest Passive House energy efficiency class – phA advanced component
- **heat transfer coefficient U_{sL} 0.84 W/(m²K)**
- minimised risk of condensation thanks to the stable f_{RSI} -value of 0.73
- low heat loss and high solar heat yield

Available sizes

Upper edge of roof size

80/80	100/100	120/120
90/90	100/150	150/150
90/120	100/200	180/180



PASSIVE HOUSE CERTIFICATION

in the highest class, phA

The compact daylight element for flat roofs has achieved the highest efficiency rating following its classification as a phA advanced component. 'The energy performance of this skylight is excellent.'

(quote Passivhaus-Institut, Darmstadt, Germany)



Premises: SHOPPING MALL

ENERGY EFFICIENCY

optimum thermal insulation with smooth isothermal profiles thanks to an overall system that avoids thermal bridges

Airtight as per EN 12207 Class 4

controllable energy load with intelligent control systems for natural ventilation, sun protection, and shading blinds

COMFORT

pleasant indoor atmosphere thanks to natural ventilation and regulation of solar heat load

high level of protection against condensation on the insides of the glazing and the frame and mullion profiles

excellent sound insulation of glazing options (EN ISO 140-3) up to 45 dB

Roof exit variant both single- and double-leaf in large dimensions for the CI System Glazed Element FE

DESIGN

filigree appearance inside and out with elegant and narrow mullion profiles

Variety of colours can be chosen individually as per RAL card

SAFETY

permanent fall-through protection (GSBAU 18) for all elements up to upper edge of roof surface 150/180

resistance class 2 verified according to DIN V ENV 1627 'opportun-ist offender' (optional)

driving rain protection as per EN 12208 Class E1500

PASSIVE HOUSE CERTIFICATIONS IN LINE WITH CLIMATE ZONES

Extending in east to west direction, the earth is divided into seven climate zones – from 'very hot' (7) to 'Arctic cold' (1). Category 2 is the 'cold' zone, and category 3 the 'cool-moderate' zone.







In the 'cold' climate zone, the **LAMILUX CI System Glazed Element FE_{energysave+}** is the first skylight worldwide to achieve Passive House certification in the highest efficiency class. As an example, it is suitable for Passive Houses in the cities of Reykjavik, Oslo, Stockholm, Warsaw, Kiev, Moscow, Yekaterinburg, Winnipeg, Quebec, Halifax and Calgary.



The two skylights **LAMILUX CI-System Glazed Architecture PR60_{energysave}** and **CI-System Glazed Element FE_{energysave}** are certified for the 'cool-moderate' climate zone. Cities such as London, Paris, Berlin, Vienna, Zagreb, Budapest, Sofia, Washington, New York, Montreal, Kansas City, Shanghai, Beijing, Seoul and Tokyo are all in this zone.

Climate zones

-  Arctic
-  cold
-  cool-moderate
-  warm-moderate



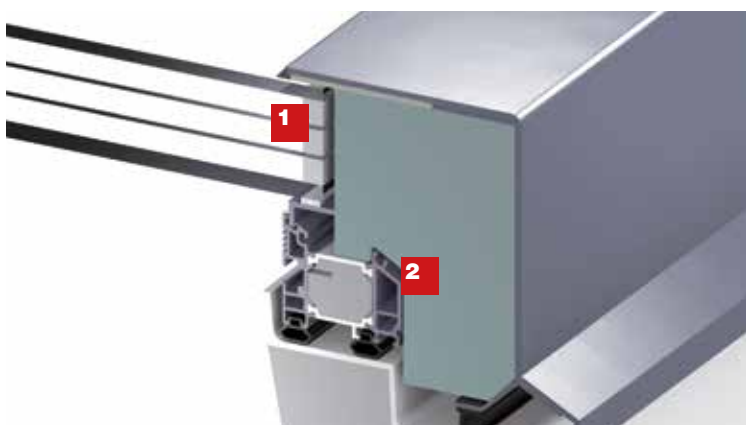
Premises: SCHOOL

LAMILUX CI-System Glazed Element FE_{energysave+}



THE FIRST CERTIFIED DAYLIGHT ELEMENT FOR THE 'COLD' CLIMATE ZONE

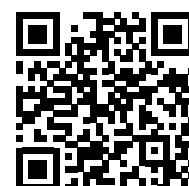
The **LAMILUX CI-System Glazed Element FE_{energysave+}** is the world's first verified and certified flat roof window for the 'cold' climate region. For example, it fulfils the very demanding Passive House criteria for the Alpine region and Scandinavia.



- 1** 'Warm Edge' with the SuperSpacer using quadruple glazing as standard
- 2** optimum insulating core material

$U_{SL} = 0.68 \text{ W/m}^2\text{K}$
 $f_{RSi} = 0.76$

The good U-value of the **LAMILUX CI-System Glazed Element FE_{energysave+}** is the result of insulation made from a special foam in the casement, upstand and the installation area, as well as from the use of quadruple glazing filled with inert gas.



www.LAMILUX.de/passivhaus



BINDER Tuttlingen

Project:

Binder GmbH is an international market leader in the development and manufacture of environmental simulation chambers. The company put their trust in the Passive House standard when building the new offices at their headquarters in Tuttlingen.

Systems:

- 2 gabled roofs **LAMILUX CI-System Glazed Architecture PR60energysave** with a surface incline of 8° (4.5 x 8.8 metres). Laminated safety glass with sunscreen 3-layer glazing (U_g -value 0.7 W/(m²K)) each split into 16 glass areas. Edge composite thermally optimised with 'warm edge'.
- 3 saw-tooth roofs **LAMILUX CI-System Glazed Architecture PR60energysave** (2.1 x 4.3 metres) with glazing as described above.
- 66 valve systems **LAMILUX CI-System fan blades M** (0.5 x 0.8 metres)
- 66 chain drives 24V

KITA Frankfurt

Project:

The City of Frankfurt is embracing the trend for sustainable and energy efficient buildings: municipal buildings are being built to Passive House standards. This includes a modern, bright and friendly nursery.

Systems:

- 1 gabled roof **LAMILUX CI-System Glazed Architecture PR60energysave** with a surface incline of 5° with dimensions of 7.5 x 7.5 metres. Laminated safety glass with heat protective 3-layer glazing (U_g -value 0.6 W/(m²K)) split into 36 glass areas. Edge composite thermally optimised with 'warm edge' with SuperSpacer.
- 12 SHEVS leaves for vertical installation
- Flyscreen for SHEVS lifts



INSELPARK Wilhelmsburg

Project:

The Inselpark swimming pool in the Hamburg district of Wilhelmsburg has been designed to meet the highest efficiency criteria and is being built as a Passive House. In addition to the Passive House daylight systems, LAMILUX is also providing the control technology for the ventilation and SHEVS function.

Systems:

- 9 Passive House flat roof windows **LAMILUX CI-System Glazed Element FE_{energysave}**. Laminated safety glass with 3-layer glazing (U_g -value 0.7 W/(m²K)). Verified as fall-through-proof skylights.
- 7 LAMILUX Passive House sloped glazing **LAMILUX CI-System Glazed Architecture PR60_{energysave}**
- 1 flat roof window **LAMILUX CI-System Glazed Element FE** in 3°-inclined design as a roof exit hatch.
- 1 ventilation control centre, 18 pneumatic drives, 4 CO₂ alarm stations

KITA Baienfurt

Project:

The City of Baienfurt is expanding its care facilities to include two further toddler groups, one kindergarten group and one full-day care facility by building the new St. Joseph kindergarten. Its energy requirements are based on the Passive House standard.

Systems:

- 3 Passive House flat roof windows **LAMILUX CI-System Glazed Element FE_{energysave}** with the dimensions of 1.5 x 1.5 metres. Laminated safety glass with 3-layer glazing (U_g -value 0.6 W/(m²K)). Mounted on a composite upstand.
- 1 LAMILUX control set for SHEVS and ventilation
- 2 chain drives
- 1 servomotor opener in tandem design
- LAMILUX electrically controllable external blinds



Scan this to discover more about
LAMILUX daylight systems!



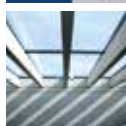
ROOFLIGHT DOME F100



CONTINUOUS ROOFLIGHT B



LIGHT PANEL



GLASS ARCHITECTURE PR 60



BUILDING CONTROLS



FRESH AIR SUPPLY DEVICES



GLASS ELEMENT F



CONTINUOUS ROOFLIGHT S



BUILDING UPGRADES



SMOKE AND HEAT
EXHAUST SYSTEMS



PHOTOVOLTAICS



FIBRE-REINFORCED PLASTICS

The technical data printed in this brochure was accurate when this brochure went to press and is subject to change without notice. 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 composite glazing were calculated using the finite element method with reference values in accordance with DIN EN 673 for insulated glass. Based on empirical values and specific characteristics of the plastics, a temperature vector of 15 K was defined as the vector between the outer surfaces of the material. Functional values refer to test specimens and the dimensions used in testing only. We cannot provide any further guarantees for technical specifications. This particularly applies to changes in installation locations, or if dimensions are re-measured on site.



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