CI SYSTEM GLASS ARCHITECTURE PR60

LIVING WITH LIGHT

LAMILUX

HIGH PERFORMANCE
DAYLIGHT SYSTEMS

LAMILUX CI SYSTEM GLASS ARCHITECTURE PR60

With our CI System Glass Architecture PR60 LAMILUX is the only daylight system manufacturer to provide an individually mullion and transom system that gives processors the option of meeting the strict energy requirements of the passive house classification. **With its outstanding insulation properties**, this aesthetic glass roof design ensures a tight building shell to the highest degree. The **narrow profile lines,** which allow maximum daylight incidence, help to reduce usage of electricity for lighting and conserve energy. Buildings can be aerated and ventilated in an energy efficient way and effectively through integrated, **intelligent automated lift systems**.

>> Far more than a trend, and instead following its own ambitious goals and international sustainability criteria, architects and planners seek to fulfil the highest energy efficiency standards in new developments and refurbishment projects.<<

Joachim Hessemer,
Technical Director
LAMILUX daylight elements

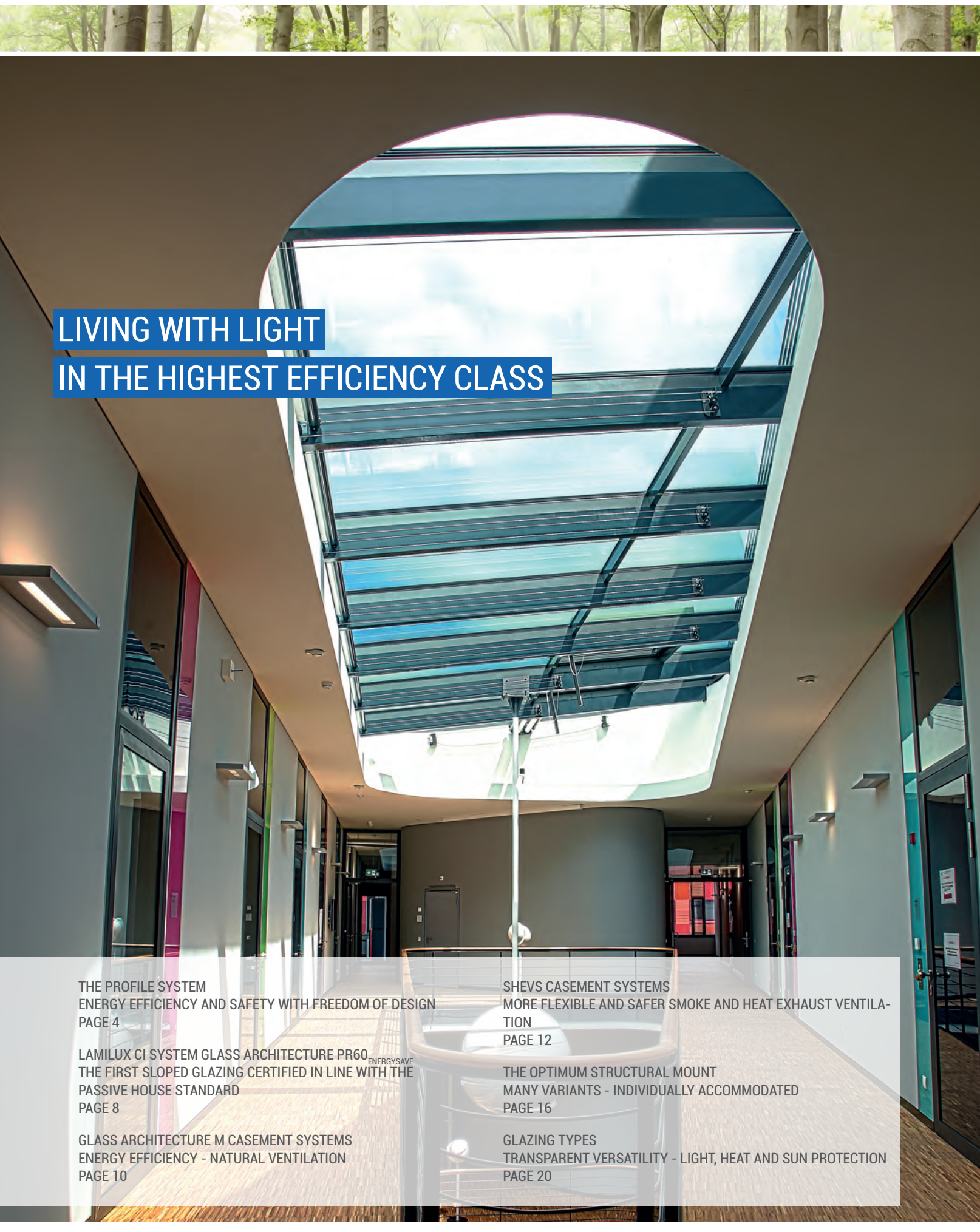
The LAMILUX CI Philosophy

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:

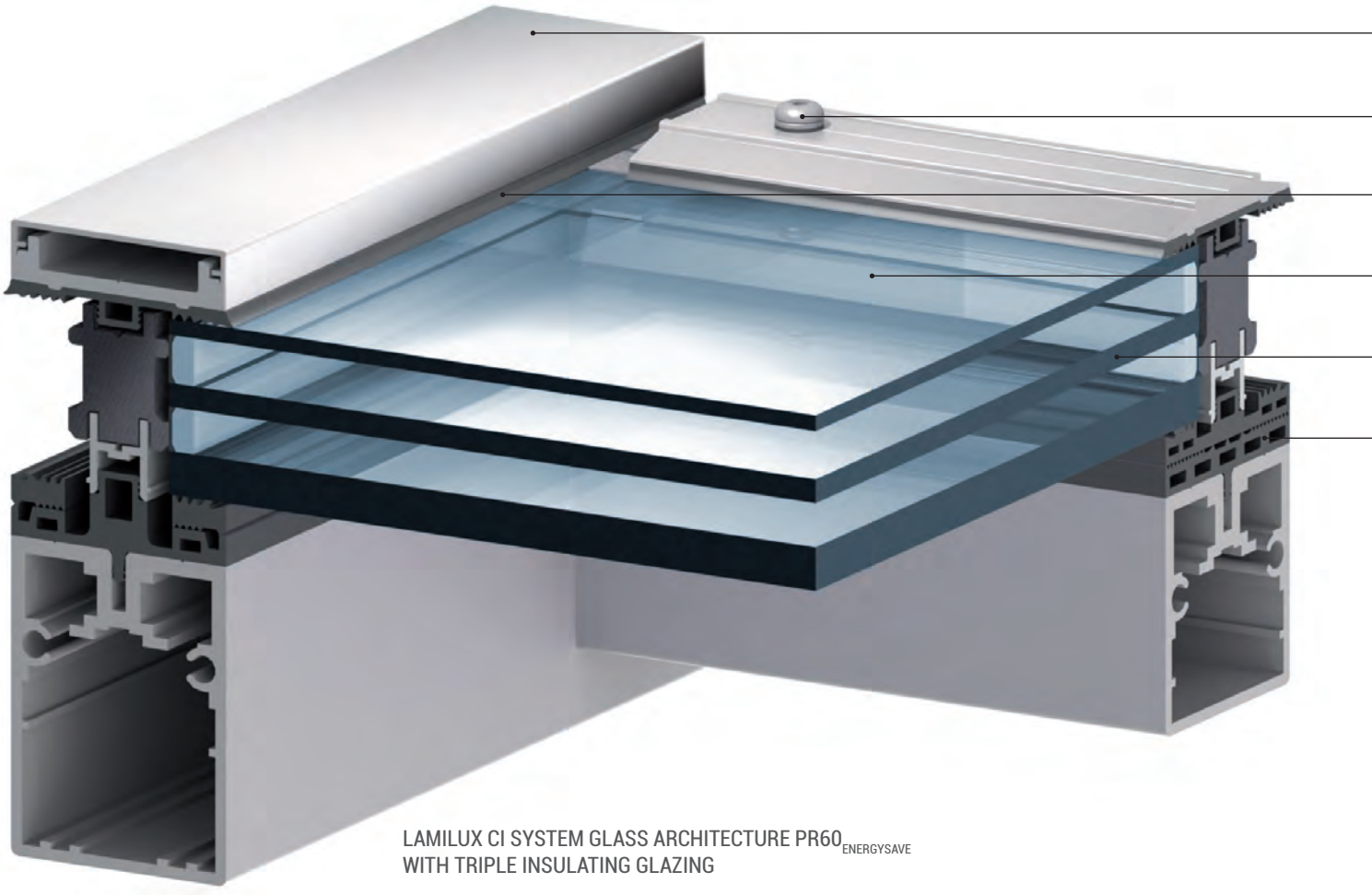
Customized Intelligence – Serving the customer is our first priority:
This requires outstanding performance and leadership in all areas relevant to customers, particularly in the role of:

- Quality leader – maximum benefits for customers
- Innovation leader - at the cutting edge of technology
- Service leader – fast, uncomplicated, reliable and friendly
- Expertise leader – best-in-class technical and commercial advisory services
- Solution providing leader - individual, tailor-made solutions



LIVING WITH LIGHT
IN THE HIGHEST EFFICIENCY CLASS

LAMILUX CI SYSTEM GLASS ARCHITECTURE PR60
LAMILUX CI SYSTEM GLASS ARCHITECTURE PR60 ENERGYSAVE



LAMILUX CI SYSTEM GLASS ARCHITECTURE PR60 ENERGYSAVE
WITH TRIPLE INSULATING GLAZING

phA CERTIFIED COMPONENT Passive House Institute

German Design Award SPECIAL MENTION 2015

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Customized Intelligence
Serving the customer is our first priority

Serving the customer is our first priority

COVER STRIPS WITH SPLASHWATER CHANNELLING (WITH OPTIONAL COVER PROFILE)

ATTRACTIVE FLAT ROUND-HEADED SCREW JOINTS WITH AN EPDM SEALING WASHER

CONTINUOUS EPDM OUTER SEAL

OPTIMISED INSULATION CORE

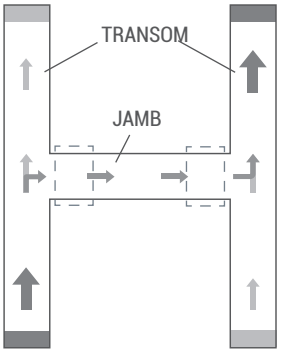
TRIPLE-PANE INSULATING GLAZING WITH A "WARM EDGE" AS A STANDARD FEATURE

OPTIMISED SEAL SYSTEM

LAMILUX CI SYSTEM GLASS ARCHITECTURE PR60 – BASIC DESIGN WITH DOUBLE INSULATING GLAZING (OPTIONAL INSULATING CORE)

LAMILUX AVS TECHNOLOGY

The special AVS technology (patent pending) developed by LAMILUX ensures proper ventilation of the glazing rebate in the transom. A difference between the pressure in the glazing rebates of adjacent mullions (rafters) is created by the wind and causes air to flow through the glazing rebate of the transoms. The "passive" nature of this process makes the system extremely cost-effective, since no active ventilation, using fans for example, is required.



The effectiveness of this technology has been verified by an independent building physics study carried out by Feldmann + Weynand. The system can be used in all types of roof and with all sizes of unit and can even be used in highly insulated constructions.

BUILDING OBJECT: FORUM MITTELRHEIN, KOBLENZ

THE PROFILE SYSTEM - ENERGY EFFICIENCY AND SAFETY

In developing the system profile for the customisable LAMILUX CI System Glass Architecture PR60 glass roof construction, the main focus was on the geometry of the main profiles. They can be used as mullions, transoms, rafters or purlins. This results in a highly adaptive mullion and transom building system that offers virtually complete freedom of design. The supporting structure is made of high-grade aluminium with integrated screw channels to ensure optimum shape stability and strength.

The LAMILUX CI System Glass Architecture PR60 uses specially interlinked slot connectors to ensure excellent dimensional stability and strength in the joints. The structurally rigid profile sections allow for even the most complex profile joints.

THE PROFILE SYSTEM AT A GLANCE

- Extremely stable supporting structure made of torsion-free aluminium
- Virtually free-form design from 0 to 90°
- Efficient ventilation in the glass rebates
- Controlled water and condensate run-off thanks to overlapping EPDM secondary draining
- Pre-defined glazing clamping system based on insulating spacer webs
- Elastic bedding of glass pane

SAFETY ON THE ROOF DUE TO CE-APPROVED QUALITY AS PER EN 13830 (ALSO BELOW INCLINATION SLOPE OF 2°)

- Driven rain tightness (EN 12154/EN 12155/RE 1950)
- Air tightness (EN 12152/EN 12153/AE 1950 Pa)
- Resistance to wind load (EN 13116/EN 12179/ 2000 Pa permissible load and 3000 Pa increased load)

ENERGY EFFICIENCY DEMONSTRATED

- Heat-transmission coefficient in mullions and transoms (Um/t) 1.3 to 0.72 W/(m²K) (depending on the glazing thickness and optional insulating core)
- Surface temperature factor fRSi of 0.66 to 0.83 (depending on the glazing thickness and optional insulating core)

COMPREHENSIVE SOUNDPROOFING

- Soundproofing demonstrated in system test in as-installed state as per EN 10140-2 up to 46 dB

OPTIMISED SEALING SYSTEM TO AVOID CONDENSATION

LAMILUX CI System Glass Architecture PR60 ensures highly efficient ventilation of glass rebates and controlled drainage of water and condensate. This is accomplished by a special sealing system. The overlapping multi-stage sealing system, which is designed without direct joints, has secondary drainage in the inner sealing layer. A joint-free, continuous drainage plane is thus guaranteed for the mullions/rafters even for joints to the supporting structure (for example, polygonal bends in barrel roofs).

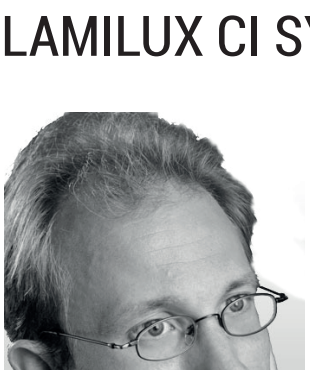
water can be ruled out. In addition to this, the seal system aids thermal separation and ensures glazing rebate ventilation around each pane All told, the profile system ensures optimised isothermal characteristics, reducing the risk of condensate forming on the inner sides of glass roof constructions.

OVERLAPPING MULLION SEAL
COLD-VULCANISATION ENSURES A PERMANENTLY
ELASTIC CONNECTION TO THE RAFTER SEAL

JOINTLESS RAFTER SEAL THROUGHOUT (IDEAL FOR ARCHED ROOFS)
WITH SECONDARY DRAINAGE AND REBATE BASE VENTILATION

Thus, the contact between room-side aluminium construction and

LAMILUX CI SYSTEM GLASS ARCHITECTURE PR60$_{\text{ENERGYSAVE}}$



>> With its CI System Glass Architecture PR60energysave LAMILUX was the first manufacturer to launch a certified mullion and transom system in the sloped glazing category. For the first time, this gives energy- and cost-conscious architects and designers a glazed roof system solution that is not only suitable for passive houses, but also meets the highest Passive House efficiency class, phA. <<

Dr. Benjamin Krick
Passivhaus Institut Darmstadt

ENERGY EFFICIENCY

- First sloped glazing certified to the Passive House Standard
- Highest Passive House efficiency class – phA advanced component
- The heat-transmission coefficient (U_{CWi}) is 0.81 W/(m²K) and thus well below the value required by the Passivhaus Institut Darmstadt of 1.0 W/(m²K)
- Optimum solar gains
- Thermal performance calculated based on DIN EN ISO 10077-1 and 10077-2

COMFORT AND TECHNOLOGY

The intelligent use of highly efficient materials limits the minimum surface temperature on the inside of glass structures. This avoids condensation and mould growth.

Mould grows on surfaces at a relative humidity of 80 percent or higher. At 20 °C and 50 percent relative humidity (standard conditions), this corresponds to a surface temperature of 12.6 °C. The details are taken into account when computing the fRsi value. This coefficient indicates the likelihood of mould growth. If the value is less than 0.7, there is a risk of mould. **With the CI System Glass Architecture PR60$_{\text{energysave}}$ system, this value is a stable 0.79. This corresponds to a minimum surface temperature of 14.8 °C – which in turn ensures secure comfort and saves energy!**

TESTED AND APPROVED WITH RECOGNISED CERTIFICATION

In addition to thermal insulation properties, evaluation in line with the passive house standard takes heat loss and heat gain analysis into consideration.

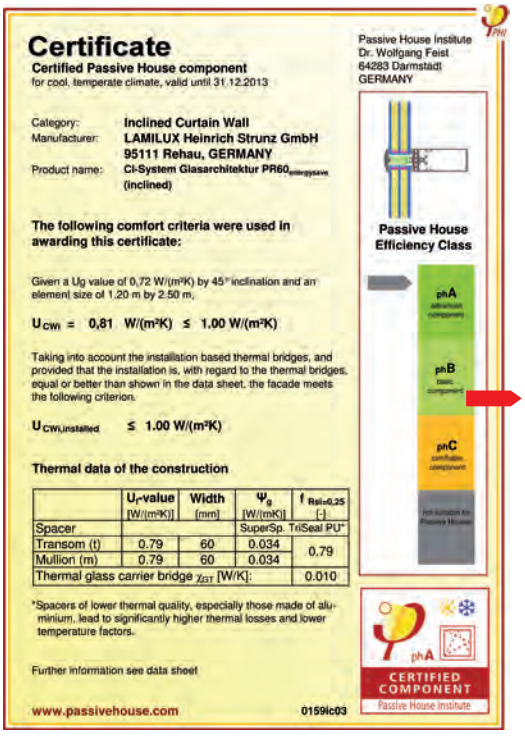
Since solar gains are difficult to detect, the approved method is to consider the losses. This means: quantifiying areas where no solar gains are possible. Losses are defined using the Ψ_{opaque} value. The lower the value, the higher is the efficiency class.

PASSIVE HOUSE EFFICIENCY CLASSES

Ψ_{OPAQUE}	PASSIVE HOUSE EFFICIENCY CLASS	DESIGNATION
≤ 0.220 W/(mK)	phC	Certifiable component
≤ 0.155 W/(mK)	phB	Basic component
≤ 0.110 W/(mK)	phA	Advanced component

SYSTEM AND METHOD

- Aluminium mullion and transom system used in a vertical or inclined position with an internal screw channel and PE insulation in the glazing rebate.
- Calculation of thermal bridges using the BISCO heat transfer software program
- Identification of thermal losses via glass support brackets and screws based on three dimensional heat transfer analysis using the Solido software programme



Certificate

Certified Passive House component
for cool, temperate climate, valid until 31.12.2013

Passive House Institute
Dr. Wolfgang Feist
64283 Darmstadt
GERMANY

Category: **Inclined Curtain Wall**
Manufacturer: **LAMILUX Heinrich Strunz GmbH**
95111 Rehau, GERMANY
Product name: **CI-System Glasarchitektur PR60 (inclined)**

The following comfort criteria were used in awarding this certificate:

Given a Ug value of 0,72 W/(m²K) by 45° inclination and an element size of 1,20 m by 2.50 m,

U_{CWi} = **0,81 W/(m²K) ≤ 1.00 W/(m²K)**

Taking into account the installation based thermal bridges, and provided that the installation is, with regard to the thermal bridges, equal or better than shown in the data sheet, the facade meets the following criterion.

$U_{CWi,installed}$ **≤ 1.00 W/(m²K)**

Thermal data of the construction

	U_f-value [W/(m²K)]	Width [mm]	Ψ_g [W/(mK)]	$f_{Rsi=0,25}$ [-]
Spacer			SuperSp. TriSeal PU*	
Transom (t)	0.79	60	0.034	0,79
Mullion (m)	0.79	60	0.034	
Thermal glass carrier bridge χ_{GT} [W/K]:				0.010

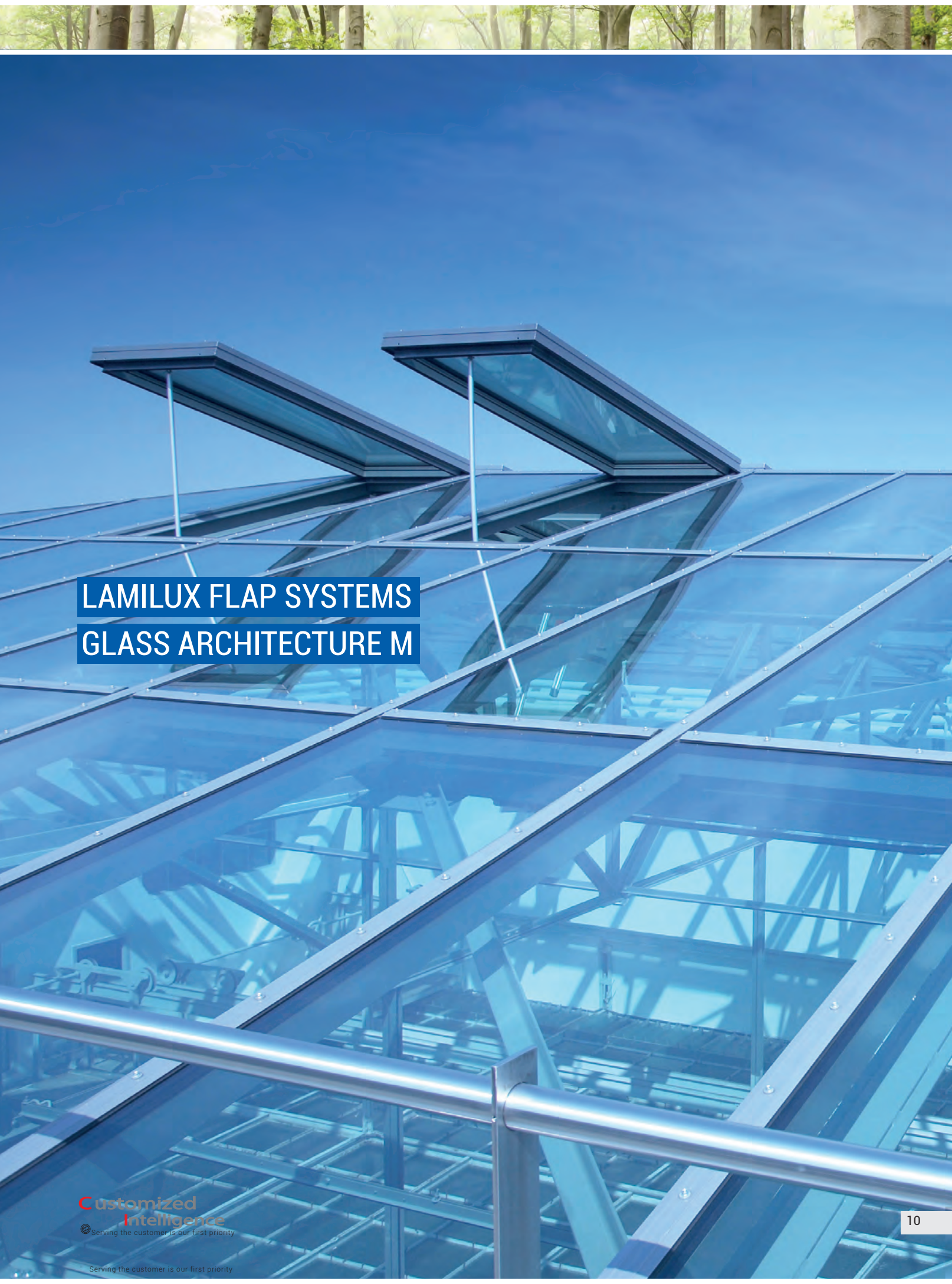
*Spacers of lower thermal quality, especially those made of aluminium, lead to significantly higher thermal losses and lower temperature factors.

Further information see data sheet

Passive House Efficiency Class
phA
phB
phC

CERTIFIED COMPONENT
Passive House Institute

www.passivehouse.com
0159ic03



LAMILUX FLAP SYSTEMS
GLASS ARCHITECTURE M

Customized Intelligence
Serving the customer is our first priority

Serving the customer is our first priority

CONTROLLABLE FLAP SYSTEMS SAVE ENERGY

Regulating integrated flap systems in glass roof and façade structures to provide natural ventilation plays a considerable role in optimising building air conditioning systems and reduces the amount of energy used for cooling in air conditioning units. 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.

CI SYSTEM VENTILATION FLAP M IN VENTILATION POSITION

CE MARKING – APPROVED ACCORDING TO DIN EN 14351-1

In 2009, approval of window flaps in line with product directive DIN EN 14351-1 and CE labelling became mandatory. Our flap systems have completed all tests successfully and possess the required certifications:

- Resistance against wind load (Class C4/B5 EN 12210)
- Water tightness (Class E 1200 EN 12208)
- Sound insulation (EN ISO 140-3 up to 45 dB)
- Heat protection (Ug values of 1.1 to 0.6 W/(m²K) EN 673)
- Overall energy transmittance (g between 18 and 78 per cent)
- Light transmission (Lt between 19 and 82 per cent)
- Permeability to air (Class 4, EN 12207)
- Uf values from 1.5 to 1.3 W/(m²K) as per EN 12412-2, EN ISO 12567-2 and prEN 1873

FLAP SYSTEMS FOR SMOKE AND HEAT EXTRACTION

The CI System Smoke Lift M is the ideal flap system for smoke and heat extraction in the glass roof. The smoke and heat extraction system can be installed at angles of 0° to 90° in CI System Glass Architecture PR60.

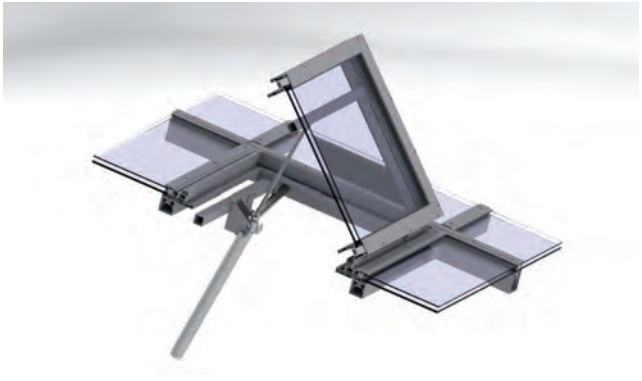
- Flap widths and heights are infinitely variable up to 3.00 m, allowing for a maximum flap size of 3.00 m²
- Complies with European standard 12101-2 for smoke and heat exhaust ventilation systems
- Selection of drive systems - pneumatic or 24 Volt electric version
- Perfectly suited for refurbishing older roof structures as it can be integrated into other systems

PRODUCT FEATURES IN COMPLIANCE WITH EN 12101-2

- Re 50/Re 1000
- WL 1500
- SL 500 - SL 1000
- Up to T (-15)
- B 300-E

INSTALLATION SITUATION OF THE FLAP SYSTEMS

(SHOWING A SMOKE LIFT AS AN EXAMPLE)



SINGLE FLAP ON FLAT ROOF

DOUBLE FLAP ON FLAT ROOF

SINGLE FLAP ON RIDGED ROOF

DOUBLE FLAP ON RIDGED ROOF

DOUBLE FLAP (FULL FLAP) ON RIDGED ROOF

SINGLE FLAP ON SHED ROOF

INTEGRATION, CONCEPTUAL DESIGN AND IMPLEMENTATION OF BUILDING CONTROL SYSTEMS

CONTROL TECHNOLOGY - LAMILUX AS A SYSTEM INTEGRATOR

Glass roof structures provide an ideal structural platform for integrating flap systems for smoke and heat exhaust ventilation (SHEV). As a specialized manufacturer and installer of SHEVs systems LAMILUX deploys sophisticated triggering and control technologies. As a system integrator we use control centres to network all moving elements in the building shell that are functionally related to SHEVS and climate control concepts. We integrate these automated systems into the central building management system.

- Actuation of pneumatic and electrical systems and drives for ventilation and SHEVS
- Design, installation and commissioning of the signalling sensor, trip units and drives
- Installation of pneumatic pipes and electrical wiring
- System integrator for third-party systems
- Interface to building control systems

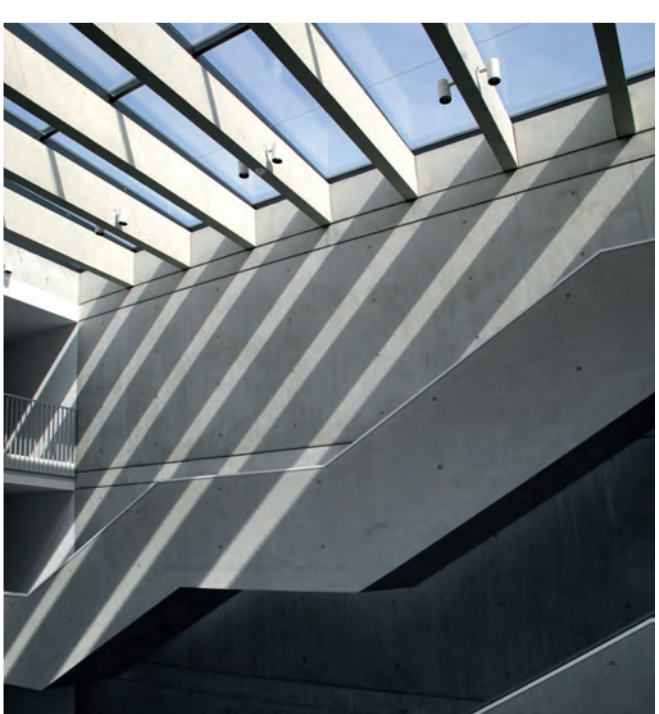
A SINGLE SOURCE IN ALL PROJECT PHASES

From small-scale control solutions, through to complex facility automation in large-scale properties – LAMILUX offers a full range of services from a single source, even across maintenance groups, thus ensuring reliable implementation: from the planning and design of the electrical or pneumatic control systems and components, to installation, commissioning and maintenance.

Our systems let you control

- Smoke and heat exhaust systems
- Lift systems for natural aeration and ventilation
- Sun protection and light control
- Sensor-controlled electric lighting circuits
- Temperature-dependent circuits for mechanical air-conditioning units

And you also benefit from intelligent networking of building safety, energy efficiency and building convenience.



SOLUTIONS FOR AN OPTIMUM STRUCTURAL MOUNT

CI System Glass Architecture PR60 is every architect's dream come true with its unlimited design freedom. Almost any aesthetically appealing and technically challenging glass roof construction can be built with this system. It ensures high stability and maximum safety also for the structural mount.

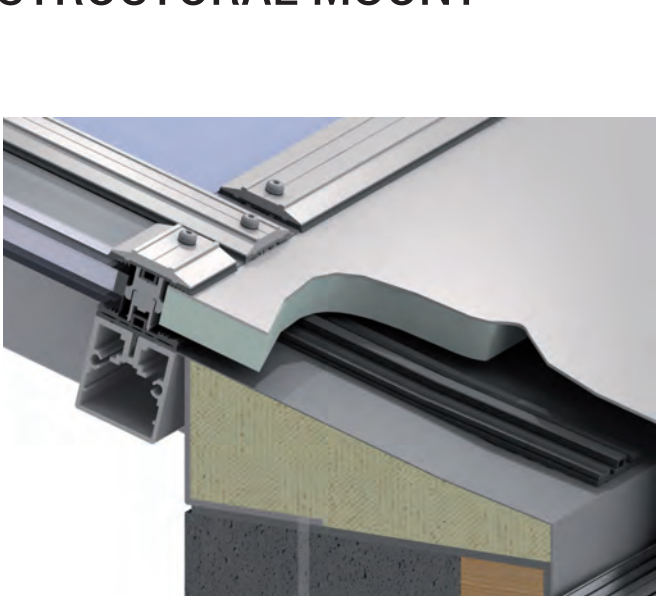
The high quality of our CI System Glass Architecture PR 60 is evidenced in premium overhead glazing and profiled cover strips with stainless steel screw joints – and thus in the structural mount. Our system features heat insulated eaves with foil edging and continuous flashing.

CUSTOMISED DESIGN

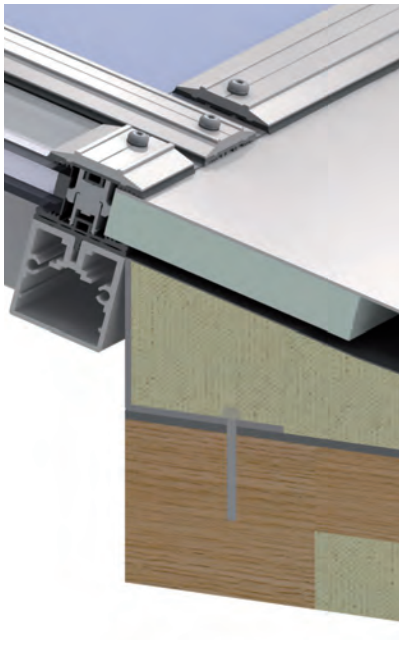
CI System Glass Architecture PR60 stands out thanks to its wide range of roof fitting and roof attachment variants and can be custom-built to accommodate all types of building architecture:

ROOF MOUNT VARIANTS (EXAMPLES):

- Connecting to a steel sheet frame
- Connecting to an insulated timber upstand with inside metal sheeting
- Connecting to an insulated concrete upstand
- Connecting to an upstand with a timber frame

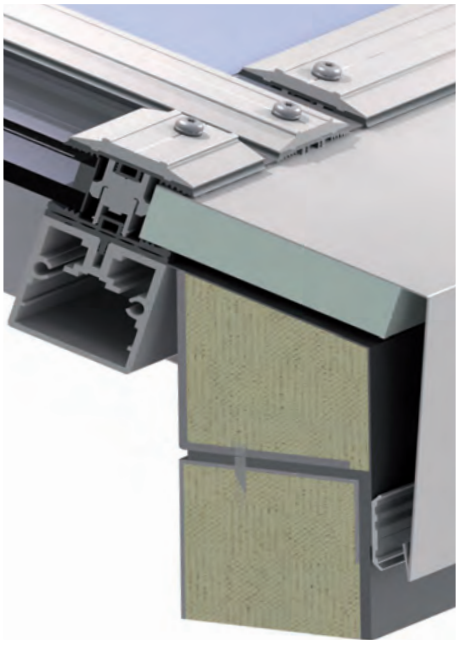


INSTALLED ON A CONCRETE UPSTAND



INSTALLED ON A TIMBER UPSTAND

INSTALLED VERTICALLY ON A TIMBER FRAME



INSTALLED ON STEEL SHEET FRAME

NOTE: The mounting systems shown in the diagrams are concept drawings for guidance purposes only. The roofing specialist must comply with technical standards for waterproofed roofs, such as flat roof guidelines, when planning and carrying out waterproofing work.

MULTIFUNCTIONALITY AND ACTIVE ENERGY MANAGEMENT

MULTIFUNCTIONAL VERSATILITY

LAMILUX Northern Lights shed roof structures are an expression of multi-functional versatility and efficient energy management. This daylight system can both save and generate energy. Only the north-facing side is glazed. The south side of the daylight structure faces the sun and usually features opaque filling materials. As a result, direct sunlight and glare are minimised inside the building.

NORTHERN LIGHTS SHED DESIGN WITH PV SYSTEM

THE NORTH SIDE – MULTI-FUNCTIONAL VERSATILITY

Light

- Insulated glazing (Ug value 1.1 to 0.6 W(m²/K) with laminated safety glass
- Glazing that channels or diffuses light
- Sun protection glass
- Glazing with integrated sun protection blinds
- Sound proofing glass

Air

- Integration of CI System Ventilation Flap M: System tested (for CE conformity) as per DIN EN 14351-1 (water tightness, air permeability, wind load resistance, sound insulation, heat protection, total energy transmittance, light transmission)

Smoke and heat ventilation

- Integration of the CI System Smoke Lift M: smoke and heat extraction system tested as per EN 12101-2.

THE SOUTH SIDE – EFFICIENT ENERGY MANAGEMENT

- Installation of highly thermally insulated sandwich panels with a filling of polyurethane foam for outstanding insulation values
- Attachment of solar collectors for thermal solar systems
- Attachment of solar panels for photovoltaic systems
- Integration of typically semi-transparent glazing with glazing-integrated photovoltaic systems

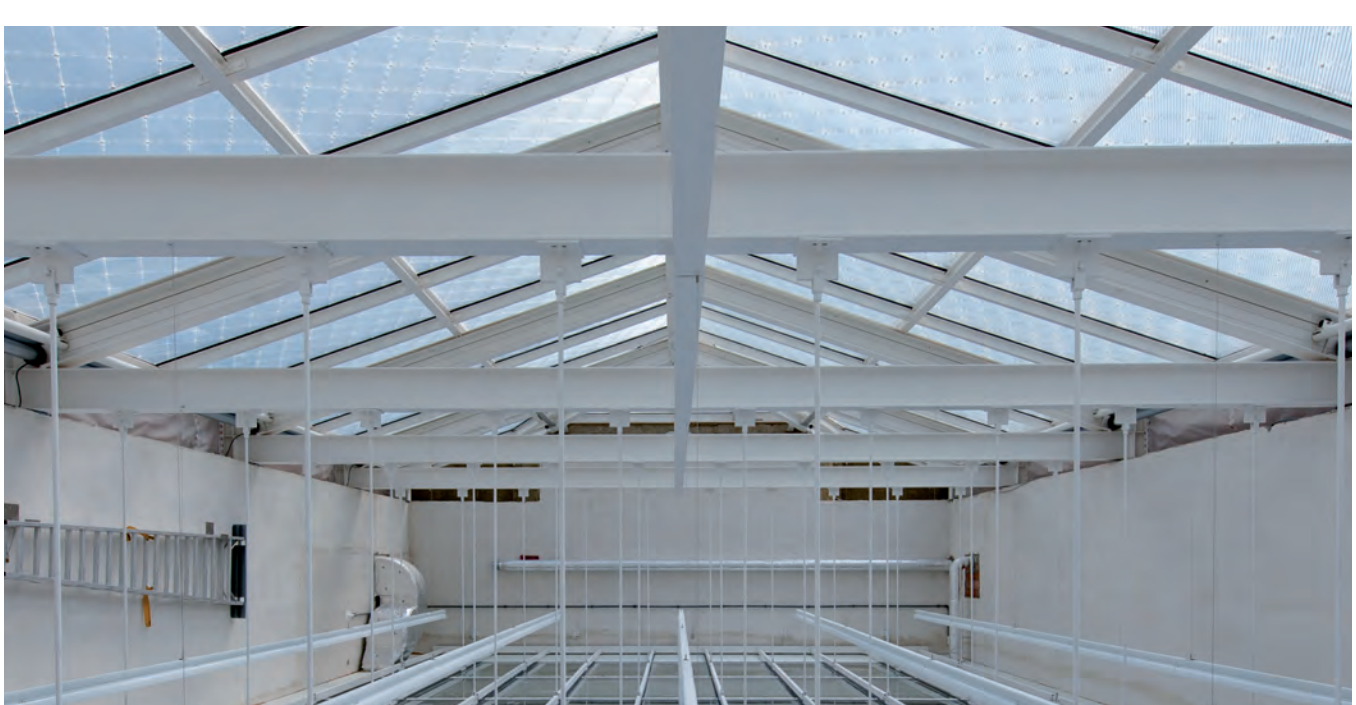
FIRE PROTECTION AND SOUNDPROOFING

Installation of sandwich panels with a mineral core insulating layer. The roof-wall panel corresponds to the building material class A2 (non-combustible) and has excellent sound insulation properties (up to 32 dB).

ROBUST JAMB AND TRANSOM CONSTRUCTION

- Based on LAMILUX CI System Glass Architecture PR60
- Eminently suitable for upgrades and changes
- Changes of use in industrial buildings
- Visible elements of the supporting structure (aluminium) and roof panels available with RAL coatings

BUILDING OBJECT: NEUE GALERIE, KASSEL

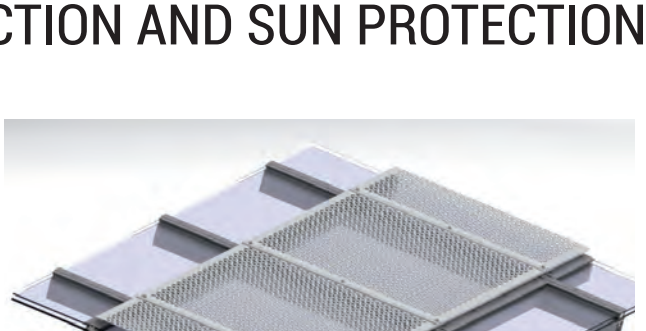


LIGHT INCIDENCE, HEAT PROTECTION AND SUN PROTECTION

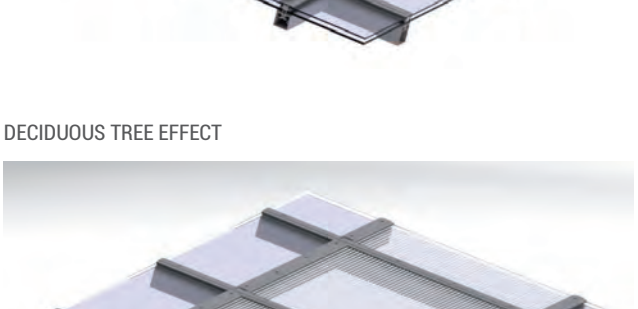
How much daylight is required for natural, energy-saving illumination, when solar heat input needs to be restricted, how glare can be eliminated – this depends glazing and shading systems geared to match the building's use and comfort requirements.

Intensive and widespread incidence of light is determined by glazing that perfectly matches the property - in addition to the width of the profiles in the supporting structure. In addition, the glazing must meet stringent requirements for thermal insulation and soundproofing.

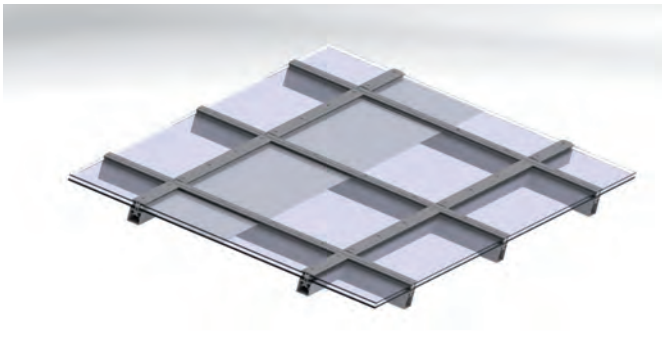
Daylight incidence and solar heat input create great potential for channelling energy into buildings and making savings on costs for heating and artificial light. This should not be achieved in an uncontrolled way, but regulated and guided by permanent or controllable shade systems.



DECIDUOUS TREE EFFECT

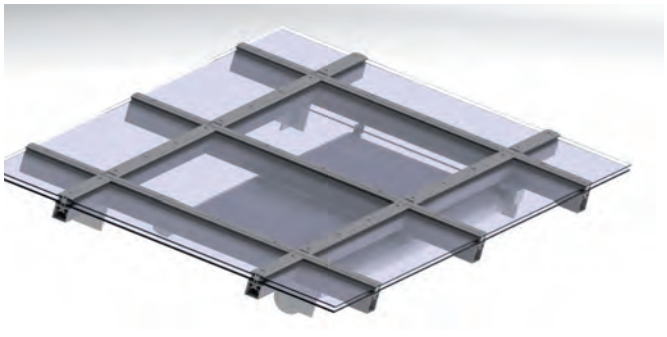


SCREEN PRINTING/MATT, LIGHT-COLOURED FILM

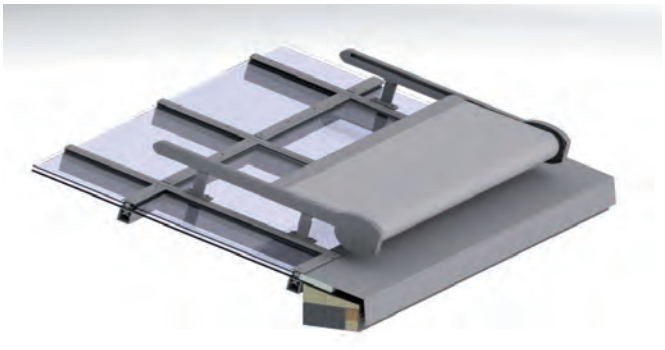


GLAZING INTEGRATED ROLLER BLIND

LOUVERS



INSIDE ROLLER BLIND



OUTSIDE ROLLER BLIND

BEST PRACTICES

FORUM MITTELRHEIN, KOBLENZ

At the heart of Koblenz city centre, a new world of shopping, the Forum Mittelrhein, invites pedestrians to come in. More than 80 shops, cafes and restaurants are gathered under one roof and offer a unique diversity of products and brands. LAMILUX designed and manufactured five skylights for the tube-shaped openings in the roofs for developer ECE who built the shopping mall. The individually designed mullion and transom structures are designed as warm façades with thermally insulated system profiles and a roof inclination of 10°. ECE is known for strict sustainability requirements in the numerous shopping mall projects it has developed in Germany and Europe.

The five skylights, which provide widespread and bright natural light, have a freely-formed basic shape. The supporting structure in each case is a supporting grid of rectangular hollow aluminium profiles that rests at regular intervals on the supporting traverses. This grid has the axial dimensions of 3 metres by 1 metre.

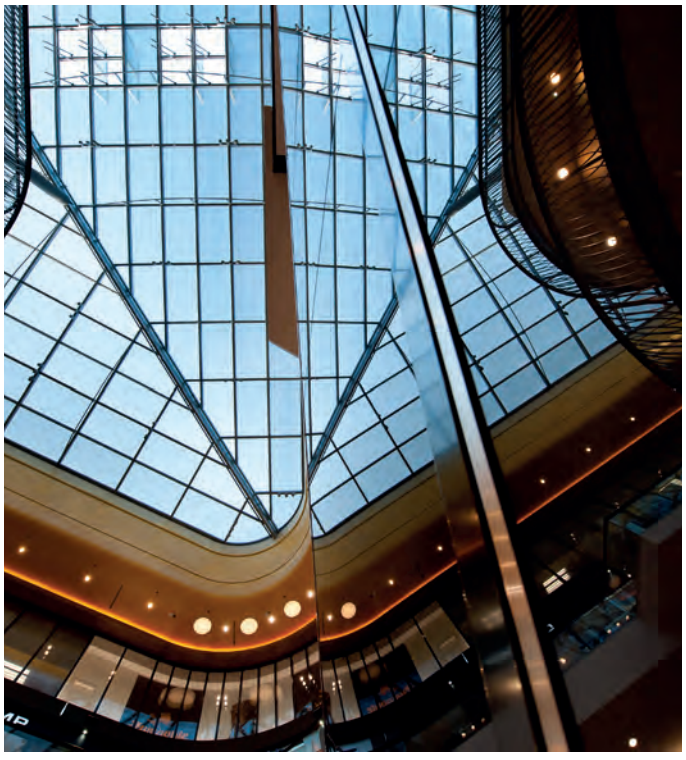
The glazing consists of double panes of ceramic-printed heat insulation glazing with a U value of 1.1 W/(m²K). In order to reduce solar heat intake, the panes have a uniform dot matrix with a flat printing scope of 20 percent, so that the light transmission is 61 percent. The total energy permeability is 47 percent.

In total there are 238 panes (65 of them sashes) measuring 3 metres by 1 metre and 103 special panes with a freely designed shape in the five supporting structures, as well as 70 fixed panes which were used in the outline contours. For smoke and heat extraction and energy-efficient natural ventilation of the shopping mall, a total of 60 LAMILUX CI System smoke lift M type lift systems are integrated in the five glass roofs. They are each driven by two pneumatic cylinders.

ACADEMY OF MUSIC, MUNICH

The Munich Academy of Music clearly shows the energy-savings that LAMILUX glass roof structures offer, when it comes to energy-saving refurbishment of existing buildings: To achieve a significant reduction in the primary energy requirements for the representative, public building, two hipped roofs, each 22 metres long and 14 metres wide, were fitted with a 20° inclination on the support structure which was revitalised with strengthening measures and visual refinements.

The new systems replace two old glass roof constructions with wired glass. Additionally, 24 lift systems for ventilation and SHEVs were integrated (CI System Ventilation Flap Type M). The results: Two highly-insulated daylight systems for a high level of daylight incidence. They achieve significant savings in terms of heating energy and artificial lighting. Additionally, the integration of ventilation flaps ensures a controllable indoor climate.



THIER-GALERIE, DORTMUND

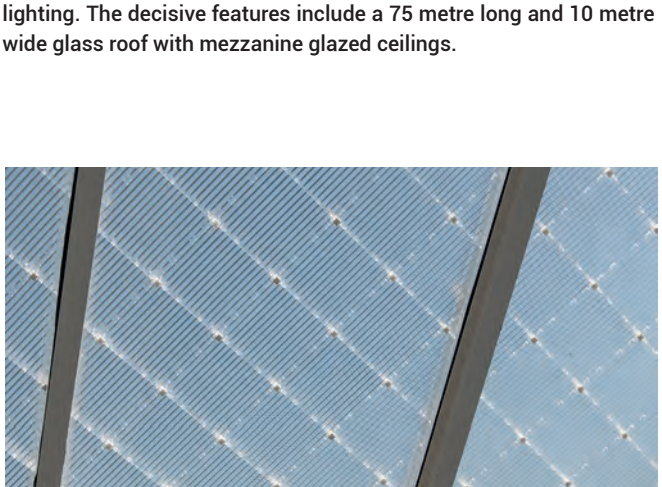
Shops, restaurants and services on a floor space of 33,000 square metres: "Thier-Galerie" has emerged at the heart of Dortmund's inner city - a shopping mall of an impressive size which welcomes its visitors to brightly lit malls. The most impressive architectural feature in the building, which cost 300 million euros to construct, is a large-scale, triangular glass roof by LAMILUX which spans the central public area with a glazed area of 2,300 square metres.

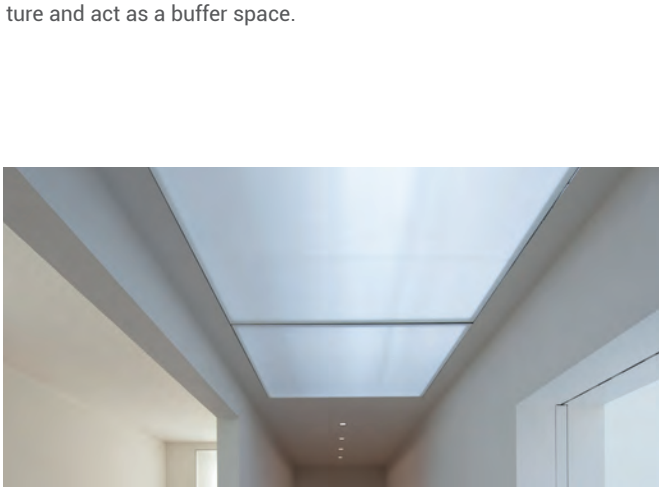
Due to the high levels of incident daylight combined with variably controllable and conveniently actuated lift systems for natural ventilation, the central roof contributes significantly to building management that is characterised by energy efficiency and sustainability. LAMILUX planned and implemented all of the SHEVs systems and control engineering in the mall and the stairwells.

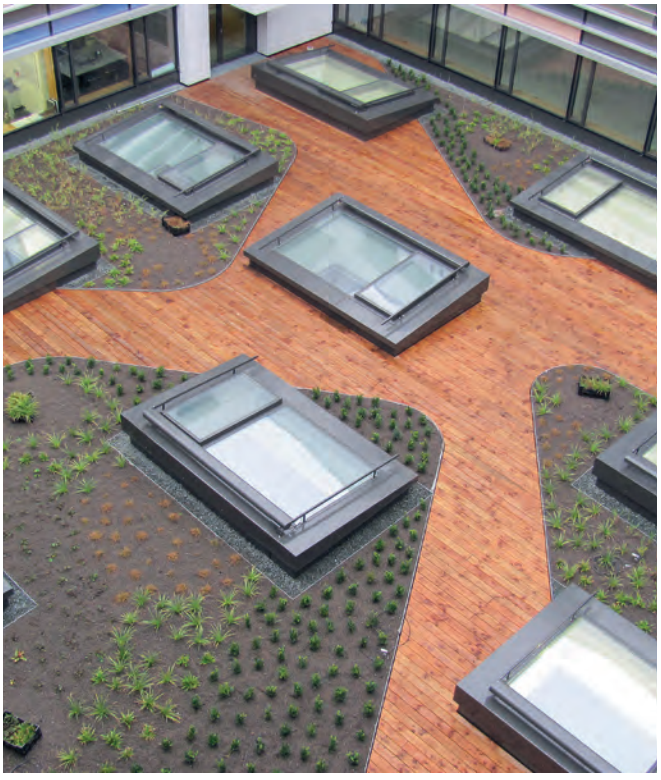
NEUE GALERIE, KASSEL

The "Neue Galerie" Kassel is one of the chosen venues for the world's largest art exhibition, "documenta", which is held every five years. But to be able to act as a temporary backdrop to a variety of exhibits, the "Neue Galerie" was completely renovated. Architect Volker Staab from Berlin designed a "daylight museum" with generous natural lighting. The decisive features include a 75 metre long and 10 metre wide glass roof with mezzanine glazed ceilings.

stices of the 320 heat protection panes. Additionally, five horizontal glass ceilings each installed above the individual skylight halls (total area of 450 square metres) and visible panes of frosted plastic fixed as an additional ceiling plane. Insulated glazing in the mezzanine ceilings thermally decouple the roof space below the skylight structure and act as a buffer space.







OFFICE BUILDING, NUREMBERG

Place / country:	Nuremberg, Germany
Year:	2013
Building type:	Office building
Solutions:	CI System Glass Architecture PR60 CI System Ventilation Flap M

Construction of a modern office building in Nuremberg. The glass roofs ensure natural daylight and also daily ventilation of the building.

- A total of 11 glass roofs with dimensions of 4.20 m x 2.80 m were installed as shed roof glazing
- Triple glazing with a Ug value < 0.8 W/(m²K)
- 8 flaps for daily ventilation and 3 SHEVS lifts
- Version with sun protection awnings

KREISSPARKASSE, DÖBELN

Place / country:	Döbeln, Germany
Year:	2012
Building type:	Prestige building
Solutions:	CI System Glass Architecture PR60 CI System Ventilation Flap M

Sophisticated glass roof, designed as an arched roof, for a prestige building designed in line with the principles of Feng Shui. Generous daylight incidence highlights the expressionist works by artist Erich Heckel from Döbeln in a unique way.

- CI System Glass Architecture KWS 60, consisting of 6 segments, Ug value: 1.0 W/m²K, sun protection glazing; dimensions: 15 m x 5 m
- SHEVS: CI System Smoke Lift M incl. motorised opening

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 of technical values. This particularly applies to changes in installation locations, or if dimensions are re-measured on site.

475 HIGH PERFORMANCE DAYLIGHT SYSTEMS

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