

BRISE SOLEIL & ARCHITECTURAL SOLAR SHADING

Certified / Approved by:

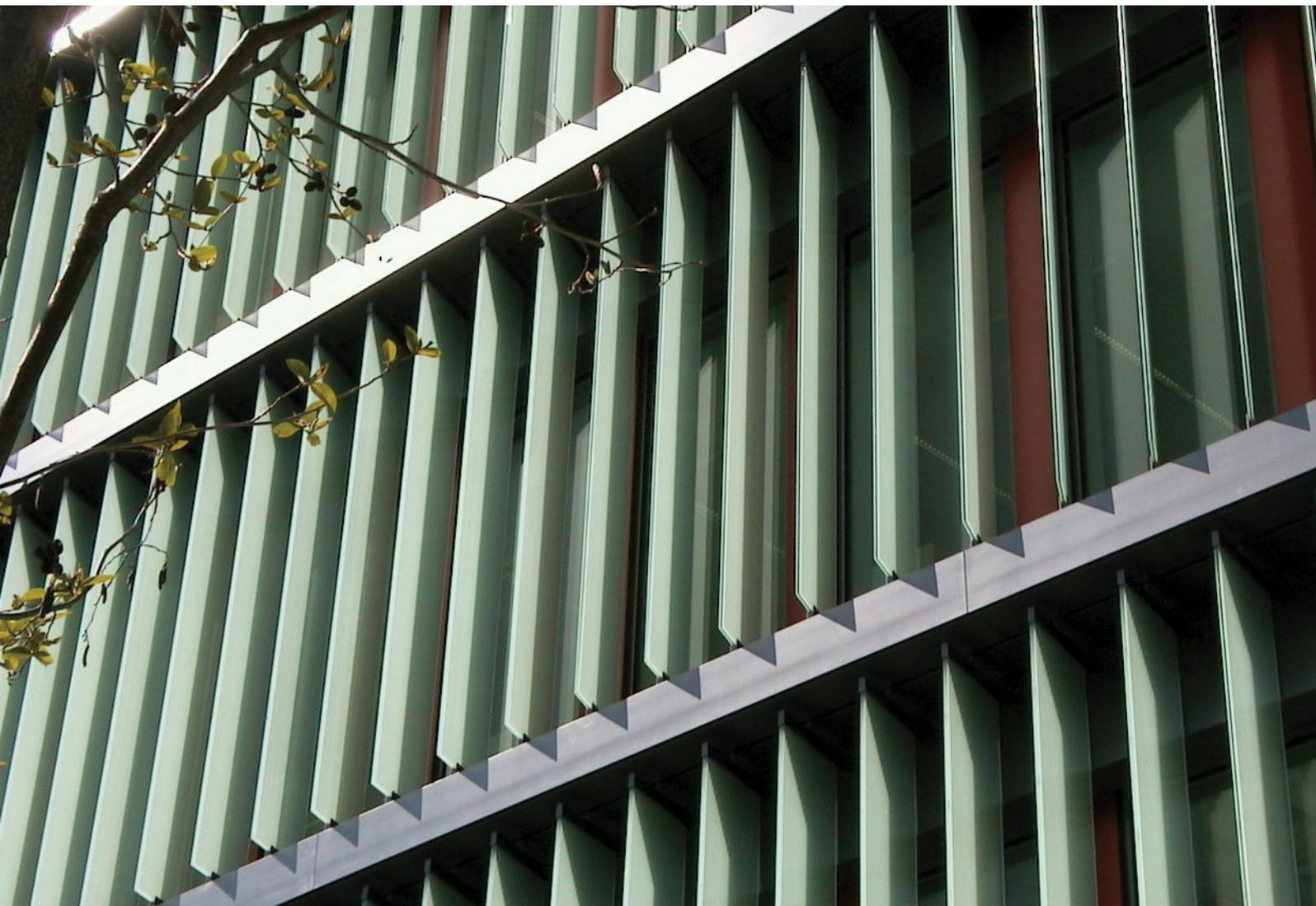


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The sun is the most important source of heat and light into the building interior, therefore the design, dimensioning and control of shading are quite challenging tasks. Solar Shading systems are designed to reduce solar heat in the summer but to welcome the extra warmth in the winter, whilst daylight must be optimally controlled by eliminating glare and reflections. Due to its contribution to energy efficiency such façade types are commonly used on commercial buildings to create premium building skins. A wide variety of small or large scale applications are available, including fixed, manually operated and motorized shading systems. Most common materials used are glass, aluminium, steel, HPL, honeycomb and wood allowing efficient shading, daylight optimization and unique design. Solar Shading systems are best categorized by the material used to provide the shading.

Technology used to install innovative shading systems integrated to the building or as second building skins includes a complex combination of materials, fittings, motor units and electronic control systems. In several cases all hardware is made of high quality mirror polished stainless steel (graded 304, 316, 316LM and V4.A), ensuring best possible protection against oxidation and corrosion. When glass is used, glass panes are provided in various shapes and are specially processed (tempered, laminated, silk printing) to meet shading requirements and safety standards. All exterior actuators are stainless steel and control units are fully programmable according to any requirements.

GLASSCON as a “turn-key” façade contractor offers tailored made solutions, by providing complete end-to-end services from design and engineering to fabrication and installation. Highly skilled in-house façade engineers manage all the technological demands of such building envelopes, in terms of performance, functionality, durability and aesthetics. Our products and services have been certified by TÜV NORD ISO 9001: 2015, the world’s most credible German Notified Body. Our vast experience since 1999 includes more than 250 realized projects worldwide, designed by architects and consultants including RENZO PIANO, ATELIERS JEAN NOUVEL, LUFTHANSA CONSULTING, HOPKINS ARCHITECTS and SANTIAGO CALATRAVA among others.

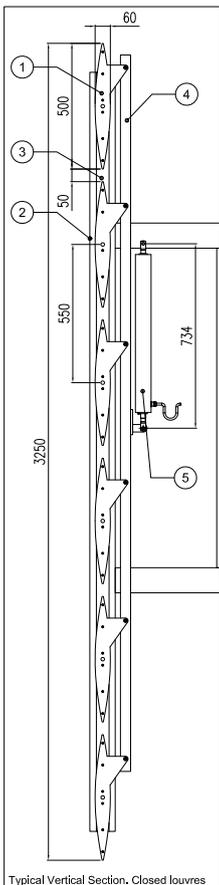




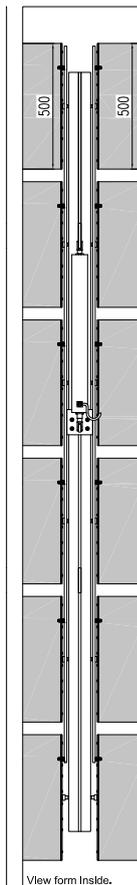
ALUMINIUM AIRFOILS type "GL/AA"

Airfoils or Alu-profile solar shades is a very effective structural solution to prevent overheating as it stops the sunlight before it comes into contact with glazed surfaces while visual contact with the outside environment is retained. Alu-profile shades are extruded aluminium blades of various shapes (fixed or movable), mounted on a fixed supporting structure. They can be placed in horizontal (brise soleil) or vertical (fins) position, in order to reduce solar heat gains and energy consumption, whilst eliminating glare effect and optimizing daylight.

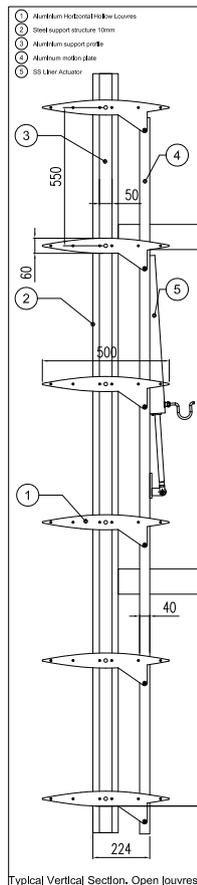
Alu-profile shades offer an exceptionally wide range of design options that enhances creative freedom and ensures occupant's comfort and sustainability objectives. Extrusion blades are available in various shapes and dimensions, such as aero foils, semi-elliptical, rectangular c-shaped or custom made metal shades. Design is completely customizable according to specific architectural requirements, allowing a wide variety of shapes, materials, colors, perforation patterns, different surface finishes and various coating options.



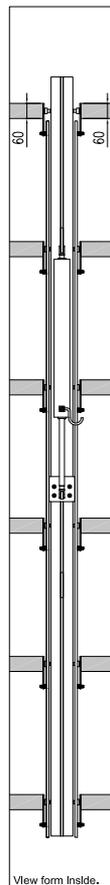
Typical Vertical Section, Closed louvres



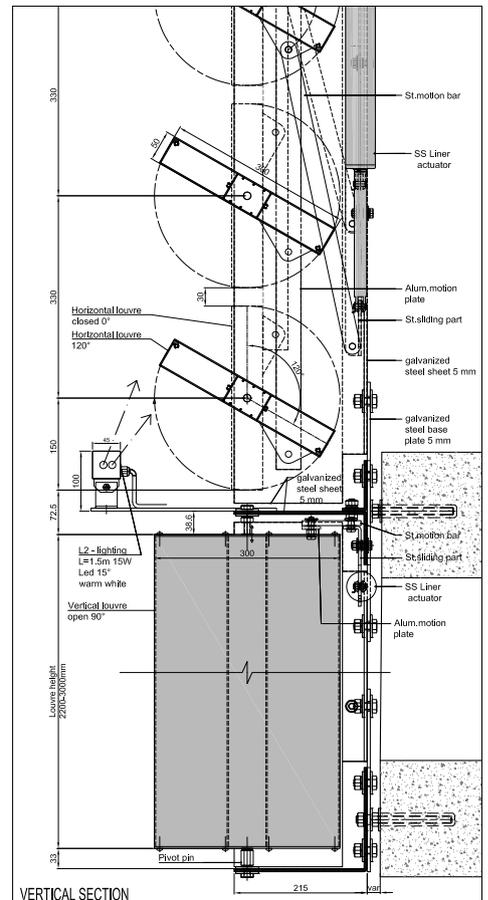
View from Inside.



Typical Vertical Section, Open louvres



View from Inside.



VERTICAL SECTION





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FOLDING SHUTTERS type "GL/FS"

Folding shutters open and close like a concertina (vertically or horizontally) usually with a relatively small opening radius. When they are opened, they take minimal space and when closed are totally parallel to the façade. Sliding mechanisms consist of smooth-running rollers, mounted on ball bearings and glide almost silently along the rails. Folding shutters are made of aluminium profiles available in various dimensions, although some limitations apply depending on design loads, support substructure and operation.

Design is completely customizable according to specific architectural requirements, offering a wide variety of materials and colors, slat designs, perforation patterns, expanded metal designs, fabric integration, HPL cladding, sound-proof materials, different surface finishes and various coating options.

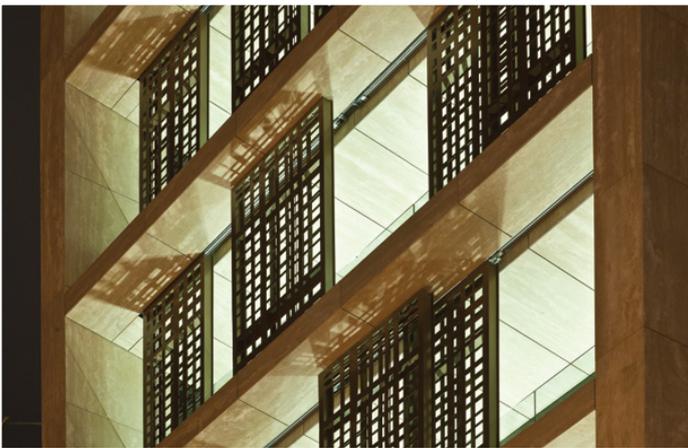




SLIDING SHUTTERS type “GL/SS”

Sliding shutters are architectural shading systems that open new possibilities in façade design. Sliding shutters protect the building’s interior against weather and direct sun, whilst creating privacy thanks to a variety of different filling materials. Sliding mechanisms consist of smooth-running rollers, mounted on ball bearings and glide almost silently along the rails.

Design is completely customizable according to the specific architectural requirements, allowing a wide variety of materials and colors, slat designs, perforation patterns, expanded metal designs, fabric integration, HPL cladding, sound-proof materials, different surface finishes and various coating options.

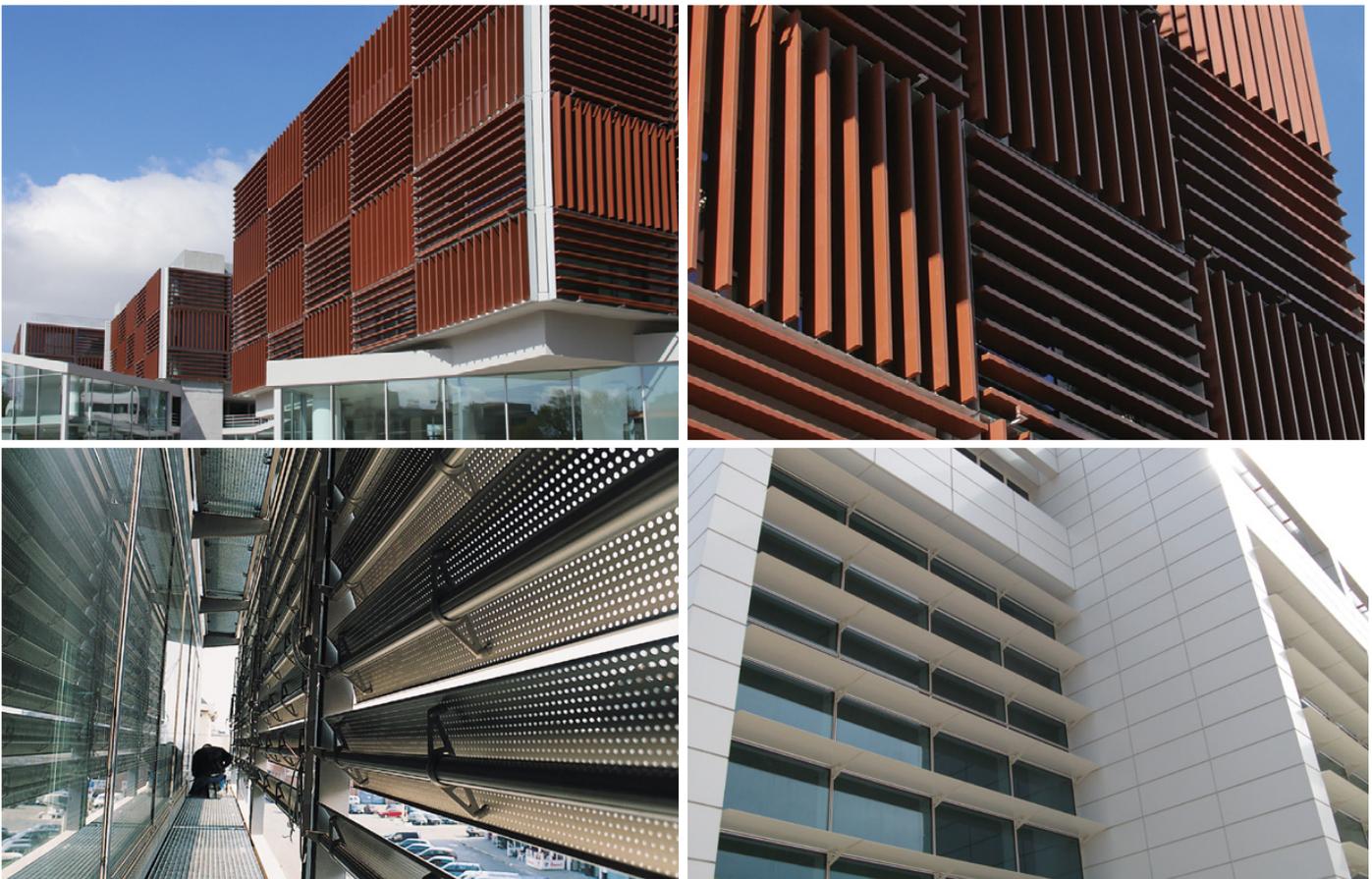




METAL LOUVERS type “GL/ML” (SPECIAL / PERFORATED / EMBOSSED)

Architectural metal louvers is a very similar solution to glass louvers, which differentiates only in the use of metal sheets instead of glass panes. Such solutions are usually bespoke designs, allowing a variety of options to architects in order to meet any design requirements, controlling the amount of light entering the building. Apart from sharing the same advantages as glass louvers, metal louvers allow much more flexible building integration and even better shading performance. The metal louvers can be placed horizontally or vertically according to the orientation. They can be mounted as fixed to the existing buildings in front of the windows or installed as a second skin façade, being operated manually or motorized.

Metal louvers are available in various dimensions, although some limitations apply depending on design loads, support substructure and operation. Design is completely customizable according to the specific architectural requirements, allowing a wide variety of materials and colors, complex geometries, perforation patterns, expanded metal designs, different surface finishes and various coating options.



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TIMBER LOUVERS type “GL/TL” - HPL LOUVERS type “GL/HPL-L”

Timber HPL shades is a shading solution suitable for small scale residential applications, used in conjunction with glass doors and windows, providing an elegant and luxurious result. They can be placed in horizontal (brise soleil) or vertical (fins) position, mounted directly on the building or fixed inside an aluminium frame to create a shutter. When installed as shutter application, HPL blades open (manually or motorized) to provide natural ventilation while shutter remains closed giving privacy & security to the space.

HPL is a solid and durable material which is produced as thin flat panels made of thermo-hardened resins, evenly reinforced with fibers based on wood and then manufactured at high pressure. The panels have an integrated decorative surface and are extremely resistant to outdoor conditions. Design is completely customizable according to the specific architectural requirements, allowing wide range of colors, effects and textures.





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HONEYCOMB LOUVERS type "GL/HL"

Honeycomb panel shades is a shading solution suitable for residential and small scale commercial applications, used in conjunction with glass doors and windows, providing limitless possibilities for finish surfaces as a result. They can be placed in horizontal or vertical position, mounted directly on the building as fixed or movable shading devices. When installed operable application, honeycomb shades open (manually or motorized) to provide natural ventilation and daylight.

Honeycomb is an extremely flat, lightweight and rigid material allowing very large span designs, with unlimited finish options to achieve remarkable effects. Design is completely customizable according to the specific architectural requirements, allowing wide range of dimensions, shapes, colors, effects and textures.

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OUTDOOR VENETIAN BLINDS type "GL/VB"

Outdoor venetian blinds are small scale minimal shading systems which provide easy and high efficient shading options through rotation and vertical sliding to any stack position. The infinitely-adjustable slats allow you to direct the light coming into the room however the user wants whilst providing variable privacy and protection from the sun. They can be mounted to the existing buildings in front of the windows being operated manually or motorized.

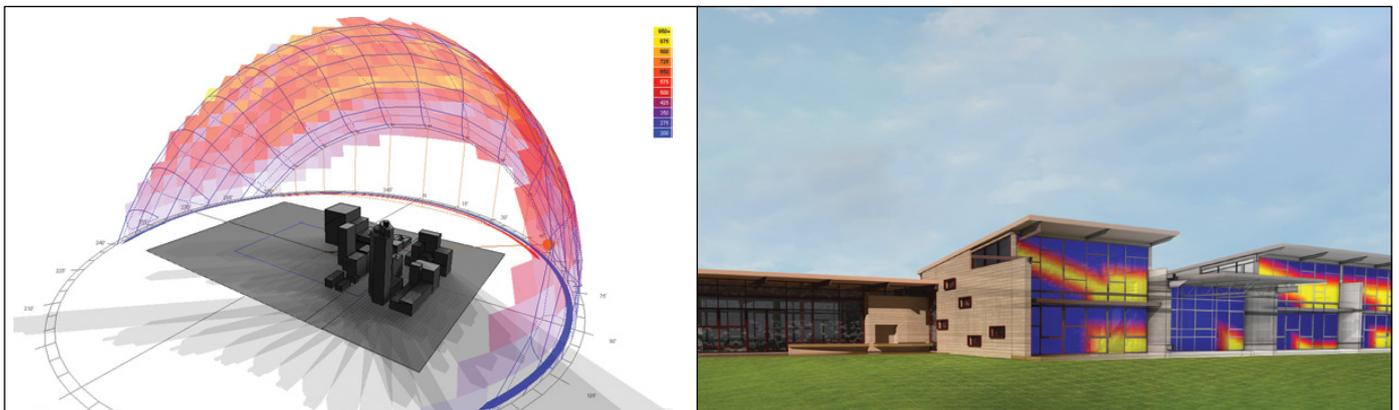
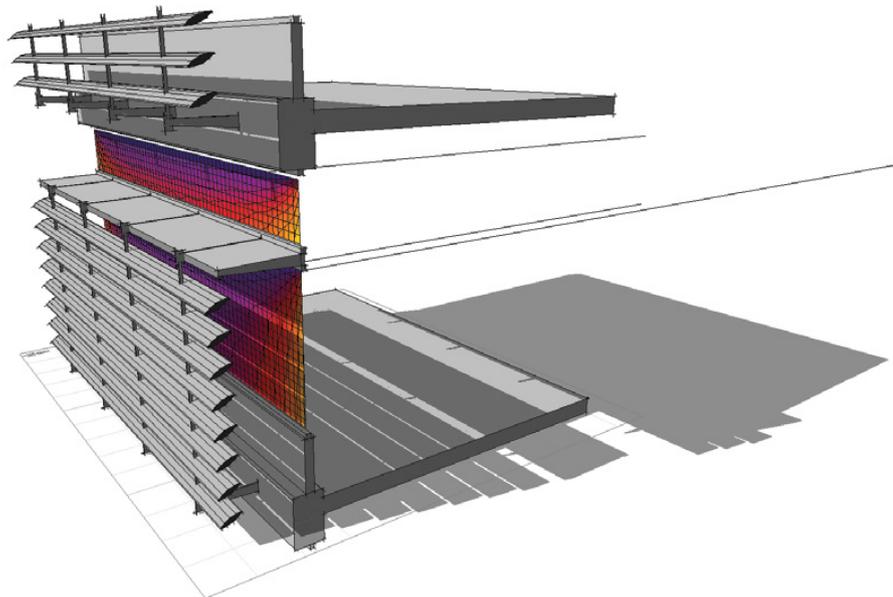
Slats are available in various materials, dimensions, although some limitations apply depending on design loads, support substructure and operation. Design is completely customizable according to the specific architectural requirements, allowing a wide variety of colors, perforation patterns, different surface finishes and various coating options.



SOLAR DESIGN AND ENGINEERING

With the increasing complexity of modern building facades, innovative system design and engineering is the key-factor for a successful project. Clients need to accurately validate the architect's design and ensure that their building will meet superior performance at competitive cost. GLASSCON has the expertise of modern façade engineering and a long proven track record. Before execution phase, our responsibility is to provide advanced end-to-end design and engineering services such as structural calculations, predictive thermal model analysis, lighting and acoustic engineering, visual and performance mock-up fabrication, testing and certification, as well as environmental compliance analysis.

Our Solar Shading systems are comprehensively designed and engineered according to European Standards (EC), US standards (ASME/ANSI) or specific local codes and regulations applied to specific countries. Structural calculations for steel and glass (linear and non-linear) are performed according to local standards with Finite Element Method/Analysis (FEM/FEA), using advanced analysis software. Regarding daylight guidance and solar illuminance analysis, our expert environmental engineers perform extensive solar studies and analyze how form and materials affect artificial and natural lighting. Solar lighting performance is performed for any given location, date, and sky condition. Using solar paths we project solar shading results directly to the exterior or interior of the buildings throughout the year, according to the façade's orientation and proposed shading system. This interactive process allow us to evaluate any design in regards to shading and propose the most efficient shading solution according to the specified requirements.



MOTORISED BRISE SOLEIL / LEED GOLD



GLASSCON was involved in the rehabilitation works of an office building complex, including the design, engineering, fabrication and installation of an architectural second skin which contributed the most to building's LEED Gold certification. The kinetic solar shading system combines solar gain

and daylight control with enhanced visual appeal. The building skin includes a custom-made system of electrically operated rotating louvers integrated into a grid canvas structure covering a surface of 2.500m² in a chessboard pattern that gives the building a unified, powerful identity.

WOODEN FINISH HONEYCOMB SOLAR SHADES



GLASSCON successfully executed the complete façade works for the Presidential Conference Centre located at Brazzaville International Airport of Congo, which was engineered by LUFTHANSA CONSULTING. Façade works include honeycomb shading panels as well as ballistic curtain walls,

windows, doors and atria. Honeycomb shades are installed as a fixed brise soleil system to ensure optical comfort to the building interior. They carry a wooden finish surface to blend with local architectural design and culture.



FIXED ALUMINIUM CANTILEVER SOLAR SHADES



GLASSCON designed, engineered and constructed a brise soleil cantilever system for a country house with integrated FIXED ALUMINIUM BLADES. After comprehensive shading study, the selected system allows undisturbed view from the interior of the building, whilst providing ef-

icient shading. Cantilever width and inclination, as well as louver density is carefully selected to allow sunlight and heat gains during winter, but block summer sun and provide the required shading.

ILLUMINATED MOTORIZED GLASS LOUVERS



GLASSCON developed, fabricated and installed a stunning solar shading system as a building envelope. Our SILK PRINTED GLASS LOUVERS feature six stimulating colors providing 20% transparency and are fitted with special stainless steel IPS 65 ELERO linear actuators. Louvers ro-

tate automatically with remote control to provide lighting guidance, eliminate glare and optimize natural daylight. Perfectly placed to leverage the unique architectural skin, our innovative louvers are set to meet upscale demands.



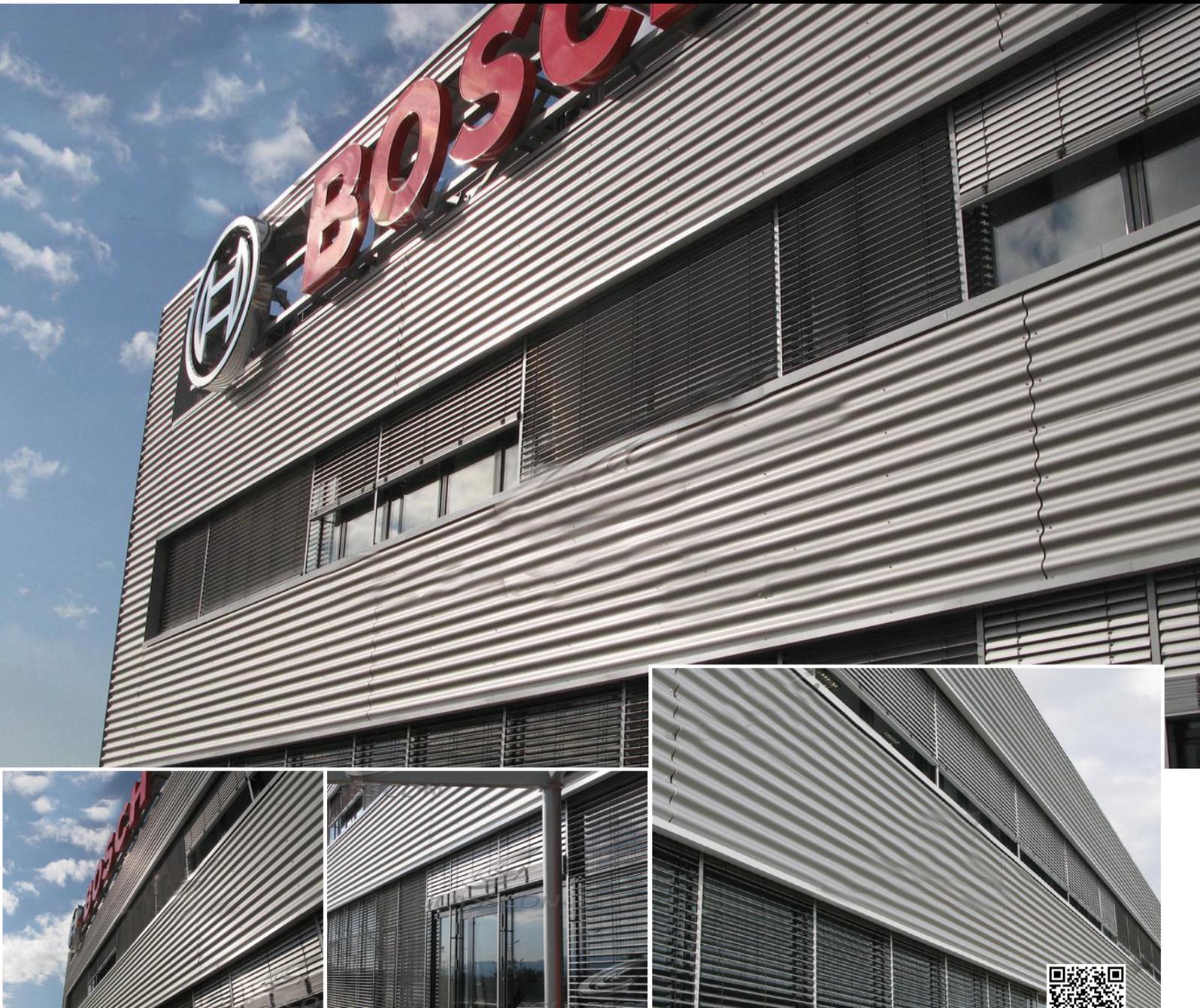
MOTORIZED ALUMINIUM AIRFOILS



GLASSCON designed, engineered and constructed a fully motorized external shading system with ALUMINIUM AIRFOILS for a telecommunications office building. The selected material has an aero blade shape and is certified for its rigidity and durability. According to the solar shading study results, the whole façade had to be totally

shaded. The elliptical shape airfoils are grouped and rotated by stainless steel IP65 ELERO motors, controlled by the building BEMS according to sun position and desired shading effect. The whole system is fully programmable through BUS connection using WAREMA Climatronic software.

OUTDOOR MOTORIZED VENETIAN BLINDS

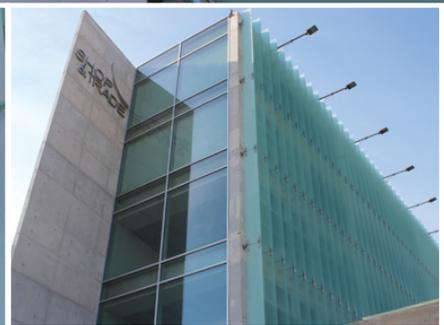


GLASSCON successfully executed the complete façade works for a Bosch office building including external motorized venetian blinds and aluminium corrugated sheet cladding. This shading system provides easy and high efficient shading options through rotation and vertical sliding to any stack position, during all periods of

the year. Placed exactly outside building windows, the slats are made of high quality aluminium material and operating mechanisms contribute to the minimal design of the system. Operation is fully motorized and programmable through BUS connection using WAREMA Climatronic software.



FIXED ARCHITECTURAL GLASS LOUVERS



GLASSCON developed, fabricated and installed an innovative solar shading system consisting of vertical architectural SOLAR GLASS LOUVERS as a complete building envelope. After comprehensive shading study, the selected system allows undisturbed view from the interior of the building, whilst providing efficient

shading. Glass louvers are installed as vertical fins supported by custom made stainless steel fittings as a bespoke solution. Solar glass panes are made of fritted tempered glass to allow sunlight whilst blocking glare and provide the required shading.

MOTORIZED HPL SOLAR LOUVERS



GLASSCON designed, developed and installed an external architectural motorized HPL SOLAR LOUVERS with a wood finish. The selected certified material is extremely weather and UV resistant, making it a low maintenance eco-friendly solution for outdoor small scale

residential shading applications. The timber alike sunshades are rotated through a central pivot, handled by stainless steel IP65 ELERO linear actuators. The whole system is fully programmable through BUS connection using WAREMA control units.

HORIZONTAL MOTORIZED GLASS LOUVERS



GLASSCON designed, fabricated and installed an innovative second skin shading system for a bank branch with MOVABLE GLASS LOUVERS operating fully automated. The glass louvers carry special ceramic printing technology to create the desired design pattern and provide efficient shading.

Glass used is tempered and heat soak tested to minimize the risk of spontaneous breakages. The rotation of the glazed louvers is handled by stainless steel German ELERO motors controlled by a fully customizable German WAREMA control unit.

HORIZONTAL MOTORIZED GLASS LOUVERS



GLASSCON designed, fabricated and installed an innovative second skin shading system for an eye clinic with MOVABLE GLASS LOUVERS operating fully automated. The glass louvers carry silk printing to create the desired transparency and provide efficient shading. Glass used is tempered

and heat soak tested to minimize the risk of spontaneous breakages. The rotation of the glazed louvers is handled by stainless steel German ELERO motors controlled by a fully customizable German WAREMA control unit.

ALUMINIUM BRISE SOLEIL



GLASSCON designed, engineered and executed the complete façade works for an office building, including motorized aluminium louvers, external brise soleil, aluminium composite panel cladding and a structural glass facade. Large scale motorized aluminium louvers provide shading

to fenestration of the top floors, while ground floor openings are shaded with smaller scale aluminium louver solution. Both shading systems are controlled by the building BEMS according to sun position and desired shading effect.



TUV NORD

CERTIFICATE

Management system as per
ISO 9001 : 2015
in accordance with the ISO 9001:2015 programme. It is hereby certified.

GLASSCON GmbH
 Südliche Münchner Straße 2
 820 31 Grünwald, München
 Deutschland



ISO 9001 management system: ISO 9001:2015 standard for the following scope:

Consulting, Design, Engineering and Construction of Sustainable Building Skins, Architectural Building Envelopes & Bespoke Facades (Curtain Walls, Glazing, Cladding Systems, Brise Soleil, Solar Shades, Load Assessment).

Certificate Reference No. 44 129 1220006
 Issue Date: No. 1268-0616
 Valid from 22/01/2016
 Valid until 21/01/2017

Stalaw

Certification Body:
 TÜV NORD CERT GmbH

This certification was conducted in accordance with the TÜV NORD CERT auditing and certification procedures that it is subject to regular surveillance audits.

TEST REPORT

Number:
1994-CPR-RP1303

Issuing date:
2016-02-08

Applicant:
GLASSCON GmbH
 Südliche Münchner Straße 2
 82031 Grünwald/München (Germany)

Tested product:
**"GLASSCON CUSTOM MADE PUNCH WINDOW,
 SNFCC – RENZO PIANO FT-03 FAÇADE SYSTEM"**
(cf. description)

Executed tests:
**Air permeability
 Watertightness under static pressure
 Resistance to wind load**

Normative References:
 EN 13830:2003
 EN 12153:2000 - EN 12153:2002
 EN 1026:2000 - EN 12297:1999
 EN 12155:2000 - EN 12154:1999
 EN 12179:2000 - EN 13116:2001



GLASSCON GmbH
📍 Mergenthalerallee 77, 65760 Eschborn, Germany
☎ +49(0)61967889560
@ sales@glasscon.com
🌐 www.glasscon.com

Certified / Approved by:

