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Shading solutions in the architectonic project

Sunlight optimization

shading solutions
that contribute to
comfort and
sustainability

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Designing with **solar shading solutions** to contribute to a sustainable comfort · **Regulations**

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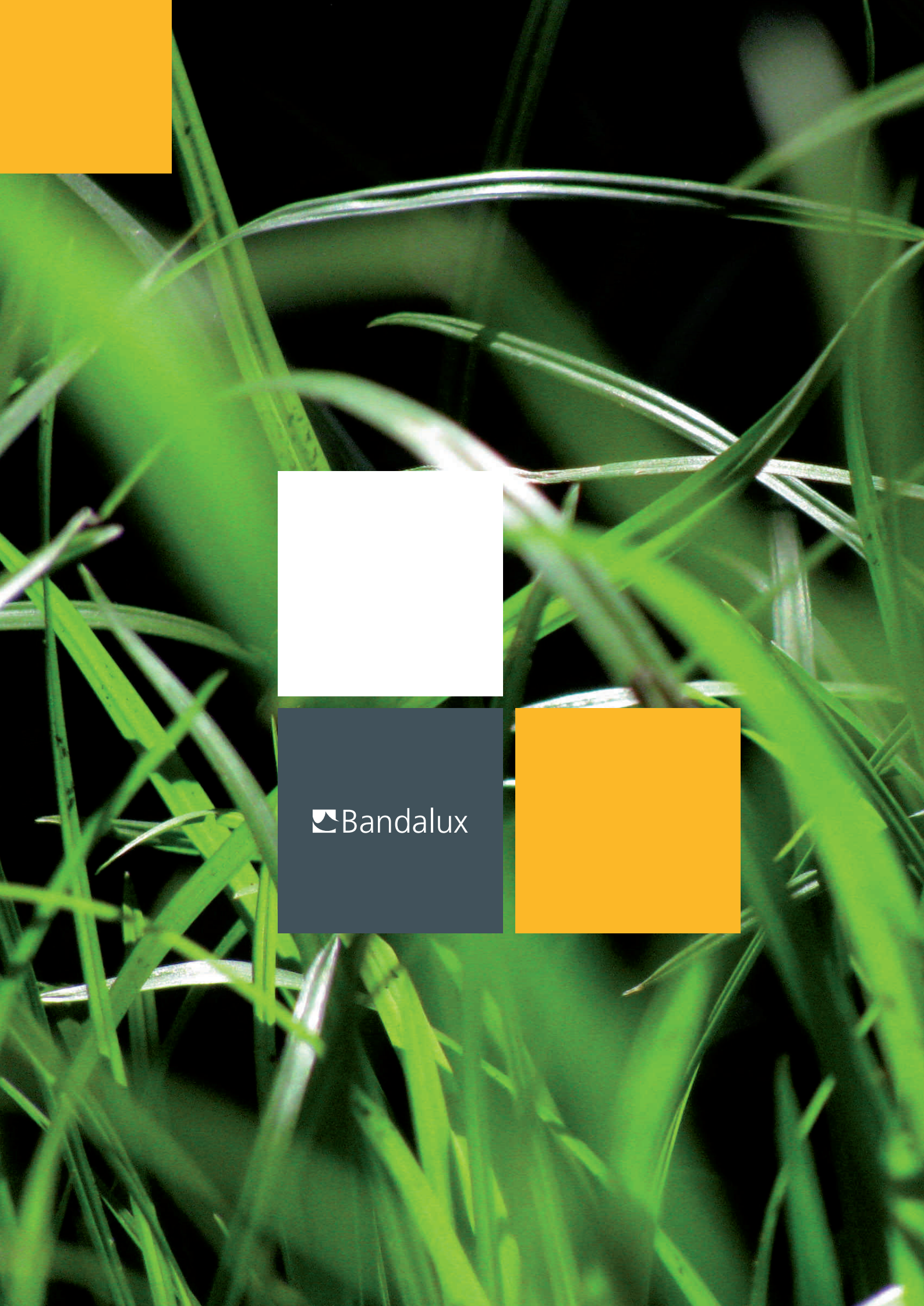
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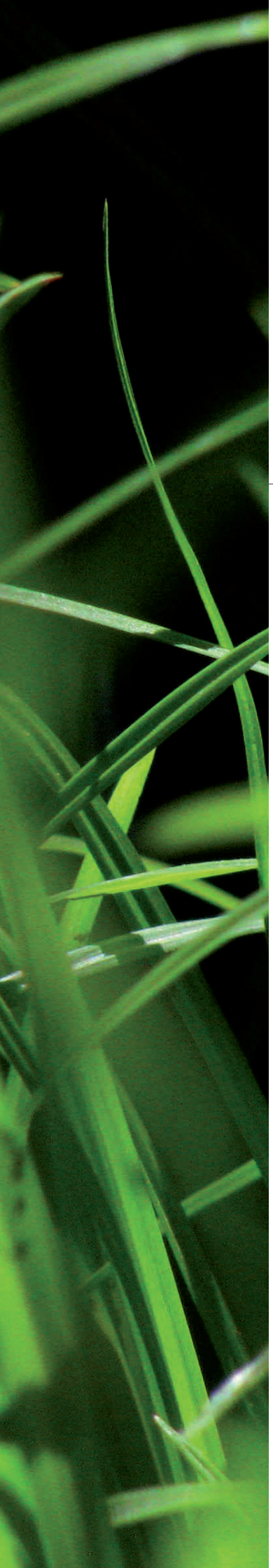


Designing with solar shading solutions

Architecture adapted to the environment, designed to obtain greater energy efficiency and an environment that guarantees greater people comfort.

A facade where the window is placed to act as an enclosure, and plays a key role in the management of the entry of light, affording a functional response to heat and light demands.

A window solution that contributes to protecting and managing the entry of light, improving living conditions on the inside: the Bandalux solar shading systems as a protection and an aesthetic appeal.

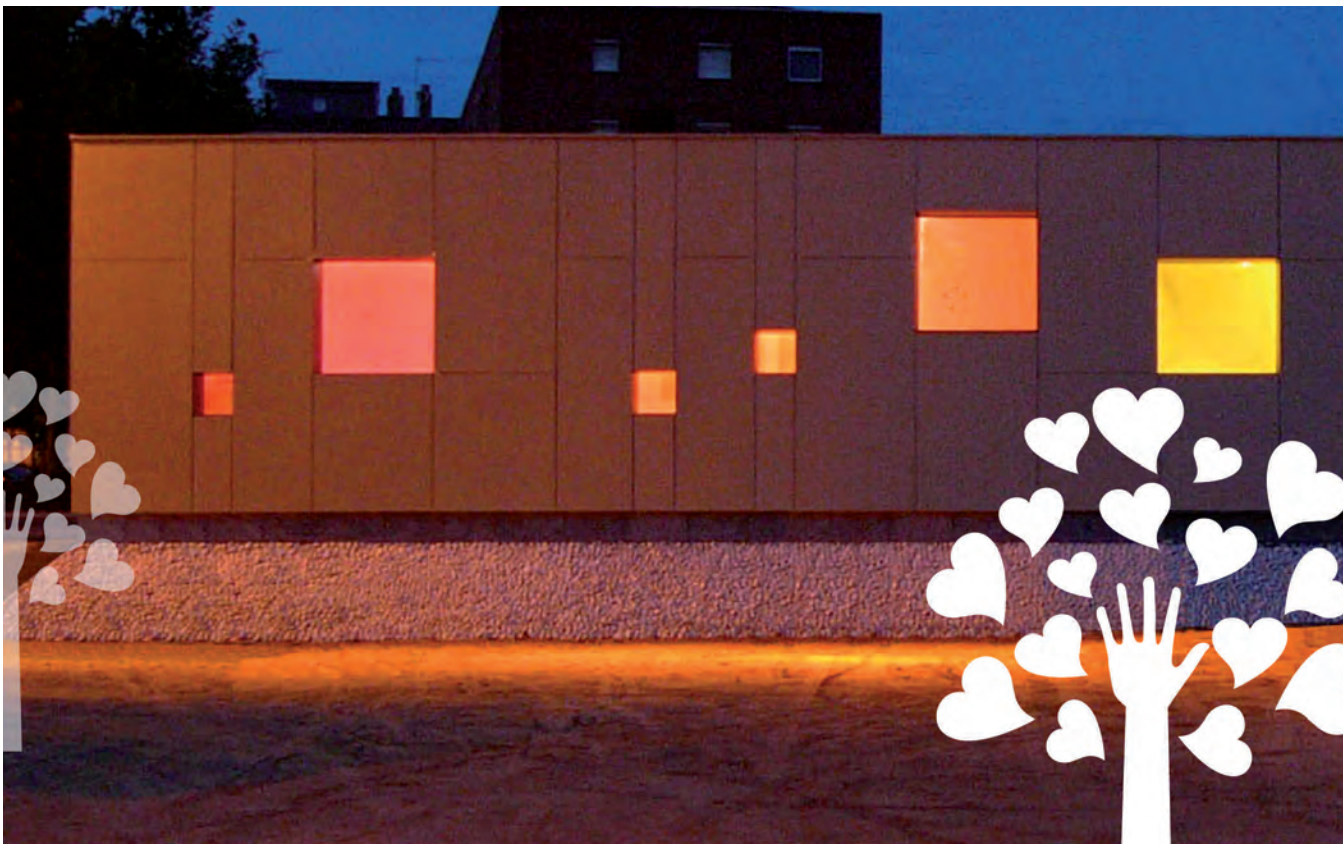
Sustainable building

A blind with Polyscreen® fabric installed on a building exterior can improve air conditioning efficiency by up to 55%, thus reducing CO_2 emissions.

Design, construction, rehabilitation and maintenance all have a major impact on:

- Quality of Life
- Resource Management
- Environmental Health

Herein lies the importance of designing and constructing sustainable buildings that minimise the use of non-renewable energies, reduce emissions of pollution and waste, and provide a more comfortable, healthy, and safe environment to live and work in.

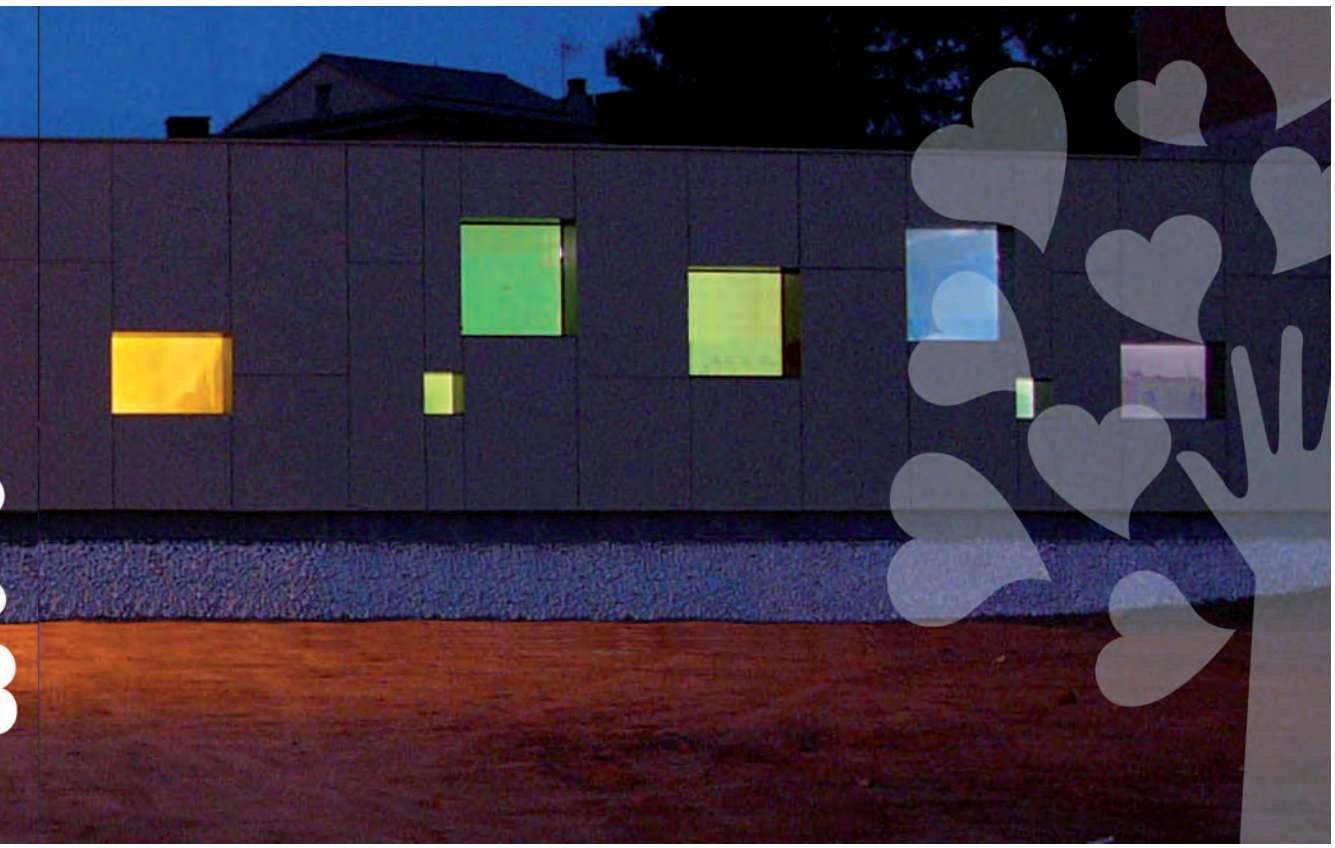


Energy efficiency

Depending on fabric color size, blinds can reduce room temperature by 5 to 10°C / 40 to 50°F, eliminating the need for an air conditioning system.

There is a series of international directives derived from the Kyoto protocol, wich focuses on improving energy efficiency in buildings and reducing CO_2 emissions.

Heating and air conditioning systems can account for up to 48% of a country-s energy consumption. Solar protection systems are a great alternative to traditional heating and cooling systems, offering a more effective way to improve energy efficiency in buildings.



Comfortable environments

Shading solutions make it easier to reach comfortable living and working temperatures easier.

Comfortable temperatures and lightting are essential to a building's design. Bandalux offers a wide variety of solutions for creating comfortable, pleasant, and safe environments.

Thermal comfort

To secure optimal thermal comfort, temperature, humidity and air movement conditions should be suitable for the activity in question.

If a building's temperature, humidity, and air circulation are not properly regulated, productivity may be effected. Job performance suffers significantly in rooms with temperatures below 20°C/68°F or above 25°C/77°F. The greatest temperature loss and gain takes place in the walls of a building.

The Bandalux solar protection systems regulate the temperature inside and react immediately to climate changes outside and, thus preventing overheating.

The use of solar protection systems makes it possible to create more comfortable working environments, which in turn improves productivity and stimulates workers' creativity and performance.

Visual comfort

The minimum level of workplace lighting established by international health and safety regulations is between 100 and 1000 lux. Workplace lighting regulations also state that reading rooms should have al least 500 lux. In addition to ensuring appropriate workplace lighting, adjustable solar protection systems block harmful UV rays and prevent computer screen glares.

Without blinds to filter sunlight, visual safety can be jeopardized and eyesight may be at risk.

Applicable standards and regulations

Bandalux blinds help fulfill standards and regulations aimed at improving building sustainability and safety, in order to achieve the LEED certified.

Safety in the event of fire:

STANDARD	SCOPE	FIRE CLASSIFICATION
UNE EN 13773	Spain – Portugal	CLASS 1
NF P 93-503	France – Belgium	M1 – M2
DIN 4102	Germany – Holland	B1 – B2
BS 5438 - BS 5867	Great Britain	Type B – Type C
NFPA 701	United States	Pass

Other standards and regulations:

STANDARD	DESCRIPTION	SCOPE
UNE EN 13773	Textiles and textile products. Burning behaviour. blinds and shades. Classification scheme.	Europe
EN 14500	Awnings and shutters. Thermal and visual comfort. Test/calculation methods.	Europe
EN 14001	BSO and blinds. Thermal and light comfort. Evaluation of the behaviour.	Europe
EN 13561	External blinds. Performance requirements including safety.	Europe
EN 13120	Internal blinds. Performance requirements including safety.	Europe
EN 13659	Shutters. Performance requirements including safety.	Europe
EN 13363	Solar protection devices combined with glazing. Calculation of solar and light transmittance.	Europe
EN 13125	Shutters and BSO. Additional thermal resistance. Allocation of a class of air permeability to a product.	Europe
EN 12045	Shutters & BSO power operated. Safety in use. Measurement of transmitted force.	Europe
EN 20105–A02	Textiles. Tests for colour fastness. Part A02: Gray scale for assessing changes in colour.	Europe
EN 60335–2–97	Household and similar electrical appliances. Safety. Part 2-97: Particular requirements for the motorization of shutters, awnings and similar equipment.	Europe
EN ISO 13934–1	Textiles. Tensile properties of fabrics.	Europe
EN ISO 105–B04	Textiles. Tests for colour fastness. Part B04: Colour fastness to artificial weathering: Xenon arc fading lamp test.	Europe
EN ISO 9227	Corrosion tests in artificial atmospheres. Salt spray tests.	Europe
EN 410	Glass in building. Determination of luminous and solar characteristics of glazing.	Europe
ISO 15099	Thermal characteristics of windows, doors and shading devices. Detailed calculations.	Europe
ASHRAE 74	Method of Measuring Solar-Optical Properties of Materials.	USA

Designing with solar protection solutions

The incorporation of blinds in a building´s design provides a functional response to thermal and light demands.

With architectural design increasingly more driven by technology, building exteriors have become more and more complex.

While technology's growing influence on architectural design has made the construction of building exteriors far more complex, it also offers numerous design possibilities.

Solar protection systems offer a way to effectively protect windows from adverse weather, provide comfortable temperatures and lighting, and improve working conditions.

Multiple combinations of window and solar projection projects make it possible to achieve both aesthetic appeal and functionality. Blinds are an indispensable element in the design of architectural facades and interior architecture.

Roller blind Square Box morotized system with Polyscreen® 352 Blanco Gris fabric.
OF=1%
gtot Int= 0,40

Blinds&shades as an element of solar protection

Achieving **visual** well-being

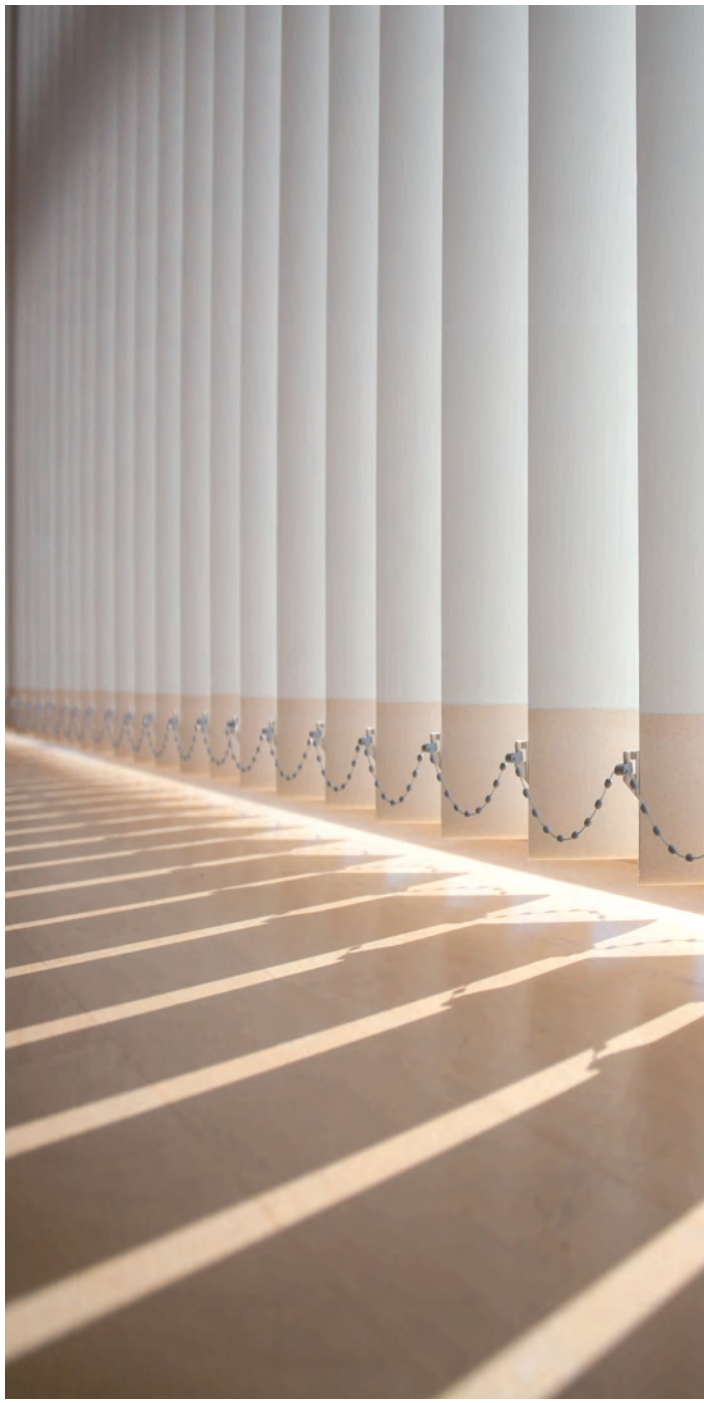
Due to the many standards and regulations governing safety and health in the workplace, it has become increasingly more imperative to study the levels of natural and artificial lighting in a project. A blind can reduce glare levels in indoor work settings and can also help to modulate the flow of natural light that enters into the room.

Lighting in the presence of **computer screens**

The prevailing legislation in matters of safety and hygiene at work renders it necessary to illuminate the work area and guarantee 500-800 lux for general work and 1,000 lux for precision jobs.

The human eye is sensitive to only a part of solar radiation, namely that which is comprised between 380 and 770 nm, and while it adapts quickly to brightness (thanks to pupil expansion and contraction), it does not adapt so easily to contrast.

The optic muscles can become fatigued during prolonged work in front of computer screens or during reading with excessive contrast. To avoid this, a difference in brightness between the walls of the background, the blind and the screen of some 1:3 is recommended.



Shades regulate the flow of incoming light, making it possible to regulate the level of light in a room depending on the activity being carried out. In work areas where computers are used, 500–800 lux should be guaranteed for general work and 1000 lux for precision work.

Vertical blind
Deco system
with 89mm slats
with Polyscreen®
351 Linen fabric.
OF= 1%
gtot Int= 0,40
gtot Ext= 0,15

Achieving thermal well-being

Thermal comfort may be defined as the possibility of regulating the energy consumption of a building by controlling natural and artificial heat inputs.

Thermal comfort depends on 3 factors:

- Heat accumulation and its distribution.
- Form and distribution of internal spaces, impacting the speed of movement of air masses at different temperatures.
- External climate conditions.

Well-being should be considered and evaluated in summer and winter alike. The objective is to achieve a constant temperature, taking into account the fact that in Europe, a building with inside temperatures of between 20°C/68°F and 25°C/77°F is regarded as comfortable.

To secure a good level of thermal comfort in winter, daytime or night-time temperatures should be above outdoor averages, whereas the opposite is true during summer.

Shade as an element of solar protection

Functions of the shade in the project

- Protection from solar radiation
- Energy savings
- Adjustment of luminous flow
- Distribution of luminous flow
- Glare protection
- Partial or total darkness
- Reduction of direct radiation in external areas
- Visual privacy
- Visibility of the outside
- Reduction of heat dispersion in walls
- Protection from UV rays
- Integration with natural ventilation
- Improve facade characteristics
- Design and aesthetics
- User comfort

Polyscreen® fabric: variety of collections that offer different degrees of shading.

EXAMPLE ▶ If we apply a curtain with Polyscreen® 650 grey-blue fabric with an openness factor (OF) of 3% on the outside of the building, we obtain:
Solar factor = 0.07 - Savings in energy consumption: 23.7% *(glass 4/16/4 acc. to/EN 14501)*

OF: Openess Factor.
gtot Int: Total solar factor (fabric+glass). Interior installation.
gtot Ext: Total solar factor (fabric+glass). Exterior installation.

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Practical cases

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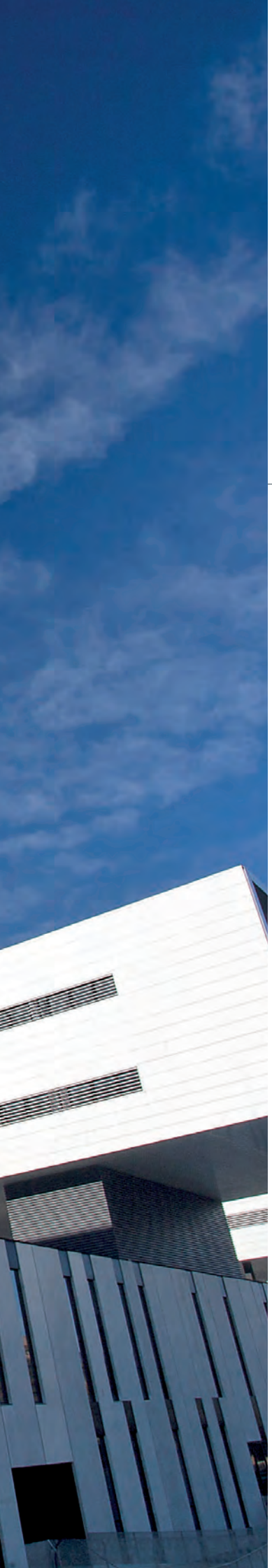


Practical cases

Bandalux has a technical assessment department to monitor work and projects, thus ensuring that it will have professional architects and engineers at its disposal to fulfil the requirements provided for in private projects and in public works.

Thanks to our close collaboration with installers and sector professionals allows us to offer a comprehensive service, from joint planning to special product development, while also addressing any technical questions that may arise during the process. Once a project has been completed, we continue monitoring it in order to ensure proper maintenance is provided. Our technical team is always available to make sure solar protection systems remain totally compliant with all applicable requirements once they are installed. The contemporary architecture and client testimonials showcased in this document are a prime example of the prestige Bandalux has across many global markets.

Some of these buildings, along with their customized shading solutions, are highlighted below.

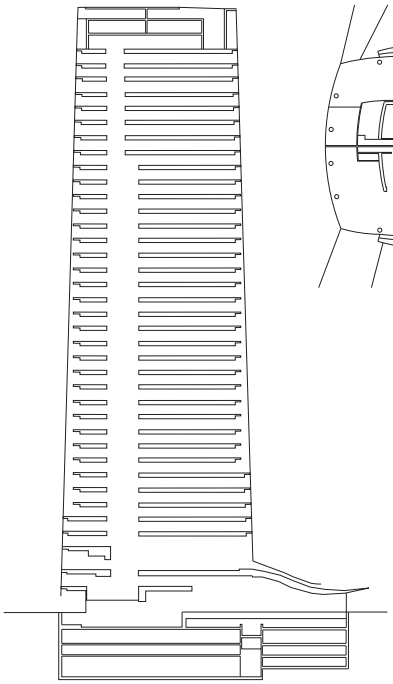
SPAIN

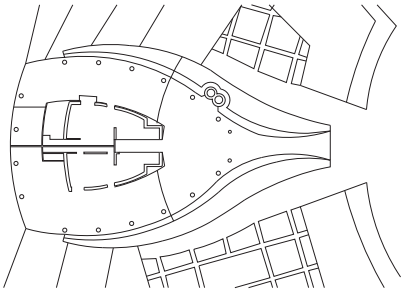
Iberdrola Tower, Bilbao

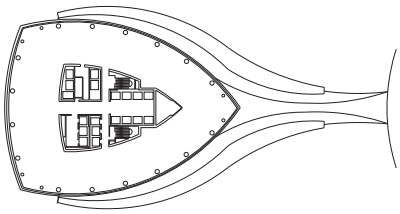
Architect: **César Pelli** · Surface: **50.000sqm (538.195ft²)** · Height: **165m (541ft)** · Date: **2007–2011**

INTEGRATED

SOLAR SHADING SYSTEMS INSTALLED:
Bandalux motorised aluminium Venetian blinds with perforated slats and a 25mm (1") head. Installed between panes. Blinds integrated to a building automation system.







"Simple, elegant, ecological and sustainable". This is how César Pelli defined the Iberdrola Tower project in Bilbao.

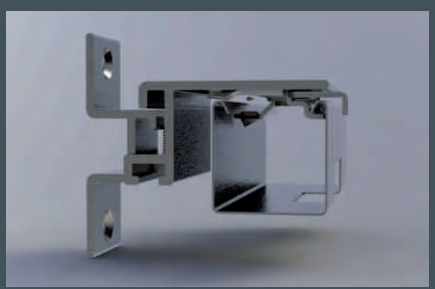
It is a 105m (344ft) high tower which became the point of reference in the new urban regeneration area of Abandoibarra in the city of Bilbao.

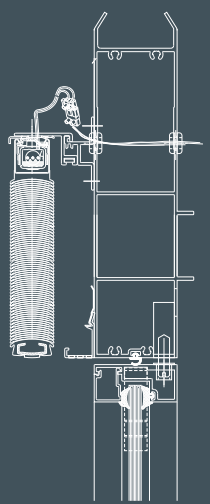
It is one of the few buildings in Europe that boasts the prestigious ***LEED cs2.0 certification***. The double-glazed facade constitutes a sustainable solution, creating a veritable bioclimatic wall.

Product developed by Bandalux for the project:

The facade was resolved by means of a double-glazed layer, with a ventilated air chamber between the two facings of the facade. The outside glass is double-glazed, whereas the inner glass is single-pane and accessible. The chamber contains an aluminium Venetian blind with 25mm (1") perforated slats. Special fixation systems were designed to guarantee easy blind maintenance. This system made for a more straightforward on-site installation. It is a hanger-type fixing which is secured to the structure suspended that, in turn, is secured to the head of the Venetian blind.

The slats of the aluminium Venetian blinds can be oriented to leverage sunlight, and the system is further optimised by its integration to a building automation system.





SPAIN

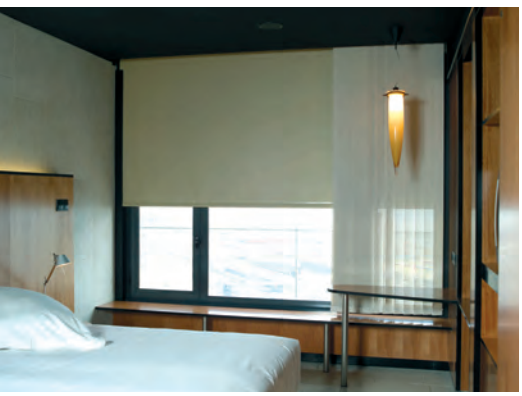
Princess Hotel, Barcelona

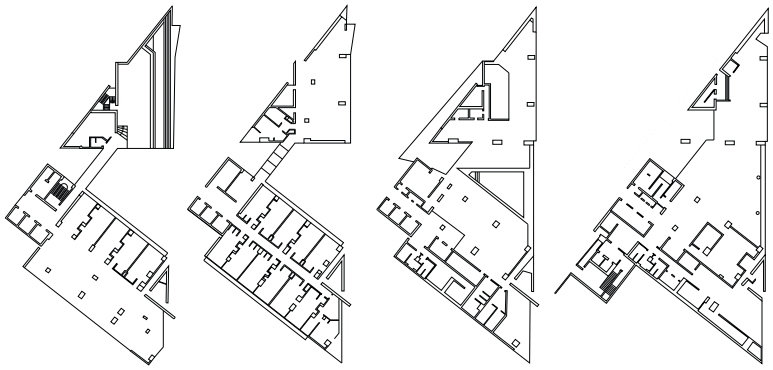
Architect: **Óscar Tusquets** · Surface: **20.000sqm (215.278 ft²)** · Height: **109m (357 ft)** · Date: **2000–2004**

INTERIOR

SOLAR SHADING SYSTEMS INSTALLED:

Bandalux roller blinds, Arion system, with Polyscreen® fabric. Premium Plus double drop system with Polyscreen® 403 Black Out fabric. Vertical blinds with Polyscreen® 351 fabric. Draperies with darkening fabrics. Interior installation.

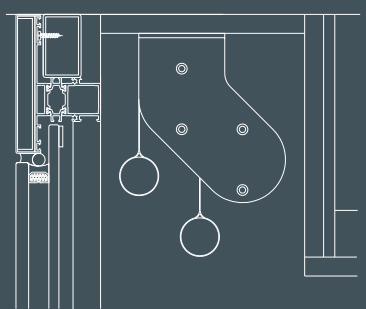




Due to the building's prominent location, the point of departure for the project was the building of a skyscraper to herald the end of the avenue called Diagonal in the city of Barcelona. The architect in charge of this ambitious project, both the building and interior design, was Óscar Tusquets, a very well-known professional. The hotel is comprised of two 23 and 26 story towers connected by transparent corridors. The fact that the area was covered by low-height regulations rendered it necessary to split the design into two blocks connected by a glass bridge, thus maintaining the building's slender appearance.

Product developed by Bandalux for the project:

The support used for the Premium Plus roller blinds was adapted to be able to drive two blinds at the same time. This allowed us to install a darkening fabric and a translucent or transparent fabric on the same support.



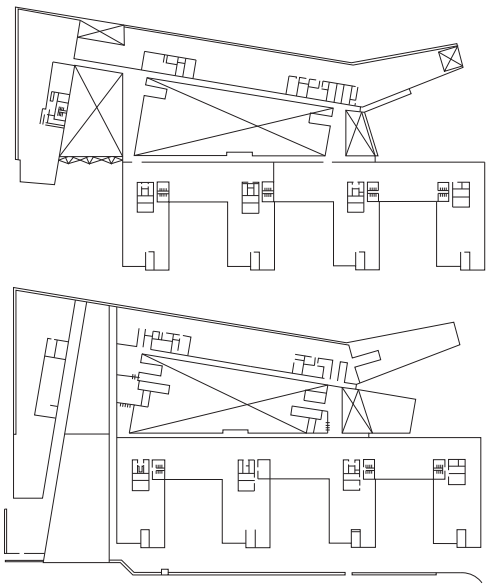
SPAIN

Endesa Head Offices, Madrid

Architect: **Rafael de la Hoz** · Surface: **34.200sqm (368.125ft²)** · Date: **1999–2003**

INTERIOR

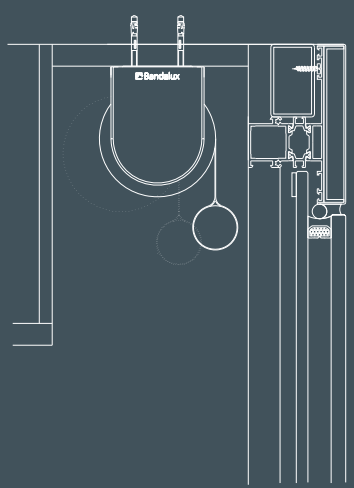
SOLAR SHADING SYSTEMS INSTALLED:
Bandalux motorised roller blind, Premium Plus system, with Polyscreen® 351 fabric. Interior installation.



The facade is comprised of a curtain wall with a glazed cover. Laminated silk-screen horizontal band slats are placed in front to optimise the solar factor of the facade in this site, which is particularly exposed, thus maintaining its transparency.

Product developed by Bandalux for the project:

Roller blinds with Polyscreen® 351 fabric were placed on the inside, with an openness factor of 1%, providing visual and thermal comfort and creating favourable working conditions to stimulate performance and creativity.



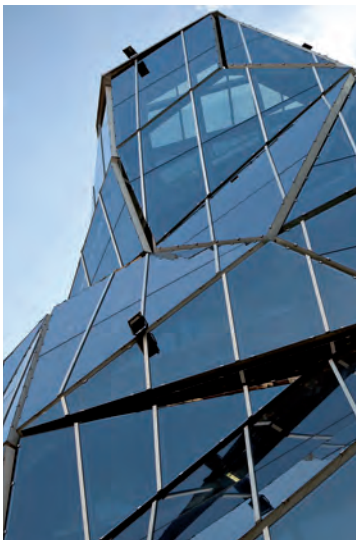
SPAIN

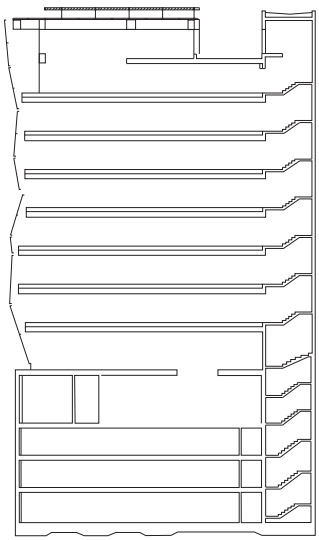
Basque Government Health Department Head Offices, Bilbao

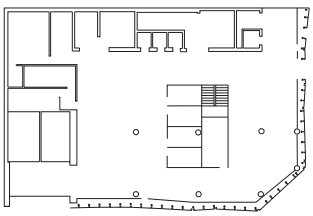
Architects: **Joan Coll–Barreu and Daniel Gutiérrez Zarza** · Surface: **8.802sqm (94.743ft²)** · Date: **2008**

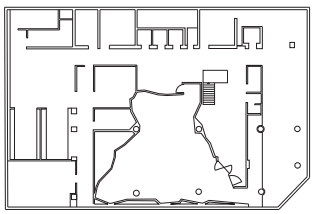
INTERIOR

SOLAR SHADING SYSTEMS INSTALLED:
Bandalux Japanese blinds with Polyscreen® 350 fabric. Interior installation.







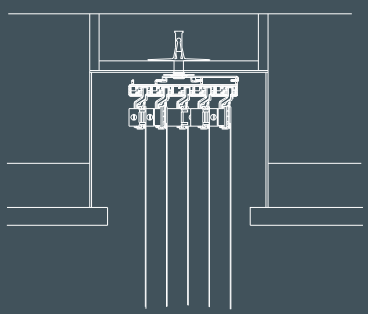


This piece of land forms a corner on one of the main axis of the Ensanche district of 1862.

The solution to the very restrictive development regulations of the area, in terms of the mandatory repetition of partition wall profiles was a double shell that fulfils the energy requirements.

This space between the exterior and interior shell makes it possible to improve the quality of the work environment, enhance habitability, and streamline the flow of foot traffic.

Product developed by Bandalux for the project:



The Japanese blinds, which offer great visual value, can cover widths of up to 6 metres (19ft) with a single drive, stopping the light from entering as they overlap perfectly, preventing any gaps of light across the whole covered surface.

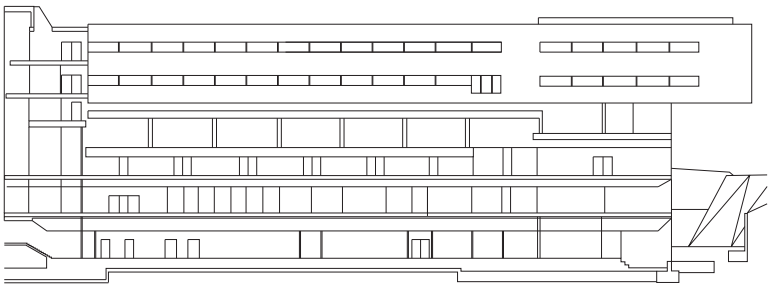
SPAIN

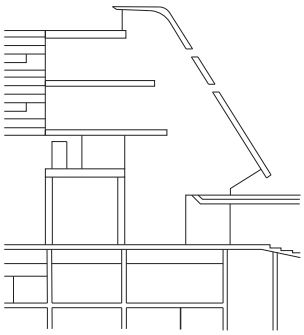
Sant Joan Teaching Hospital, Reus

Architects: **Felip Pich–Aguilera, Teresa Batlle and Mario Corea** · Surface: **124.000sqm (1.334.725 ft²)** · Date: **2009**

INTERIOR

SOLAR SHADING SYSTEMS INSTALLED:
Bandalux roller blinds with 75mm (2 61/64") Square Box and antibacteria darkening fabric. Interior installation with darkening guides.





The large horizontal structure contains two basements and two ground floors, on which there are 6 hospitalization wings. The ground level contains public areas like offices, whereas healthcare facilities are located underground.

The entire building interior is lit by patios that cross the building vertically. A longitudinal axis for the general public is conceived as a branching avenue where the different spaces are located. The building was designed with energy efficiency in mind. A study was realized by dynamic siimulation of the orientation, sun exposure and shadows.

Product developed by Bandalux for the project:

Motorised roller blinds with 75mm (2 61/64") Square Box were installed and a special component was designed for the box to be accessible, adapting the window aprons to allow for integration with the 20mm (13/16") terminal.

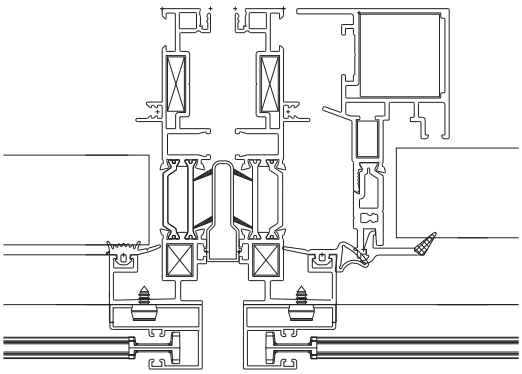
The application of total blackout required by the client was addressed by combining darkening guides with Black Out fabric, which meets the hospital's specific needs.The material is fire retardant and sterile, thus creating a more hygienic space.

FRANCE

Rhône-Alpes County Building, Lyon

Architect: **Christian de Portzamparc** · Surface: **40.000sqm (430.556 ft²)** · Date: **2006–2011**

SOLAR SHADING SYSTEMS INSTALLED:
Bandalux roller blinds with 85mm (3$^{11/32}$") Box with Polyscreen® 350 fabric, roller blinds with 75mm Square Box integrated in the facade with Polyscreen® 352 fabric and Zip guides with Polyscreen® 314 fabric. Exterior and integrated



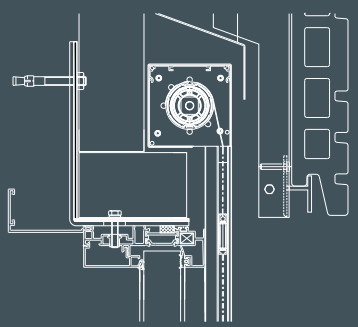
The Rhône-Alpes County Building in Lyon houses 1,500 agent offices, a multipurpose room, committee rooms, reception areas, parking facilities, and a restaurant for personnel.

The heart of the building is an interior visible area, comprised of debating and meeting spaces. The interior network of luminous spaces is surrounded by the building which is coiled around them, permitting natural lighting and outside views at all times.

This composition multiplies and diversifies the spaces. The body of offices forms a continuous chain, a unique and flexible building that winds around the central space.

Product developed by Bandalux for the project:

Roller blinds with 75mm (2$^{61/64}$") Square Box installed on the facade with a programmed motorisation system. A special support was designed to be able to align the guide with the front of the blinds and hide it between the window jambs, thus affording the facade a homogeneous appearance. Some blinds were installed with Zip guides to allow an inclination of 18° with the fabric tightened.

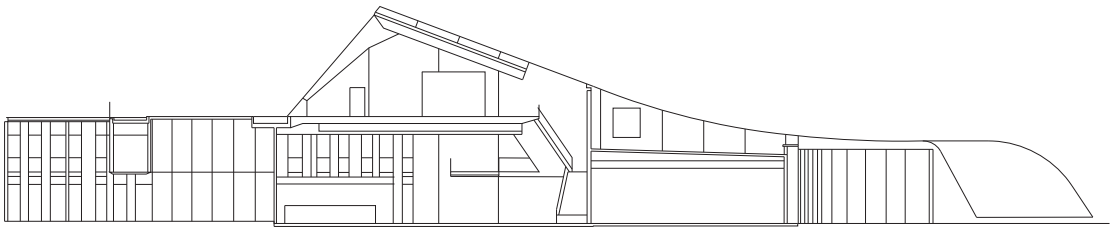


FRANCE

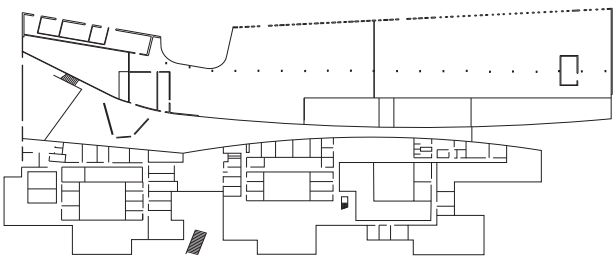
Rossignol Head Offices, Saint Jean de Moirans

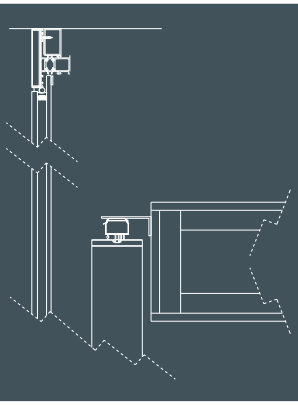
Architect: **Isabel Hérault, Ives Arnod** · Surface: **11.700sqm (125.937ft²)** · Date: **1999–2003**

SOLAR SHADING SYSTEMS INSTALLED:
Bandalux vertical blinds with 89mm (3 1/2") slats with Polyscreen® 403 fabric.
Interior and integrated installation.



The World Head Offices of Rossignol design is far from a stereotypical office building, blending nature with technology. The project, which was tailored to the Rossignol plant, inspires flowing movements, and boasts snow and glacier-like reliefs sculpted by the elements. The entire building is protected by a retractable wooden roof resembling a glacier.





Product developed by Bandalux for the project:

The facades, depending on their location, switch between large glazed surfaces facing the mountainside and a series of vertical wood and glass strips, creating a dynamic effect.

Vertical blinds were chosen because they can cover the building's large windows and facilitate optimal solar light management. The orientable slats regulate light flow according to the position of the sun, guaranteeing total thermal and visual comfort all day long.


Biblioteca Municipal
B

PORTUGAL

Viana do Castelo Auditorium Library, Oporto

Architect: **Álvaro Siza Vieira** · Surface: **10.000sqm (107.639ft²)** · Date: **2007**

INTERIOR

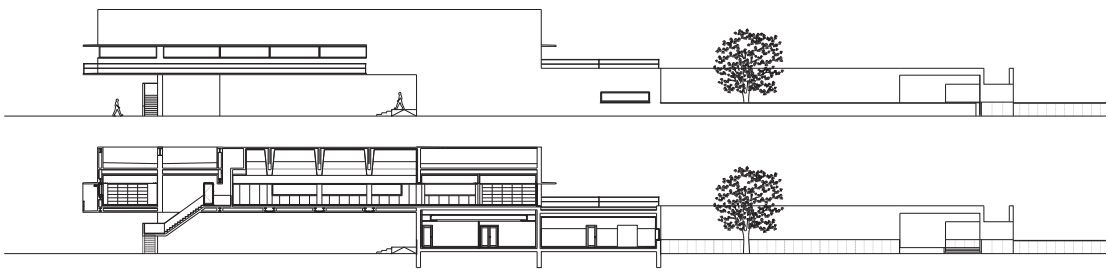
SOLAR SHADING SYSTEMS INSTALLED:

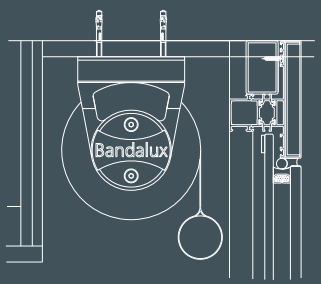
Bandalux motorised roller blinds, Arion system, with Polyscreen® 550 fabric. Interior installation.

The project was part of a city development plan by Fernando Távora, , which provided multi-purpose buildings. It is a body of 45x45m (147ft x147ft), totally overhanging, which includes a central gap of 20x20m (65ft x 65ft).

The building is divided into two floors: the ground floor houses the atrium, reception area, auditorium, bar and administration area; the top floor houses the reading room, which is divided into two sections. The shape of the building is born of the following premises: overhang of the longer part of the building, which is supported to the east and the west by two L-shaped columns.

Orthogonally on the ground plan and elevation, there is a predominance of horizontal openings complemented by skylights in the reading rooms. The materials used in the facade are simple: concrete work on the top of the building, and stone flooring on the bottom.





Product developed by Bandalux for the project:

Due to the large-sized windows of the Library, the Arion system roller blinds, which can cover up to 33sqm (355ft²), were used. Polyscreen® fabric was chosen for its ability to provide views of the Iima River, while simultaneously providing privacy to the inside.

Reference buildings

Water Tower, Zaragoza. Architect: Enrique de Teresa
Premium Plus roller blinds with Polyscreen® 350 Fabric. Interior installation.

Le Cinetic, Paris
Architects: Valode & Pistre Arquitectes.
Aluminium Venetian blinds. Interior installation

Axe Avenue, Paris. Architects: Kohn Pedersen Fox Associates and SRA. 50mm (2") aluminium Venetian blinds. Interior installation.

Joaquín Rodrigo Music Higher Conservatory, Valencia. Architect: Ignacio Belenger. Premium Plus roller blinds with Polyscreen® 350 fabric. Interior installation.

Caja Madrid Tower, Madrid. Architect: Norman Foster 50mm (2") perforated aluminium Venetian blinds, motorised, with cable. Interior installation.

Automotive Intelligence Center (AIC), Bilbao. Architects: Estudio de Arquitectura ACXT
Motorised roller blinds, Arion system, with Polyscreen® 353 fabric. Interior installation.

Ellipse Building, Brussels. Architects: Art&Build, Montois Partners.
Motorised aluminium Venetian blinds. Interior installation.

Radio Espace, Lyon. Architect: AAMCO.
Box roller blinds with Polyscreen® 351 fabric. Exterior installation.

Tabaknatie, Antwerp, Belgium. Architect: Arcade.
Motorised roller blinds, Arion system, with Polyscreen® 350. Interior installation.

Zaragoza Conference Center, Zaragoza. Architects: Elena Albareda, Marta Serra, Jesús Arcos and Jean Kessedjian. **Arion and Premium Plus roller blinds with Polyscreen® 351 fabric. Interior installation.**

San Jorge University, Zaragoza. Architects Basic Workshop: Javier Pérez-Herreras and Javier Quintana de Uña. **Atos roller blinds with Polyscreen® 403 fabric and traditional blinds with Duoface Ignis darkening fabric.**

Parc du Millenaire, Paris
Architect: Artet Charpentier.
Aluminium Venetian blinds. Interior installation.

First Tower, Paris. Architects: Kohn Pedersen Fox Associates and Sabout Rouit Associés.
Premium Plus roller blinds with Polyscreen® 353 fabric. Interior installation.

Mobistar Head Offices, Brussels. Architect: Assar Architects.
Premium Plus roller blinds with Polyscreen® 352 fabric. Interior installation.

Le Spallis, Paris
Architects: Antony Bechu and Tom Sheeham.
50mm (2") aluminium motorised Venetian blinds
Interior installation.

Aragon Blood Bank, Zaragoza. Architects: Joaquín Magrazo, Juan Gayarre, Ricardo Maro and Fernando Used. Vertical blinds and Arion roller blinds Polyscreen® 351 fabric. Interior installation.

Palau de la Música Catalana, Barcelona.
Architect: Lluís Domènech i Montaner.
Motorised roller blinds, Arion system, with darkening fabric. Interior installation.

International University Sports Federation (FISU), Château de la Solitude, Auderghem, Belgium. Architect: Atelier d'Architecture Général, Eric Philippe. Arion roller blinds with Polyscreen® 352 Fabric. Interior installation.

Arnaiz Terralia Building, Madrid. Architects: Arnaiz Consultores. **Arion and Premium roller blinds with Polyscreen® 403 fabric. Interior installation.**

Alhambra BSCH Building, Madrid. Architect: Arnaiz Consultores. **Premium roller blinds. Interior installation.**

Grupo Ortiz Head Offices, Madrid. Architects: Fairbanks, Abad and Montero (G.O.P.). **Premium and Premium Plus roller blinds with darkening fabric and Polyscreen® 351. Interior installation.**

Diagonal ZeroZero Tower, Telefónica Head Offices, Barcelona. Architect: Massip-Bosch Arquitectes. **Motorised roller blinds, Premium Plus system, guided with Polyscreen® 403 darkening fabric. Interior installation.**

Flavia, Paris
Architect: Jean Claude Besseau
Aluminium Venetian blinds with 25mm (1") slats. Interior installation.

Balthazar, Paris
Architect: Richard Meier.
Premium Plus roller blinds and motorised aluminium Venetian blinds.

Waterfront International, Port of Spain, Trinidad y Tobago. Architect: Genivar Inc.
89mm (3 1/2") vertical blinds with PVC slats
Interior installation.

Delage, Paris. Architect: Conceptua
Aluminium Venetian blinds.
Interior installation.

Paraninfo, Zaragoza. Architect: Mariano Pemán. Motorised roller blinds, Arion system, with Polyscreen® 550 fabric.
Interior installation.

Other reference buildings

Belgium

BASF, Waterloo
Crystal City, Brussels
Ellipse Building, Brussels
French Embassy, Brussels
Ideal Comfort, Brussels
M&M, Namur
Mobistar, Brussels
Police Academy, Mons
Procter & Gamble, Brussels
Reuters, Brussels
Smals, Brussels
South City, Brussels
Tabaknatie, Namur
Tour Proximus, Bruselas
Toyota, Cuemes
UNESCO, Auderghem

France

Axe Avenue - Grand Axe, Paris
Bagneux Porte Sud Cogedim, Paris
Bâtiment Galilee, Toulouse
Canceropole, Toulouse
Cáseme Pompier, Paris
Centre de Haute Couture, Rennes
Centre Financier, Lyon
Cite Universitaire, Montpellier
Conseil Général, Bordeaux
Conseil Général, La Roche Sur Yon
Courcellor Tower, Paris.
Credit Agricole Branch, Nice
Crystalis, Paris
Ecole Boule, Paris
Ecole de Pólice, Lyon
EDF Wood Park, Toulouse
First Tower, Paris
Hémodialyse, Bordeaux
Hôtel de Région, Lyon
HSBC Branch, Nantes
Le Balthazar, Paris
Le Bon Marche, Paris
Le Cinetic, Paris
Le Delage, Paris
Le Flavia, Paris
Le Progrès, Lyon
Le Sale des Marches, Paris
Le Spallis, Paris
Iliade Massy, Paris
L'Olympe, Paris
Montpellier Hospital, Montpellier
Moulin Noir, Paris
Olivier de Serré Tower, Paris
Parc du Millénaire, Paris
Pôle Inter consulaire de la Dordogne, Périgueux
Radio Espace, Lyon
Rest. Jules Verne (Eiffel Tower), Paris
Rive de Seine, Paris
River Ouest, Paris
Sanofi, Toulouse
Siège Descours et Cabaud, Lyon
Siège mondial Rossignol, Lyon
Sorin, Paris
Synergis, Paris.
Syrius, Paris.

Greece

Athens Hotel, Athens
Hilton Hotel, Athens

Iceland

Landsbanki, Reykjavik
Price Water House Coopers, Reykjavik

Ireland

Gran Canal Hotel, Dublin

Italy

Area di Recerca, Trieste
Ferrari, Milan
Trieste Airport, Trieste

Luxemburg

Merryl Linch, Luxemburgo

Morocco

Plaza Hotel, Casablanca

Monaco

Casino, Mónaco
Dexia, Mónaco
Novotel, Mónaco

Netherlands

Bakker Barendrecht, Ridderkerk
KPMG, Amsterdam
Mitsubishi, Amsterdam

Portugal

Auditorium Library, Viana do Castelo
Escritorios de Tejo, Lisboa
Grupo Totta, Lisboa
IBM, Lisboa

Spain

Aceitera de Queiles, Navarra
Alhambra Building (Grupo Santander), Madrid
Ambar Tower, Madrid
Aníbal Building, Barcelona
Apia XXI, Cantabria
Archaeological Museum, Alicante
Aragon Autonomous Government, Zaragoza
Aragon Blood Bank, Zaragoza
Aragon Government, Zaragoza
Arnaiz Consultores Head Offices, Madrid
Automotive Intelligence Center (AIC), Vizcaya
Axa Building, Barcelona
Barceló Hotel, Almería
Barcelona Parks and Gardens, Barcelona
Barnasfalt, Barcelona
Basauri Civic Centre, Vizcaya
Bilbao Port Authority Tower, Vizcaya
C.S. Military Hospital Pº Zorrilla, Valladolid
Caixa Geral, Madrid
Caja Madrid Tower, Madrid
Caja Madrid, Barcelona
Carrefour Offices, Madrid

(continued...)

Other reference buildings

Spain (continued...)

Castile and Leon Parliament , Valladolid
Castillo del Gorraiz Hotel, Navarre
Catalonia Hotel, Passeig de Gracia, Barcelona
Celia Cultural Centre, Teruel
Ricardo Tormo Circuit, Valencia
City Park, Barcelona
Congress Centre, Alicante
Construcciones Ortiz, Madrid
Cretas Museum, Teruel
Ebro River Museum, Zaragoza
Endesa Head Offices, Madrid
Erdisu - Building, Granada
ESADE, – Barcelona
Europe Building, Valencia
Euskatel Telefonía, Vizcaya
Ferrovial Head Offices, Madrid
Fremap Mapfre, Madrid
Galicia Government, Pontevedra
Galicia Parliament, La Coruña
Ginés Navarro Building, Madrid
Health Ministry, Vizcaya
Hidrocantábrico Head Offices, Asturias
High Performance Centre, Huesca
Iberdrola Tower, Vizcaya
Iberia Aventis, Madrid
Ikerlan, Guipúzcoa
Inem, Madrid
ING Team, Vizcaya
Isdefe, Madrid
IT School, Granada
Jaén Newspaper, Jaén
Jesuit School, Vizcaya
Joaquín Rodrigo Music Higher Conservatory, Valencia
Justice City, Alicante
Kursaal Theatre, Barcelona
La Salle Campus, Madrid
La Unión y el Fénix, Madrid
Labour University, Asturias
Las Provincias Newspaper, Valencia
LKS Building, Guipuzcoa
Mahón Hospital, Balearic Islands
Mango, Barcelona
Mapfre, Valencia
María Moliner Municipal Public Library, Madrid
Mataró General Hospital, Barcelona
Medicine School, Valencia
Meliá Hotel, Barcelona
Montepríncipe Building (Grupo Santander), Madrid
Mutua Intercomarcal Building, Barcelona
Nevada Palace Hotel, Granada
Nike, Barcelona
Nou Racó Restaurant, Valencia
ONCE, Barcelona
Ophthalmological Centre, Valencia
Palau de la Música Catalana, Barcelona
Paraninfo Building, Zaragoza
Parque Empresarial La Finca, Madrid
Pedro de Mena Museum, Malaga
Picasso Museum, Malaga
Plaza del Ejército Health Centre, Valladolid
Plaza Moyúa Building, Vizcaya
Princesa Letizia Auditorium, Asturias
Princess Hotel, Barcelona
Procisa, Madrid
Quirón Hospital, Vizcaya
Quirón Hospital, Malaga
RACC, Barcelona
Red Eléctrica Española, Las Palmas
Renta Aragon Building, Zaragoza
Reus Teaching Hospital, Tarragona
Rovira i Virgili University, Tarragona
San Jorge University, Zaragoza
San Miguel de los Reyes Library, Valencia
Sant Boi Hospital, Barcelona
Santa Elena Clinic, Malaga
Sea Port, Tarragona
Seat, Barcelona
Son Dureta Hospital, Balearic Islands
Summer Course Building, Asturias
Sun Microsystem, Madrid
Teknon Medical Centre, Barcelona
Telefónica Móvil, Madrid
Telefónica ZeroZero Tower, Barcelona
Torre Barcelona Building, Barcelona
Tourism Board, Málaga
Tyrsa, Valencia
UGT Trade Union, Granada
Unión Fenosa, Madrid
Valeo Térmico, Zaragoza
Vienna and Dublin Buildings, Barcelona
Vigo University City, Pontevedra
Vigo University, Pontevedra
Villablino Hospital, Leon
Vueling Building, Barcelona
Water Tower, Zaragoza
Wellness Hotel, Valencia
Works Clerks College (COAATM), Madrid
Xanit Clinic, Malaga
Zaragoza City Hall, Zaragoza
Zaragoza Conference Center, Zaragoza

Trinidad and Tobago

Waterfront International,
Port of Spain

United Kingdom

BECAD Hospital, London
Hurlston Golf Club, Lancashire
US3 Tower, Liverpool

Bandalux

3

Blinds and Shades systems · **Product specifications**

bandalux.com

Roller shade O–Box

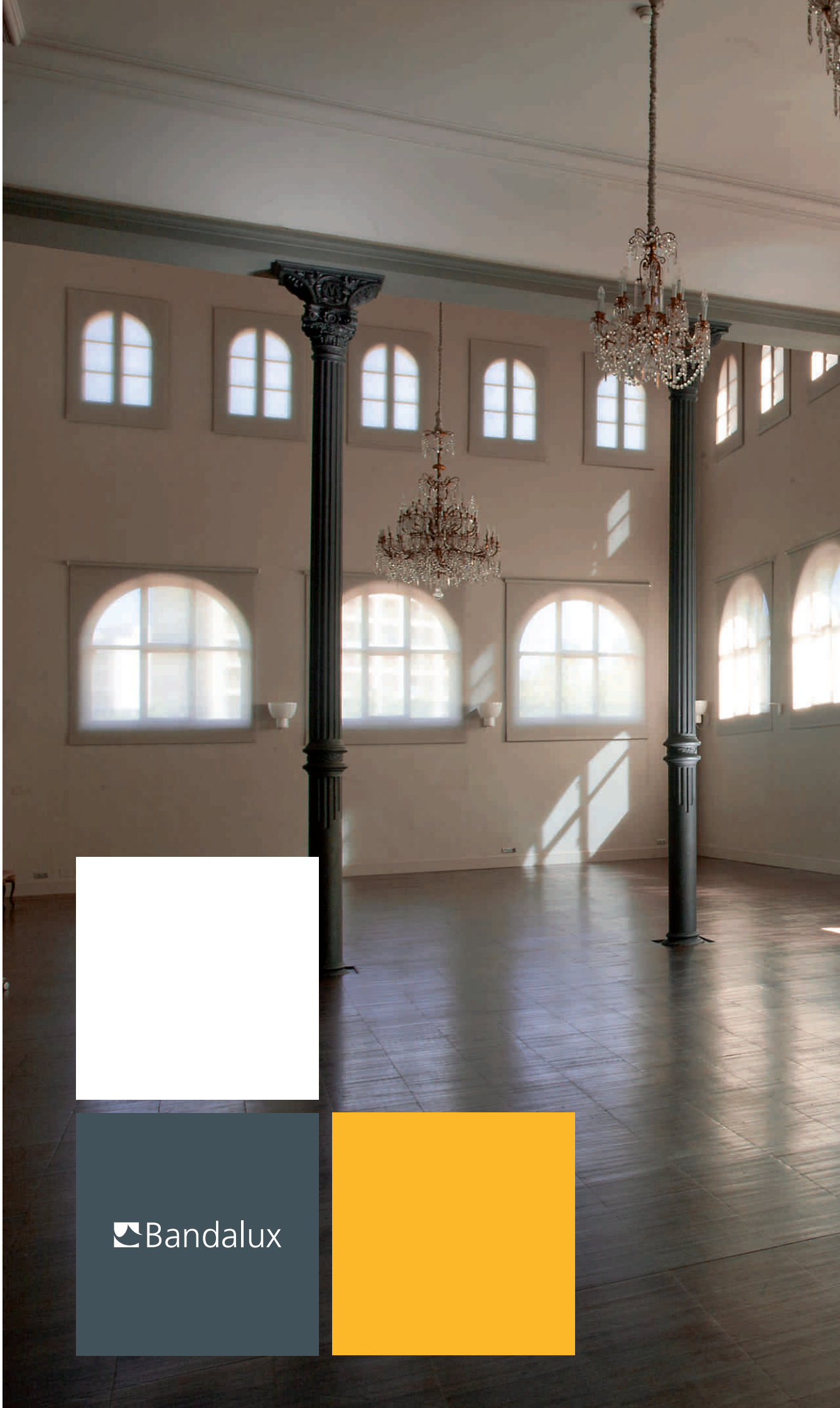
Bandalux

Product specifications

	INTERIOR	EXTERIOR	INTEGRATED	
Premium Plus roller shade	•	•	•	44
Arion roller shade	•	•	•	50
Roller shade with cassette:				
· D-BOX (T-BOX)	•	•	•	56
· O-BOX	•	•	•	57
· Z-BOX	•	•	•	58
Deco vertical blind	•	–	•	64
Omega aluminum venetian blind	•	–	•	70
Imagine pleated blind	•	–	•	76
Zen sliding panel	•	–	•	82
Matik draperie	•	–	•	88
Veranda awning	•	•	–	92
BSO exterior aluminium venetian blind	–	•	•	96

In order to adapt to the requirements of each project, Bandalux presents a broad range of solutions in solar protection that adapt to the building's aesthetic and functional particularities, providing optimal light management and energy efficiency.

Note: All measurements are given in millimetres/inches.
For further information please consult the Bandalux Price List Technical Data.


Bandalux

Motorised Premium Plus roller blind with Polyscreen® 352 Blanco Sable fabric. OF=1% gtot Int= 0,39 gtot Ext= 0,1

Suggestions for choosing a solar shading solution

How to decide:

- Orientation, weather and season of the year to be prioritised
- Lux requirements according to the activity
- Type of light entry management
- Privacy
- Energy saving
- Space to be covered
- Applicable legislation and regulations

To be considered

01 Dimensions & shapes of the surface to be covered

Larger dimensions require larger, and therefore heavier, blinds that can be difficult to operate. For this reason, the use of a drive motor is recommended.

Windows with irregular shapes

There are a wide variety of options for getting round curved, triangular, etc.

02 Need for light/privacy management

- Fabrics with **different degrees of shading**
- **Anti-reflective pearly fabrics:** they avoid glare in indoor spaces.
- **Double shade supports or night/day blinds:** combination of dark and transparent/translucent fabric in the same system.
- **Concealer guides with 100% dark fabrics:** blacking out the room.

Suggestions for choosing a solar shading solution

03 Operation systems

Chain:
Commands should be located at an accessible height.

Crank:
Leave sufficient room for the operation.

Motor:
The electrical installation should be suited to the blind motor and its commands.

04 Installation

Special supports are required for different types of surfaces (false ceilings, plaster, beam, columns, drains, porches, etc.).

Rods

Due to their height, some blinds require a greater gathering size that must be considered in the rod's design.

05 Safety

- Certified Children Guard fabrics that do not emit toxic substances
- Certified Sanitized fabrics that are anti-odor, anti-mildew, and anti-bacterial.
- Fire retardant fabrics that do not ignite in the event of fire
- Operation systems inaccessible to children: motorisation and crank
- Aluminum guides or stainless steel cable to prevent possible fabric tearing caused by adverse weather conditions, like wind and rain.
- Automatism: wind and sun sensors that guarantee maximum resistance and protection against adverse environmental conditions.

Premium Plus roller shade

Maximum measurements

	SINGLE DROP			DOUBLE DROP
	CHAIN	CRANK	MOTOR	CRANK AND MOTOR
Maximum width	3800mm/12,47ft	3800mm/12,47ft	3800mm/12,47ft	6000mm/19,68ft
Maximum height	4500mm/14,76ft	4500mm/14,76ft	4500mm/14,76ft	4500mm/14,76ft
Maximum surface	12,9m²/42,32ft²	16m²/52,49ft²	16m²/52,49ft²	24m²/78,74ft²

Specification (example)

Bandalux Premium Plus roller shade system operated by a Motion AC 230V/50Hz (120V/60Hz) motor, in Polyscreen® 350 technical fabric with an openness factor of 10%, comprised of 80% PVC and 20% high-tenacity PES, a weight of 390 g/m²(148oz/ft²) and a thickness of 0,53mm(0,0210")(±5%), and fire behaviour certificate M1/C1/B1/NFPA. The fabric is rolled by tubes with diameters of ø44-55-65mm ($1^{3/4"}$,$2^{3/16"}$,$2^{9/16"}$) according to the shade dimensions and with a bottom counterweight of ø20mm (3/4") concealed by the fabric. The tube and the bottom counterweight are made of extruded aluminium. Interior ceiling installation by mechanically fixed metal supports. Profile and trim colours coordinated with fabric colour or according to specifications. Optionally, they include a lateral guide with braided ø3,5mm (1/8) plasticised steel cable. The ceiling-to-floor cable guide fixing includes top and bottom steel supports. The installation supports and guide components have an anti-corrosive treatment. The guide rails are telescopic and permit angular oscillation for better control of movement

Text is subject to change according to specification

Characteristics

- To cover up to 24m² (258ft²) of surface area with a single drive.
- Homogeneous filtration of incoming light flow, since the shade acts as a screen, covering the whole glazed surface.
- Rustproof guides and components for exterior installation. The shade, which is integrated into the facade, plays a key role in the building's design by responding to thermal and light demands.
- The roller shade can be personalised, including logotypes, motifs and slogans.
- Fabrics that comply with building standards and regulations: Polyscreen®, fire retardant, darkening agents, mother of pearl (anti-reflective), anti-bacterial, recycled.

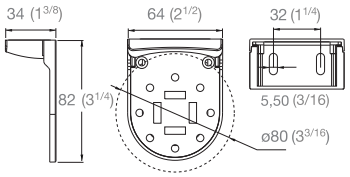
Motorised Premium Plus roller shade with Ecoreflex Grey fabric.
OF= 5%
gtot Int= 0,39

Motorised Premium Plus roller shade with Polyscreen® 403 Blanco Sable fabric. OF=3%
gtot Int= 0,38
gtot Ext= 0,13

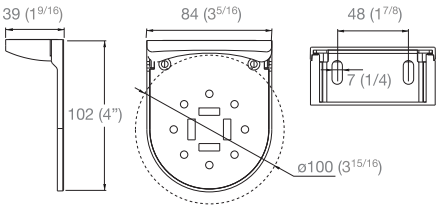
Premium Plus
roller shade

Premium Plus
roller shade,
installation
on rod with
Polyscreen® 350
Tobacco fabric.
OF= 10%
gtot Int= 0,49

Supports and covers mm (in)



Premium Plus I Support



Premium Plus II Support

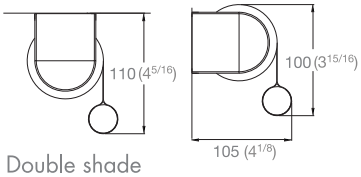
Premium Plus roller shade, with double intermediate support and Polyscreen® 555 Crystal White fabric.
OF= 5%
gtot Int= 0,39

Double intermediate support

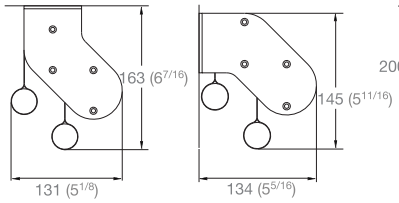
It allows to install two or more blinds with only one operating mechanism, by motor or crank.

Stacking height mm (in)

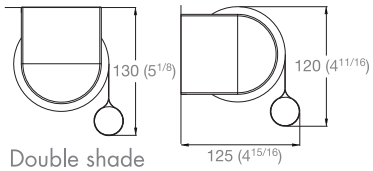
Premium Plus I



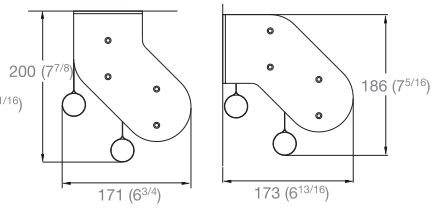
Double shade

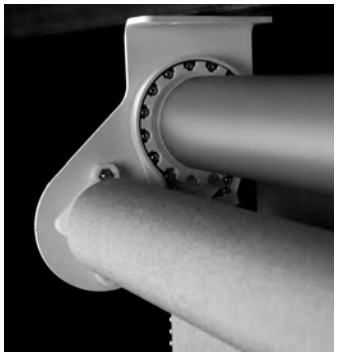


Premium Plus II



Double shade

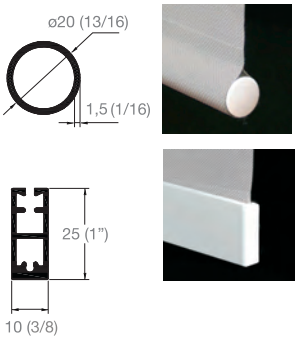


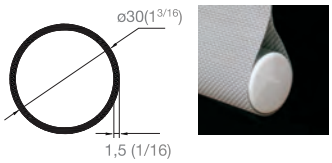


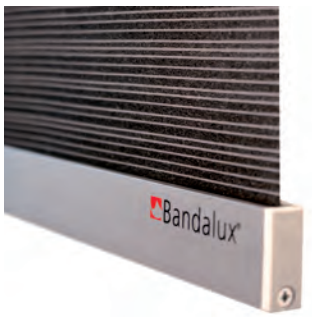
Double shade support

Premium Plus roller shade, with "U" reinforced guide exterior installation and intermediate profiles with Polyscreen® 650 Blanco Lino fabric.
OF=3%
gtot Int= 0,38
gtot Ext= 0,13

Bottom weight mm (in)



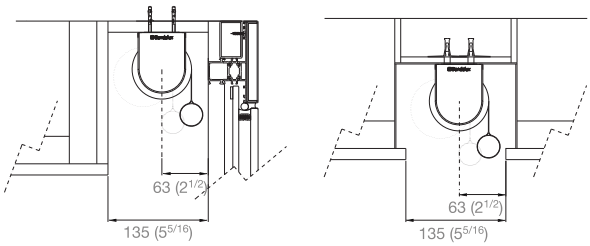




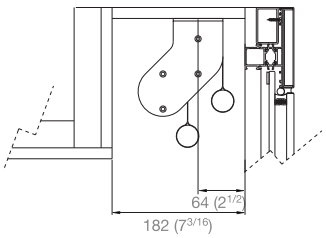
Installation

INTERIOR

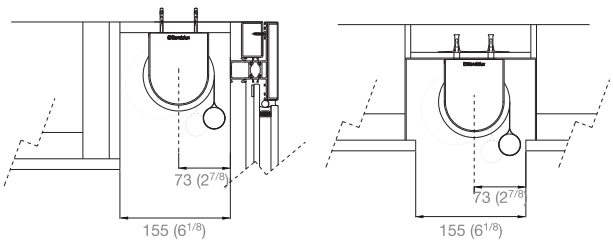
Premium Plus I on rod



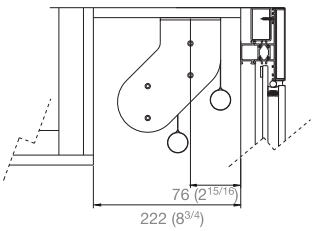
Double Premium Plus I on rod



Premium Plus II on rod

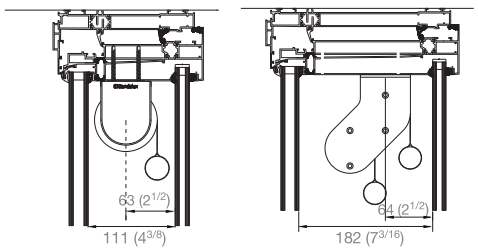


Double Premium Plus II on rod

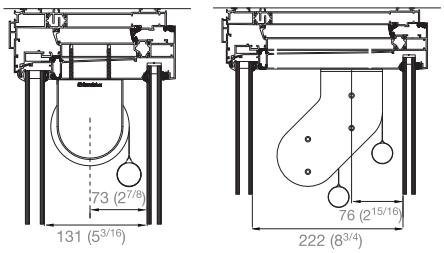


INTEGRATED

Premium Plus I

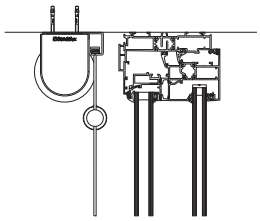


Premium Plus II

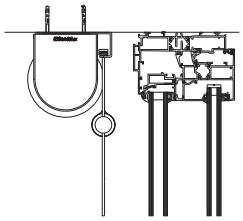


EXTERIOR

Premium Plus I



Premium Plus II



Arion
roller shade

Maximum measurements

	SINGLE DROP		DOUBLE DROP	
	CRANK	MOTOR	CRANK	MOTOR
Maximum width	4750mm/15,58ft	4750mm/15,58ft	9000mm/29,53ft	9000mm/29,53ft
Maximum height	6000mm/19,68ft	7000mm/22,97ft	6000mm/19,68ft	7000mm/22,97ft
Maximum surface	28,5m²/306ft²	33,3m²/358ft²	54m²/581ft²	63m²/678ft²

Specification (example)

Bandalux Arion roller shade system is operated by a Motion AC 230V/50Hz (120V/60Hz) motor, in Polyscreen® 550 technical fabric with an openness factor of 5%, comprised of 85% PVC and 15% high-tenacity PES, a weight of 581 g/m² (220oz/ft²) and a thickness of 0,69mm(0,0272″)(±5%), and fire behaviour certificate M1/C1/B1/NFPA. The fabric is rolled up by metal tubes with diameters of ø65-83mm (2 9/16″ - 3 1/4″), according to the shade dimensions. The shade has a concealed steel profile with a diameter of ø40mm (1 9/16) by way of bottom counterweight. The roll-up tubes and the bottom counterweight have an anti-corrosive treatment. Exterior wall installation by mechanically fixed metal supports. An optional lateral guide is included with ø5mm (1/5″) stainless steel cable. The ceiling-to-floor cable guide fixing includes top and bottom steel supports for tightening. The installation supports and guide components are made of aluminium.

Text is subject to change according to specification

Characteristics

- To cover up to 63m² (678ft²) of surface with a single drive, thanks to durable supports.
- Stainless steel cable that acts as a guide, and through which the shade slides, permitting better exterior fastening.
- Motorisation options for large structures, similar to those used for awnings.
- Fabrics that comply with building standards and regulations: Polyscreen®, fire retardant, darkening agents, anti-bacterial, recycled and all-weather resistant.

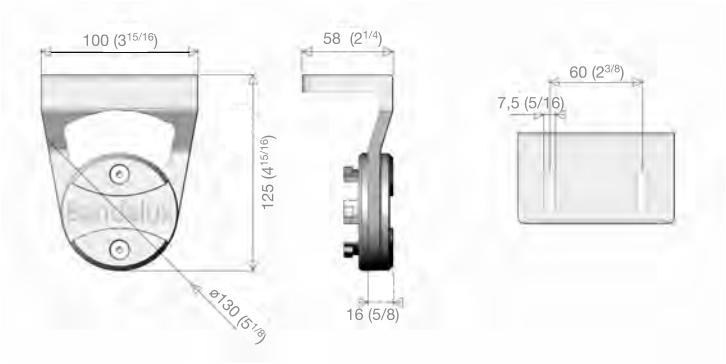
Arion roller shade with double intermediate support, with Polyscreen® 555 Silver White fabric.
OF= 5%
gtot Int= 0,41 gtot Ext= 0,17

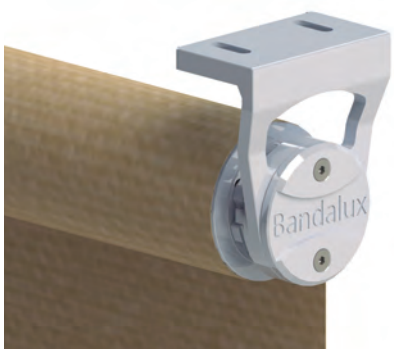
Motorised Arion roller shade with Polyscreen® 597 White Linen fabric.
OF= 7%
gtot Int= 0,39
gtot Ext= 0,16

Arion
roller shade

Arion roller shade, installation on rod with Polyscreen® 314 Linen White fabric.
OF=14%
gtot Int= 0,41

Supports mm (in)

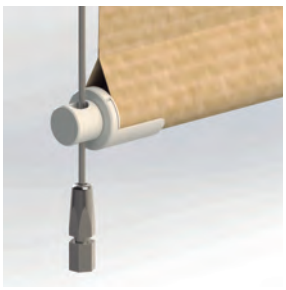




Arion roller shade, exterior installation with Polyscreen® 550 Ash fabric.
OF= 5%
gtot Int= 0,49
gtot Ext= 0,11

Motorised Arion roller shade with Black Out Black/White fabric.
OF= 0%

Cable guide



Guiding to floor

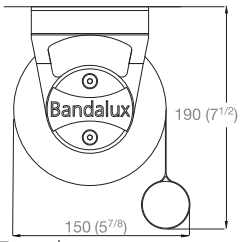
Guiding to wall

Ceiling mounting installation with guiding rod

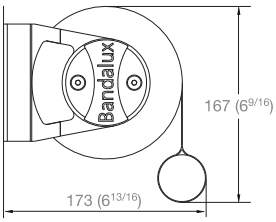
Wall mounting installation with guiding rod

Arion roller shade, interior installation, and Polyscreen® 550 Ebony fabric.
OF= 5%
gtot Int= 0,50
gtot Ext= 0,10

Stacking height mm (in)



To ceiling

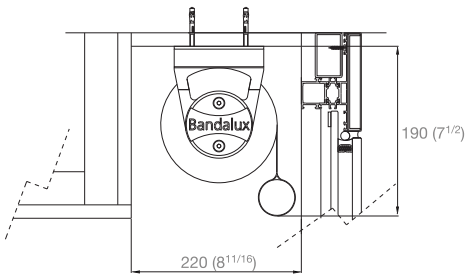


To façade

Installation mm (in)

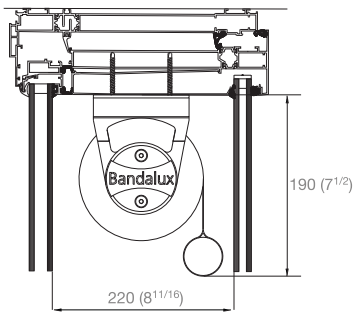
INTERIOR

On rod



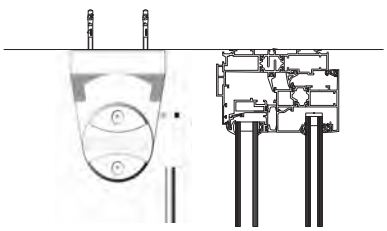
INTEGRATED

Between panes

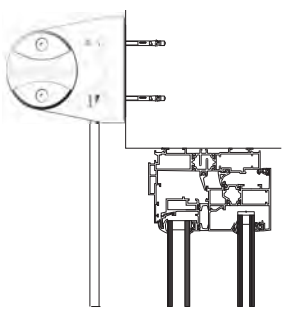


EXTERIOR

To ceiling



To façade



D-Box and T-Box roller shade

Maximum measurements

	D-BOX		T- BOX	
	CHAIN	CRANK AND MOTOR*	CHAIN	CRANK AND MOTOR
Maximum width	3500mm/11,48ft	3500mm/11,48ft	3500mm/11,48ft	3500mm/11,48ft
Maximum height	4000mm/13,12ft	4000mm/13,12ft	4000mm/13,12ft	4000mm/13,12ft
Maximum surface	9m²/97ft²	14m²/150ft²	9m²/97ft²	14m²/150ft²

Specification (example)

Bandalux D-Box roller shade system is operated by a Motion AC 230V/50Hz (120V/60Hz) motor with rear cable outlet, in Polyscreen® 351 technical fabric with an openness factor of 1%, comprised of 80% PVC and 20% high-tenacity PES, a weight of 453 g/m² (172oz/ft²) and a thickness of 0,59mm (0,0232") (±5%), and fire behaviour certificate M1/C1/B1/NFPA. The system is comprised of an accessible box containing two profiles with Qualicoat® lacquered finish. The fabric is rolled up by tubes with diameters of ø25-32-44-55-65mm (1"-1 1/4"-1 3/4"-2 3/16"-2 9/16") according to the shade dimensions and with a bottom counterweight of ø20mm (13/16"") concealed by the fabric. The profiles of the box, roll-up tubes and bottom counterweight are made of extruded aluminium. Exterior wall installation by mechanically fixed and lacquered aluminium supports. Profile and trim colours coordinated with fabric colour or according to specifications. Optionally, it includes a lateral aluminium guide for the telescopic runners assembled on the bottom counterweight. The guide runners permit angular oscillation for better control of movement caused by the force of the wind.

Text is subject to change according to specification

Characteristics

- For optimal exterior installation, guides and components are made of durable rust-proof materials with the fabric rolled up to prevent water from leaking in and damaging the system.
- The box is integrated in the building façade, with the possibility of securing the shade to the side guides without installation supports at the top (self-supporting installation).
- Multiple options: intermediates profile for exterior installation (avoiding the sail effect caused by the wind) and concealing guides (room black-out).
- Fabrics that comply with building standards and regulations: Polyscreen®, fire retardant, darkening agents, mother of pearl (anti-reflective), anti-bacterial, recycled.
- The T-Box system for Roller Shades offers freestanding solutions with telescopic guides included.

O-Box roller shade

Maximum measurements

	O–BOX	
	CHAIN*	CRANK AND MOTOR
Maximum width	3000mm/9,84ft	3500mm/11,48ft
Maximum height	3000mm/9,84ft	4000mm/13,12ft
Maximum surface	6m²/64ft²	14m²/150ft²

* Chain only available for O–Box 95mm

Specification (example)

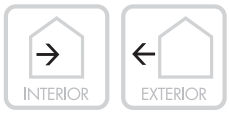
Bandalux O-Box roller shade system is operated by a Motion AC 230V/50Hz (120V/60Hz) motor with rear cable outlet, in Polyscreen® 403 technical fabric with an openness factor of 3%, comprised of 80% PVC and 20% high-tenacity PES, a weight of 432 g/m² (164oz/ft²) and a thickness of 0,53mm (0,0208") (±5%), and fire behaviour certificate M1/C1/B1/NFPA. The fabric is rolled up by tubes with diameters of ø-44-55-65-83mm ($1^{3/4}$"-$2^{3/16}$"-$2^{9/16}$"-$3^{1/4}$") according to the shade dimensions and with a bottom counterweight of ø30mm ($1^{3/16}$")concealed by the fabric. The tubes and the bottom counterweight are made of extruded aluminium. The round box of the O-Box shade is an open system comprised of two extruded aluminium profiles with Qualicoat® lacquered finish. Self-supporting exterior installation by aluminium side guide that slots into the box. These lateral profiles along with the terminal runs are fixed to the façade either mechanically or by separators. The runners assembled in the bottom counterweight are telescopic and permit angular oscillation for better control of movement caused by the force of the wind. Profile colour combined with the colour of the fabric, or according to specifications.

Text is subject to change according to specification

Characteristics

- The sleek, rounded box protects the fabric and prevents water from leaking in and damaging the system.
- Guides and components made of weather resistant material.
- The box can be moved to the desired position by means of side fixing rods.
- Fabrics that comply with building standards and regulations: Polyscreen®, fire retardant, darkening agents, mother of pearl (anti-reflective), anti-bacterial, recycled. Depending on fabric colour, the temperature of a room can be reduced by 5°C /41°F to 10°C/50°F, eliminating the need for air conditioning systems.

Z–Box roller shade



Maximum measurements

	Z-BOX	
	MOTOR	CRANK
Maximum width	4400mm/14,44ft	4000mm/13,12ft
Maximum height	4000mm/13,12ft	4000mm/13,12ft
Maximum surface	14m²/150ft²	14m²/150ft²

Specification (example)

Bandalux Z-Box roller shade system is operated by a Advance AC 230V/50Hz (120V/60Hz) motor with rear cable outlet, in Polyscreen® 550 technical fabric with an openness factor of 5%, comprised of 85% PVC and 15% high-tenacity PES, a weight of 581 g/m² (220oz/ft²)and a thickness of 0,69mm (0,0272") (±5%), and fire behaviour certificate M1/C1/B1/NFPA. The system consists of two aluminum profiles of 130x130mm ($5^{1/8}$"x$5^{1/8}$") with Qualicoat® lacquered finish, assembled together as a box with an easy opening that protects and houses the fabric roll and shade components. The fabric is rolled up by tubes with diameters of ø65-83mm ($2^{9/16}$"- $3^{1/4}$") concealed by the shade dimensions, topped at its bottom by a counterweight made of aluminum, thereby keeping fabric tight. The box profiles, roller tubes and bottom counterweight are made of extruded aluminum. Self-supporting exterior installation with lateral extruded guides with Qualicoat® lacquered finish of 48x49mm ($1^{7/8}$"x$1^{15/16}$") section, whose interior houses a mechanical device that prevents the fabric from being removed from the guides, allowing support of 90Km/h (60 mile/h.) wind speed. Both sides of the fabric present termo-solded-zipper, which slides to roll and unroll the fabric inside a co-extruded plastic profile with hardness shore calculated to damp wind forces.

Text is subject to change according to specification

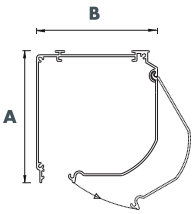
Characteristics

- It has been designed with a unique Zip system that tightens the fabric and prevents pleats and creases.
- With interior installation, the Z-box system uses Black Out fabric to provide complete shading.
- On the exterior, fabric reminds inside lateral guides to provide a high resistance to winds up to 90 Km/h.(60 mile/h.)
- Available in 2 dimensions (100mm ($3^{15/16}$") and 130mm ($5^{1/8}$")), the Z-Box roller shade is operated by crank or motor.
- Box available in 5 colors: white, black mate, grey, metal grey and stainless steel.

Z-Box
Roller Shade

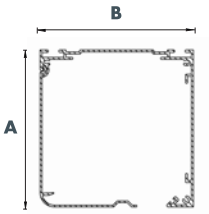
CASSETTES mm (in)

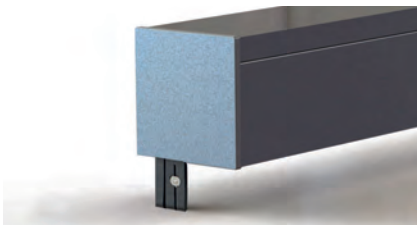
D–Box & T-Box



	D-BOX 55mm ($2^{3/16}$″)		D-BOX 65mm ($2^{9/16}$″)		D-BOX 85mm ($3^{5/16}$″)		D-BOX 110mm ($4^{5/16}$″)	
	A	**B**	**A**	**B**	**A**	**B**	**A**	**B**
D-Box without support	64 ($2^{1/2}$)	55 ($2^{3/16}$)	75 ($2^{15/16}$)	65 ($2^{9/16}$)	95 ($3^{3/4}$)	85 ($3^{5/16}$)	120 ($4^{11/16}$)	110 ($4^{5/16}$)
			T-BOX 65mm ($2^{9/16}$″)		**T-BOX 85mm ($3^{5/16}$″)**		**T-BOX 110mm ($4^{5/16}$″)**	
T-Box without support	–	–	75 ($2^{15/16}$)	65 ($2^{9/16}$)	95 ($3^{3/4}$)	85 ($3^{5/16}$)	120 ($4^{11/16}$)	110 ($4^{5/16}$)

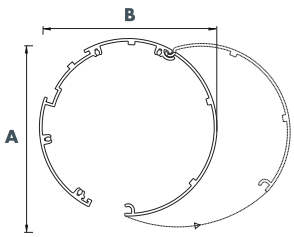
Z–Box

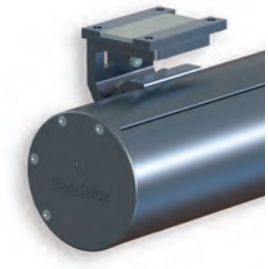




	Z-BOX 100mm ($3^{15/16}$″)		Z-BOX 130mm ($5^{1/8}$″)	
	A	**B**	**A**	**B**
Z-Box without support	100 ($3^{15/16}$)	100 ($3^{15/16}$)	130 ($5^{1/8}$)	130 ($5^{1/8}$)

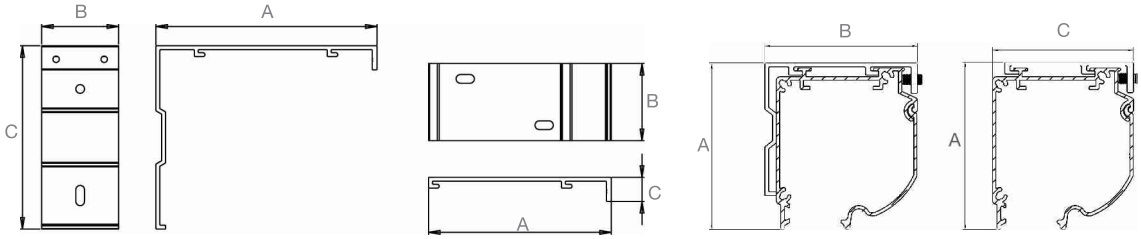
O–Box





	O–BOX 95mm ($3^{3/4}$″)		O–BOX 130mm ($5^{1/8}$″)	
	A	**B**	**A**	**B**
O-Box without support	95 ($3^{3/4}$)	95 ($3^{3/4}$)	130 ($5^{1/8}$)	130 ($5^{1/8}$)

D-Box (T-Box) mm (in)



Wall support

	A	B	C
D-Box 55	60 (2 3/8)	30 (1 3/16)	52 (2 1/16)
D-Box 65	70 (2 3/4)	40 (1 9/16)	59 (2 5/16)
D-Box 85	90 (3 9/16)	40 (1 9/16)	80 (3 3/16)
D-Box 110	115 (4 1/2)	40 (1 9/16)	95 (3 3/4)

Ceiling support

	A	B	C
D-Box 55	51 (2")	30 (1 3/16)	12,0 (7/16)
D-Box 65	59 (2 5/16)	40 (1 9/16)	12,5 (1/2)
D-Box 85	75 (2 15/16)	40 (1 9/16)	12,5 (1/2)
D-Box 110	95 (3 3/4)	40 (1 9/16)	12,5 (1/2)

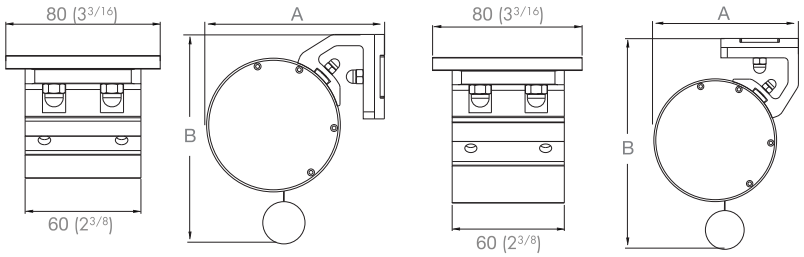
Wall support

	A	B	C
D-Box 55	66 (2 9/16)	60 (2 3/8)	55 (2 3/16)
D-Box 65	77 (3")	70 (2 3/4)	65 (2 9/16)
D-Box 85	97 (3 13/16)	90 (3 9/16)	85 (3 5/16)
D-Box 110	122 (4 13/16)	115 (4 1/4)	110 (4 5/16)

Ceiling support

	A	B	C
D-Box 55	66 (2 9/16)	60 (2 3/8)	55 (2 3/16)
D-Box 65	77 (3")	70 (2 3/4)	65 (2 9/16)
D-Box 85	97 (3 13/16)	90 (3 9/16)	85 (3 5/16)
D-Box 110	122 (4 13/16)	115 (4 1/4)	110 (4 5/16)

O–Box support mm (in)



Wall support

	A	B
O–Box 95	127 (5")	146 (5 3/4)
O–Box 130	162 (6 3/8)	181 (7 1/8)

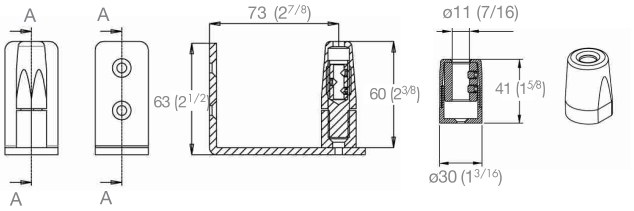
Ceiling support

	A	B
O–Box 95	112 (4 3/8)	163 (6 3/8)
O–Box 130	148 (5 13/16)	196 (7 11/16)

Z-Box roller shade with reinforced 'U' guide and Polyscreen® 351 Blanco Gris fabric. OF= 1% gtot Int= 0,42 gtot Ext= 0,08

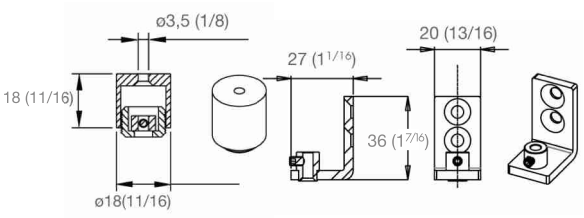
Cable guide / Rod guide mm (in)

O-Box

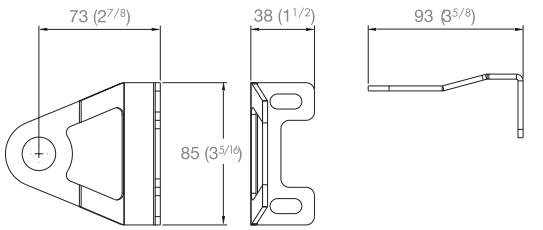


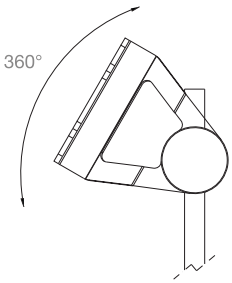
Cable Rod

D-Box



Rod guide (only O–Box) mm (in)

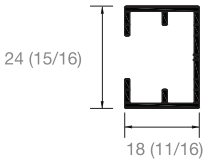




O–Box roller shade with rod guide with Black Out Black fabric.
OF= 0%

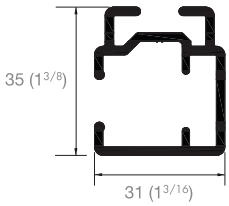
O–Box roller shade with reinforced 'U' guide with Polyscreen® Coupage String fabric.
OF= 5%
gtot Int= 0,45

D-Box and O-Box guides mm (in)



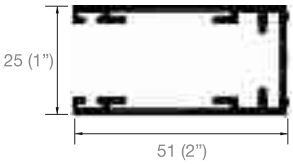
Low 'U' guide (D-Box)

Interior installation. Small guide to facilitate integration with aluminium carpentry work.



Reinforced 'U' guide (D-Box, O-Box)

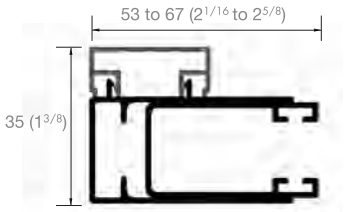
Exterior installation. Very durable and resistant. With option of separation from façade and the installation of intermediate profiles.



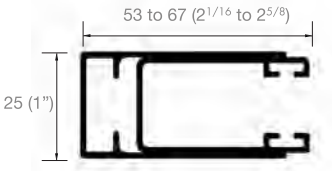
Hidden 'U' guide (D-Box)

Interior installation. Black out. Includes mat on the profile and on the guides.

T-Box guides mm (in)



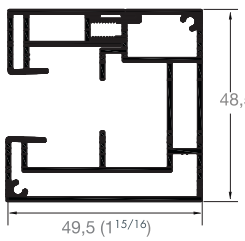
Front R2 guide



Lateral R2 guide

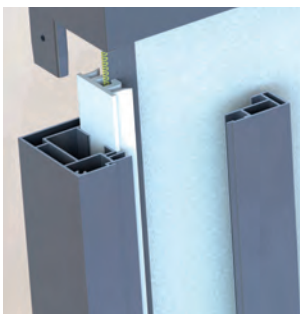
Front or lateral R2 Telescopic.
Interior and exterior installation.
Privacy with Black Out fabric.

Z-Box guides mm (in)



ZIP Guide

Interior and exterior installation. Zip system. Total darkening with Black Out fabric.



ZIP system

Blind for interior and exterior installation, designed with a unique Zip system that allows rightening of fabric to avoid pleats and creases. Suitable for a maximum area of 14m²(150ft²). High resistance to the wind. Total darkening with Black Out fabric.

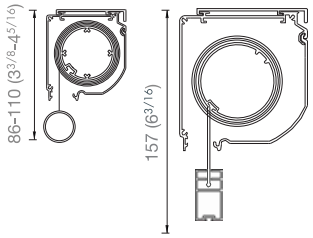
Intermediate profiles

Patented by Bandalux, the system is designed to prevent sudden movement and fabric damage caused by wind, ensuring a higher level of resistance and security.

D-Box roller shade with reinforced 'U' guide and intermediate profiles with Polyscreen® 550 Blanco fabric.
OF= 5%
gtot Int= 0,37
gtot Ext= 0,16

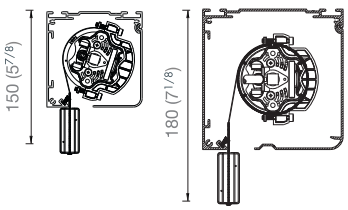
Stacking heights mm (in)

D–Box/T–Box



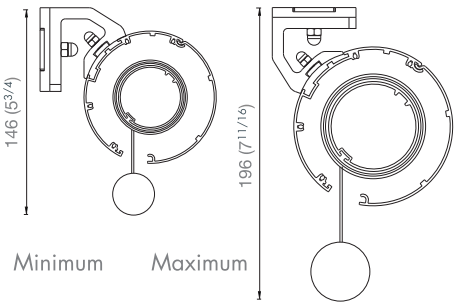
Minimum Maximum

Z–Box



Minimum Maximum

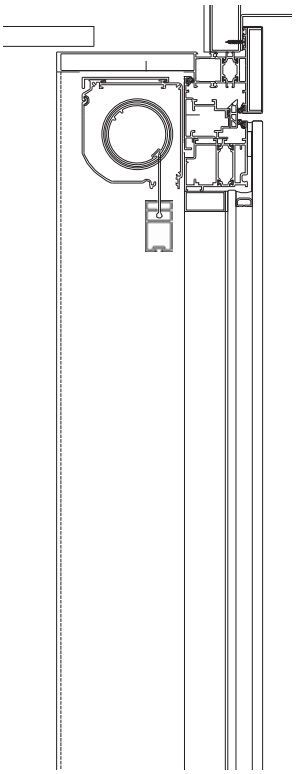
O–Box



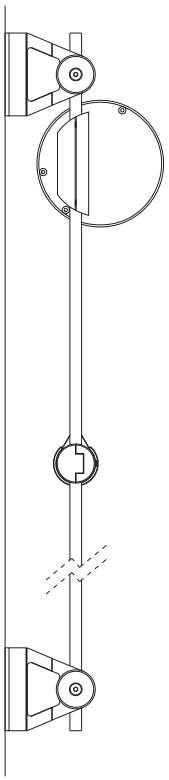
Minimum Maximum

Installation mm (in)

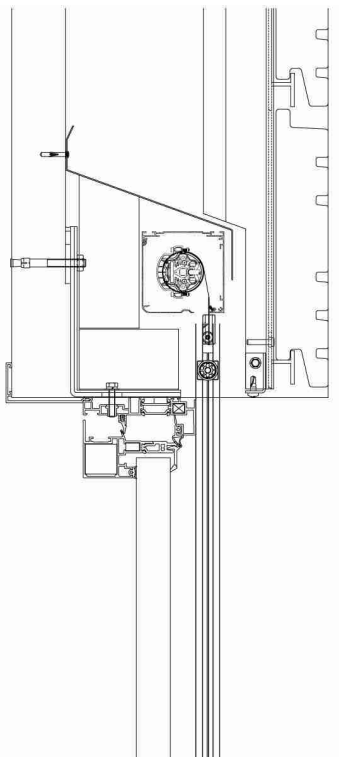
D–Box



O–Box

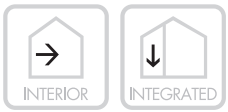


Z–Box



Note: The preceding cases of installation are only examples.
The installation of the roller shade with box (BOX, Z-BOX and O-BOX) can be adapted to any of the cases INTERIOR/EXTERIOR/INTEGRATED.

Deco
vertical blind



Maximum measurements

	TEXTILE SLAT	PVC AND ALUMINIUM SLAT
Maximum width	6000mm/19,68ft	6000mm/19,68ft
Maximum height	6000mm/19,68ft	4000mm/13,12ft
Maximum surface	24m²/258ft²	18m²/194ft²

Specification (example)

Bandalux Deco vertical blind system is operated by cord and chain for slat movement and orientation. The slat is 89mm (3 1/2) wide, in Polyscreen® 351 technical fabric with an openness factor of 1%, comprised of 80% PVC and 20% high-tenacity PS, a weight of 453g/m² (172oz/ft²) and a thickness of 0,59mm (0,0232") (±5%), and fire behaviour certificate M1/C1/B1/NFPA. The headrail is made of extruded aluminium with supports dimensions of 40x29mm (1 9/16" - 1 1/8"). Stainless steel separators are precisely cut to ensure slats overlap evenly.

Text is subject to change according to specification

Characteristics

- The blind covers up to 24m² (258ft²) of surface with a single lane up to 6-m wide containing one drive.
- The range of maneuverability allows total control of sunlight entry, offering up to 180° turns on its vertical axis. By adjusting the slats you can maintain good visibility outwards while maintaining privacy on the inside.
- Option of installation on sloping ceilings, stairs or sloping bases.
- With the curved headrail or trim option you can get overcome obstacles like stairs, partition walls, etc.
- Fabrics that comply with building standards and regulations: Polyscreen®, fire retardant, darkening agents, mother of pearl (anti-reflective), anti-bacterial, recycled.

Motorised Deco vertical blind with 89mm ($3^{1/2''}$) aluminium slats Silver Textured.
OF=0%

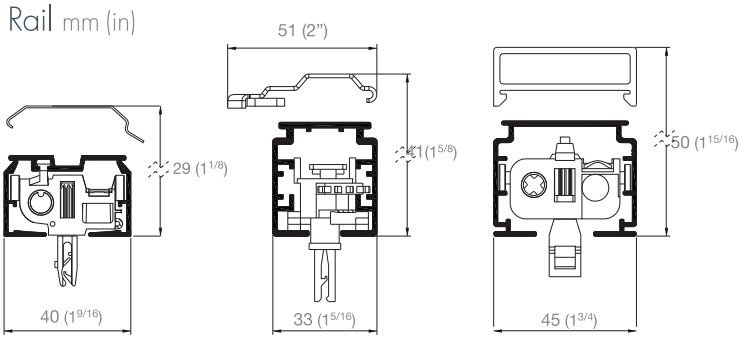
Deco vertical blind with 89mm ($3^{1/2''}$)slats with Polyscreen® 353 Blanco antracita fabric.
OF= 1%
gtot Int= 0,40
gtot Ext= 0,05

Deco vertical blind with 89mm ($3^{1/2''}$)slats` with Línea 2000 Bourgogne and Custard fabric.

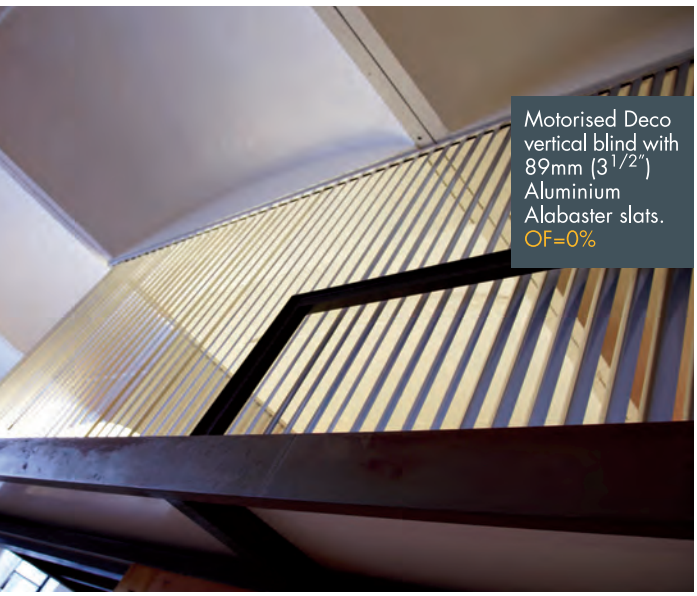
Deco
vertical blind

Deco vertical blind with 89mm ($3^{1/2}$") slats, with sloping headrail with Línea 2000 Nacarade Silver fabric.

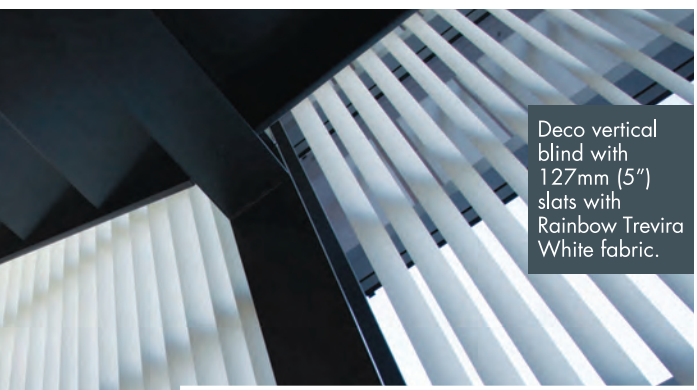
Rail mm (in)



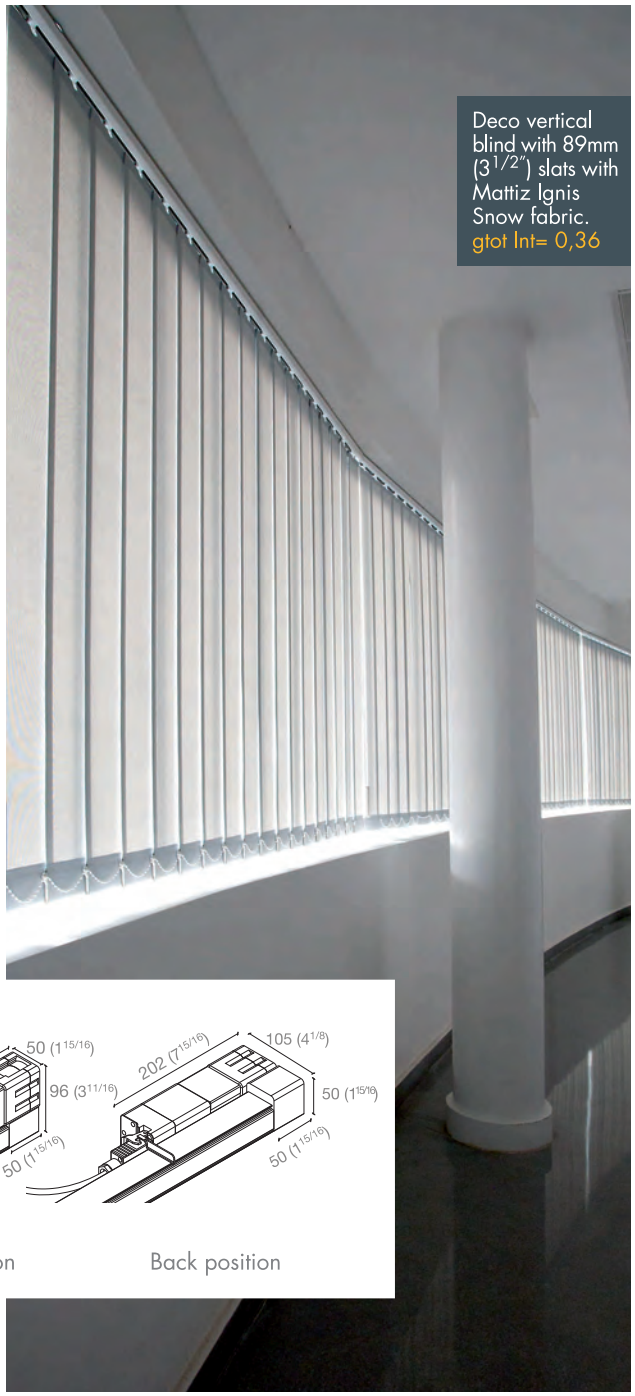
Straight rail | Curved Rail | Motor Rail



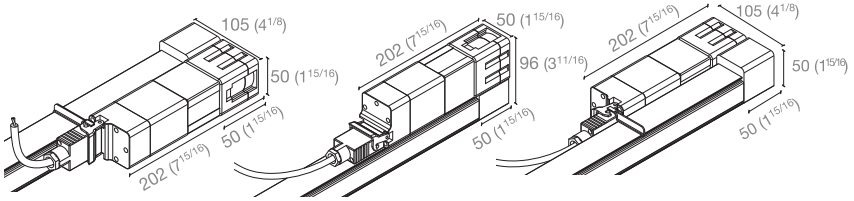
Motorised Deco vertical blind with 89mm (3 1/2") Aluminium Alabaster slats. OF=0%



Deco vertical blind with 127mm (5") slats with Rainbow Trevira White fabric.

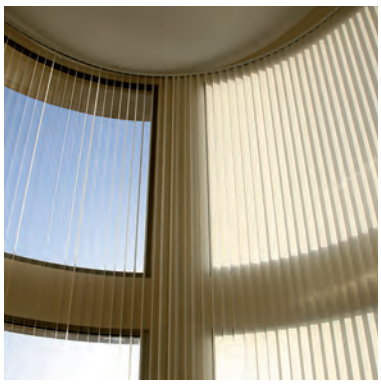


Deco vertical blind with 89mm (3 1/2") slats with Mattiz Ignis Snow fabric. gtot Int= 0,36



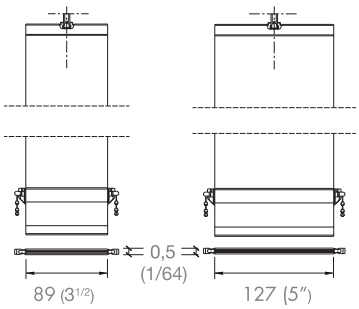
Forward position | Superior position | Back position

■ Sloped and curved headrail



Deco vertical blind with 89mm ($3^{1/2}$") slats and curved headrail with Línea 2000 Bordeaux fabric.

Slat sections mm (in)



Stacking width

For 1m (3,28ft) of blind:

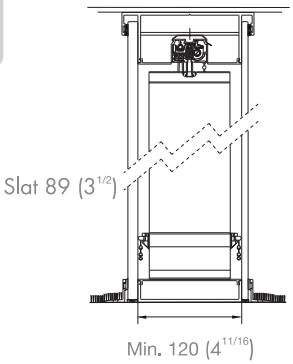
89mm (3 1/2") slats ....148 mm (5 13/16")

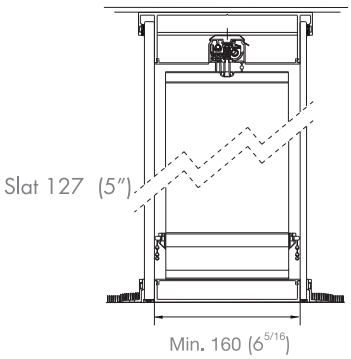
127mm (5") slats ..... 134 mm (5 1/4")

Installation mm (in)

INTEGRATED

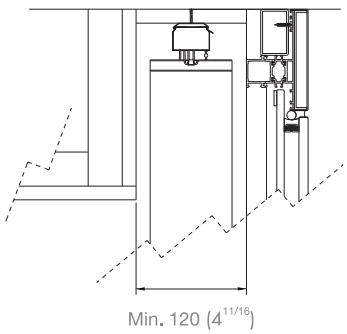
In recess

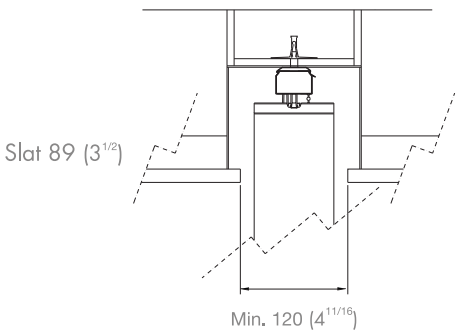


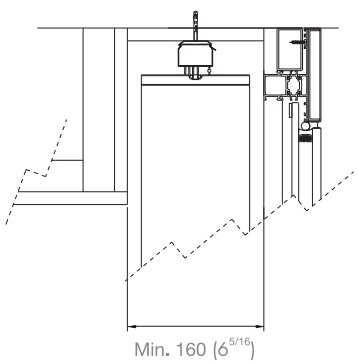


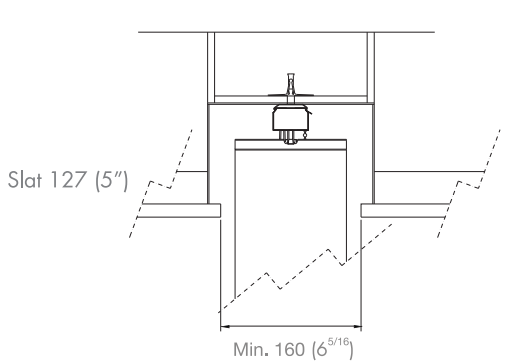
INTERIOR

On rod

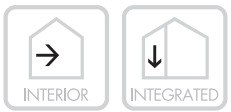








Omega
aluminum blind



Maximum measurements

	CHAIN	CRANK	MOTOR
Minimum width	2500mm/8,20ft	3000mm/9,84ft	2500mm/8,20ft
Maximum height	3000mm/9,84ft	3000mm/9,84ft	3000mm/9,84ft
Maximum surface	6m²/64ft²	6m²/64ft²	4m²/43ft²

Specification (example)

Bandalux Omega monocommand aluminum blind system with 25mm (1") aluminum slats is operated by a DC 24V motor. The Omega aluminum blind is comprised of an extruded aluminum head with Qualicoat® lacquered finish. It houses the mechanisms used to unfold, raise and orient the blind. The slat is an aluminum profile with a lacquered finish, 0,21mm (0,0083") thickness, and 25mm (1") width. A steel support with anti-corrosive treatment is used for installation. Closed aluminum terminal comprised of 2 extruded profiles.

Text is subject to change according to specification

Characteristics

- The 0,21mm (0,0083") aluminum slats rotate up to 180° on their horizontal axis, graduating sunlight from any position.
- Installation between panes is ideal for separating spaces where privacy is required.
- 100% aluminum slats, 15 (9/16") or 25mm (1") wide.
- The structure is light and ideal for installation on walls that cannot withstand a great deal of weight due to an aluminum head and terminal.
- Corrosion-proof, making it suitable for damp and saline environments.

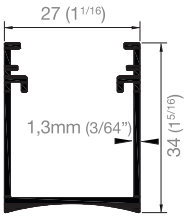
Motorised Omega aluminum blind with 25mm (1") Alabaster slats.

Motorised Omega aluminum blind with 25mm (1") Pewter slats.

Omega
aluminum blind

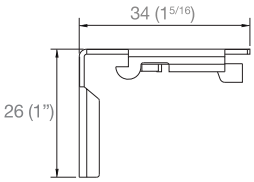
Omega aluminium venetian blind with 25mm (1") Aluminium Texture slats.

Headrail, bottom rail and support mm (in)

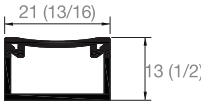


Headrail

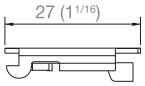
Top profile. Reduces the acoustic emissions of the motor.



Wall support



Bottom rail



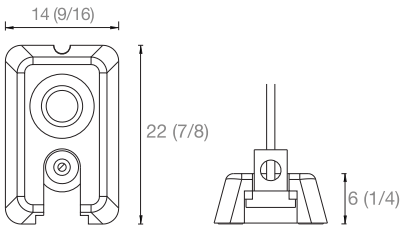
Ceiling support

Omega aluminium venetian blind with 25mm (1") White Gloss slats.

Monocommand operating system

Only one operating system (chain, crank or motor) that allows the tilt, lift or slats drop.

Guiding mm (in)

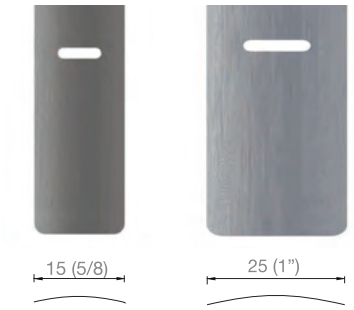


Cable guide

When unrolled, the ground bracket is concealed in the bottom rail.

Omega aluminium venetian blind with 25mm (1") Smoke Grey slats.

Slat sections mm (in)



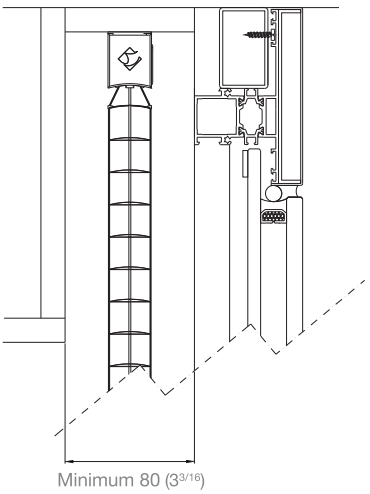
Stacking height

For 1m (3,28ft) of blind:
25mm (1") slats ..... 82mm ($3^{1/4"}$)
15mm (5/8") slats ..... 89mm ($3^{1/2"}$)

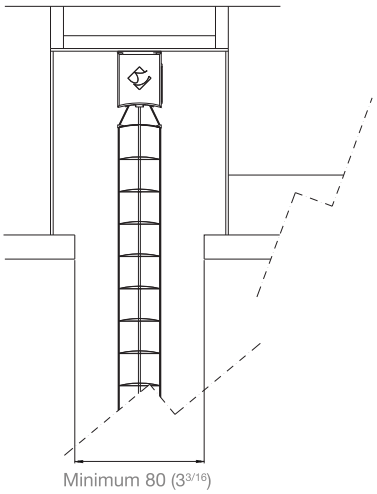
Installation mm (in)

INTERIOR

On rod

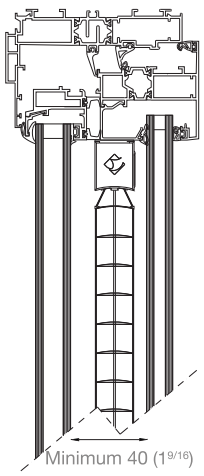


On false ceiling

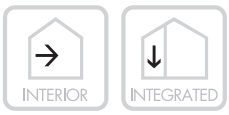


INTEGRATED

Air chamber



Imagine pleated blind



Maximum measurements

	STANDARD FABRIC	CELL FABRIC
Maximum width	2350mm / 7,71ft	4400mm / 14,44ft
Maximum height	4500mm / 14,76ft	4000mm / 13,12ft
Maximum surface	12m²/129ft²	12m²/ 129ft²

Specification (example)

Bandalux Imagine system pleated blind for windows with a maximum slope of 60°, driven by a DC 24V motor, with Solar Elegant Ignis fabric, comprised of 100% PES, a weight of 107 g/m² (40oz/ft²), a thickness of 0,2mm (0,0079") and fire behaviour certificate C1/M1/TypeB. The pleated blind is comprised of a head with a lacquered finish, inside which the operation components are located. To keep the fabric taut, there is a bar at the bottom to act as a counterweight. In turn, this profile serves to level the horizontal drop of the fabric folds. The head and the bottom counterweight are made of extruded aluminium.

Text is subject to change according to specification

Characteristics

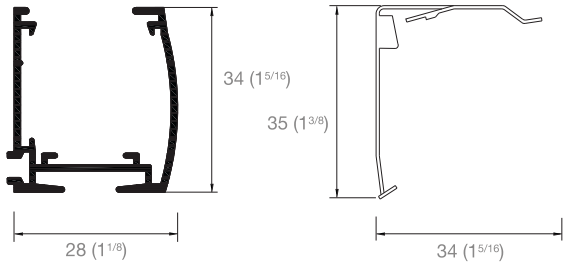
- System that covers rectangular, irregular, and circular shaped windows with gathering at the top and/or bottom.
- The night and day models permit the combination of two fabrics: a decorative fabric for daytime and a blackout fabric for nightime. The blackout fabric is pulled up during the day so that the decorative fabric covers the window, whereas the opposite occurs at night.
- Fabrics that comply with building standards and regulations:
  - *Wetex with impermeable coating*: prevents mildew from forming.
  - *Cell:* thermal insulation: improves energy efficiency by providing heat protection during the summer and keeping heat during the winter.

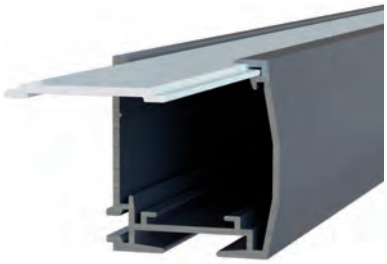
Pleated blind with Opac Cell Green fabric.
OF=0%

Imagine pleated blind

Imagine pleated blind with Ecovision White fabric. OF= 3%

Headrail and support mm (in)

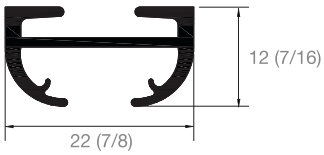


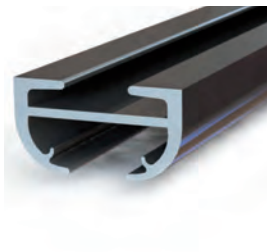


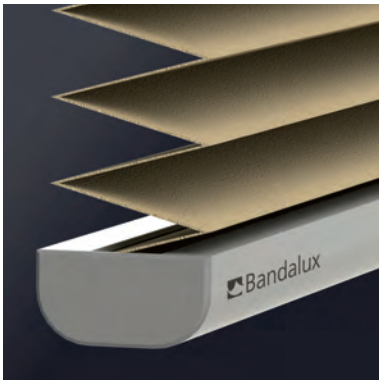
Top profile. Reduces the acoustic emissions of the motor.

Imagine pleated blind with Solar Elegant Wetex Blanco fabric.

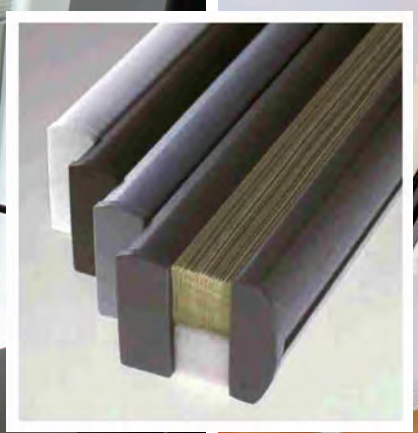
Bottom rail mm (in)





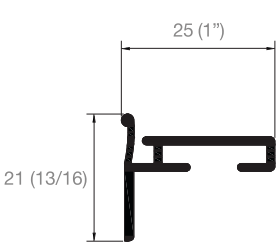


Imagine pleated blind with Lumière Nacar fabric.



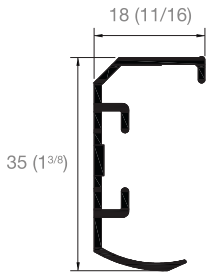
Imagine pleated blind with Pebbles White fabric.

Guide mm (in)



'L'side guide

Semi-concealing guide. Can be installed in frames with an angle of 90° or 96°.



'U' side guide

Concealing guide, integrating the fabric in the guide. Screw-free installation on the frame is possible.

Stacking height

For 1m (3,28ft) of blind:

From 40mm (1 9/16) to 60mm (2 3/8")

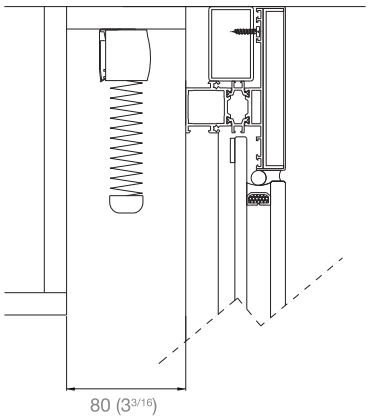
For 1m (3,28ft)of blind (with Cell fabric):

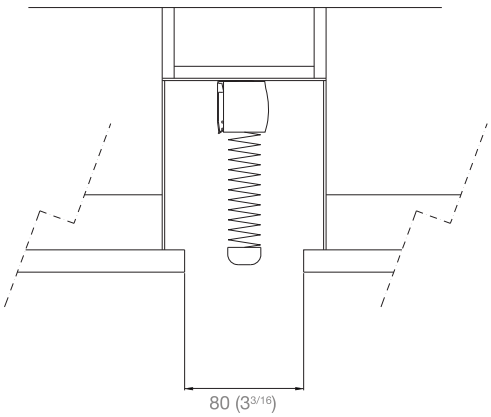
From 60mm (2 3/8") to 80mm (3 3/16")

Installation mm (in)

INTERIOR

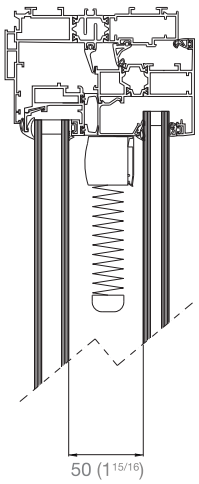
On rod





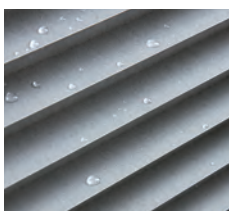
INTEGRATED

Between panes



Day and night

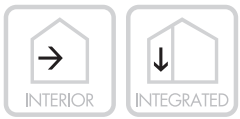
Two fabrics are combined to allow double light management: a decorative fabric for daytime and a blackout fabric for nightime. During the day, the decorative fabric brings light to the space, whereas the blackout fabric adds privacy to the setting at night.



Wetex fabric

Its impermeable coating prevents mildew from forming.

Zen
sliding panel



Maximum measurements

Maximum width	6000mm / 19,68ft
Maximum height	3250mm / 10,66ft
Maximum surface	19,5m² / 210ft²

Specification (example)

Zen sliding panel Bandalux. The system permits several types of movement (side, central or towards both ends), in Polyscreen® 403 fabric with an openness factor of 3%, comprised of 80% PVC and 20% high-tenacity PES, a weight of 432 g/m² (164oz/ft²) and a thickness of 0,53mm (0,0210") (±5%), and fire behaviour certificate M1/C1/B1/NFPA. The blind is comprised of a top profile, or headrail, in extruded aluminum with a Qualicoat lacquered finish and side tracking to keep fabric in place. The fabric is suspended from the holder by a closing tape attached to the top. At the bottom of the fabric there is a 3x40mm (1/8 x $1^{9/16}$ ")aluminium counterweight to guarantee fabric tautness. Wall installation is achieved by a support secured to the rail with a reinforced bracket. The whole ensemble is made of steel with an anti-corrosive treatment.

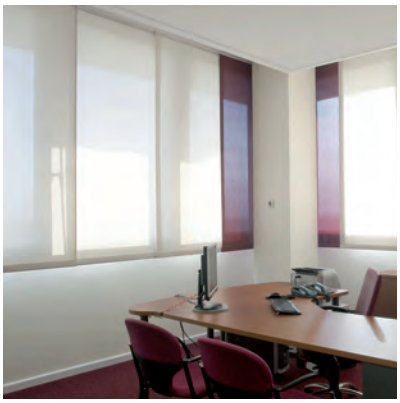
Text is subject to change according to specification

Characteristics

- The superimposed fabric layers prevent gaps where the light can filter through, increasing shading protection.
- Interior installation covers windows and separates spaces by acting as a wall or partition.
- The rail of up to 5 tracks, permit multiple gathering configurations.
- Fabrics that comply with building standards and regulations: Polyscreen®, fire retardant, mother of pearl (anti-reflective), anti-bacterial.

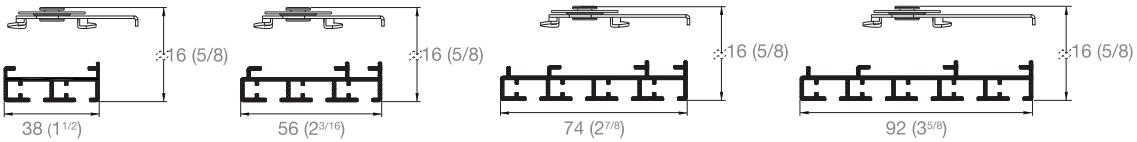
Zen sliding panel with Mattiz Ignis Snow fabric.
GToT Int= 0,39

Zen
sliding panel



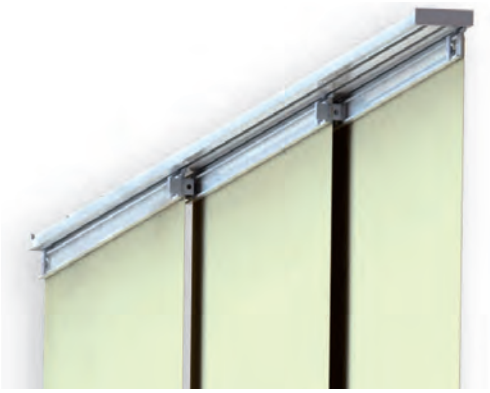
Zen sliding panel with Línea 2000 Cherry, Terracota, Orange, Sunny and Mustard fabrics.

Headrail and support mm (in)

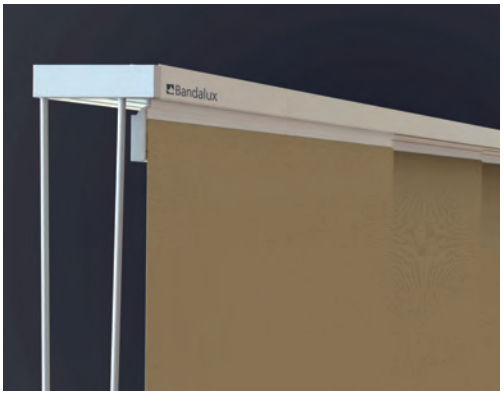


2 tracks | 3 tracks | 4 tracks | 5 tracks

Zen sliding panel with Ecoreflex Beige fabric.
OF= 5%
GToT Int= 0,39



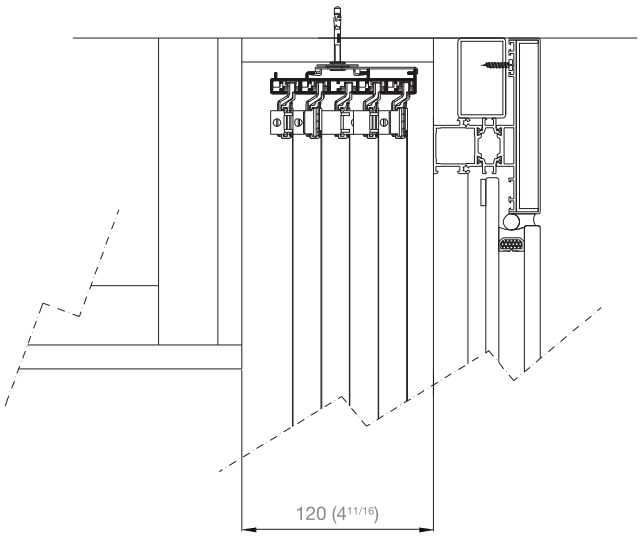
Zen sliding panel with Mattiz Ignis Ivory fabric.
GToT Int= 0,37

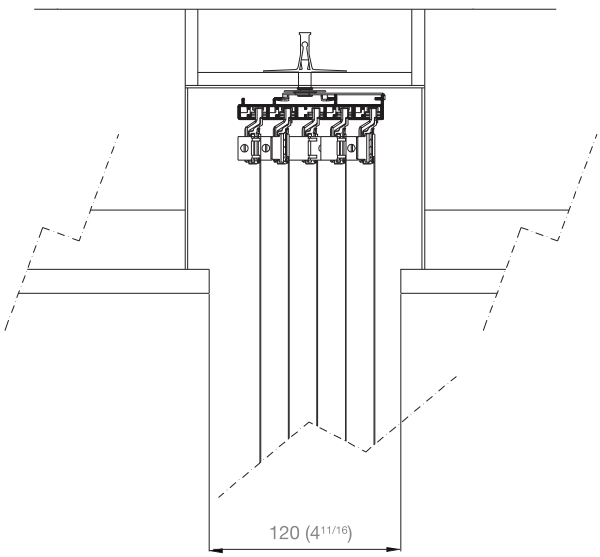


Installation mm (in)

INTERIOR

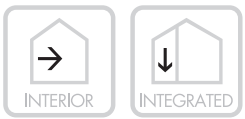
On road without motor (5 tracks)





Matik draperie

Maximum measurements



	ELEMENTS HEADRAIL	MOTOR HEADRAIL
Maximum width	5000mm /16,40ft	12000mm / 39,37ft
Maximum height	3000mm / 9,84ft	6000mm / 19,68ft
Maximum surface	15m² / 161ft²	72m² / 775ft²

Specification (example)

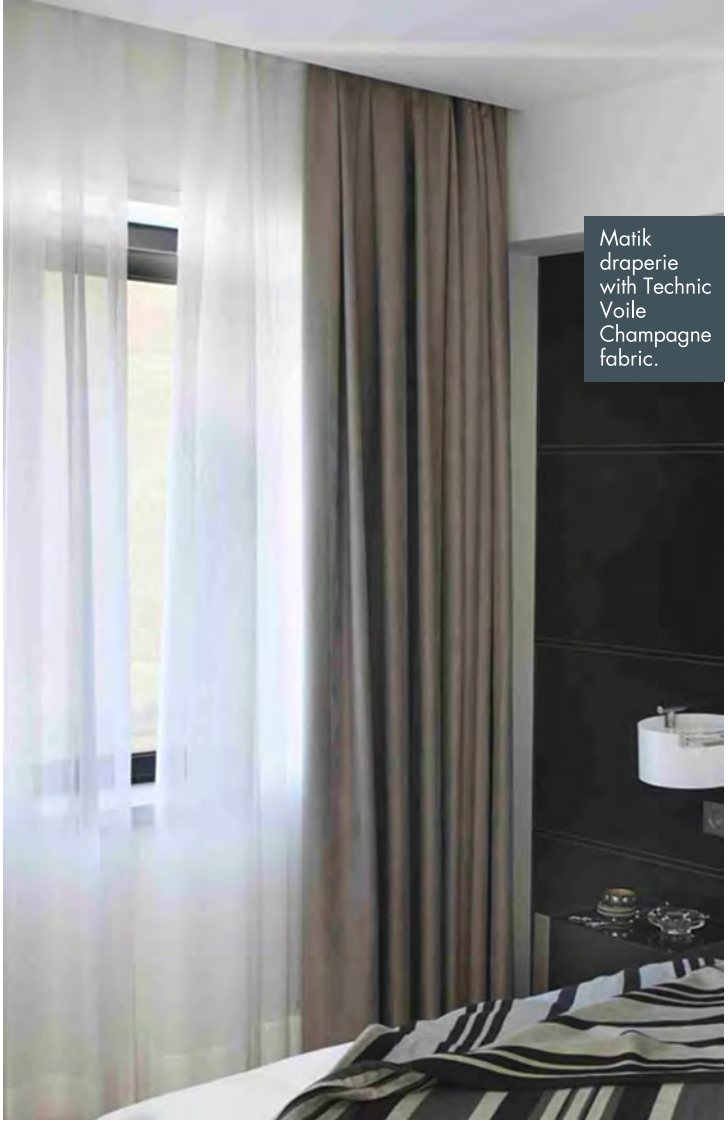
Bandalux Matik draperie system is operated by a DC 24V motor. Operation can be either by command or pushbutton, or else by manual movement of the fabric with obstacle detection halt. The blind is made of darkening Fabric, Technic Opac, comprised of 100% PES, a weight of 250g/m² (95oz /ft²) ftand fire behaviour certificate C1. The system consists of a top profile in extruded aluminum that is secured to the celing with a steel support. Steel hooks are used to slide the fabric along a rail that has been treated with an anti-corrosive solution.

Text is subject to change according to specification

Characteristics

- To cover a surface of up to 72m² (775ft²) with a single drive.
- Darkening agents provide total blackout and may be combined with a decorative fabric.
- The availability of a curved rail permits the installation of draperie in spaces with uneven walls.
- If the rail is motorised, the motor is activated automatically by pulling on the fabric, making it easier and faster to gather and open.
- Fire retardant and darkening fabrics that comply with building standards and regulations.

Matik draperie with Technic Voile White fabric.
FR: C1/M1



Matik draperie with Technic Voile Champagne fabric.

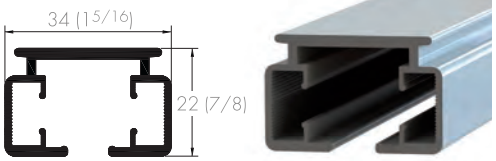
Matik draperie with Duoface Ignis Snow fabric.
100% Opac

Matik draperie

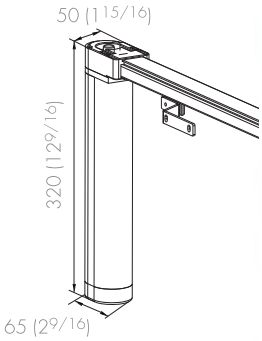
Matik draperie with Loneta Opac Beige fabric.
100% Opac

Matik draperie with Technic Opac Dove darkening fabric.
100% Opac

Motorised headrail mm (in)



Motor rail

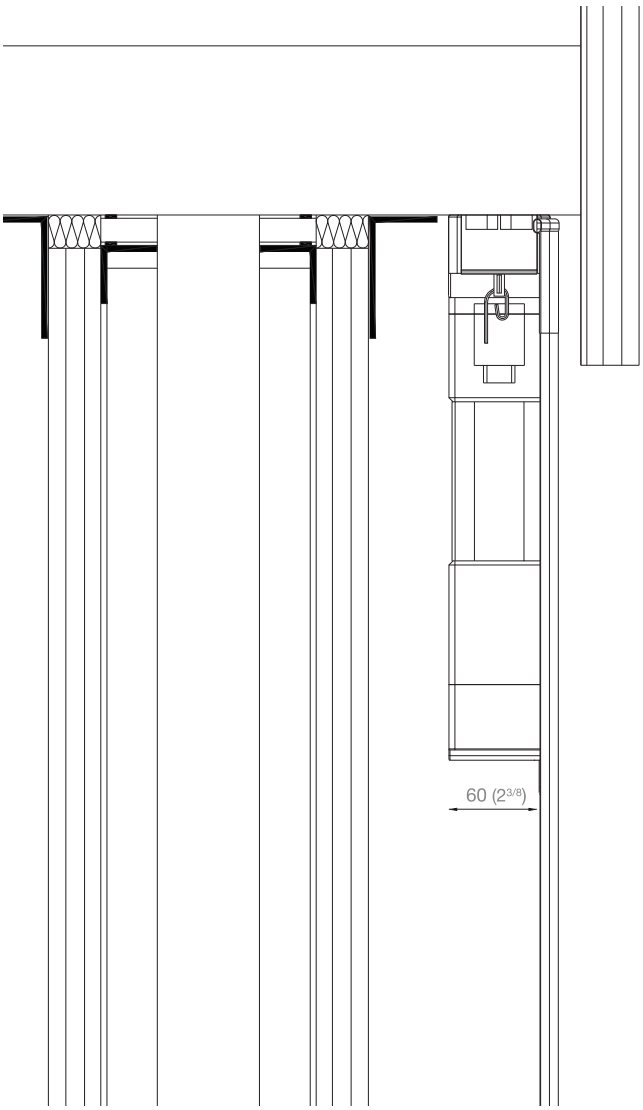


Close up of motor

Installation mm (in)

INTERIOR

Installation of motorised headrail



Veranda awning

Maximum measurements

	MOTOR
Maximum width	5000mm / 16,40ft
Maximum height	4250m / 13,94ft
Maximum surface	21,25m² / 229ft²

Specification (example)

The Bandalux Veranda awning system is a self-supporting and compact system with tensed fabric roll-up driven by an Advance AC 230V/50Hz (120V /60Hz) motor. Polyscreen® 550 technical fabric with an openness factor of 5%, comprised of 85% PVC and 15% high-tenacity PES, weight 581g/m² (220oz/ft²) and a thickness of 0,69mm (0,0272") (±5%), and fire behaviour certificate M1/C1/B1/NFPA. This system consists of a top box in extruded aluminum with a lacquered finish and measuring 155mm ($6^{1/16}$"), housing a tube of ø78mm ($3^{1/16}$") made of steel with anti-corrosive treatment where the fabric is rolled up. This box also contains driving and tightening mechanisms for the end profile and fabric. Two profiles with dimensions of 75x60mm ($2^{15/16}$" x $2^{3/8}$") are snapped into each end of the box, along which the end profile runs and the cables that keep the end profile taut are housed. The side profiles and end profile are made of lacquered extruded aluminium.

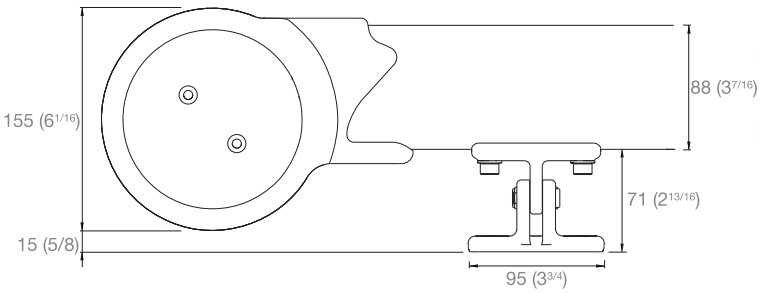
Text is subject to change according to specification

Characteristics

- Suitable for covering surfaces of up to 21,25m² (229ft²), integrated in both interior and exterior structures with horizontal, vertical, or sloping planes.
- It complies with the European Standard EN 13561, which specifies the requirements, manufacturing risks, transport, installation and maintenance of building awnings.
- The box integrated in the structure protects the fabric and the mechanisms from adverse weather conditions.
- The motorised option can easily drive large awnings up to 5m (16,40ft) wide and 4,25m (13,94ft) high.
- Polyscreen® and acrylic canvas fabrics that comply with building standards and regulations.

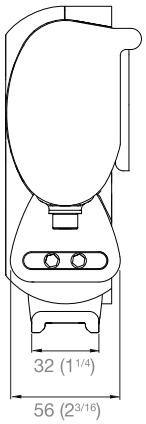
Veranda awning
with Polyscreen®
650 Linen fabric.
OF= 3%
GToT Int= 0,40
GToT Ext= 0,13

Structure mm (in)

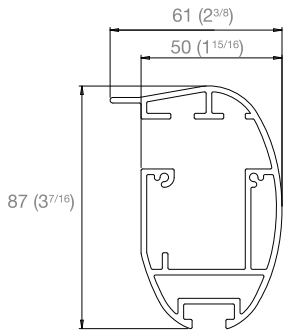


Veranda awning with Polyscreen® 353 Blanco Sable fabric.
OF= 1%
GToT Int= 0,38
GToT Ext= 0,09

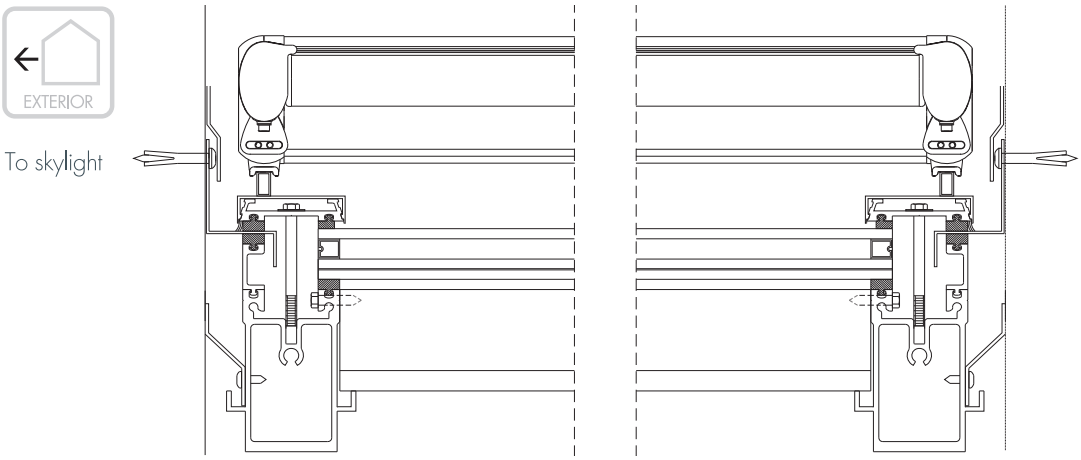
Support mm (in)



Guides mm (in)



Installation



Veranda awning with Polyscreen® 650 Blanco fabric.
OF= 3%
GToT Int= 0,37
GToT Ext= 0,14

BSO exterior aluminium venetian blind

Maximum measurements

	C80, Z90 Y Z70		F80		C50	C50+
	CRANK	MOTOR	CRANK	MOTOR	CRANK AND MOTOR	
Maximum width	4000mm / 13,12ft	4000mm / 13,12ft	3500mm / 11,48ft	3500mm / 11,48ft	2500mm / 8,20ft	3000mm / 9,84ft
Maximum height	4000mm / 13,12ft	4000mm / 13,12ft	4000mm / 13,12ft	4000mm / 13,12ft	2500mm / 8,20ft	4000mm / 13,12ft
Maximum surface	9m² / 97ft²	16m² / 172ft²	9m² / 97ft²	9m² / 97ft²	5m² / 54ft²	9m² / 97ft²

Specification (example)

Bandalux BSO exterior aluminium Venetian blind. Z90 self-supporting model operated by an Advance AC 230V/50Hz (120V/60Hz) motor, with aluminium-plated slates, a thickness of 0,45mm (0,0177"), and width of 90mm ($3^{9/16}$) with Z-shaped reinforced at the ends. It includes a weatherstrip light excluder and zamac runners at the end of the slats for sliding over the guides. The system is comprised of a steel-plate top profile, or head, with a thickness of 0.60mm(0,0232") and size of 56x58mm ($2^{3/16}$" x $2^{5/16}$") optional in aluminium), which houses the orientation and vertical movement mechanisms. The blinds are raised and lowered by the rotation of a metal shaft that drives pulleys which gather and open in 8mm (0,31") thich Texband® tape. The top profile, or headrail, and the metal shaft have an anticorrosive treatment. Optionally, it includes a side aluminium guide. These profiles carry a plastic profile for optimal system acoustics.

Text is subject to change according to specification

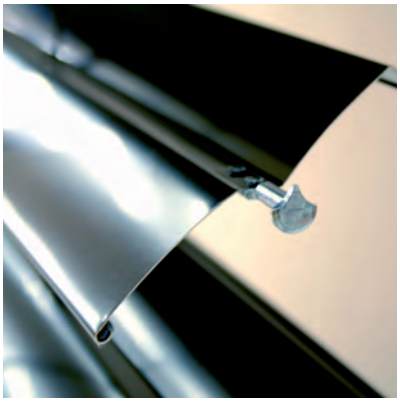
Characteristics

- Total integration in the building façade as a second skin, reducing thermal loads and contributing to energy saving.
- Various slats that adapt to all solar incidence angles, therefore making is possible to regulate incoming light and provide clear outside visibility.
- Extremely long-lasting, corrosion-free parts that can withstand extreme weather conditions. Wind resistance of up to 90 km/h (60 Mile/h) can be achieved (class 6, maximum according to EN 13659 standard)
- Installation of motors with IP55 protection to guarantee exterior installation, , ensuring the motor is protected from dust and liquids.

BSO exterior aluminium venetian blind, mod. Z70 RAL 9006.

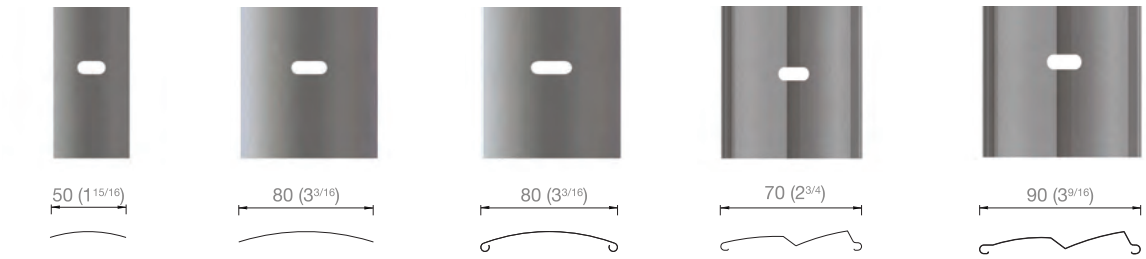
BSO exterior aluminium venetian blind, mod. F80 RAL 9007.

BSO
exterior aluminium venetian blind



BSO exterior aluminium venetian blind, mod. Z90 RAL 7038.

Slats mm (in)



C50 F80 C80 Z70 Z90

BSO exterior aluminium venetian blind, mod. C50 RAL 7016.

Guides mm (in)

'GUP' guide

Direct to wall, small [18x20mm (11/16"x13/16")] with the possibility of side installation.

'GUE' guide

Permits the use of separation brackets or telescopic supports for wall installation and for separation.

'GUD' guide

Double guide with bracket fixing.

Cable guide

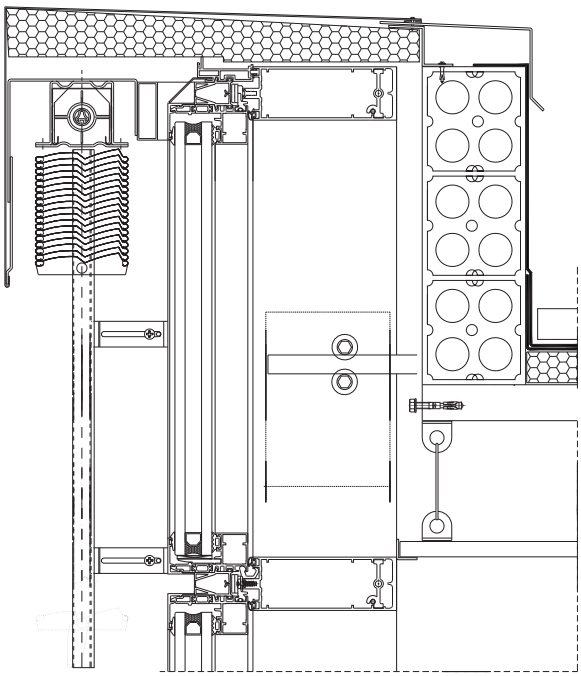
Guide for the outside lattice using ø3 - 3,5mm (ø1/8"- 5/32") braided steel cable.

Bracket guide

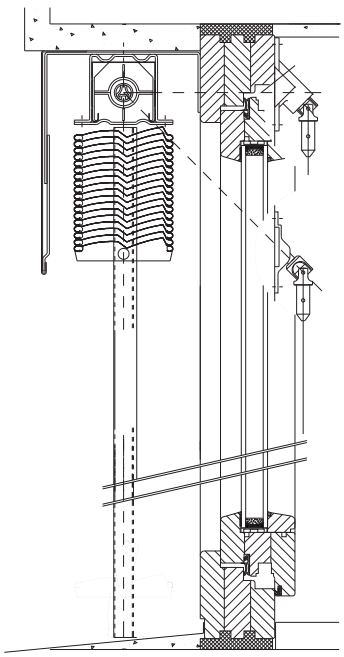
Wall installation. Separate.

Installation mm (in)

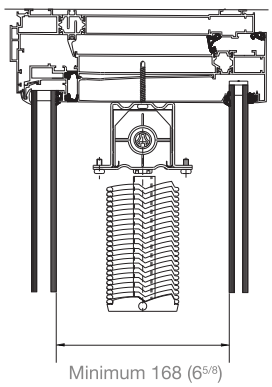
Aligned on the façade



To recess



To chamber

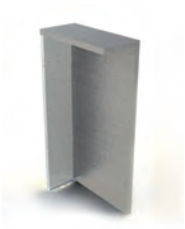


Valance

'L' valance

'U' valance

Circular valance

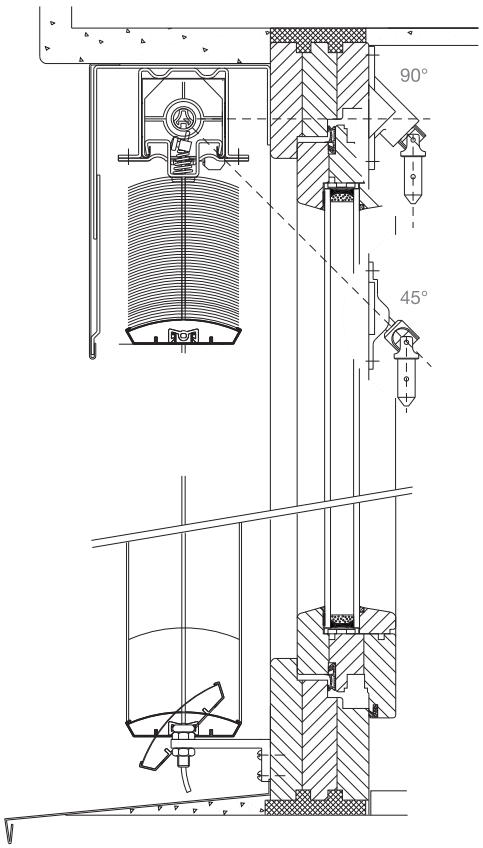


Lateral cover

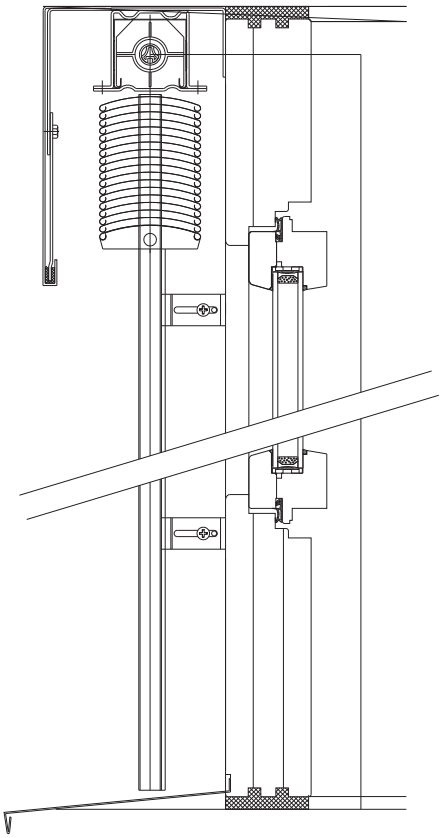
Installation

INTEGRATED

On jambs



On lintels



BSO exterior aluminium venetian blind, mod. Z90 RAL 7038.

BSO exterior aluminium venetian blind, mod. F80 RAL 9007.

BSO exterior aluminium venetian blind, mod. C80 RAL 7016.

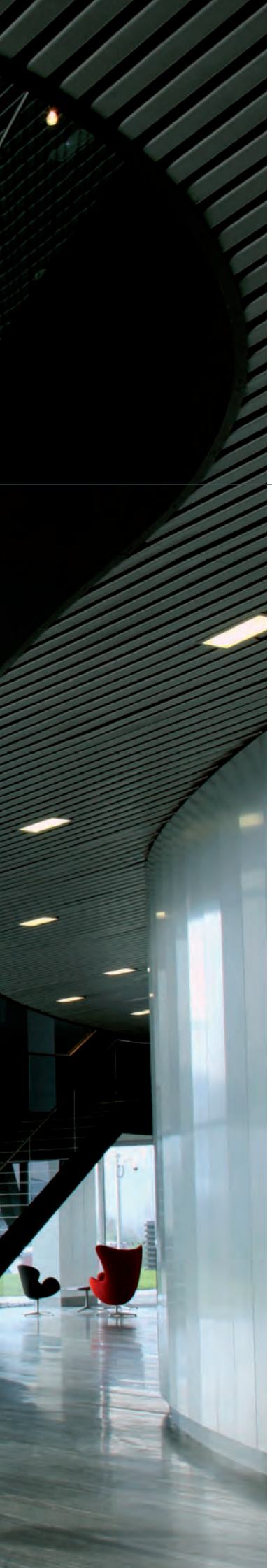
Bandalux

4

Fabrics for **special needs**

bandalux.com

Bandalux



Fabrics for specific needs

There are different types of technical fabrics with specific characteristics, designed to adapt to the particularities of each project: solar protection, light management in work areas, partial darkening or blackout, heat regulation, greater refractive index... Each case requires a study to determine the fabric that provides greatest functional efficacy.

Any fabric or material used in shading protection should guarantee the following basic characteristics:

- Filter the outside light
- Guarantee comfortable environments
- Contribute to energy efficiency
- Offer privacy
- Comply with the international standards and legislation on building elements for public spaces

POLYSCREEN®

Polyester thread
with PVC cover

Fabric features and benefits POLYSCREEN®

The technical characteristics of the Polyscreen® fabric guarantee greater energy efficiency, better solar protection and crete comfortable and sustainable environments. **Its highly resistant PVC-coated polyester** thread affords a smoother appearance, as well as greater durability to prevent tearing and fraying, making it easy to incorporate into interior and exterior design projects alike. Its mesh structure, varying weights and openness factors, lead-free composition, and **fire retardant classification** make it the leading technical fabric in light management.

fire retardant

It has all the certifications required for use in any new building project:

- Class 1: UNE EN 13773
- M1: NFP 92-503
- NFPA 701: pass
- B1: DIN 4102
- Euroclass: EN 13501
- CTE

energy saving

The fabric promotes energy efficiency by minimising the need for energy consumption in heating and ventilating (Energy Efficiency Directive 2002/91/EC), thus contributing to sustainable development. Its mesh structure filters sunlight to allow fresh air to enter while preventing interior spaces from overheating.

environmentally friendly

The fabric contains no lead or toxic substances and has a minimal impact on the environment.

highly resistant

Polyscreen fabric is highly resistant to effects caused by sunlight, ensuring minimal discoloration (4-6 Grey Scale Fastness). It performs well in situations in which the fabric is drawn tautly, is sturdier in the event of twisting, has a high resistance to tearing and breakage, and can withstand extreme environmental conditions without the need for side reinforcements.

recyclable

Recyclable fabric, which may be used in the manufacture of material such as: plastic bags, linings, floors...

high flexibility

It is a stable fabric that does not lose its shape with changes in temperature, thanks to its high linear expansion coefficient. It does not fray either. Its exclusive cylindrical thread type allows for excellent rolling and unrolling and offers an attractive textile finish.

visual comfort

For optimal light management, Polyscreen® is presented with **different openness factors: 0%, 1%, 3%, 5%, 6%, 7%, 10%, 11%, 13%, 14% and 16%**, offering personalised protection, varying degrees of transparency and privacy, and greater visual comfort.

thermal comfort

It protects the inside from heating caused by sun shining on glazed surfaces and allows air to flow through, thus achieving natural ventilation that reduces the need for air conditioning.

IMO

Polyscreen® possesses the IMO 033/08 certification of the International Maritime Organization, stating that it is resistant to saline environments and sever weather, making it suitable for use within the nautical industry.

transparency

High level of transparency, providing good visibility of the outside during the day while maintaining privacy on the inside.

nonabrasive / allergen free

It does not contain components that can cause irritation or allergic reactions during handling, such as fibreglass.

odourless

It does not give off unpleasant odours, thus protecting air quality.

versatile

A variety of blinds can be used for both interior and exterior use: vertical, roller, panel, roman shades, awnings and skylight blinds, in any size and for any type of application.

easy maintenance

It is a hygienic, dust repellent fabric that can be easily washed by submerging it in water, wiping it with a damp cloth, or by vacuuming.

colour range

Available in a range of 13 fabric families grouped by type of thickness and weight, offering more than 100 colours and infinite possibilities of personalisation on demand.

antibacterial

It provides a safeguard against bacteria and mites.

Glazing and shading solar protection

Glazing classification according to EN 14501 regulation

The European standard EN14501, published in 2005, established a method to measure and classify the thermal and visual comfort of shading solutions. The most common types of glazing were used for this analysis:

- **Glazing Standard A:** Clear single glazing 4mm
- **Glazing Standard B:** Clear double glazing 4-12-4
- **Glazing Standard C:** Double glazing low-e filled with argon 4-16-4
- **Glazing Standard D:** Reflective double low-3 glazing filled with argon 4-12-4

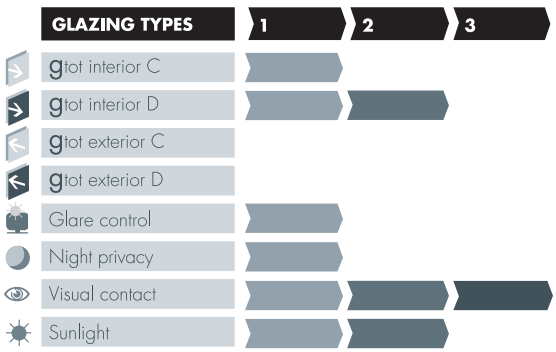
gtot are given using glazing C and D, with a 3 levels classification: LITTLE, MODERATE or GOOD EFFECT.

GLAZING TYPES	1	2	3
gtot interior C	LITTLE	MODERATE	GOOD
gtot interior D	LITTLE	MODERATE	GOOD
gtot exterior C	LITTLE	MODERATE	GOOD
gtot exterior D	LITTLE	MODERATE	GOOD
Glare control	LITTLE	MODERATE	GOOD
Night privacy	LITTLE	MODERATE	GOOD
Visual contact	LITTLE	MODERATE	GOOD
Sunlight	LITTLE	MODERATE	GOOD

See below some examples for a colour selection:

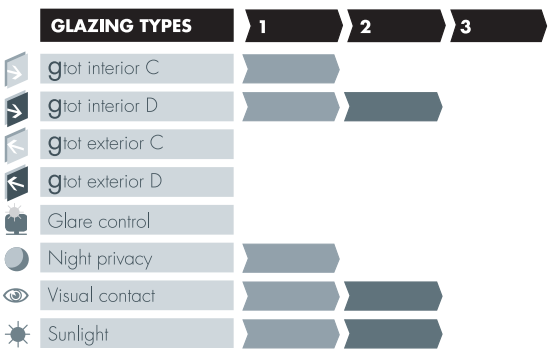
Polyscreen® 314

Colours: Ebony Orange, Ebony Linen, White Grey



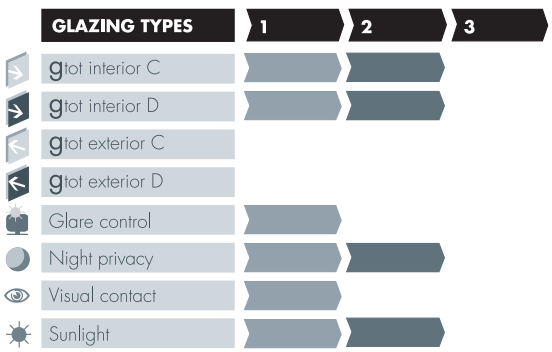
Polyscreen® 350

Colours: Linen, Blanco, Blanco Lino, Blanco Perla, Perla Gris



Polyscreen® 351

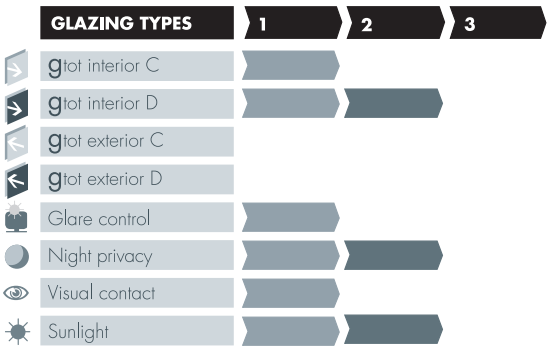
Colours: Blanco, Blanco Lino



Glazing and shading solar protection

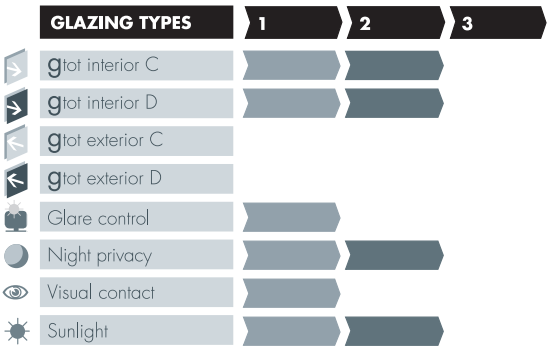
Polyscreen® 365

Colours: Blanco, Blanco Lino, Blanco Perla



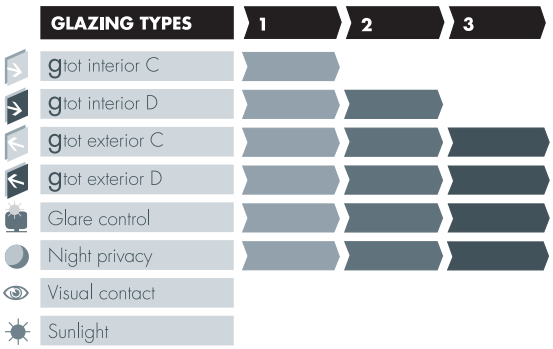
Polyscreen® 403

Colours: Blanco, Blanco Linen



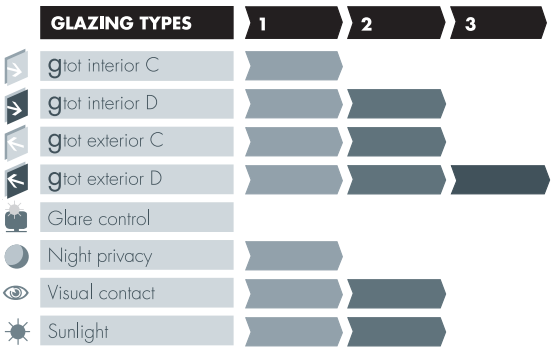
Polyscreen® 550 Black Out

Colours: Blanco, Blanco lino



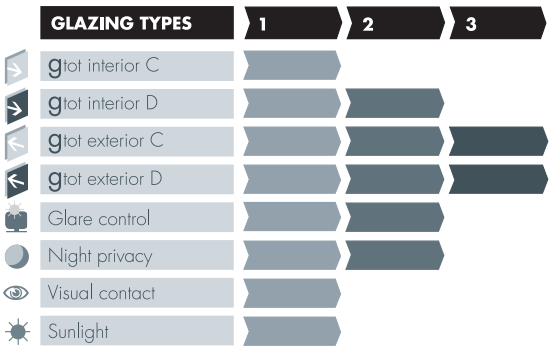
Polyscreen® 597

Colours: White Linen



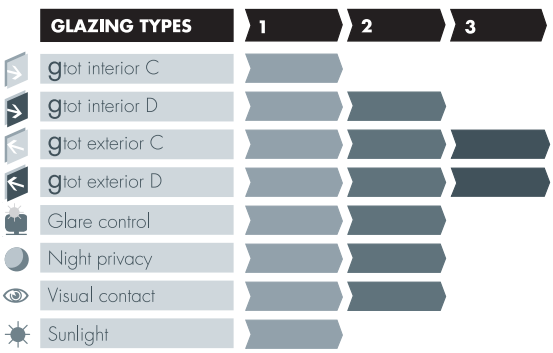
Polyscreen® 550

Colours: Ebony, Tobacco



Polyscreen® 650

Colours: Sand, Grey



Other fabrics

Blackout fabrics

They can be used in interiors and exteriors and prevent the transmission of light in rooms, delivering total privacy and keeping the heat out.

These fabrics are ideal for projection rooms, hotel rooms, buildings located in very sunny areas...

They are all guaranteed by official certifications that endorse their fire reaction rating, since in the event of fire they prevent the release of harmful gases and provide fire protection.

Recycled

Made from cotton and plastic (REQ) waste products. The use of these recycled fabrics allows for greater energy efficiency and is more environmentally friendly.

Mother of pearl

Fabric with Solar Reflective Coating (SRC) lining on the exterior filter sunlight and prevent unwanted glare to ensure visual comfort.

The mother of pearl, or nacarade, finish turns any type of fabric – thick, thin, light, or dark – into an efficient solar filter.

Other fabrics

Environmentally friendly

Hallogen- and lead-free fabrics do not emit harmful gases or toxic substances, ensuring user safety and reducing environmental pollution.

Antibacterial

They prevent bacterial growth and help create healthier, more hygienic environments, making them ideal for places like hospitals, clinics, and schools.

Waterproof

The impermeable protective film that covers these fabrics prevents mildew from forming. Recommended for wet areas: greenhouses, showers...

Other fabrics

Sunlight management

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Sunlight management

This chapter analyzes the efficiency of shading protection systems, taking into account all the parameters that affect their management, and analysing all the coefficients involved so as to make it easier to choose the solar protection system best adapted to the project.

Transmission of solar radiation

External shading solutions can eliminate up to 90% of solar radiation.

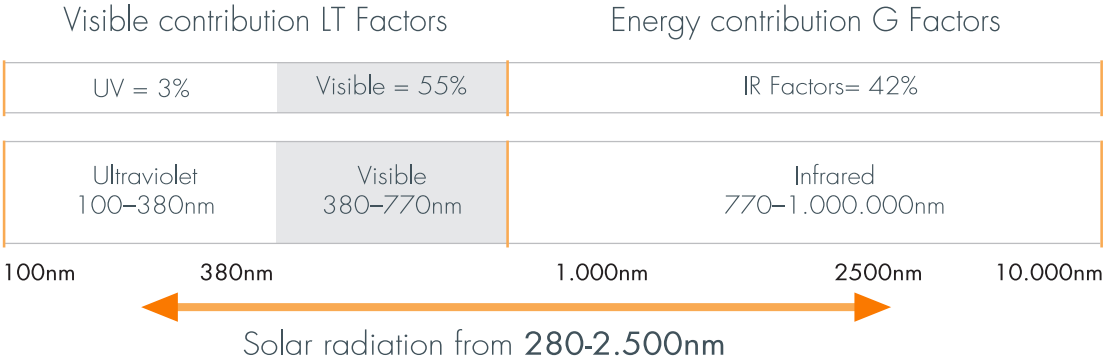
The earth receives energy from the sun in electromagnetic form, with wavelengths between 280 and 2,500 nanometres (nm).

Of this energy, only that which is between 380 and 770nm is visible to the human eye. Visible radiation accounts for approximately 50% of the total energy issued by the sun.

Of the total incident energy (wavelengths between 280 and 2500nm), the visible range (wavelengths between 380 and 770nm) will affect light transmission coefficients: LT. And the part corresponding to the infrared range (wavelengths above 770nm) will affect the solar factors: G, affecting the building's thermal gain.

Once incident solar radiation (1), particularly the infrared part, enters an ambience, it interacts with the bodies present or grey bodies*, causing them to heat and give off infrared radiation (2) on a mean wavelength of K> 1.000 nm. This radiation cannot return through the glazing, and thus eventually reheats the building. If the building is not properly ventilated, the radiation cannot get out and is reflected again by the glazing (3), giving rise to the well-known greenhouse effect inside the building.

* Grey body is defined as that which, besides absorbing energy, transmits and reflects it. Black bodies only absorb energy.



Glazing and façade coefficients

Since the advent of tempered glass, the use of glazing enclosures has become increasingly more frequent on façades, giving rise to a significant increase in the need to use shading protection systems in buildings. It should be remembered that glass is not 100% transparent, since it depends on the type of incident radiation.

The solar response capacity of a façade is calculated on the basis of two solar radiation spectra: visible and total. The coefficients that refer to the total spectrum will be energy coefficients, and those pertaining to the visible spectrum, optical-light coefficients. When considering the energy characteristics of a glazed facade, we should also take into account the characteristics of the glazing and those of the shading protection system.

All the parameters used will therefore refer to the window + solar protection ensemble. In the context of this chapter, we will be using the following terms and symbols, included in the EN 410 and EN ISO 7345 European Standards:

- g: Transmittance factor of total solar energy
- U: Thermal transmittance coefficient ($W/m^2 K$)
- G: Thermal conductance ($W/m^2 K$)
- α: Absorption
- ρ: Light reflection coefficient
- τ: Light transmittance coefficient

Subindexes:

- B: Solar protection device
- e: Exterior
- g: Glazing
- t: Total
- v: Visible

Glazing coefficients

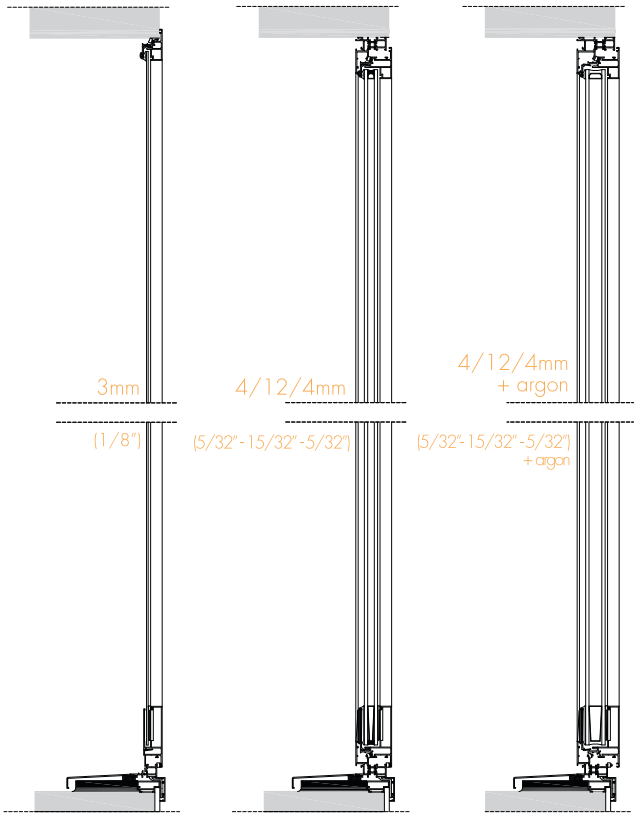
A low solar transmission coefficient is needed to achieve greater energy saving.

The transmittance coefficient (U) of a façade measures the ability to limit thermal transmissions by conduction between the exterior and the interior of a premise.

Due to increased demands in energy saving, the thermal qualities of glazing have increased in a very short period of time, giving rise to lower transmittance coefficients. With a traditional 3mm (1/8") thick glass we used to obtain U=5,9W/m²K.

With solutions with 4/12/4mm sections, values of up to U=2,7W/m²K can be reached.

If, moreover, we use a section with inert gases in the chamber, the 'U' can be reduced to 2,5W/m². The low ranges can reach 11=1,5–1,2W/m²K.



Insulating and solar glazing

Type	τ_v (solar transmision)	g_g	U_g
Single glazing 4mm (5/32")	0,90	0,86	5,9
Glazing with chamber	0,81	0,76	2,92
Glazing with low emissivity chamber	0,73	0,70	3
Glazing with low emissivity chamber	0,80	0,75	1,8
Glazing with solar control chamber	0,40	0,40	2,9
Glazing with chamber with solar filter	0,70	0,40	1,8

Glazing coefficients

From the energy standpoint, 6 basic parameters need to be defined:

U Thermal transmittance coefficient

A building exchanges energy with the outside in the form of heat. In summer, this exchange takes place from the exterior towards the interior and in winter it is the opposite. The thermal transmittance coefficient is calculated with the following formula: $U_g=Q/S * \Delta T$

Q=energy / S=surface of the glazing / ΔT=difference between interior/exterior or temperature (by convention it is 1°C)

g Solar factor/passive solar gain

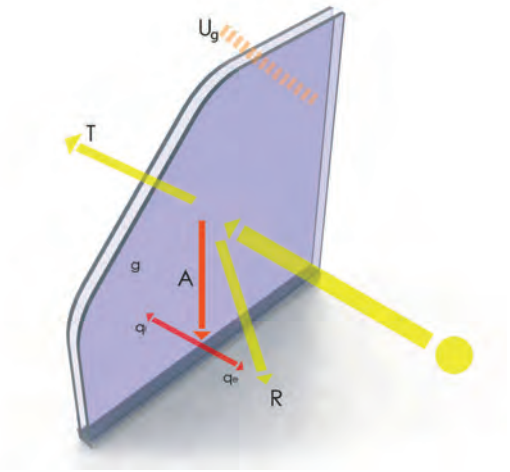
The portion of solar energy absorbed by the glazing (A) is sent, in units of time, towards the inside (qi) and the outside (qe). These components are defined by the secondary or indirect radiation, and therefore by the characteristics of the glazing used. The solar factor is calculated with the following formula: $g_g=T+qi$

T Solar transmission coefficient

It is the part of total incident solar radiation that is transmitted through glazing. Value between 0 and 1.

R Solar reflection coefficient

It is the part of total incident solar radiation reflected by glazing. Value between 0 and 1.



SC Shading coefficient

The shading coefficient SC is still used in English-speaking countries as an alternative to the solar factor. It is a relative value g of the glazing used (we call it g') with regard to the g of a light base glazing of 3mm (1/8") with g=0,87. Therefore: SC=g'/0,87

A Solar absorption factor

It is the proportion of energy that is absorbed by the glazing and which subsequently will be transferred to the environment. The energy transmitted is a secondary part of the total solar transmission. Value between 0 and 1.

Glazing with lower energy characteristics = low U and low g T+R+A=1

The following parameters need simply to be defined to make a light classification:

RL Light reflection coefficient

It is the part of incident visible radiation reflected by the glazed part. Value between 0 and 1.

LT Light transmission factor

It represents the portion of visible radiation transmitted directly through the glazing. A light tempered glazing may have an LT of 0,88–0,90.

Coefficients of shading protection systems

The shading systems as a dynamic solar protection device for managing the thermal and lighting needs.

UNE EN 13363-1 EN 14500 EN 14501

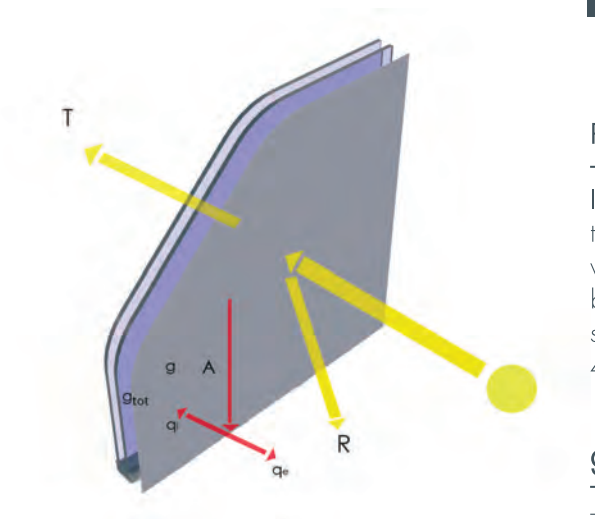
The current regulations on solar protection UNE EN 133631, UNE EN 14500, UNE EN 14501 have developed a series of optical-energy terms that help to classify blinds. They are divided into two large groups: those that affect energy transmission, and those that affect user visual comfort.

Shading protection systems can be installed on the outside, inside or in glazing chambers. To assess their effect, the parameters pertaining to glazing should be taken into account in addition to system characteristics.

Glazing manufacturers have recently made a major effort to considerably minimise the transmittance U. However, the same cannot be said of the solar factor of glazing. Moreover, the need for a low solar factor varies according to the season of the year (minimum levels are needed in summer, but not in winter), therefore glazing should not have a constant low solar factor.

In such a situation the following combination should be used: glazing with low transmittance "U" but a high solar factor, with a dynamic solar protection device. In this way the solar input can be reduced only when necessary.

Energy coefficients pertaining to glazing+blind



T Fabric's solar transmission coefficient

It is the part of the solar radiation transmitted directly through the fabric. Value between 0 and 1. For Venetian blinds, this datum is measured by orienting the slats in different positions, taking note of the reference position.

A Fabric's solar absorption coefficient

It is the part of energy absorbed by the fabric The part absorbed and re-emitted towards the interior represents the exterior part of the total transmission. Value between 0 and 1. The absorption of a body depends on its mass. In the case of blinds it depends on thickness and is obtained from the following expression:
1=absorption+transmission+reflection

The following basic parameters need to be defined to classify a shading protection system in energy terms:

R Fabric solar reflection factor

It is the part of the total incident radiation reflected by the blind. Value between 0 and 1. In the case of fabrics with different sides, the values on both sides need to be measured. For slatted blinds, the measurements should be taken with the slats in the following positions: 45° and 90°, and the orientation applied indicated.

gtot Total solar factor

The total passive gain factor **gtot** is the ratio between the solar flow transmitted through a glazing plus a blind, and the total incident flow on the surface area. Value between 0 and 1.

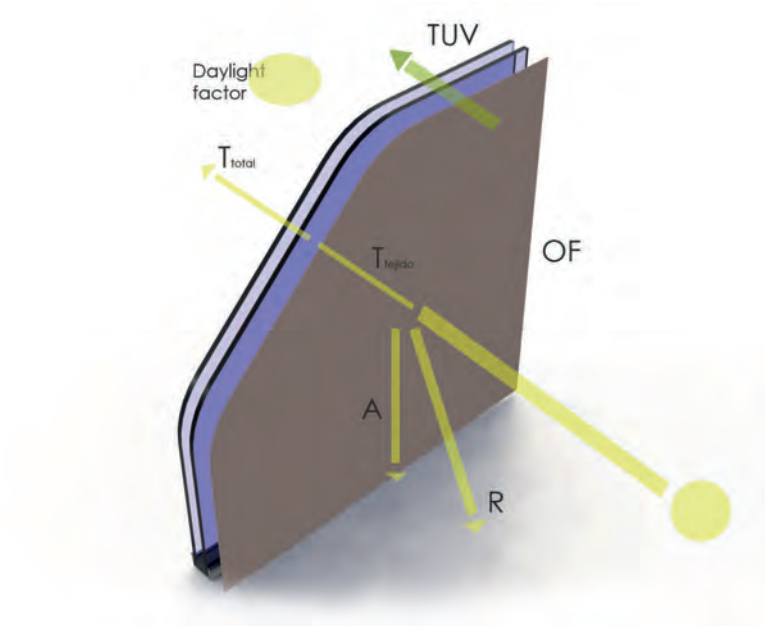
SPI Solar protection index

The solar protection index represents, as a percentage, the incident solar flow rate eliminated by the installation of the blind. It is obtained with the total solar factor. Its value is: SPI = (1gt)

SC Shading coefficient

Like the coefficient of simple glazing, the blind SC expresses the value of the solar factor with a given glazing with regard to a 3mm (1/8") glazing. It is not the most used one, since 3mm (1/8") glazing is not the most common in Europe. Its value is proportional to 0,87, which is the solar factor of the 3mm (1/8") glazing.

Light coefficients for glazing+blind



A shading protection system can be classed, in terms of light, on the basis of the following parameters:

A Light absorption factor

Light absorption is not subject to re-emissions. Value of 0 to 1. This value is not calculated, but rather is derived from the following formula: 1=A+T+R

OF Openness factor

Filtering textiles are the most commonly used fabrics to make shading protection systems. The degree of openness should be taken into account when choosing a fabric.

T (τ_B) Light transmittance coefficient

It is the part transmitted by the fabric. It also depends on the nature of the fabric and its colour. Value between 0 and 1.
In the case of Venetian blinds, it is applied with the solar protection device closed. If it is open at 45°, and assuming that there is no direct penetration of sunlight, the following correction should be used:

$$\tau^{corr}{}_{e,B} = 0{,}65 * \tau_{e,B} + 0{,}15\rho_{e,B}$$

$\rho_{e,B}$= solar reflection coefficient of the side of the solar protection device of the radiation side.

$\tau_{e,B}$= Solar transmittance coefficient of the solar protection device.

T_{tot} ($\tau_{v,t}$) Total light transmission coefficient

The total light transmission coefficient takes the different transmission coefficients of glazing and the fabric into account. Calculation for exterior solar protection devices:

$$\tau_{v,t} = \tau_v * \tau_{v,B} \ / \ 1\text{-}\rho_v * \ \rho'_{v,B}$$

Calculation for interior solar protection devices:

$$\tau_{v,t} = \tau_v * \tau_{v,B} \ / \ 1\text{-}\rho'_v * \ \rho_{v,B}$$

Where:

τ_v = Transmittance coefficients of glazing light.

ρ_v = Light reflection coefficient of the glazing side facing the incident radiation.

ρ'_v = Light reflection coefficient of the glazing side opposite the incident radiation.

$\tau_{v,B}$ = Light transmittance coefficient of the solar mechanism.

$\rho_{v,B}$ = Light reflection coefficient of the side of the solar protection device facing the incident radiation.

$\rho'_{v,B}$ = Light reflection coefficient of the side of the solar protection device opposite to the incident radiation.

TUV Ultraviolet Transmission

Measurements can be taken in the ultra violet spectrum (190–380nm), since this type of radiation may be harmful to the human eye.

R (ρ_B) Light reflection coefficient of the fabric

It is the part directly reflected by the fabric. It depends on the surface and colour. Value between 0 and 1. For fabrics with 2 different sides, a specific value should be measured for each side. In the case of Venetian blinds, it is applied with the solar protection device closed. If it is open at 45°, and assuming that there is no direct penetration of sunlight, the following correction should be used:

$$\rho^{corr}_{e,B} = \rho_{e,B} * (0.75 + 0,70\ \tau_{e,B})$$

$\rho_{e,B}$= Solar reflection coefficient of the side of the solar protection device of the radiation side.

$\tau_{e,B}$= Solar transmittance coefficient of the solar protection device.

Daylight factor

The daylight factor is an immediate and effective indicator of the quality of light that illuminates a space.

Solar coefficient calculation formulas

Here are some examples of the calculation of solar coefficients based on the EN 13363-1:2003 directive. These formulas classify the different shading protection systems according to 3 types of glazing.

With the results obtained you can select the mechanism that best adapts to your project, thus optimising energy resources.

1) Window with **exterior shading protection system**

$$g_t = \tau_{e,B}\, g + \alpha_{e,B}\, G/G_2 + \tau_{e,B}\, (1 - g)\, G/G_1$$

Where:

$\alpha_{e,B} = 1 - \tau_{e,B} - \rho_{e,B}$ $\quad G_2 = 10W/(m^2 * K)$

$G_1 = 5W/(m^2 * K)$ $\quad G = (1/U_g + 1/G_1 + 1/G_2) - 1$

2) Window with **shading protection system integrated on the façade**

$$g_t = g\tau_{e,B} + g(\alpha_{e,B} + (1 - g)\, \rho_{e,B})\, G/G_3$$

Where: $\quad G_3 = 3W/(m^2 * K)$

$\alpha_{e,B} = 1 - \tau_{e,B} - \rho_{e,B}$ $\quad G = (1/U_g + 1/G_3) - 1$

3) Window with **interior shading protection system**

$$g_t = g\,(1 - g\ \rho_{e,B} - \alpha_{e,B}\, G/G_2)$$

Where: $\quad G_2 = 30W/(m^2 * K)$

$\alpha_{e,B} = 1 - \tau_{e,B} - \rho_{e,B}$ $\quad G = (1/U_g + 1/G_2) - 1$

Note: The formulas are based on a typical simple model and the values of the G parameters are adjusted mathematically by a more precise reference calculation, following the principles of the EN 1 3363-2 European Standard.

The following formulas should be used to determine the direct solar transmittance coefficient in the glazing + solar protection system ensemble.

- Exterior solar protection devices:

$$\tau_{e,t} = \tau_e \, \tau_{e,B} \, / \, 1 - \rho_e \, \rho'_{e,B}$$

- Interior solar protection devices:

$$\tau_{e,t} = \tau_e \, \tau_{e,B} \, / \, 1 - \rho'_e \, \rho_{e,B}$$

Where we distinguish between:

ρ_e = Solar reflection coefficient of the side of the glazing facing the incident solar radiation.

ρ'_e = Solar reflection coefficient of the side of the glazing opposite the incident radiation.

$\rho_{e,B}$ = Solar reflection coefficient of the side of the solar protection facing the incident radiation.

$\rho'_{e,B}$ = Solar reflection coefficient of the side of the solar protection device opposite the incident radiation.

Choice of the shading protection system according to the **solar coefficient**

Generally speaking, systems with a low solar coefficient provide the best thermal characteristics.

It should be considered that a low solar coefficient may be obtained from different solar protection devices. It is possible to achieve the same solar coefficient even with different coloured fabrics.

For example, a solar coefficient gtot of 0,20 can be obtained by installing a dark external roller blind:

$\tau_{e,t}$ de 0,06 + qit de 0,14

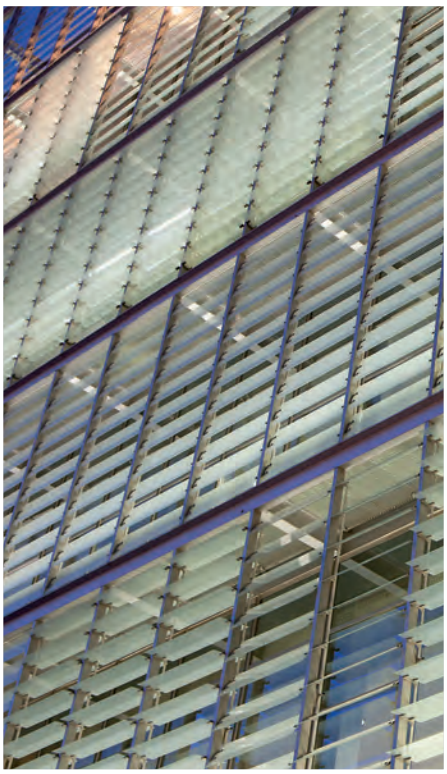
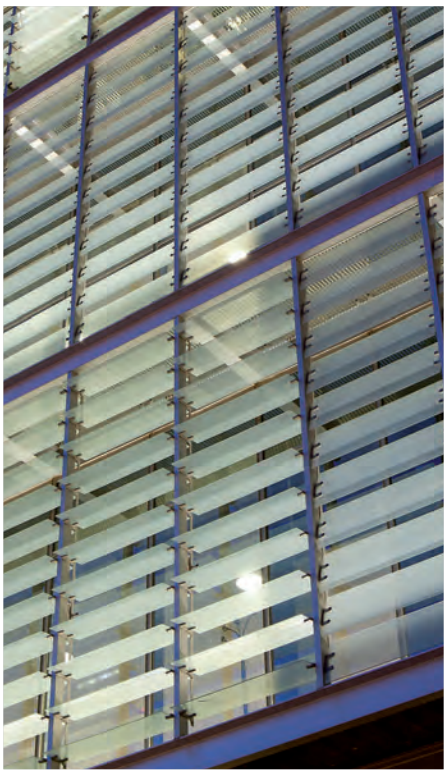
or with a light coloured one:

$\tau_{e,t}$ de 0,12 + qit de 0,08

There are 2 different behaviours for the same result in thermal topics: **the dark one works by absorption** and emission with evident light attenuation; and **the light one by reflection**, direct transmission and strong light diffusion.

T.E.S.T. control

The T.E.S.T. program may be used to calculate the reduction in the blind's solar coefficient with glazing.


Bandalux provides architects and building professionals with the **T.E.S.T (Thermal Energy Saving Tool For Multizone)** program, developed jointly with:

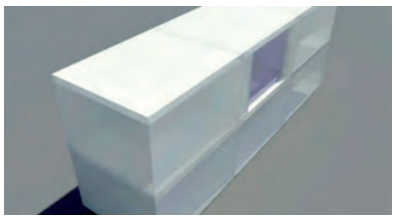
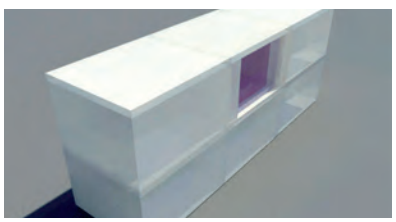
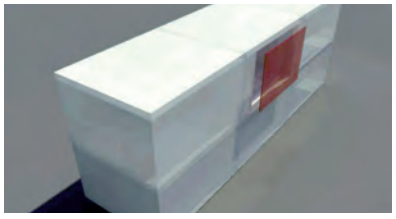
TNO: Netherlands Organization for Applied Scientific Research

AICIA: Investigation Association / Industrial Cooperation of Andalusia (Sevilla University, Termotecnia group).

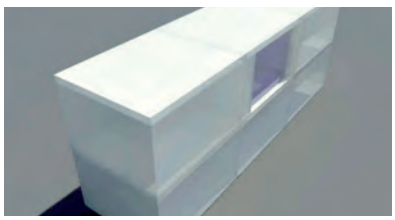
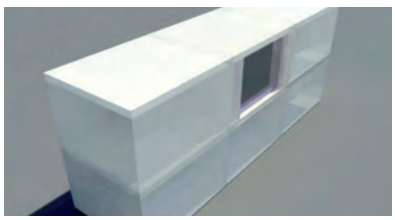
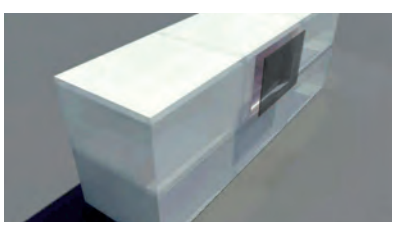
This tool will help to select the most appropriate shading protection system depending on the orientation of the window, glazing characteristics and fabric type. The outcome is always the greatest energy efficiency.

Calculations according to T.E.S.T. Examples

The calculations made below are examples based on the **T.E.S.T program** which compares energy saving depending on blind position, type of glazing used and geographic location. A glazed surface of 10 sqm (107 ft^2) is taken. The example involves a room in an office block facing south, in the centre of the façade. The only area in contact with the exterior is the glazed surface. The walls, in contact with the surrounding offices, are at the same temperature as the office being modelled. The floor surface is 20 sqm (5m x 4m) 215ft^2 (16,40ft x13,13ft) with a volume of 50m^3 (1765 ft^3).

	Case 1: Glazing standard C (4/16/4 light) according to EN 14501	Case 2: Glazing standard D (4/16 argon/4 reflection) according to EN 14501
	Without solar protection Solar coefficient g=0,76 U=2,9W/m^2K	Without solar protection Solar coefficient g=0,30 U=1,3W/m^2K
	With Polyscreen® 650 fabric White Line INTERIOR Solar coefficient g=0,38 U=1,4W/m^2K Standard B interior white linen versus without protection: Savings=26,8%	With Polyscreen® 650 fabric White Linen INTERIOR Solar coefficient g=0,25 U=1,3W/m^2K Standard D interior white linen versus without protection: Savings= 5,19%
	With Polyscreen® 650 fabric White Linen EXTERIOR Solar coefficient g=0,13 U=1,4W/m^2K Standard B exterior white linen versus without protection: Savings= 68,6%	With Polyscreen® 650 fabric White Linen EXTERIOR Solar coefficient g=0,09 U=1,3W/m^2K Standard D exterior white linen versus without protection: Savings= 21,6%

Calculations according to T.E.S.T. Examples

Case 1: Glazing standard C (4/16/4 light) according to EN 14501	Case 2: Glazing standard D (4/1 or argon/4 reflection) according to EN 14501	
Without solar protection Solar coefficient g=0,76 U=2,9W/m²K	Without solar protection Solar coefficient g=0,30 U=1,3W/m²K	
With Polyscreen® 650 fabric Grey Blue INTERIOR Solar coefficient g=0,48 U=1,4W/m²K Standard B interior grey blue versus without protection: Savings= 10,1%	With Polyscreen® 650 fabric Grey Blue INTERIOR Solar coefficient g=0,27 U=1,3W/m²K Standard D interior grey blue versus without protection: Savings=3,1%	
With Polyscreen® 650 fabric Grey Blue EXTERIOR Solar coefficient g=0,8 U=1,4W/m²K Standard B exterior grey blue versus without protection: Savings= 76,9%	With Polyscreen® 650 fabric Grey Blue EXTERIOR Solar coefficient g=0,07 U=1,3W/m²K Standard D exterior grey blue versus without protection: Savings= 23,7%	

Bioclimatic facades and building automation systems

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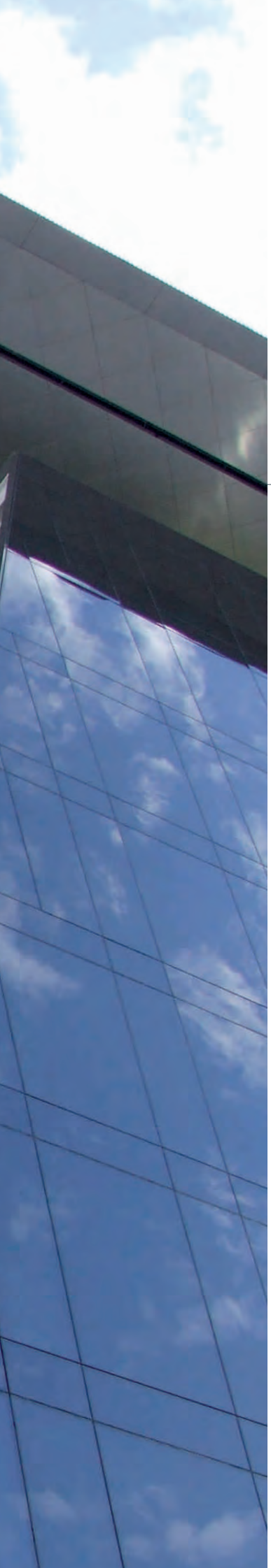


Bioclimatic façades

The building industry faces new challenges, mainly geared towards adapting architectural projects to the demands of energy saving and user comfort, without foregoing the desired level of finishing.

An optimal form of integrating the protection system in the building is to include intelligent systems that render it possible to cater to energy efficiency at all times.

Requirements

One of the essential elements in catering to new requirements is the façade: good façade design is indispensable in constructing a sustainable building.

Moreover, all works should comply with the legislation and regulations that limit the consumption of electrical energy, be it for air conditioning or heating. Therefore, all projects should take the following points into account:

Environmental requirements

Buildings are responsible for 43% of total energy consumption in Europe. This consumption must be reduced by using natural energies such as the sun, daylight or natural ventilation.

Automated shading is one of the parameters that help to optimise the use of a natural resource such as the sun.

Improvement of the quality of the interior ambience

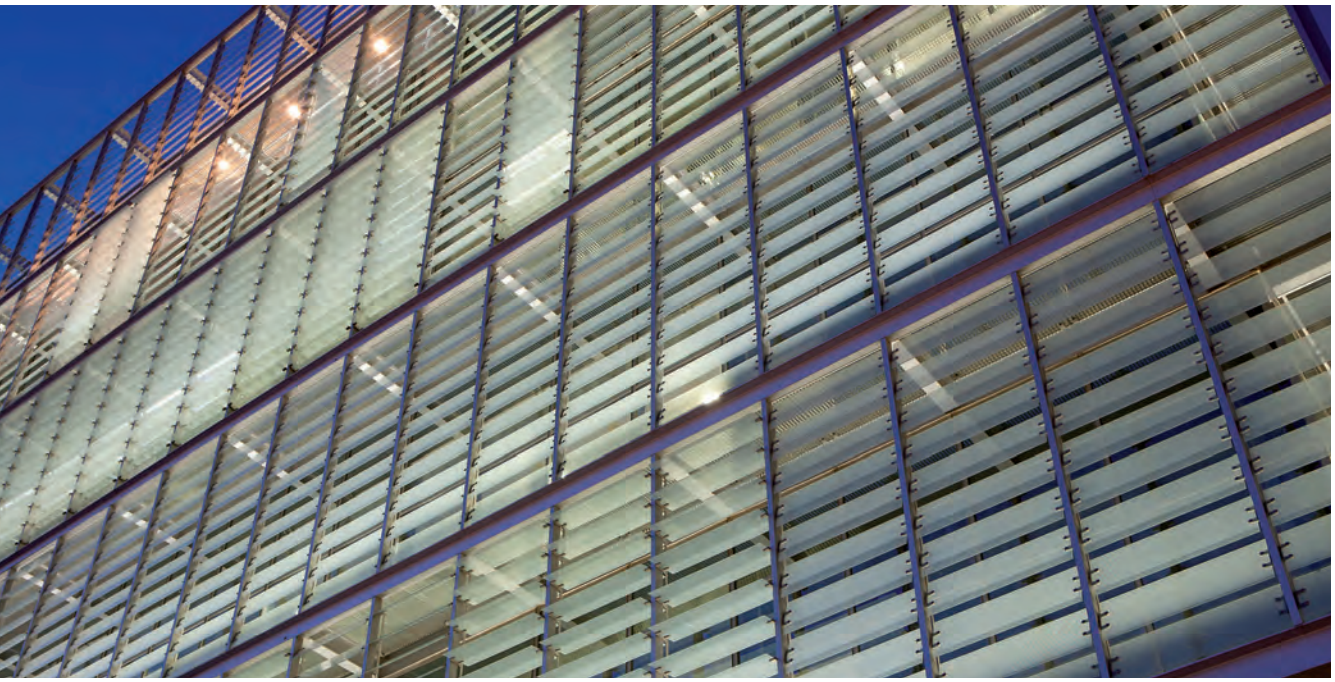
The aim is to maintain comfortable temperatures on the interior and secure light comfort for as long as possible, avoiding glare.

Afford the investment added value

The investment in an integrated façade may be recouped after one year, thanks to the reduction in electricity consumption for heating, air conditioning and lighting. The energy cost of a building will have an incidence on the selling price.

The centralised management of the motors of the shading devices, as well as the use of external sensors, prolongs their life, reducing maintenance costs.

Parameters



A bioclimatic façade is more efficient than a standard façade since it works as a filter between the interior and the exterior. Parameters to be taken into account:

1. Importance of the context

Solar incidence, temperature and rainfall vary according to the season of the year, time of day and orientation of the building.

All these factors have an impact on the building's energy consumption.

2. Dynamic insulation

Dynamic insulation (action according to needs on shading protection systems) which makes it balance heat exchange, reducing-air conditioning and heating requirements, thus catering to different requirements in summer and winter.

Parameters

Summer

The inside is totally protected by means of an interior or exterior protection mechanism. Excess heat is reflected, thus keeping the temperature inside lower. The combination of the solar coefficient (g) of the glazing and the solar protection of the blind should be optimised to reach the needs to reduce energy and light management. A solar protection system located on the exterior is an effective solution for limiting energy gains. The incident sun is reflected before it reaches the window. However, there are also interior systems that limit absorption and reflect the sun outwards.

Winter

During the day, the heat that has entered the windows accumulates in the building. The protection devices can be gathered in when the building is not occupied or when there is no glare.

In the afternoon, when the sun stops heating the building and the exterior temperature drops, the heat is trapped on the interior.

The solar protection devices should be lowered. The combination of transmittance (U) of the glazing and the shading protection should be as low as possible.

The double glazing plus external protection is the effective solution. Similarly, the orientable devices also help to insulate the window. An integrated façade renders it possible to regulate the heat exchanger at all times. It regulates the functions of "solar input" and "heat maintenance", rendering it possible to heat or cool the ambience intelligently.

3. Management of natural light

Effective control of natural light can improve the visual comfort, wellbeing and productivity of the building's occupants, while also reducing the need for artificial lighting.

For the visual ambience to be optimal, the solar protection devices should fulfil a triple objective, guaranteeing, for the occupants:

· A good level of lighting in the room suited to the work done there.
· Excellent gain in natural light, without glare problems.
· A good level of contrast, very important in the case of activity with computer screens.

For this purpose, the shading protection systems should adapt to energy-saving needs, guaranteeing the comfort of their occupants. An intermediate positioning should be possible at all times to provide a balance between the two demands, both energy and comfort.

1/3/10 Rule

The difference in light between what the eye perceives (30° cone) and the visual stain on paper should have a ratio of 1:3. The difference between light perceived (cone at 90°) and that of the surface of the windows or adjacent walls should have a 1 in 10 proportion.

Solar protection can be adapted to each project. The visibility of the exterior is a decisive element in the occupants' impression of comfort. In the case of exterior or interior venetian blinds the position of the slats can be adjusted, allowing just the necessary degree of brightness through on every occasion. A suntracking function (orientation according to the position of the sun) makes it possible to orient the slats at all times.

Roller blinds with Polyscreen® fabric

The degree of openness determines the degree of visibility for the exterior. The higher the better for the exterior, although the risk of glare will also increase. The shading protection system should be positioned so that it prevents glare and reflections on computer screens.

4. Natural ventilation

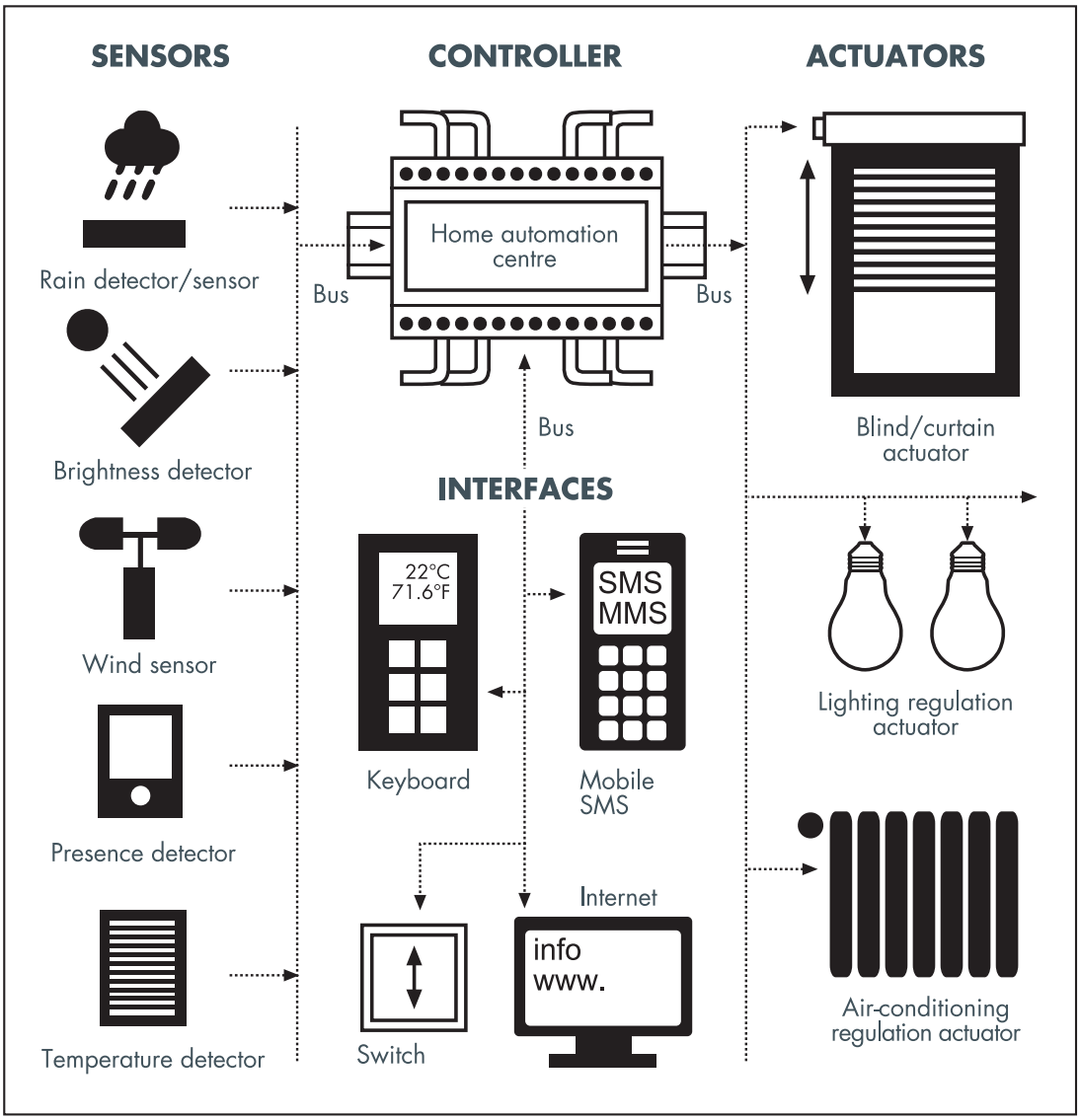
Natural ventilation is an effective way of improving air quality in a building and of cooling it at night, particularly during the summer months. The automation of windows during the hours in which a building is unoccupied permits ventilation through the façade, significantly reducing the temperature accumulated in the building and improving air quality on the interior for the next day.

Advantages of an **integrated solution:**

1. Regulate thermal exchange
2. Optimise the management of natural light
3. Guarantee a decorative façade
4. Protect from exterior solar control devices
5. Facilitate daily management
6. Preserve control flexibility (one controls in each office)

Home automation systems

The etymology of the term home automation is house that works alone. Therefore, home automation is the ensemble of systems that automate a building, and which provide it with benefits in energy management, safety, communication and comfort. This technology is integrated in the intelligent design of a building.



Benefits of an automated home system

1. Benefits

1.1. **Energy saving.** Home automation delivers efficient management of the different devices and systems installed in buildings:

Air-conditioning: programming and zoning. A suitable management of dynamic shading protection systems complement each other and adds energy-saving to air-conditioning in buildings.

Electricity management: Streamlining of electrical loads. Powering-off of non-priority-use equipment depending on power consumption and rate management (the use of apparatuses is switched to low rate hours).

1.2. **Comfort.** Management of all the actions that improve the comfort of the users of a building. This includes visual comfort provided by dynamic shading protection systems (suitable lux levels, glare, privacy).

1.3. **Safety/Security.** Management of the safety/security network that protects both people and their belongings.

1.4. **Communications.** Control of all communications systems or structures in the building.

2. Home automation system

The amplitude or range of a home automation solution may vary: from a single mechanism that performs a single action to complex systems that control all the installations in a building. Elements/devices that configure a home automation system:

2.1. **Controller:** mechanism that manages the system according to programming or the information it receives. There may be one or several in the home automation system.

2.2. **Actuator:** it receives and executes orders from the controller (on/off, up/down, etc.).

2.3. **Sensor:** it takes a reading of the environment to generate actions (light, wind, water sensors, etc.).

2.4. **Bus:** device through which information is transmitted between the different devices of the home automation system. It may be by wiring or by wireless networks.

2.5. **Interface:** devices (screens, mobile telephone, internet, loudspeakers) and formats (binary, audio) on which the information is displayed to users, allowing them to interact with the system. Home automation systems act and interact with the building's electrical apparatuses and systems according to the program settings, the information collected on the sensors, the information provided by interconnected systems and direct user action.

Architecture of the home automation system

3. Architecture of the home automation system

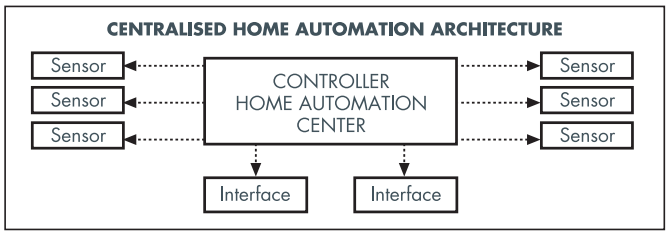
The different typologies of architecture are defined according to where the intelligence of the home automation system is located:

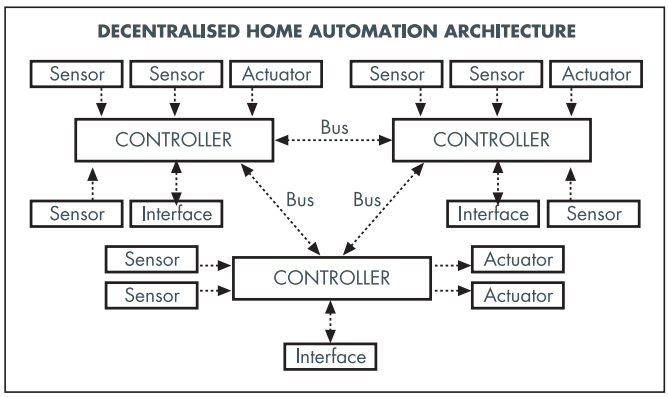
3.1. Centralised: management is carried out by a single centralised controller that sends the information on actuators and interfaces according to programming, settings, information from the sensors, interconnected systems and users.

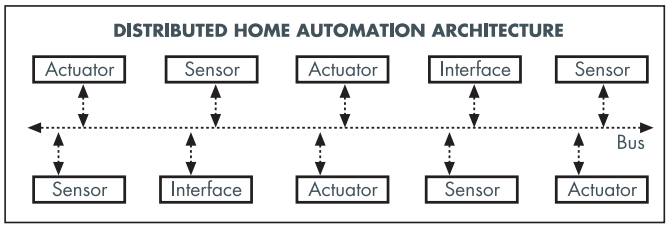
3.2. Decentralised architecture: management is through several controllers interconnected by a bus.

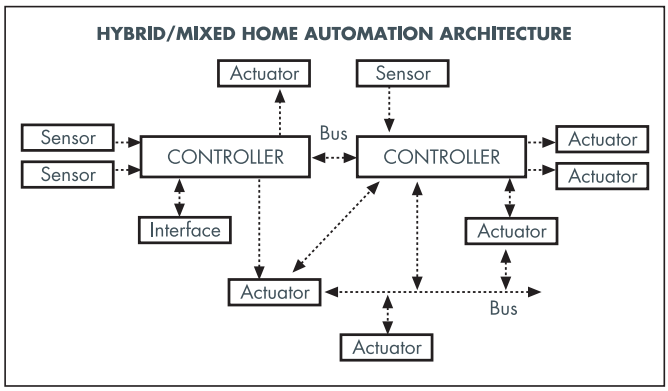
3.3. Distributed architecture: each sensor and actuator is also a controller capable of acting and sending information to the system according to the program, the settings, the information it captures and that which it receives from the other system devices.

3.4. Hybrid or mixed architecture: it combines centralised, decentralised and distributed architectures.









Home automation protocols

4. Home automation protocols

They are the procedures used by the home automation systems for communication between all the devices with "controlling" capacity. There is a wide variety of protocols, which may be open (free use for everyone), or be proprietary:

KONNEX

Initiative of three European associations: EIBA (European Installation Bus Association), Batibus Club Internacional and EHSA (European Home Systems Association) to create a single European Standard for Building Automation.

EIB

European protocol used by more than 150 companies as a Hardware and Software specification of a distributed automation system that guarantees compatibility between all products.

EHS

European Home System: Home automation protocol in the European Community Synopsis research programme.

Protocol by radio of different manufacturers for the exchange of data at low speed in automation, security and home automation networks.

LON Local Operating Networks

Control protocol created by the North American Echelon company. Comprehensive solution in control systems.

Batibus

Totally open protocol that any company interested in adding it to its product portfolio can implement. At access level, this protocol uses the Ethernet-like CSAAACA (Carrier Sense Multiple Accesses with Collision Avoidance) technology but with a positive collision resolution.

X10

Data transmission protocol by carrier waves over a building's electrical network. It controls a maximum of 256 devices on the same circuit. It has been on the market for more than 20 years and it is broadly distributed in the USA with the main protocols and home automation systems present in all markets.

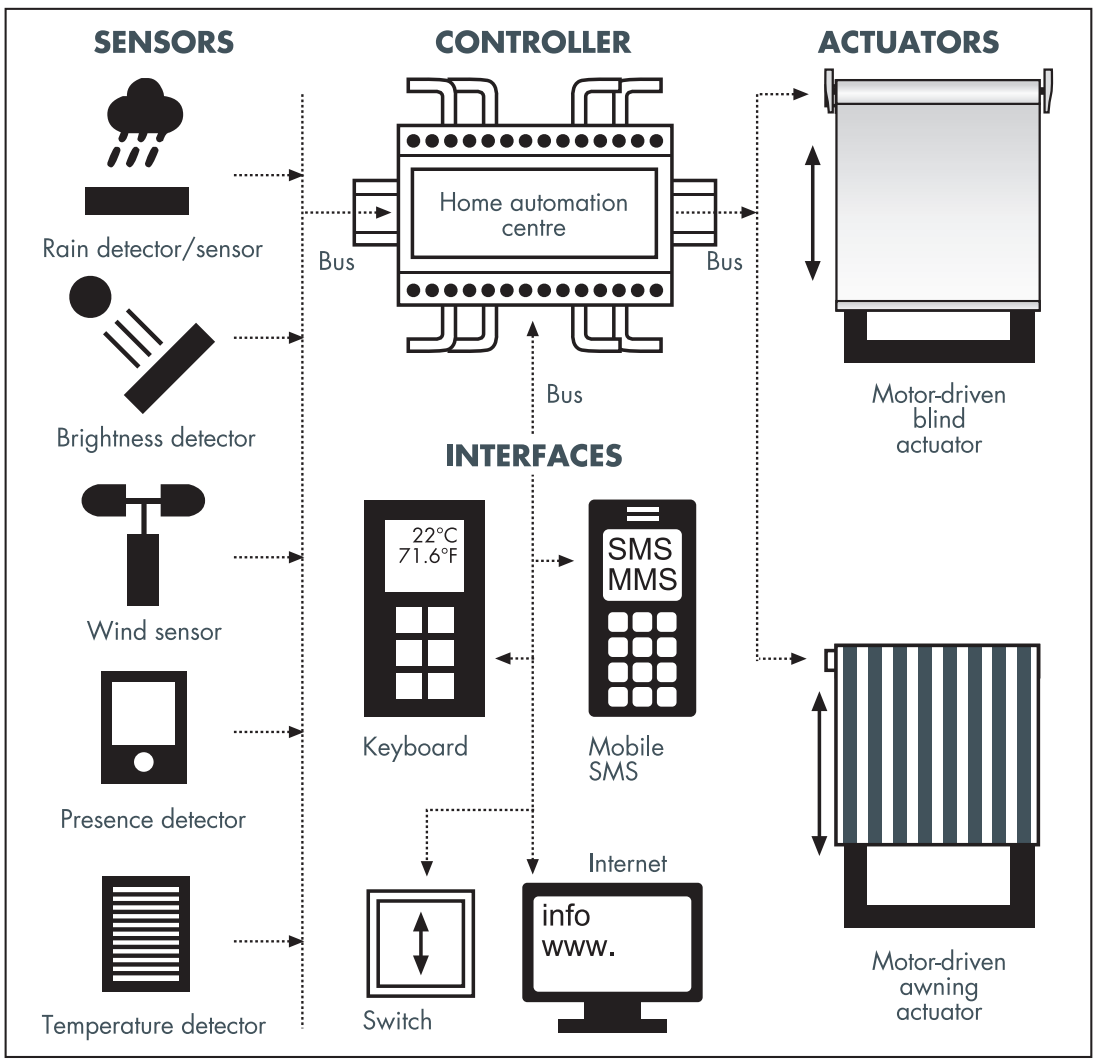
smi

SMI engine is an innovative system for aluminum blinds with a 24 Vdc motor that incorporates an SMI (PCB) interface. It has been developed in order to connect several units of blinds of the same building. Connected by a "bus" line, the (BMS / BAS) controller and motorized blinds SMI communicate one with each other bidirectionally. The controller sends commands to the motor based on the information it receives.

Integration of solar protection in home automation systems

5. Integration of solar protection in home automation systems

The inclusion of motor-driven solar protection devices in home automation systems improves energy-saving and increases comfort in buildings. Slats can be raises or lowered and/or orientated from a centralised and/or remote home automation system.



The control and automation of motorised shading protection systems is carried out in one or several groups, generally on a by-room basis.

Actuation factors on solar protection devices:

- **Presence control:** the home automation detects the presence of people in a room.
- **Natural light:** with a view to leveraging solar energy, dynamic solar protection devices are raised in winter and lowered in summer to avoid overheating the building,
- **Meteorological conditioning factors:** raise or lower to avoid deterioration.
- **Time scheduling:** depending on the activity performed in the building.
- **Presence simulation:** it acts randomly as a theft deterrent.

Operation of the **solar protection device motors:**

The motors commonly used in roller blinds and awnings are alternating current tubular motors which can be powered directly from the electrical network. There is a very broad range of systems, rendering it possible to select the system that adapts best to the loading stresses required by the solar protection device.

Devices are distinguished by their end-of-stroke technology: mechanical or electronic. Electronic ends-of-stroke provide better control over the mechanism, versatility (possibility of fast and simple change of ends-of-stroke) and even the determination of intermediate positions. Small-head venetian blinds are powered by direct current motors, requiring a transformer for direct connection to the electrical mains or the use of batteries. The main manufacturers of motors for solar protection devices are extending their offer, including silent motors with low dBA level.

Options for device integration

Options for the **integration of protection devices in home automation systems**

Any motor, sensor and electrical or electronic mechanism that Bandalux includes in its range of solar protection devices may be controlled by means of integration in a home automation system. Home automation systems generally have "Modules for Solar Protection Devices". There are several options for the location of these modules and they vary, generally, depending on whether the system is wired or not wired, and whether the building is new or refurbished.

Typologies of integration of solar protection devices in home automation systems:

- **Radio-based systems:** the "Modules for Solar Protection Devices" tend to be located near the solar protection devices: behind the switch, in false ceilings, etc.

- **Wired systems:** Normally, the wiring of each one of the solar protection devices is connected to the general home automation panel, where the "Modules for Solar Protection Devices" are located.

- **Power line Systems:** the building's electrical wiring is used for home automation communication.

In installations in a building that has already been constructed, the "Modules for Solar Protection Devices" tend to be located near the solar protection devices; whereas in new buildings they are located in a centralised panel.

Corporate information

Bandalux

bandalux.com

Bandalux

Corporate information

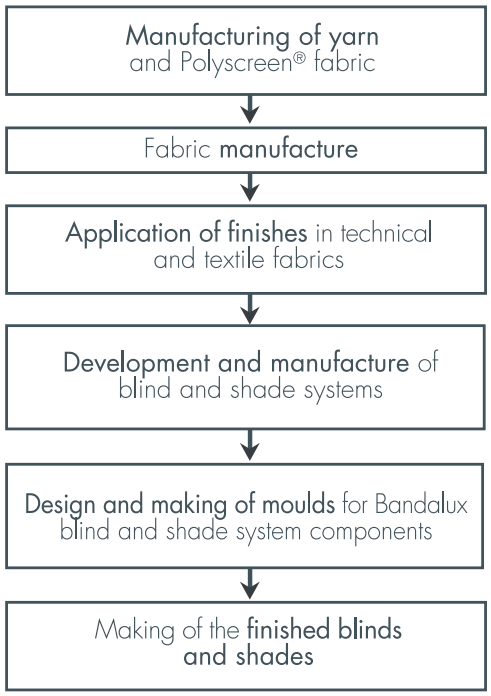
Bandalux develops, manufactures and markets an extensive range of blinds and shades made from a variety of materials and systems, in order to cover two distinct market segments: Home (domestic use) and Contract (shading systems used in offices, hospitals, hotels….).

Bandalux has become an innovation and state-of-the-art referent, thanks to the incorporation of the technical advances in his new products development. His contemporary and alternative designs, combined with functional and durable systems, satisfy the market needs.

Bandalux

vertical integration

Bandalux belongs to a European family holding, made up of vertically integrated companies that control the entire production process: from the fabrics and systems manufacture, until the finished taylor-made blinds&shades. This connection allowed Bandalux to build a confidence and reliability customer relationship.



- Production facilities of more than 70.000m² (753.473ft²).
- Workforce over 1.200 professionals of more than 30 nationalities.
- Over 10.000.000m² (107.639.100ft²) of technical fabric production per year.
- Over 1.000.000 blinds & shades produced per year.
- Over 1.000 buildings projected with shading protection systems.
- Present over 75 countries around the world.

Bandalux

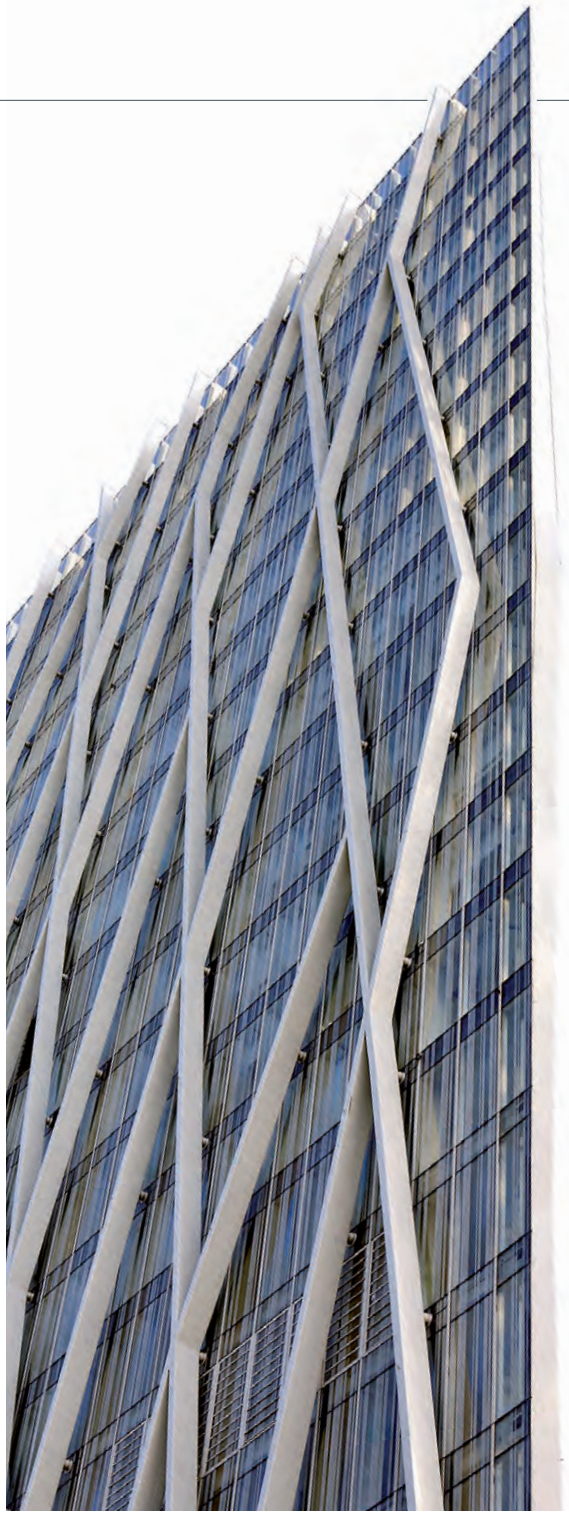
The dynamism of a consolidated brand

- Creation of **blinds, shades and taylor-made decorative and technical solutions.**
- Innovative products providing **maximun comfort**.
- Service, quality and **professional training**.
- Four **production plants,** investment in R&D.
- Commitment to the **environment.**
- Over **15 showrooms** in Europe and U.S.

USA · SPAIN · FRANCE · ITALY · PORTUGAL · BENELUX

Certifications and labels

Bandalux



Bandalux complies with the objectives established by the HQE (Haute Qualité Environnemental) management system:

Control of the impact of buildings on the outside environment:

- Harmonious relationship between buildings and the environment
- Integration of the choice of building methods and materials
- Water and energy savings
- Minimised waste
- Minimised building maintenance

Creation of a pleasant interior setting:

- Visual and thermal comfort
- Air Quality Control
- Noise control measurements
- Hygiene and cleanness
- Odour control

Certifications and labels

Bandalux

Bandalux develops recyclable and environmentally-friendly products, implementing exhaustive controls in its manufacturing processes to safeguard the environment, offering lasting, reliable and easy-to-maintain shading protection systems.

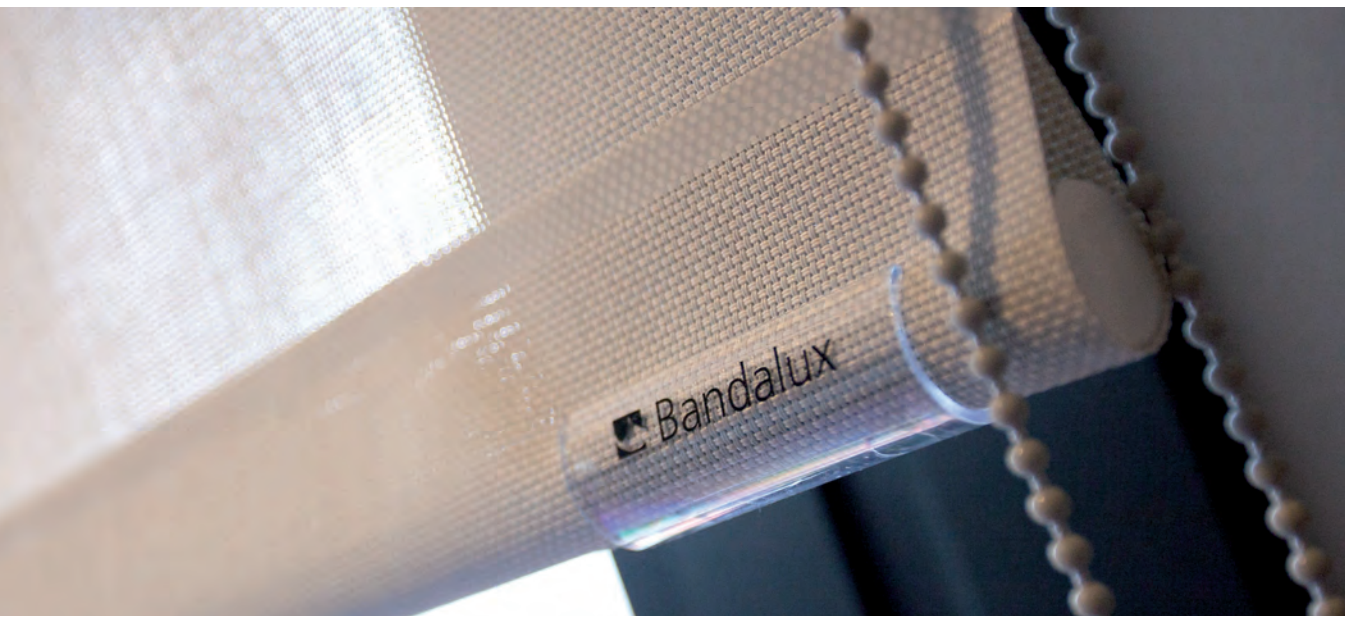
FABRICS:

Quality

All fabrics are manufactured exclusively by Vertisol Internacional, which is ISO 9001-certified since 1998. This ensures that all products meet the requirements of a good quality management system.

Environmental management

The Vertisol environmental management system is certified according to the ISO 14001. This certification guarantees the involvement of all the organisation in an efficient environmental management program.



Certifications and labels

Bandalux

Recycling

A program that includes the recycling of waste generated during the manufacturing process, the production of reusable packing material and the addition of recycled material as a substrate for floor covering.

eco codice®

Oeko–tex® standard100

A certification that guarantees the use of environmentally-friendly products and the absence of toxic materials such as: heavy metals, lead, etc.

CONFIDENCE IN TEXTILES
Tested for harmful substances
according to Oeko-Tex Standard 100

Sanitized®

Certificate applicable to some fabrics which avoid the proliferation of bacteria and mite, inhibit the development of fungus and mildew and stop unpleasant odours.

Sanitized
More than clean

Possible treatment for all models

Air quality

This programme has been designed to define the low emission of chemical substances in places where childern and adults spend long period of time: schools, nurseries, clinics, hospitals...This certification guarantees compliance with the strictest requirements.

UL
GREENGUARD
PRODUCT CERTIFIED FOR LOW CHEMICAL EMISSIONS
UL.COM/GG
UL 2818
GOLD

Fire retardant

Bandalux fabrics fulfil all the necessary standards to be integrated within the project of a new building:
Clase 1: UNE EN 13773 / M1: NFP 92-503 / NFPA: pass
B1: DIN 4102 / Euroclass: EN 13501

On-board vessel guarantee

The Polyscreen® fabric possesses the IMO 0338/14 certification of the International Maritime Organization, stating that it is resistant to saline environments and severe weathering and fit for use within the nautical industry.

IMO
0338/14

Certifications and labels

Air quality in indoor spaces is a factor that directly affects user health

The CE European Conformity

It affects certain groups of standardised industrial products and services. Manufacturers must declare that their products meet the minimum legal and technical requirements in security of the European Union member states.

EMAS

Voluntary regulation that promotes the ongoing improvement of environmental behaviour. Organisations with the EMAS distinction have an environmental policy in place.

BLINDS & SHADES SYSTEMS:

ISO 9001

It belongs to the ISO 9001 family of international quality standards, and sets the requirements to be met by quality systems for internal, contractual or certification purposes.

ISO 14001

International standards on environmental management whose aim is to furnish companies with an Environmental Management System (EMS) that is effective, proven and fitted in other manufacturing activities.

ISO 18001

It enables companies to prevent them from occupational risks at work, establishing a lasting commitment with the prevention, systematizing the management of health and safety on the workplace.

Galicia Calidade

Galicia Calidade is promoted by the Chamber of Commerce and Industry in Galicia, which acredites the quality of a number of products and services and their promotion both within and outside the region.

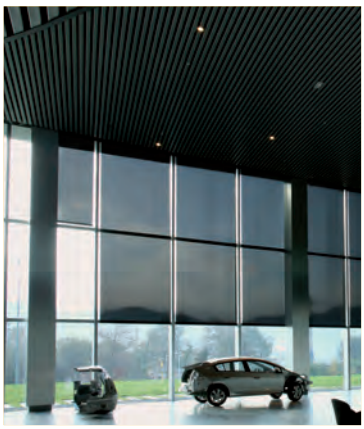
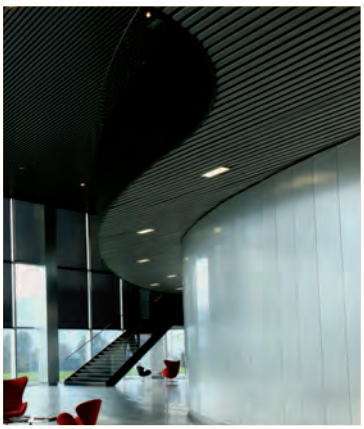
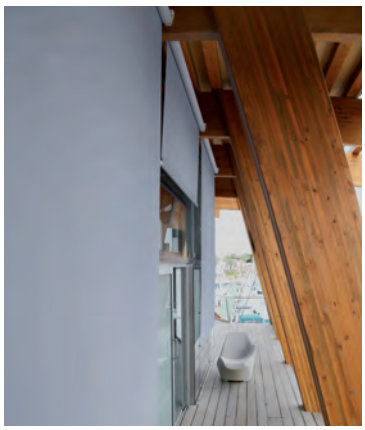
Child Safety System

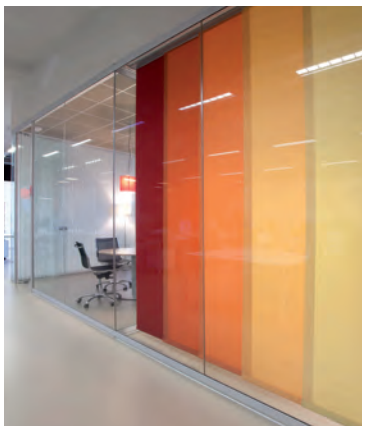
According to the safety standard EN13120, Bandalux includes safety devices for chain and cord operating systems in order to take care of kids.

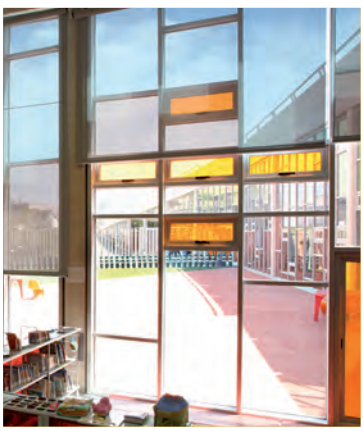
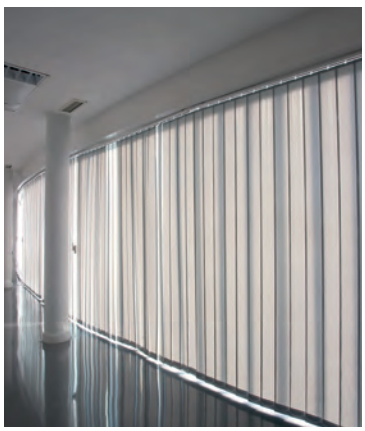
Product range

Bandalux

contract

Bandalux

home









Special thanks

Bandalux is grateful for the collaboration received from customers, partners, suppliers and employees.

Especially those companies that allowed the pictures of their installation to be part of the artwork of this project.

Thanks to all, for the achievement of these more than 1000 projects.

Thanks

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