



Solar Shading Systems



All AWV solar shade devices are licensed products of Colt International Ltd.



Introduction

Front Page: Berlaymont, Brussels

Over 236,800 sq. ft. of controllable Colt Shadoglass louvers were installed onto the European Commission Headquarters. These act as a high performance secondary facade. The control system was supplied by Colt and adjusts the position of the blades in response to changing climatic conditions and available daylight.

INTRODUCTION

Excessive solar heat gain and solar glare can be a costly and unwanted hindrance for building owners. In addition, owners require designers to reduce heat gain, with solar shading recommended as a preventative measure unless glass areas are minimized.

AWV solar shading systems offer designers the opportunity for distinctive architectural impact, while reducing solar heat gain.

SOLAR RADIATION & LOUVERS

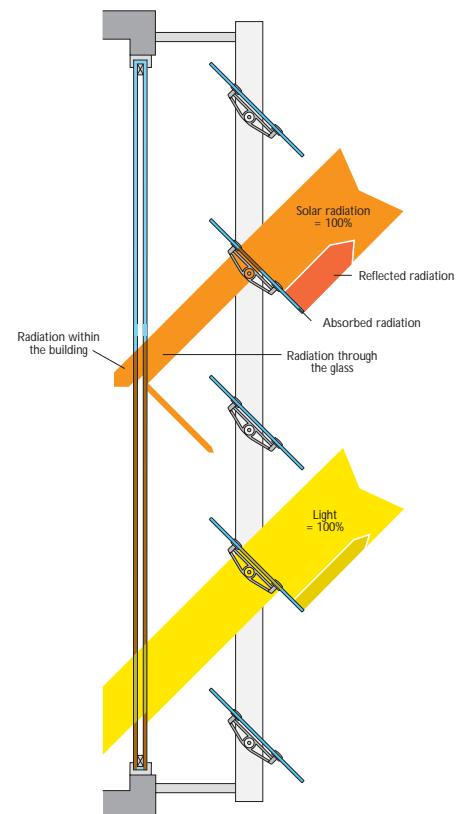
External solar shading is one of the most effective ways to control the internal conditions of a building.

Radiation from the sun is transmitted, absorbed and reflected by the blades. As a result, solar heat gain is prevented from passing into the building, minimizing ventilation requirements and reducing cooling loads. If a controllable system is installed, adjustable blades track the position of the sun, thereby reducing the numbers of days when the building overheats. Equally, in winter the blades may be adjusted in such a way that the building benefits from the heat from the sun, and they can be closed at night reducing heat loss.

Simultaneously, daylight levels are enhanced, and levels of glare are reduced.

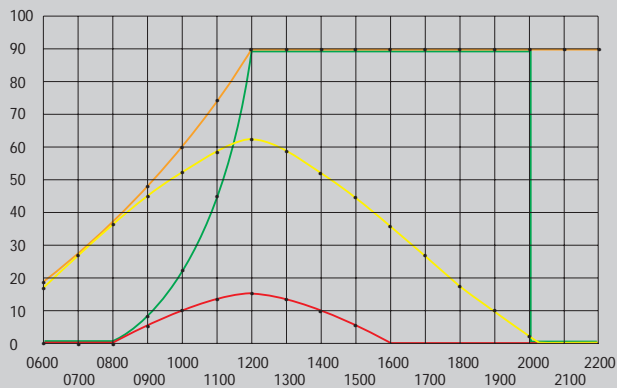
AWV's OFFER

- Calculation of sun angles and heat loads.
- Selection of the most appropriate system from a wide range of options.
- Solar Shading panels are available in various configurations, materials, finishes and coatings to meet the requirements of almost any project.
- Three advanced control options are available, ICS 4-Link for large or medium sized projects, Soltronic for smaller projects, and the innovative Girasol thermohydraulic system, which requires no external energy source.
- All systems are durable and reliable with low maintenance needs.

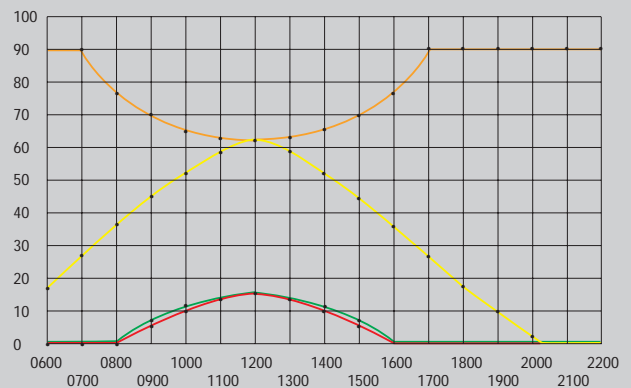


SUN PATH DIAGRAMS

East facade



South facade



GMT Time (h)

● Sun altitude in summer
● Sun altitude in winter

● Blade angle in summer (June)
● Blade angle in winter (Dec)

Notes: 1. When blade angles $>90^\circ$ - facade is in the shade. 2. Normally the angle of the blade follows the VSA (vertical shadow angle). When shading is not required (i.e. when facade is in the shade or when the sky is overcast), the blades may be set for a maximum daylight entry or vision to the outside, or are closed for night security insulation.

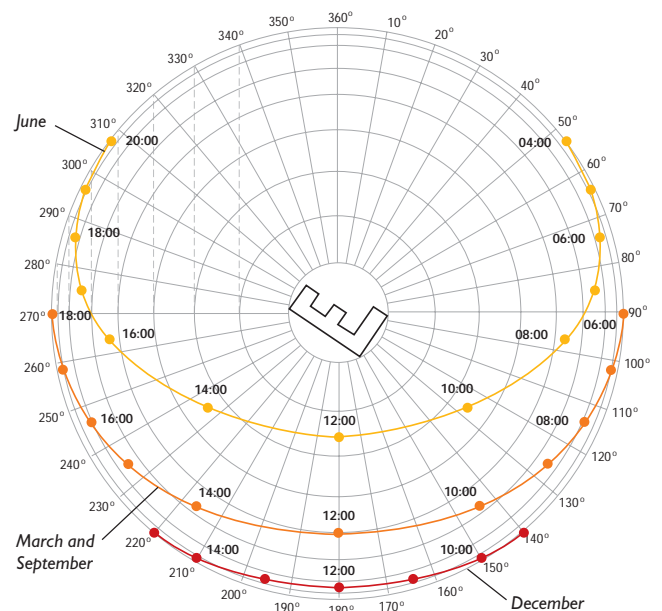
TOTAL CONTROL

Although fixed solar shading performs well on a South facing facade, performance is dramatically reduced on a East or West facing facade which receives a large amount of sunshine during the day.

A controllable shading system can best overcome this problem. Sun tracking blades follow the path of the sun, making sure the solar shading system always optimizes the amount of daylight entry.

On dull or overcast days the blades are controlled in such a way that if clouds pass over the building, the blades will automatically open to maximize daylight entry and then later revert back to their original position.

The Sun path diagram (right) for latitude 52°N shows the position of the sun throughout the day during the months of June, March/September and December.



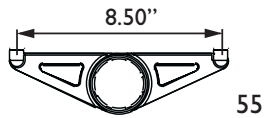
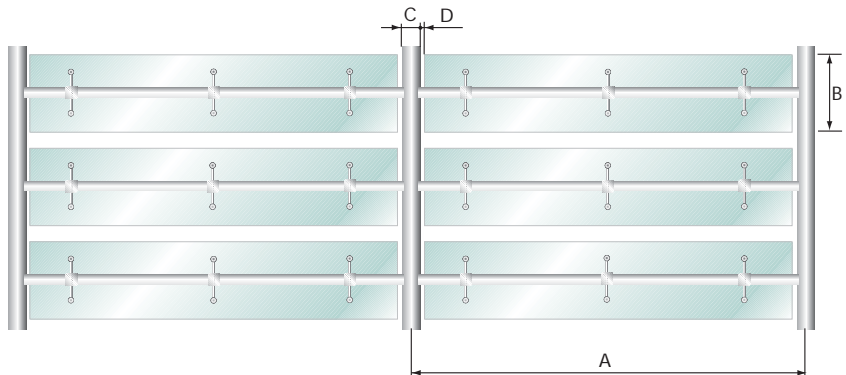
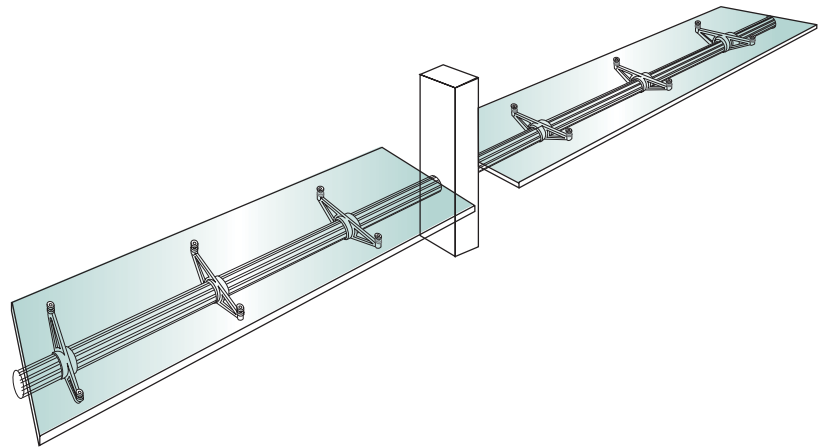
Carrier System I (LSI)

CARRIER SYSTEM I (LSI)

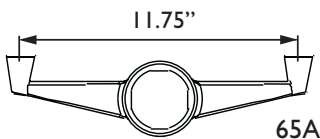
Intended for wider spans, Carrier System I incorporates a central aluminum torsion tube along the length of the blade, and is ideal for continuous facades, as well as for roofs.

For glass, cross sectional blade widths from 11.75" and up to 23.5" are available.

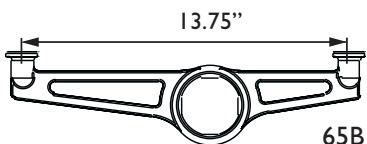
This carrier system is also suited for use with metal, fabric, wood, terracotta clay and translucent acrylic blades.



55



65A



65B

Glass Parameters Table

Dimensions	LSI - 55	LSI - 65A	LSI - 65B
A in. (max)	97.50	128.75	128.75
B in.	11.75 - 19.50	13.75 - 21.50	16.50 - 23.50
C in.	2.50	2.50	2.50
D in.	.50	.50	.50
Angle of rotation°	0 - 100	0 - 100	0 - 100
Torsion tube Ø in.	2.00	2.50	2.50

Note: Table to be used as a guide only. Allowable dimensions depend upon the specific requirements of the project.



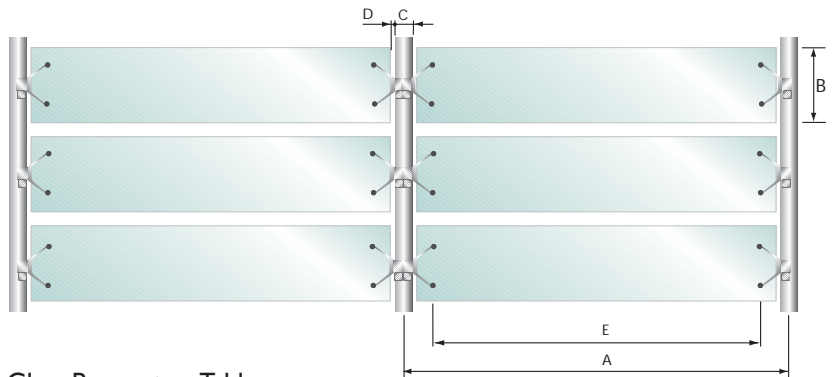
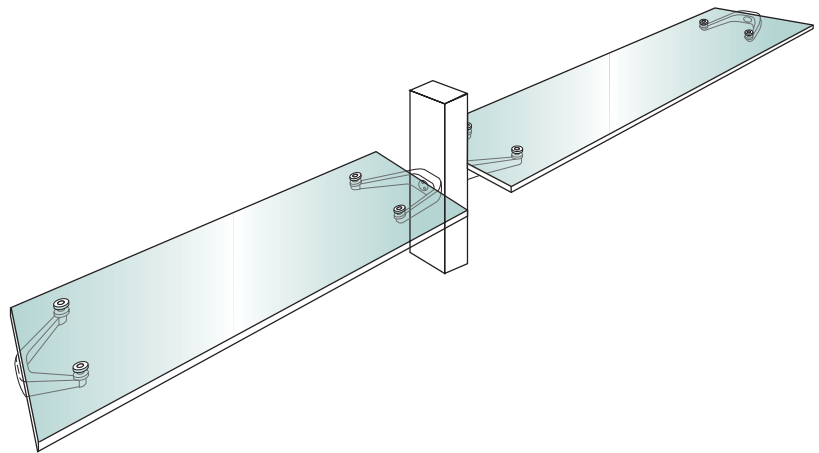
Carrier System 2 (LS2)

CARRIER SYSTEM 2 (LS2)

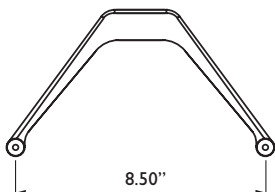
Primarily intended for smaller spans or where frequent anchor points are available, Carrier System 2 provides minimum obstruction to the glass area, thereby maximizing daylight and enhancing the view to the outside.

For glass, Carrier System 2 is available with cross sectional blade widths of up to a maximum of 19.50 inches.

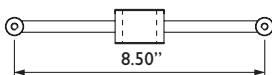
This carrier system is also suited for use with metal, fabric, wood, terracotta clay and translucent acrylic blades.



Plan view of LS2-30 bracket



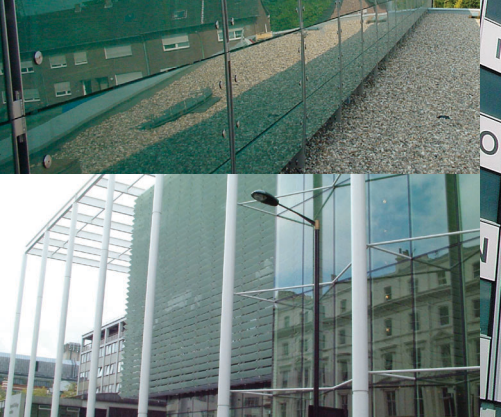
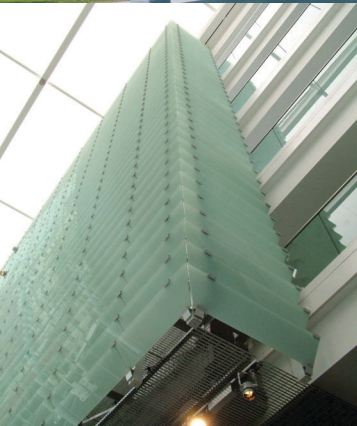
Plan view of LS2-30I bracket



Glass Parameters Table

Dimensions	LS2-30	LS2-30I
A in. (max)	78	78
B in.	19.50	19.50
C in.	2.50	2.50
D in.	.50	.50
E in.	66.25	66.25
Angle of rotation ^o	0 - 100	0 - 100

Note: Table to be used as a guide only. Allowable dimensions depend upon the specific requirements of the project.



Carrier System 3 (LS3)

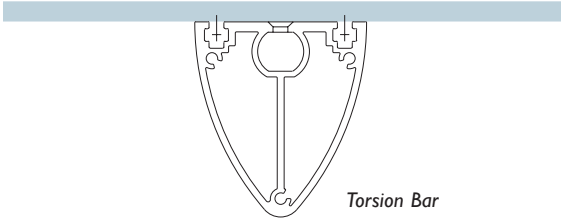
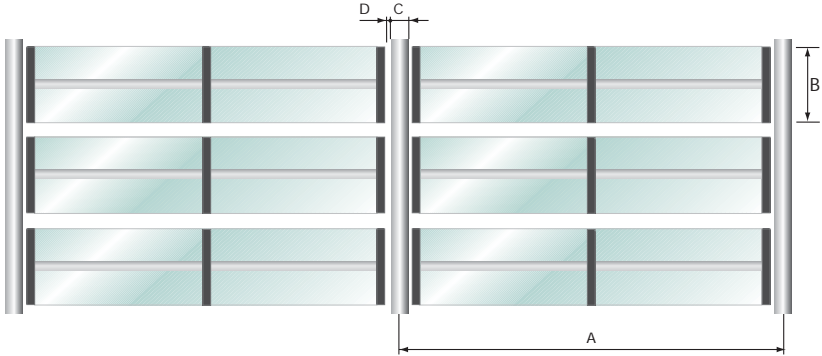
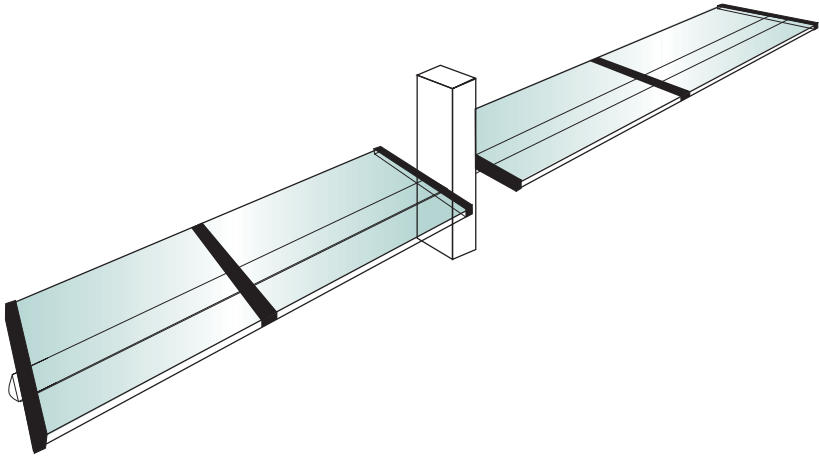
CARRIER SYSTEM 3 (LS3)

Like System 1, Carrier System 3 is intended for wider spans and incorporates a discreet central aluminum torsion tube along the length of the blade. It is ideal for continuous facades as well as for roofs.

For glass, blade spans of up to 156" long can be achieved without any additional supporting structure.

Glass blades can have a cross sectional width of up to 23.50".

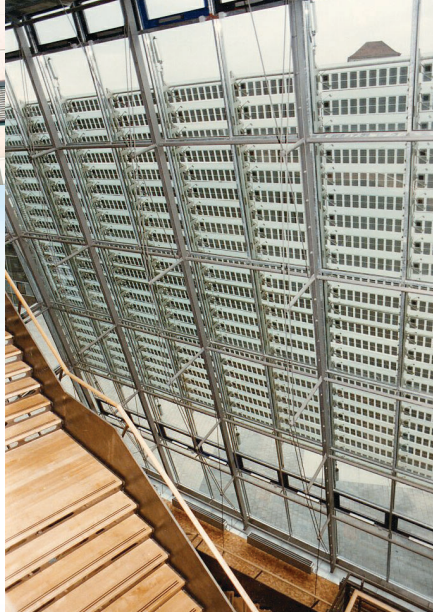
This carrier system is also suited for use with metal, fabric, wood, terracotta clay and translucent acrylic blades.



Glass Parameters Table

Dimensions	LS3
A in. (max)	15.75
B in.	23.50
C in.	2.50
D in.	.25
Angle of rotation°	0 - 100

Note: Table to be used as a guide only. Allowable dimensions depend upon the specific requirements of the project.



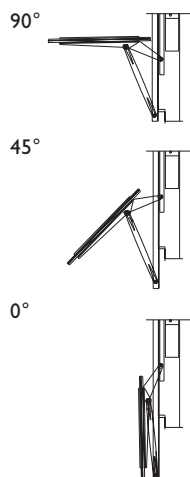
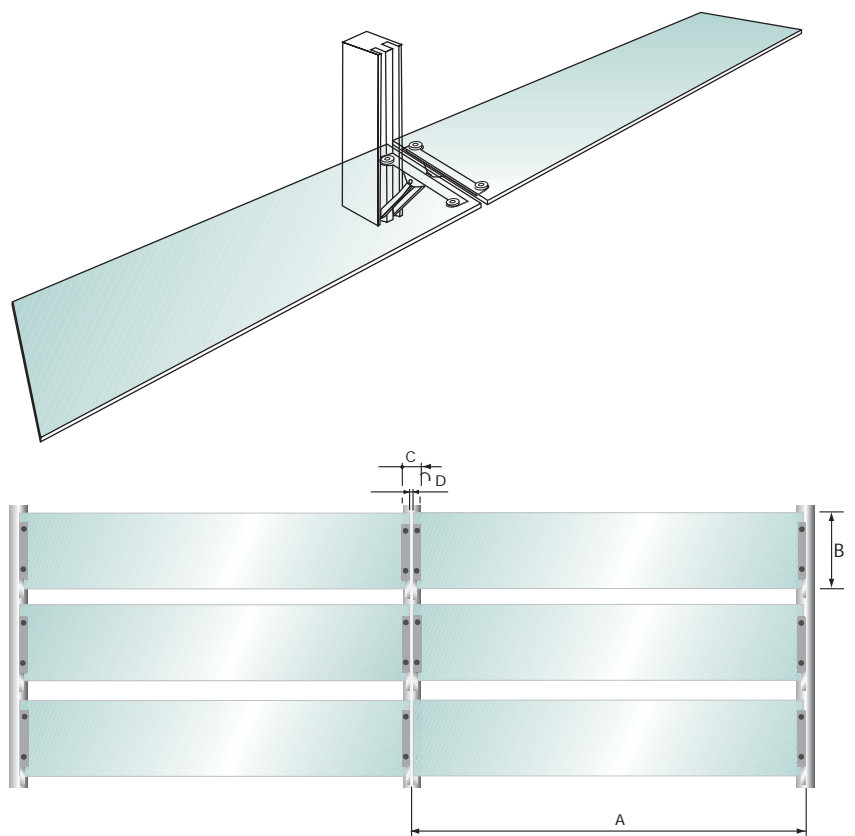
Carrier System 4 (LS4)

CARRIER SYSTEM 4 (LS4)

Carrier Systems 1, 2, 3 and 5 are pivoted systems which require the supports to be connected to each side of the blade. Carrier System 4 provides a back hung design solution with hidden control mechanisms integrated within the main vertical supports. This allows for seamless continuous blades with unobtrusive supports when viewed from the outside, due to the blades being installed in front of the supports.

For glass, Carrier System 4 is suitable for smaller spans of up to 70.25" in length. It can utilize cross sectional blade widths of up to 23.50", incorporating photovoltaic cells if required.

This carrier system is also suited for use with metal, fabric, wood, terracotta clay and translucent acrylic blades.



Glass Parameters Table

Dimensions	LS4
A in. (max)	70.25
B in.	2.50
C in.	2.50
D in.	.50
Angle of rotation°	0 - 90

Note: Table to be used as a guide only. Allowable dimensions depend upon the specific requirements of the project.



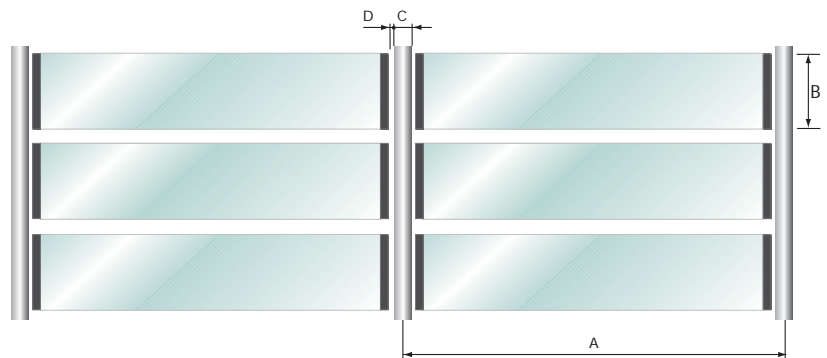
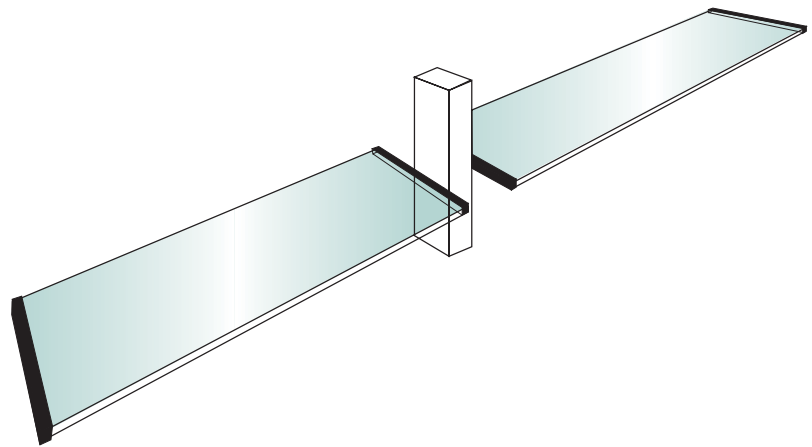
Carrier System 5 (LS5)

CARRIER SYSTEM 5 (LS5)

Carrier System 5 is a fully center pivoted system which provides maximum transparency. Blades are supported at each end by a bonded and extruded end cap.

For glass, blade spans of up to 70.25" long can be achieved without any additional support work. This system can utilize cross sectional blade widths of up to 23.50".

This carrier system is also suited for use with metal, fabric, wood, terracotta clay and translucent acrylic blades.



Glass Parameters Table

Dimensions	LS5
A in. (max)	70.25
B in.	2.50
C in.	2.00/2.50
D in.	.50
Angle of rotation°	0 - 100

Note: Table to be used as a guide only. Allowable dimensions depend upon the specific requirements of the project.

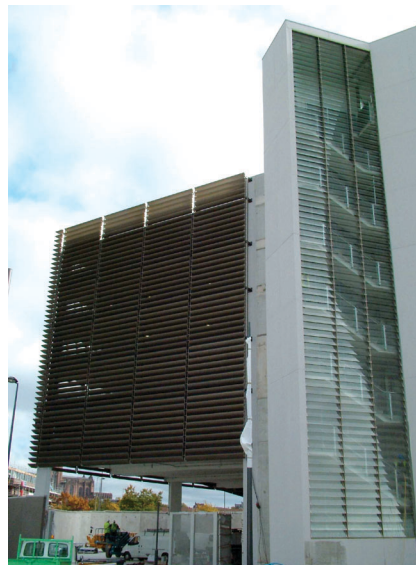
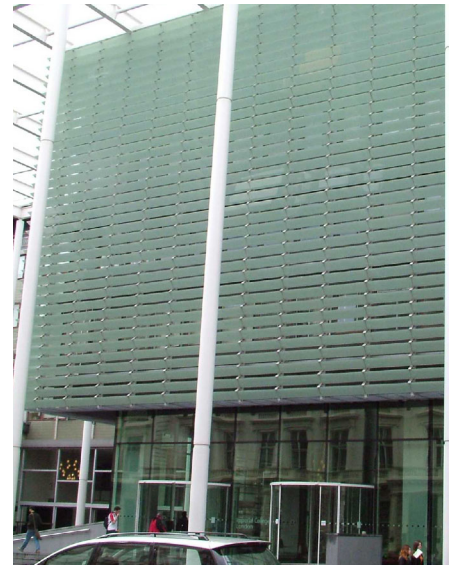


Shadoglass

Shadoglass describes a fixed or controllable external solar shading system that incorporates glass blades. A Shadoglass shading system can reduce solar heat gain, lower air conditioning running costs, and lessen glare while maximizing the use of natural daylight. The glass blades are available in various colors, surface finishes and coatings to meet specific design requirements. This enables the designer to control the quality of light entering the building. Photovoltaic cells may be integrated into the glass so as to obtain further energy benefits.

Features and benefits

- Available as standard in widths of up to 23.50”.
- Available in unsupported spans of up to 6.50 ft., supported spans of up to 13.00 ft. (depending on windloads and other criteria).
- Wide range of colors, surface finishes and coatings.
- All principal support components manufactured from corrosion-resistant extruded aluminum alloy with stainless steel fixings.
- Fixed or controllable.
- May permit the integration of photovoltaic cells.



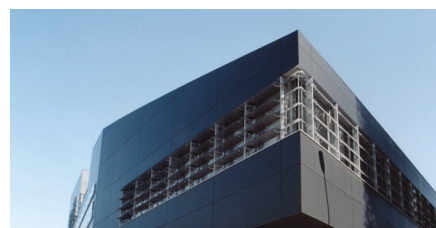
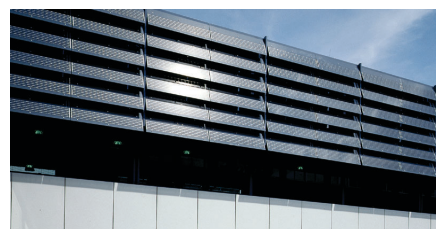
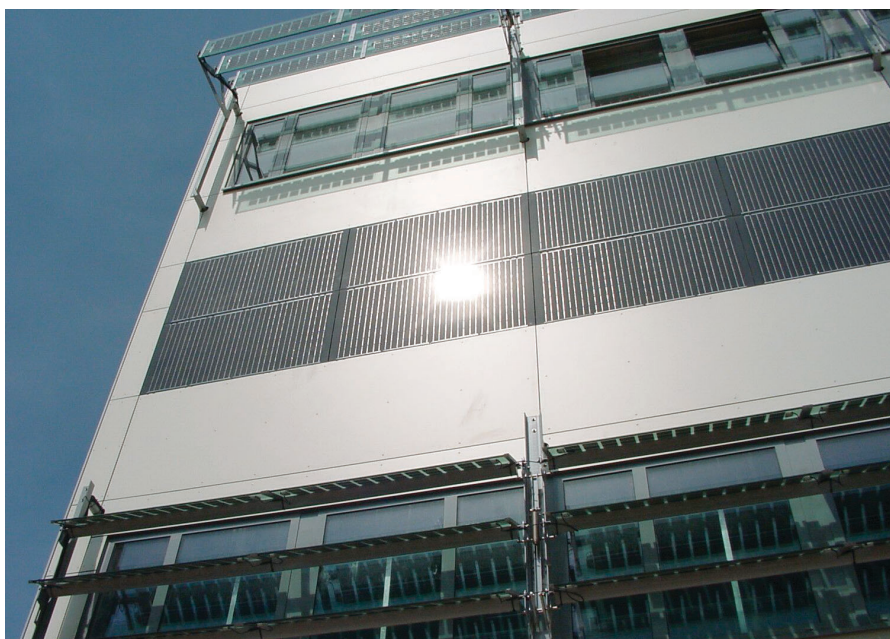
Shadovoltaic

Shadovoltaic describes a fixed or controllable external solar shading system that incorporates glass blades with photovoltaic cells integrated into the glass so as to generate electricity at the same time as providing shading. The blades are available in various colors, surface finishes, patterns and coatings to meet specific design requirements.

Both monocrystalline and polycrystalline cells may be used. The photovoltaic cells may be integrated into the glass, either by attaching them onto the reverse side of the glass panels or by laminating them between two sheets of glass.

Features and benefits

- Combines the functions of solar shading with the generation of electrical power.
- Available in widths of up to 23.50”.
- Available in supported spans of up to 13.00 ft. (depending on windloads and other criteria).
- Wide range of colors, surface finishes, cell patterns and coatings.
- All principal support components manufactured from corrosion-resistant extruded aluminum alloy with stainless steel fixings.
- Fixed or controllable.



Shadotex

Shadotex is a unique, alternative solar shading solution. It consists of a special fabric stretched between two sides of a blade support frame. The fabric is manufactured with a weave to prevent solar glare and solar heat gain. The fabric can also create attractive diffused light and can allow high external vision.

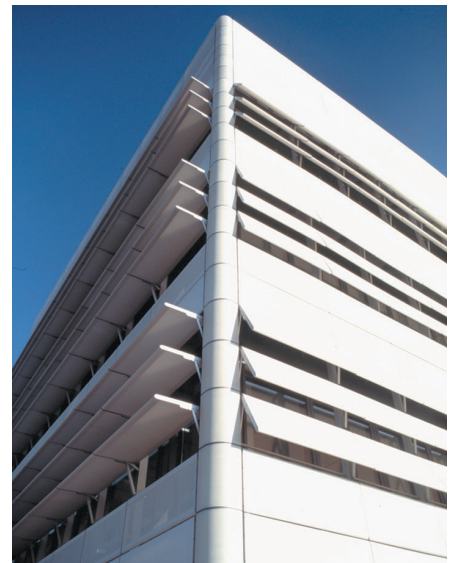
This type of product is extremely lightweight which allows large spans to be constructed without the need for additional supporting framework.

This system offers building designers a unique solution to external solar shading systems.

Features and benefits

- Modern and unique design.
- Optional fabric choice.
- High solar absorption.
- High solar reflection.
- Lightweight construction - ideal for large spans.
- Good external vision.
- A wide range of colors.
- Easy to clean (since it is resin/teflon coated).

For more details, please refer to the 'Shadotex' electronic brochure located on our website.



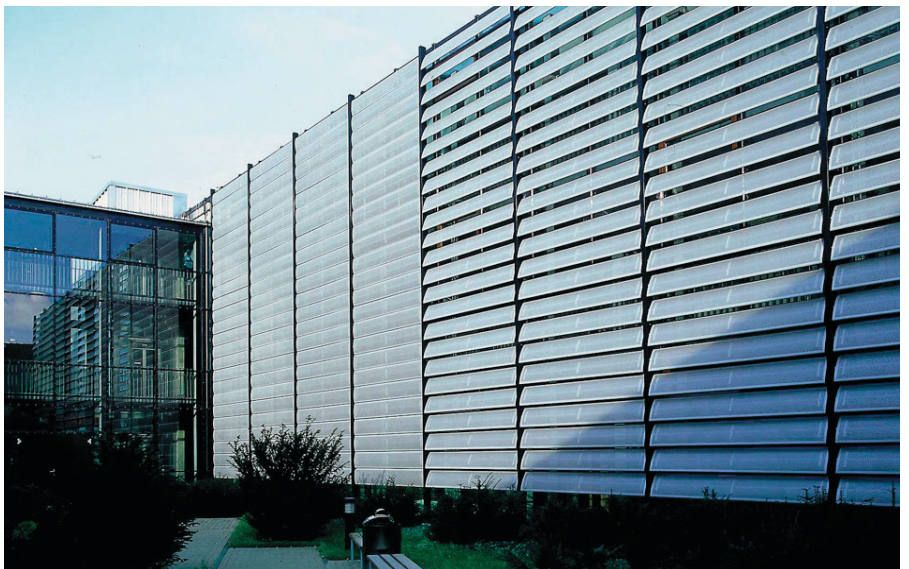
Shadometal

Shadometal is a fixed or controllable external solar shading system that may be installed either vertically or horizontally onto the building facade or roof. It may be combined with glazed facades. Shadometal can reduce solar heat gain, lower air conditioning running costs, and lessen glare while maximizing the use of natural daylight.

Features and benefits

- Fins available as standard one-piece extrusions in widths up to 15.75" and as multiple clipped together extrusions in widths up to 41.00".
- Available in unsupported spans of up to 19.75 ft., supported spans of up to 33.00" (depending on windloads and other criteria).
- Can be perforated for improved light transmission.
- A wide range of standard profiles and custom profiles and designs can be developed on larger projects.
- All principal components manufactured from corrosion-resistant extruded aluminum alloy with stainless steel fixings.
- Shadometal is either fixed or controllable.

For more details, please refer to the 'Shadometal' electronic brochure located on our website.



Custom Solar Shading Systems



Specially designed in collaboration with you to meet your specific project requirements on larger projects.



Controls

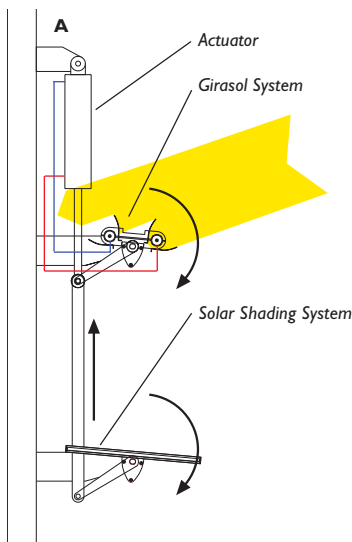
AWV Solar Shading systems may be controlled in three different ways:

- Hand control via lever or crank handle.
- Electrically operated via actuators, which require a controller such as ICS 4-Link, SolTronic or a client BMS.
- Self powered via a thermal hydraulic controller Colt Girasol. This operates autonomously and requires no additional source of power other than the sun.

GIRASOL

Girasol operates solar shading louvers without the need for electrical power or a sophisticated control system.

Absorber tubes, enclosed by mirrors, force a hydraulic cylinder to open or close the blades according to the position of the sun.



Tubes are filled with a special hydraulic fluid and as the sun moves over the building, there will be an imbalance of heat between the two tubes and the blades will open or close as appropriate.

ICS 4-LINK

ICS 4-Link is ideally suited to larger projects with more complex control requirements. It is a generic control system that can operate HVAC, smoke control and solar shading systems.

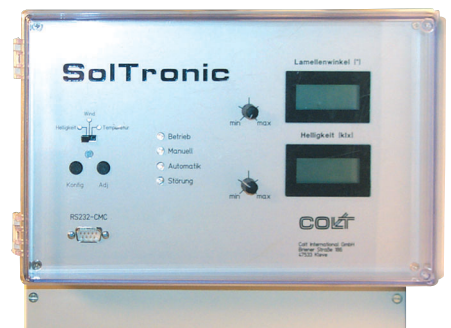
This product has a wide variety of operating modes, including sun tracking, daylighting optimization and PV illumination. It responds to timers and sensors to ensure that the building 'reacts' appropriately to the sun's position and to the weather.

Remote operation is available via an internal modem interface and a manual override is also possible.

SOLTRONIC

SolTronic is ideally suited for small to medium sized projects. It is a simplified version of ICS 4-Link and can control up to ten actuators in any single zone.

This product responds to external weather conditions, automatically calculating the position of the sun, and adjusts the position of the blades accordingly.





COMMISSIONING

Proper commissioning by experts is essential. We recommend that our specialist staff commission and certify the system.

MAINTENANCE & TESTING

AWV solar shading systems require virtually no maintenance.

All components of any system should be serviced at least once a year and tested monthly.



All AWV solar shade devices are licensed products of Colt International Ltd.



American Warming and Ventilating
7301 International Drive
Holland, OH 43528
Tel 419.865.5000
Fax 419.865.1375
www.awv.com