

SURE SHADE®

External motorised operable and retractable aluminium louvres (external venetian blinds)

An overview of available product types & construction specifications

External venetian blinds have been globally tested and universally found to be the best method of reflecting solar heat, while at the same time, allowing natural light, through the glazing (windows).



The percentage of solar heat reflected by these external venetian blinds is dependent upon the reflectivity of the slat colour with the colours most reflective, silver and white, resulting in an 87% decrease of solar heat entering through the glazing.

The current external venetian blinds allow natural light to penetrate through the glazing while removing the solar heat and solar glare and are, in this regard, unique to all other shade building products.

Other methods of solar heat minimisation used in or on glazing; reflective film, e glass, nano particle surfacing, single tint and double tint etc. can only achieve partial success to the detriment other aspects of glazing. All such methods permanently degrade light transmission, diminish the natural internal light levels (lux measurement) inside the building and fail to overcome the central issue, that of **removing the solar heat before the glazing and frames**.

In excess of 2 million external venetian blinds are sold annually in Europe, and to date, in Australia European models have either been fully imported or copied and assembled. However the European market has accepted that the blinds should be fully retracted in moderate velocity winds as Europe does not have the experience of high wind and summer heat and the European market is also most interested in heat lose rather than heat gain.

Accordingly, to date, all external venetian blinds are fitted with wind velocity sensors which cause the blind to be retracted in moderate winds and for the Australian market this is and continues to be a major issue. Annually Australian coastal wind velocity conditions are very seldom calm. In the Sydney metropolitan area (other locations specifications are available) annually there is greater than a 20% chance that a wind velocity of greater than 30kph will occur from the NW and NE and a 15% chance from the W and E and these wind velocities are most often coupled with "wind gusts" well in excess of 30 kph. In summer the probability for a wind velocity in excess of 30kph increases to 40% from the NE.

| Residential | Home Units | Commercial | Industrial |
|---|---|--|--|
|  <p>LOGIC CONTROLS</p> <ul style="list-style-type: none"> • 24v & 240v electronic control • Building & management systems • Project specific systems <p>RADIO CONTROLS</p> <ul style="list-style-type: none"> • Radio hand transmitters • Wireless wall control • Wind & sun control | <p>SURE SHADE®</p> <p>EXTERNAL VENETIAN BLINDS</p> <ul style="list-style-type: none"> • Aluminium slat, head rail & guides • Lifting tape, ladder braid & hardware • Pelmet : extruded aluminium | <p>LIFTMASTER®</p> <p>ELECTRIC DRIVES</p> <ul style="list-style-type: none"> • Garage door & gates • Venetian & roller blinds • Roller shutters & awnings |  <p>ALUMINIUM GARAGE DOORS</p> <ul style="list-style-type: none"> • Industrial, commercial & domestic • Tracks, hinges, brackets & profiles • Springs : powder coated |

European designed external venetian blind units are not engineered to provide wind stability at these velocities and subsequent to official Swiss wind testing all external venetian blinds are provided with an anemometer (wind sensor) to retract the external venetian blind at wind velocities greater than 30-40 kph.

However given Australian high velocity wind gust conditions of greater than 40kph and the time for an external venetian blind to retract of approximately 60 seconds the wind sensor should be set to retract at a wind speed of less than 30kph to prevent damage should the wind gust to beyond 40kph. Given this, that could equate to the external venetian blind fully retracted in more than 20% of the time that the Australian solar radiation is at the most extreme level.

Now there is an Australian product, the **SURE SHADE® ULTIMATE 120S external motorised operable retractable aluminium louvre**, a world first engineered design granted a **tested Australian patent**.

Developed, engineered and manufactured in Australia for the Australian climatic condition of high wind loading and high solar heat that may not require a wind sensor under normal Australian wind load conditions.

In summary, globally the external venetian blind industry has evolved slowly from internal venetian blind designs and can be divided into three (3) categories of innovation and product engineering to reflect the capacity of the blind to cope with Australian wind velocity loadings, from Category 1, the least capable to Category 3 the most capable. All these profiles are now manufactured in Australia by **SURE SHADE®** :

Category 1 Basic wind loading models

Category 2 Superior wind loading models

Category 3 Ultimate wind loading models

Category 1 Basic wind loading models

- A/ Ladder braid slat control
- B/ Wire side guides or
- C/ Extruded aluminium side guides with plastic run rail inserts & Zamac side pins
- D/ Extruded aluminium bottom rail : end caps & eye wire/side pin 316 stainless steel

Models : **SURE SHADE® Basic 100F L3 W & SURE SHADE® Basic 80C L1 W**
& SURE SHADE® Basic 80C L1 E

Basic wind loading models use ladder braid to control the slat or louvre and this ladder braid methodology is taken directly from internal venetian blinds. The ladder braid is a woven polyester with extruded ladder strings on which the blind slat is either rested upon or placed between. The blind slat is then tilted by moving the ladder string either up or down by means of a bearing and motor.

The disadvantage of ladder braid is that the polyester fibres stretch which causes the top blind slats to be closed while the bottom blind slats are not and therefore uneven solar heat reflecting and light penetration is present in the blind. This disadvantage can be overcome by adding kevlar/aramid, non stretch fibres, into the ladder braid. However all such reinforced ladder braid are not of equal quality. The kevlar/aramid polymer is extremely “slippery” and to prevent the ladder braid from slipping from the kevlar/aramid string very technical weaving methods have to be employed otherwise the result is not stable and the ladder braid will still stretch over time as the braid slips from the kevlar/aramid. Unless the kevlar/aramid reinforcing has been double over locked before being introduced into the ladder braid weaving process and then again over locked within the polyester ladder braid during weaving the ladder braid will still stretch.

The fixing of the blind slat to the ladder braid and ladder string is achieved by a number of methods yet unfortunately there is no guaranteed method to prevent the blind slat from slipping around the ladder string either because of wind loading or braid stretching.

All wire guides are not of equal: wire guide cable is either untreated, galvanised or stainless steel. Given Australia's highly corrosive coastal salt air and humidity rust is a major issue ALL SURE SHADE® blind wire guides are stainless steel polymer coated for both blind and surface abrasion resistance.

SURE SHADE® wire guide is coated with the high performance superior polymer PA12 which features high toughness, very high resistance to grease, oil, water, saline solution & organic solvents and stress cracking. It has a low coefficient of sliding friction and has a high abrasion resistance even when running dry and also has noise & vibration damping qualities.

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The blind slat profile **SURE SHADE® Basic 100F** is 100mm wide and can only be controlled by ladder braid and is manufactured from a special aluminium alloy which provides the slat with flexibility of movement under wind load or use. The advantages of the flexible slat is that the slat is able to absorb impact by deflecting and rebound back to the original convex shape.

However this excessive flexibility of the blind slat has a significant drawback as the slat will move to either rotate around the ladder string or distort and flatten against the glazing in the wind causing excessive instability, movement, noise and block out of light.

Independent wind tunnel testing has shown that when the flexible alloy slat is installed in excess of 150mm away from the glazing wind air pressure will move from the glazing back towards the underside of the slat (concave). In such a case **a wind speed in excess of only 4 metres per second (14.4kph) will buckle the Basic 100F slat outwards and cause excess instability, slat movement and side to side movement which will require intervention of the installed wind sensor and blind slat retraction.**

Lack of slat rigidity also necessitates that the ladder braid be closely placed along the length of the blind slat as the slat flexibility will cause the slat to sag if the ladder braid is spaced too far apart. The side to side movement control of the blind slat is achieved by a wire guided through the end of each slat, yet wire guiding has major defects ;

1/ Wind loading will cause the blind wire guide to vibrate, resonate and shake the blind slats causing considerable noise. (similar to rigging on a boat in the wind)

2/ Due to the single convex/concave blind slat design light block and sun glare cannot be achieved with wire guide as there will always be approximately 20% light coming through the slats even when the slats are fully closed.

3/ Wind will cause the blind to sway sideways and move forward and backwards hitting walls and the glazing when under wind load.

In summary the **SURE SHADE® Basic 100F L3 W** offers high solar heat block out at a very cost effective price *where wind loading, installed distance from glazing and light block out is not an issue.*

The **SURE SHADE® Basic 80C L1 W** slat profile is 80mm wide and is of a more robust construction and can be manufactured to be more wind stable as compared to the 100F. However ladder braid 80C slat construction, under wind loading, will still attempt to rotate around the ladder string. Similar to 100F the 80C can also have side wire guides fitted which allows very easy fixing and minimal visual obstruction but is not wind stable.

Side wire guides allow significant blind slat movement, either front to back or side to side, due to the inherently unstable engineering of the blind slat and as mentioned regardless of the blind profile wire guides when under wind loading resonate (“sing”) and vibrate.



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The SURE SHADE® Basic 80C L1 E can gain some wind stability when wire guidance is replaced with Zamac pins, riveted to alternate slats (left and right), which engage with an extruded aluminium side guide. The side guide has plastic side inserts to reduce noise and provide easy movement yet the possibility of the 80C slat rotating in the ladder string is only reduced and cannot be eliminated.



Category 2 Superior wind loading models

- A/ Hagofix® slat control,
- B/ Extruded aluminium side guides with plastic run rail inserts
- C/ Zamac side pins
- D/ Extruded aluminium bottom rail : end caps & eye wire/side pin 316 stainless steel

Models : **SURE SHADE® Superior 80C H2 E & SURE SHADE® Superior 80C H2 W**

The 80C slat with a 4mm rolled edge can be constructed without ladder braid by using Hagofix®. The Hagofix® system embeds a stainless steel connector into the rolled edge beading of a blind slat and a spigot attached to a kevlar/aramid tape provides extremely secure attachment and extensive slat angle control. The blind slat cannot swivel or slide within this fitting which provides over all positive slat control and an inherently stable external venetian blind product.

When Hagofix® slat control is used in conjunction with wire guiding of the blind slats, the **SURE SHADE Superior 80C H2 W** a more practical and useable solution can be provided for applications where a less intrusive blind stability system is required and a low wind loading component is present.

For greater stable, secure and refined operation **SURE SHADE Superior 80C H2 E** slat can have side pins. Constructed from *Zamac side pins* are an innovation for stabilising and greatly improving the 80C slat blind. Zamac is a family of alloys with a base metal of zinc and alloying elements of aluminium, magnesium and copper.

Zamac pins are mechanically riveted to alternate slats (left and right) which engage with an extruded aluminium side guide. The side guide have a plastic side insert to reduce noise and provide ease of slat movement.

When the 80C slat is used with Hagofix®, side pins and extruded aluminium side guides the profile can be made to be wind stable under moderate loads, however the single convex/concave blind slat design of the 80C cannot offer light and sun reflective glare block out when fully closed.



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Category 3 Ultimate wind loading models

- A/ Wind stable aerodynamic slat profile
- B/ Hagofix slat control, extruded aluminium side guides with plastic run rails
- C/ Zamac side pins
- D/ Extruded aluminium bottom rail : end caps & eye wire/side pin 316 stainless steel
- E/ Integrated sealing keder for maximum light control
- F/ Integrated sealing keder for improved sound insulation

Models : **SURE SHADE® Ultimate 120S H3 E & SURE SHADE® Ultimate 120S H3 W**

The **SURE SHADE® ULTIMATE 120S** is a world first engineered design, and carries an world wide tested patent and has been developed and manufactured in Australia for the Australian climatic condition of high wind loading and high solar heat.



1/ The **SURE SHADE® ULTIMATE 120S** slat wind stability has been enabled by a new evolutionary design that has a slat width of 120mm which allows both positive (+) and negative (–) air pressure to be balanced along the slat profile.



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A + air pressure at two locations, front and back, provides down ward pressure of the blind slat rather than upward lift as for the 100F and 80C slat profiles.



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2/ The world renowned Hagofix® slat support system of spigot tape with stainless steel connector has been modified and designed by SURE SHADE® . The size , metal properties and design of the stainless steel connector has been developed by SURE SHADE® to increase the wind load capacity of the system and the distance between spigots has been increased to 107mm to suit rotation of the larger slat.

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3/ The **SURE SHADE® Ultimate 120S** slat size meets Australian expectations of large viewing areas through windows while still meeting the European requirement of allowing 40% of the view when providing shade at a solar angle of 20 degrees. The **SURE SHADE® Ultimate 120S** with a 120mm wide profile has more open space area due to there being less slats impeding the view.



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4/ The **SURE SHADE® ULTIMATE 120S** profile has been designed to take part in the climate debate by providing a means of reducing peak electrical load for all building cooling, heating and electrical applications by reducing or increasing of solar heat transfer into the building in a progressive manner while still maximising natural light transfer into the building.

The **SURE SHADE® ULTIMATE 120S** can be optioned to move in an arc of 120 degrees from 56 to 176 degrees that will allow the control of solar heat and the capturing and reflecting of morning light up to 11 metres into the room while preserving a glare free work environment at the window.

The light is reflected by the 120S slat upwards towards the ceiling at a controlled angle and from there the light reflects downwards to provide increased luminescence up to 11 metres into the building.

As the sun tracks from east to west the slat can be optioned to progressively close from 56 degrees to 135 degrees to reflect back solar heat and still allow natural light into the building. The blind slat can also provide considerable light control when fully closed.

The **SURE SHADE® ULTIMATE 120S** slat will greatly assist in category points required in Australian Green Star rating tool calculation as glazing the single greatest building product that captures and radiates solar heat into the building.

The Green Star rating tool has nine (9) categories and the **SURE SHADE® Ultimate 120S** can provide or assist in gaining points in the following 5 categories.

| | |
|---|--|
| Management – Man Credits address the adoption of sustainable development principles from project conception through design, construction, commissioning, tuning and operation. | IEQ - IEQ Credits target environmental impact along with occupant well being and performance by addressing the HVAC system, lighting, occupant comfort and pollutants. |
| Energy - Ene Credits target reduction of greenhouse emissions from building operation by addressing energy demand reduction, use efficiency, and generation from alternative sources. | Materials - MAT Credits target resource consumption through material selection, reuse initiatives and efficient management practices |
| Innovation - Inn Green Star seeks to reward marketplace innovation that fosters the industry's transition to sustainable building. | |

There are currently 83 individual titles available in 9 categories of the Green Star rating tool and the **SURE SHADE® Ultimate 120S** product has direct input into 12 individual titles that cover 5 categories:

Category Management

Title **Building Management Systems** Credit # Man- 9 Points Available **1**

Category IEQ – Indoor Environmental Quality

| | | |
|-------|---|---|
| Title | Thermal Comfort | Credit # IEQ-5 Points Available 2 |
| | Daylight Glare Controlled | Credit # IEQ-11 Points Available 1 |
| | Electric Lighting Levels | Credit # IEQ-13 Points Available 1 |
| | External Views | Credit # IEQ-14 Points Available 2 |
| | Individual Thermal Comfort Control | Credit # IEQ-15 Points Available 2 |

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Category Energy

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|-------|-------------------------------------|---|
| Title | Greenhouse Gas Emissions | Credit # Ene-1 Points Available 20 |
| | Peak Energy Demand Reduction | Credit # Ene-3 Points Available 2 |

Category Materials

| | | |
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| Title | Design for Dis-assembly | Credit # MAT-8 Points Available 1 |
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Category Innovation

| | | |
|-------|---|--|
| Title | Innovative Strategies & Technologies | Credit # Inn-1 Points Available 2 |
| | Exceed Green Star Benchmarks | Credit # Inn-2 Points Available 2 |
| | Environmental Design Initiatives | Credit # Inn-3 Points Available 1 |

Points available from the 12 titles 37

Total points available in all 9 categories 164

% of points to which the **SURE SHADE® Ultimate 120S** can contribute **22.6%**

The following Green Star ratings are available :

4 Green Star (score 45-69) signifies “Best Practice” in environmentally sustainable design and/or construction.

5 Green Star (score 60-74) signifies “Australian Excellence” in environmentally sustainable design and/or construction.

6 Green Star (score 75-100) signifies 'World Leadership' in environmentally sustainable design and/or construction



5/ The **SURE SHADE® Ultimate 120S** pelmet, verticals and fittings have been engineered to meet the pressures that wind Kpa forces generate under Australian wind conditions.

The pelmet has been designed to span over 5 metres without intermediate fittings while still maintaining integral rigidity and structure necessary to provide a stable structure within tolerances for longevity of the bearings, motor and drive shaft.

Slat extension profiles, 100mm to 200mm, that cover the retracted slats have been engineered to provide positive attachment to the pelmet with the correct tolerances to allow clearance of the slat fittings and, for future service, is simple and quick to remove.

The vertical tracks are available in two varieties, FG#2 and FG#4. Both are suitable for single or double slat installations. It is essential for the correct operation of the slats that,

at all times, the vertical track remains rigid and parallel to the pelmet structure and accordingly the Sure Shade extrusions are designed with integral strength and rigidity.

For situations that require the maximum wind tolerance when building structures are not available or deficient the Sure Shade 40x80mm FG#4 can span over 3.6 metres without intermediate fittings while still maintaining integral rigidity and structure necessary to provide a stable structure within tolerances for longevity of the bearings, motor, drive shaft and slat.





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6/ The **SURE SHADE® Ultimate 120S** can be manufactured with wire guides if the wind loading is moderate and aesthetics of minimal visual obstruction is paramount. Since the 120S slat is inherently stable a higher wind loading can be accommodated when compared to the 100F or 80C constructed with wire guide.

However we do not recommend wire guide for both sides of the blind. The best alternative is to have wire guide only on one side with stability offered by a Zamac slat side pins engaged into an aluminium side guide extrusion on the other side.

The intrinsic efficient slat shape also ensures that with wire guiding the slat can close tightly upon it self to 3 degrees when in the closed position and minimise light intrusion.

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7/ The **SURE SHADE® Ultimate 120S** can be optioned for **sun tracking**. The package includes an intermediate logic interface control board manufactured by Liftmaster® that allows continuous monitoring of the angle of the individual blind slats. This means that the building management system (BMS) system can reliably assume slat angles without the need for extensive re-referencing that occurs in current systems.

(re-referencing in current EVB tracking solutions results in moving the blind to a full open position at determined times during the day or night and then returning the blind to the original position)



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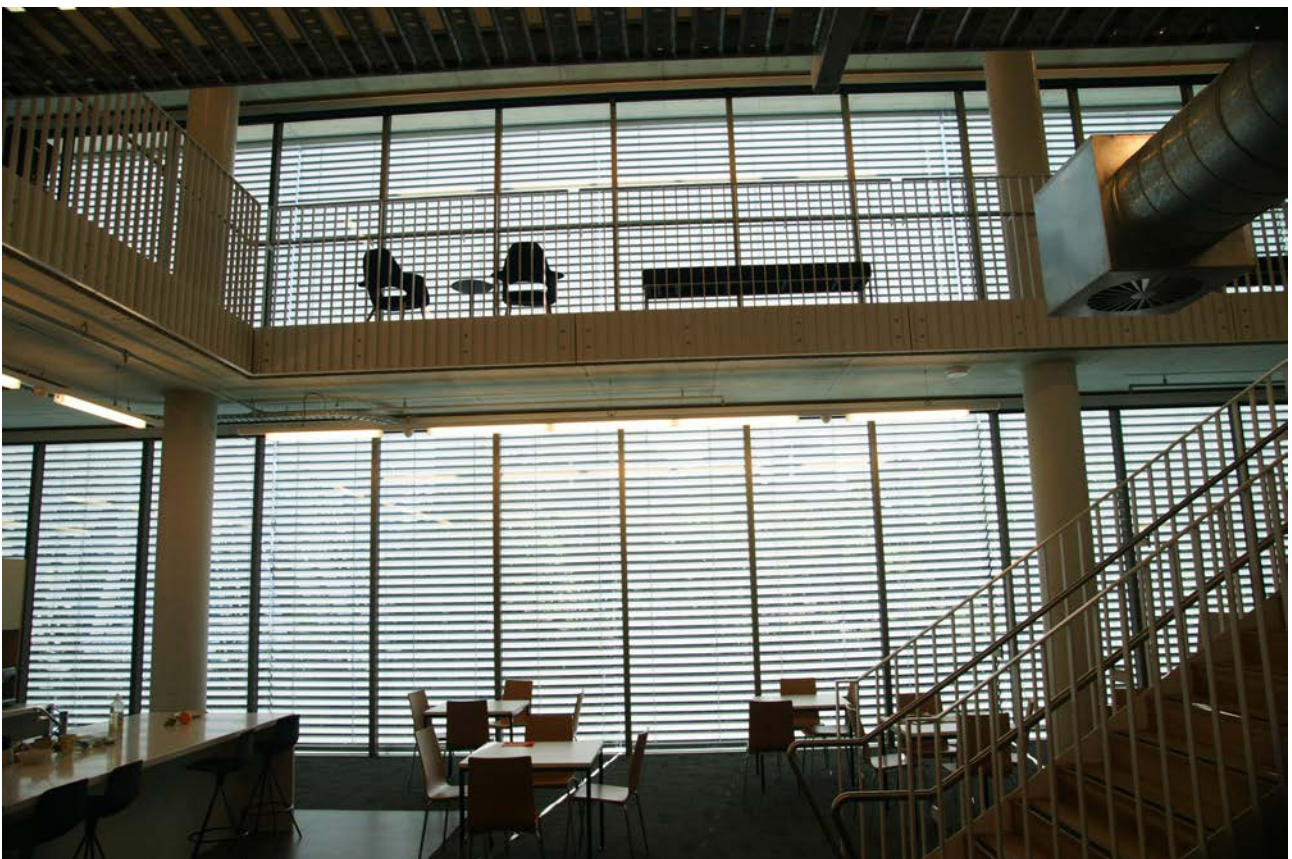
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